Trust and Reciprocity in Input Markets: A Lab-in-the-Field Experiment in Bangladesh

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Abstract

Improving the quality of agricultural inputs used by farmers is a potentially important instrument to improve productivity and food security. However, most inputs are experience goods, meaning that quality is unobservable to buyers before purchase, and sellers need to use price or reputation to signal quality. Through a lab-in-the-field experiment with input retailers (sellers) and farmers (buyers) in Bangladesh, we test to what extent sellers can signal quality through prices and reputation, and whether a buyer-driven accreditation and loyalty reward scheme helps improve market outcomes. We create competitive input markets in which sellers set prices and quality, while buyers observe price but not quality when choosing their sellers. We find that sellers provide mostly low-quality products and buyers reveal low demand for more expensive, high-quality inputs. Accrediting sellers based on buyer satisfaction leads to higher input quality and more repeat purchases only when combined with loyalty rewards for accredited sellers of the high-quality product, or for their buyers. The scheme improves average earnings for sellers but not for buyers because the performance of quality signals remains weak. Thus, although small incentives may be particularly effective at improving market outcomes, they do not necessarily enhance quality signals and farmer welfare.

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1 Introduction

Economists have long studied how market failure arises in the relationship between price and quality when quality is not fully observable (e.g. Akerlof, 1970). When price and quality, or perceptions about quality, depend upon one another, then a change in price can be thought of as having two components: a change in the perception of quality along a fixed information demand curve, as well as a shift in the demand curve due to the change in perception of quality (Stiglitz, 1987). If uncertainty about quality declines, improved equilibria become possible; Spence (2002) shows that an improvement in information can have positive effects on productivity. Recent papers on the price-quality relationship in agricultural markets demonstrate that this has implications for agricultural productivity in developing countries as well.

From the pespective of output markets, Saenger, Torero and Qaim (2014) show that when milk producers can appeal to third-party quality testing, milk quality provided to purchasers and prices paid to farmers improves. Bernard et al. (2017) show that when onions are sold for weight rather than volume and can be inspected for quality, farmers purchase more quality-enhancing inputs and receive higher prices for their crop. From the perspective of input markets, counterfeiting or adulterated inputs likely reduce demand among farmers for what would otherwise be profitable inputs. Bold et al. (2017) find that up to 50 percent of maize seeds are not authentic and 30 percent of fertilizer does not contain specified nutrients in Uganda, and farm returns would be high if these inputs were replaced with authentic ones. Similarly, Fairbairn et al. (2016) and Ashour et al. (2016) find that fertilizers and herbicides in Tanzania and Uganda, respectively, are often inauthentic, reducing demand for both products.

Market systems offering both low- and high-quality products for sale, at varying prices to signal differences in quality, could potentially help improve agricultural productivity since smallholder farmers who perceived higher quality inputs as profitable could purchase them. Price is however often a weak signal of quality, in part because the farmer does not observe the quality of any purchased seeds, fertilizers or pesticides until it has been applied in the field.

An input seller can therefore provide inferior products at high prices without immediate consequences; in fact, the seller may not even know the quality of the product himself, depending upon the information they glean from the wholesaler. Consequently, asymmetric information between input dealers and smallholders can lead to an equilibrium in which only low-cost, low-quality inputs are available, leading to suboptimal productivity levels.

This paper uses a lab-in-the-field experiment with 720 input retailers and smallholder farmers in rural Bangladesh to test whether a set of changes promoted by agricultural market systems interventions can help create farmer trust in sellers' price signals of quality, and seller reciprocity in rewarding loyal farmers with high-quality products. Doing so, we model a market in which input sellers compete on both price and quality. Farmers can only observe prices at the time of purchase; sellers have asymmetric information about quality of their inputs. The literature demonstrates that competition among sellers improves quality in laboratory experiments (Bolton, Loebbecke and Ockenfels, 2008; Dulleck, Kerschbamer and Sutter, 2011), but this finding holds true only in the absence of price competition; otherwise, consumers pay too much attention to observable price instead of unobservable quality dimensions, and the market reverts to a low-cost, low-quality equilibrium, even in the presence of repeated interactions (Huck, Lünser and Tyran, 2016). Our first objective is to measure the degree to which this is the case in our experimental setting.

Our second objective is to evaluate whether two types of market systems interventions–an accreditation system and reward schemes for high-quality retailers–improve these market outcomes. In the accreditation treatment, all market actors learn which retailer performed best in terms of farmer satisfaction in the previous round prior to their decisions regarding the next round.[1] We hypothesize that accreditation may reduce false signals (in which a retailer sells products that are inferior to what he claims to sell). However, it does not necessarily improve market outcomes; retailers may prefer maximizing profit margins by providing low-cost low-

[1] In Bangladesh, the USAID funded agro-inputs project has recently created the Agricultural Inputs Retail Network (AIRN) to attempt to provide such accreditation.

quality inputs over building a reputation through accreditation and attracting a large market share. We therefore also test whether loyalty rewards, which are made available only to accredited retailers selling the high-quality product, improve trust and reciprocity. We will analyze whether this effect is stronger depending on whether the rewards are being provided to the retailer or the buyer.

We find that in our baseline market system, retailers provide mostly low-cost, low-quality products, and farmers pay attention mainly to price, not to expected quality, resulting in low demand for more expensive, high-quality inputs. Accrediting sellers based on farmer satisfaction does not significantly improve outcomes, because farmer satisfaction is strongly influenced by price and is therefore a noisy signal of retailer quality. Introducing rewards for retailers selling the high-quality product when accredited, or rewards for buyers of the high-quality product from an accredited retailer, leads to higher input quality, more repeat purchases, and reduced price elasticity. Finally, when given to retailers, rewards significantly improve retailer but not farmer earnings, while rewards do not affect either farmer or retailer earnings significantly when given to farmers. Thus, small incentives may be particularly effective at improving quality signals within markets, but do not necessarily improve farmer welfare.

This paper contributes to the literature in three distinct ways. First, we extend the literature using laboratory experiments to study trust and reciprocity in markets with asymmetric information about product quality (Bolton, Loebbecke and Ockenfels, 2008; Dulleck, Kerschbamer and Sutter, 2011; Huck, Lünser and Tyran, 2016). Whereas existing studies focus on student populations as participants, we focus on a setting with actual input retailers and famers in Bangladesh. Participating input sellers have higher levels of education and cognitive performance, and act more as profit maximizers, than participating farmers. Farmers forgo earnings to an extent that has not been observed in market experiments with more common subject pools of university students. This difference in behavior between input sellers and farmers is likely to be relevant outside the laboratory as well, and hence has implications for behavior and outcomes in the market of interest.

Second, we study how different types of market systems development interventions, including accreditation and rewards, influence behaviors. Existing literature has analyzed the impacts of Amazon-type buyer-driven accreditation schemes, but focusing on subject pools of university students instead of agricultural input market actors in developing countries. In those experiments, as well as in our accreditation treatment, the main incentive for sellers to deliver high quality and obtain a high rating is that it can increase future market shares. To our best knowledge, there are no studies testing the effects of associating monetary incentives directly with having good ratings by providing a reward for offering high quality. We find that input companies trying to strengthen their brand and distribution network for high-quality inputs may give such rewards, for instance in the form of discounts, trainings or other benefits, to either preferred sellers or their buyers.

Third, we highlight a novel way of measuring the impacts of agricultural market systems development, i.e. of programs that work with private sector firms to co-develop commercial strategies to more effectively engage and incentivize value chain actors, including smallholder farmers, input suppliers, output buyers, and service providers. The goal of such interventions is to improve transactions, build trust and industry networks, and enable increased investment, competition, and positive development outcomes for communities in target areas. Such interventions are necessarily too complex and adaptive to attempt to measure overall impacts through standard impact evaluation methods, for instance randomized controlled trials with baseline and endline surveys, because it would at best provide an average treatment effect on all the adaptive interventions at once. Instead, we simulate the market environment in the laboratory and observe the effect of specific interventions resulting from market systems development on behaviors, outcomes, and mechanisms behind market interactions, including for instance price signaling, relation formation, and determinants of demand.

The remainder of the paper is structured as follows. The next section describes the lab-in-the-field experiment, including the experimental task, the experimental treatments, predictions, and procedures. After that, we present descriptive statistics for the participant sample. Section

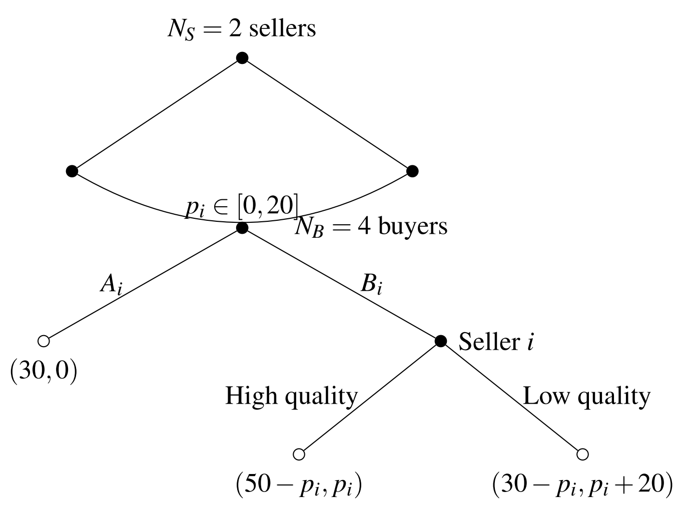
4 describes behavior in the simulated control group markets and the effects of accreditation and rewards for preferred sellers or their buyers. The final section concludes.

2 Methods

2.1 Experimental task

The 720 input retailers and smallholder farmers in Bangladesh participating in the lab-in-the-field experiment played a game that mimicks an input market with $N_B = 4$ farmers (i.e., 'buyers') with the option to purchase from $N_S = 2$ input retailers (i.e., 'sellers'). Figure 1 summarizes the game. Each seller provides two different inputs (i.e., 'products'): A, which has a fixed price and quality, and B, for which seller i chooses a price $p_i \in [p_{min} = 0, p_{max} = 20]$ and quality level $q_i \in \{H, L\}$, where H and L are used to indicate high and low quality, respectively. The buyer chooses a seller and whether to buy A or B, observing prices set by both sellers, $\{p_1, p_2\}$, but not the quality $\{q_1, q_2\}$ of product B.

Figure 1: Description of the benchmark game



Note: Market structure in the control group of the experiment. p_i stands for price of input seller i. The experimental instructions were referring to the high-quality product as the 'blue brand' and to the low-quality product as the 'yellow brand' instead of referring to quality.

Product A yields the buyer a fixed payoff $y = 30$ whereas sellers earn zero from providing A.[2] When selling product B, the seller earns p_i if choosing high quality, or $p_i + \delta$, with $\delta = 20 > 0$, if choosing low quality. A buyer of product B earns either $y + \delta - p_i$, if the seller offers high quality, or $y - p_i$, if the seller offers low quality. The buyer cannot observe product quality prior to making a purchase. Hence, the total surplus of selling product B instead of product A, $\delta = 20$, can be interpreted as the difference in sellers' cost between providing high and low quality, as well as the difference in how much the high and low quality product yields the buyer. Thus, we model both prices, which are observable, and the choice to provide high versus low quality, which is unobservable, as a redistribution of returns between buyers and sellers.[3]

We structure the parameters to satisfy a number of stylized facts observed in agricultural input markets. First, for every feasible price level of product B, buyers could do equally well (or better) by buying the fixed-price fixed-quality product instead of the low-quality version of product B. Formally, at every feasible price level, the buyer will weakly prefer product A over B_L. This property is called *exposure*.

$$30 = y \geq y - p_i = 30 - p_i \text{ for all } p_i \in \{0, 20\} \tag{1}$$

The low-quality product is more efficient, as it generates a higher surplus than the fixed-price fixed-quality product, but it is sold with a high profit margin for sellers, making it an unattractive option for the farmer.[4] Exposure necessitates $p_i \geq 0$, which also implies the *mutual gain*

[2] Payoffs would not change if A were provided by an external party. Thus, our choice to model A as a purchase from seller i does not affect the equilibrium predictions. Input A could be a traditional input, providing lower yields than a modern input of high quality, or it could be a modern input of high quality from a reputable wholesaler, which is associated with higher transportation and transaction costs.

[3] Alternatively, we can write the total surplus from A, which is also the buyer's payoff from A, in a more flexible form, by writing it as a proportion of the total surplus from B, i.e. $\eta(y + \delta)$, $\eta \in (0, 1)$, whereby η is not necessarily equal to $y/(y + \delta)$. When imposing reasonable conditions on η, we can generalize our results to this more flexible specification.

[4] There are allegations, for instance, that price cuts of fertilizer have benefited businessmen rather than farmers as the price of fertilizers had already decreased in the international market. There have also been complaints of non-urea fertilizer being sold at the non-subsidized price, with businessmen not passing on the subsidy to the farmer.

property, meaning that for every feasible price level, the seller prefers selling product B_H over selling the fixed-price fixed-quality product A, $p_i \geq 0$.

Second, the opposite holds for the high-quality version of product B; for every feasible price level, buyers could do equally well (or better) by buying this product instead of the fixed-price fixed-quality product. This means that the buyer prefers B_H over A. We label this property *improvement*:

$$50 - p_i = y + \delta - p_i \geq y = 30 \text{ for all } p_i \in \{0, 20\} \tag{2}$$

This property is motivated by price regulation and subsidies in agricultural input markets. Bangladesh introduced price regulation of urea fertilizers in 2010, substantial subsidies for selected non-urea fertilizers in 2012, and also in case of seeds, prices are heavily regulated in the formal sector (Jaim and Akter, 2012). Farmers might also use slightly different or inappropriate fertilizers as informal substitutes. Price regulation and subsidies for some will hence also limit the price that retailers can ask for other fertilizers, even if not subsidized.

Finally, for a given price, sellers prefer selling the low-quality product B_L over the high-quality product B_H; that is, $\delta = 20 > 0$. This property is called *temptation*. The lower cost of providing inferior quality can be interpreted in at least three ways: the retailer pays a lower price for these products when buying it from a wholesaler; the retailer adulterates or counterfeits the input, for instance by mixing hybrid seeds with traditional seeds; and third, the retailer does not invest in proper storage and handling facilities, reducing the input quality while in the retailer's store. Each of these practices have been observed in agricultural input markets, resulting in substandard input quality at the retailer level (Bold et al., 2017).

We set the minimum price as low as possible while still satisfying exposure, $p_{min} = 0$. As a result, at the minimum price, self-interested buyers are indifferent between products A over B_L, which allows us to test to what extent buyers purchase the inefficient product (product A) to sanction sellers for providing low quality. Setting a higher minimum price would also rule out an equilibrium in which input sellers provide low quality, and self-interested buyers purchasing this input. Moreover, by setting the minimum price equal to $p_{min} = 0$, prices are not a strong signaling device; even at the minimum price, a seller will not incur losses while providing the high-quality product, meaning that low prices do not have to be a signal of low quality.

Likewise, we set the maximum price as high as possible while still satisfying improvement, $p_{max} = \delta = 20$. As a result, for all feasible prices, a seller's profit margins when providing the high-quality product, $p_i \leq p_{max} = 20$, cannot exceed the margin when providing the low-quality product, $p_i + \delta \geq p_{min} + \delta = 20$; intuitively, on a *per farmer* basis, sellers cannot earn *more* from providing B_H instead of B_L, even when asking the minimum price for B_L and the maximum price for B_H, so that the only reason for providing high quality is that it can increase a seller's market share in the long run.

2.2 Experimental design

Table 1 provides an overview of the experimental design. We randomize between session whether participants play the baseline game of Figure 1, resembling stylized properties of input markets, or a modified game that introduces potential solutions to the low-quality low-price equilibrium in the game: 'accreditation' of preferred retailers, 'direct rewards' for preferred retailers providing high quality, and rewards for their clients if purchasing high quality, incentivizing these retailers to provide high quality through 'indirect rewards'.

Table 1: Experimental design

Treatment	Sessions	Rounds	Buyer ratings	Preferred seller	Rewards
Control group	10	10	✓		
Accreditation	10	10	✓	✓	
Direct rewards	10	10	✓	✓	✓
Indirect rewards	10	10	✓	✓	✓

In each of the four treatments, buyers of the efficient product rate their purchase after learning whether they were offered the high- or low-quality product by indicating whether or not they are satisfied with their purchase. In the accreditation treatment, we accredit the seller with the largest number of positive buyer ratings as the 'preferred seller'. This accreditation can be observed by all buyers and sellers within the market, allowing sellers to build a reputation not only among their own clients, but also among other buyers. One could interpret this accreditation as a private input company using buyer satisfaction to identify preferred retailers for its distribution network.

We also study the effect of two alternative rewards treatments for preferred sellers. In one treatment, preferred sellers receive a bonus equal to $\rho = 5$ for each high-quality product sold (see Panel (a) in Figure 2). This 'direct reward' can be interpreted as the input company giving good retailers selling the high-quality product and hence protecting their brand a bonus, future discount, promotional materials, or additional training. These direct rewards accrue directly to sellers. In the 'indirect rewards' treatment, on the other hand, the $\rho = 5$ bonus for preferred sellers of the high-quality product accrues to buyers (see Panel (b) in Figure 2). This treatment can be interpreted as input companies for high-quality inputs giving buyers a rebate or additional training through their network of preferred sellers.

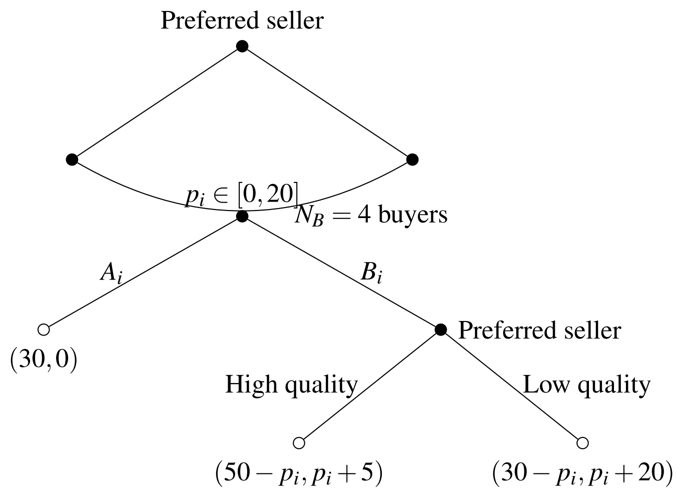
Every treatment was played in ten sessions and we organized 40 sessions in total. Sessions were randomly assigned to treatment, with stratification by district. Participants were invited to a session in their own union. In unions with more than one session, we randomized the session to which participants were invited. Each session included three groups (or markets) of two input sellers and four farmers, culminating in a total of 120 groups with two input sellers and four farmers per group, or 240 input sellers and 480 farmers in total. The game was played for 10 rounds, resulting in a total of 2400 observations for 240 input sellers and 4800 observations for the 480 farmers.

2.3 Equilibrium predictions

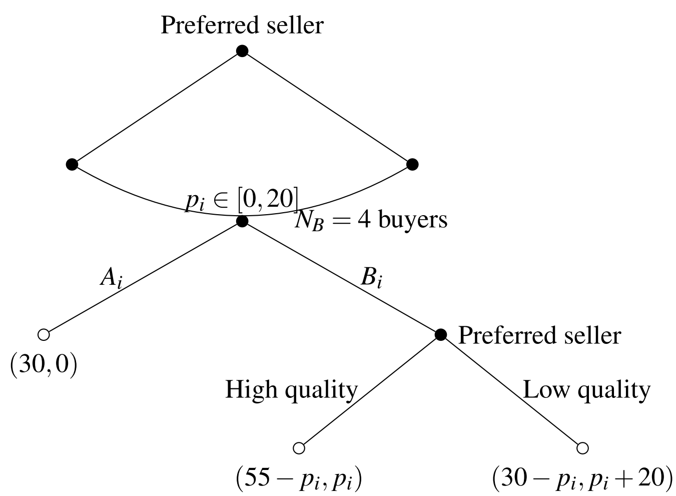
In deriving equilibrium predictions, we will first show optimal decisions in a one-shot version of the binary trust game (BTG) with exposure, improvement and temptation in Figure 1, followed by a discussion of how these predictions extend to a game with multiple rounds.

Purchasing Product B is efficient due to *improvement*, but by *temptation*, the dominant

Figure 2: Game when purchasing from preferred seller in rewards treatment



(a) Direct rewards



(b) Indirect rewards

Note: Payoff structure when the buyer chooses to purchase from a preferred seller in the (a) direct rewards or (b) indirect rewards treatment. Figure 1 summarizes the payoff structure when the buyer chooses to purchase from a non-preferred seller.

strategy for a profit-maximizing seller is to offer low quality in the last round. Knowing that the seller will offer low quality, *exposure* implies that the dominant strategy for a buyer is to choose product A, reducing efficiency, unless B_L is offered at the minimum price, $p_i = 0$. At that price, buyers will be indifferent between products A and B_L and may purchase product B, improving efficiency. Anticipating that buyers will not purchase product B at strictly positive prices, both sellers will charge the minimum price, $p_i = 0$. By backwards induction, similar behavior is predicted for earlier rounds.[5] The expected payoff for a seller is 20 Taka per buyer of product B per round, and buyers earn 30 Taka per round, independent of the product purchased.

Now consider observing a seller charging a strictly positive price, $p_i > 0$. A profit-maximing buyer with the belief that seller i offers high quality with probability $\pi_i > 0$ will purchase this product if and only if $20\pi_i - p_i > 0$, that is, if the expected benefit of earning an additional 20 with probability π_i (due to buying high quality) outweighs the cost of paying $p_i > 0$ (due to buying product B instead of A). By temptation, a self-interested profit-maximizing seller will offer low quality, but if $\pi_i > 0$, a buyer believes that the seller may offer high quality and purchase product B at strictly positive prices. We interpret this as 'trust' and if the seller indeed decides to provide the high-quality product, we interpret that decision as 'reciprocity'.[6]

The analyses above considered a Nash equilibrium in which the seller has no incentive to deviate from the strategy of providing low quality-products at the minimum price. However, we

[5] In earlier rounds, the presence of time dynamics and reputation concerns could allow for the existence of a Nash equilibrium in which the buyer purchases product B from seller i in the last round if and only if that seller provided high quality in the previous round. For the buyer, this strategy is incentive-compatible, given his indifference between products A and B_L when the seller does not charge a strictly positive price, $p_i = 0$. Seller i provides high quality in the previous round if and only if discounted last-round profits, $\beta_i\delta$, where $\beta_i < 1$ is the seller's discount factor, exceed δ, the gain from providing low quality in the second-last round. Because $\beta_i < 1$, this is never satisfied. The seller will hence provide low quality in the second-last round. By backwards induction, the same will hold for all rounds in a finite repeated game.

[6] In theory, an input seller may decide to provide B_H if his payoffs are very high, while the farmer's payoffs are very low, and he is averse to inequality. Appendix B derives conditions under which this is the case. Because the seller earns less than the farmer even when providing low quality, an aversion to inequality cannot motivate the seller to provide high quality. Although inequality aversion can explain buyers' decision to purchase the efficient product B when $p_i = 5$, it is an improbably explanation when $p_i = 10$, and inequality aversion cannot explain purchases of product B when $p_i \in \{15, 20\}$.

anticipate that sellers may choose to provide high quality even in the last round in order to reward (or reciprocate) farmers for their trust. Trust game participants in laboratory experiments often return (or reciprocate) more than predicted by game theory, even when incorporating inequality aversion in the utility function. If farmers believe that sellers can reciprocate and provide high quality even in the last round, a seller who can build a credible reputation of being a trustworthy seller can attract a higher market share.

The question, then, is how a seller can differentiate himself from other sellers. One objective of market systems development interventions is to improve quality signals and enable sellers of high-quality products to attract a larger market share. Accreditation, in which we identify one seller as the 'preferred seller', is one mechanism through which sellers can build a reputation. Except for during the last round, sellers have an incentive to provide high quality in order to earn larger numbers of positive ratings. At the same time, in the last round, accreditation creates no incentive to provide high quality, because there will be no future rounds for which the seller will want to be accredited. Buyers will know that last-round accreditation is not an indication of the seller's intention to provide high quality, and pay no attention to accreditation in the last round, removing sellers' incentive to become accredited also in the second-last round. By backwards induction, accreditation does not affect the Nash equilibrium.

As alternative solutions, we therefore explore the two different "rewards" treatments. The direct rewards treatment, in which preferred sellers receive a bonus equal to $\rho > 0$ for each high-quality product sold, makes it more attractive to provide high quality than in an accreditation treatment alone, because of the externally provided bonus. This increases the value of becoming the preferred seller and attracting a larger market share. However, the benefits accrue to the sellers, not to buyers, and sellers may not share the increased surplus with the farmers by lowering prices.

In the indirect rewards treatment, we therefore give the bonus to buyers of B_H from a preferred seller. We expect that the incentive to become a preferred seller and to provide high quality is lower in this treatment compared to the direct rewards, but since benefits accrue to buyers, we expect them to pay more attention to quality in rating sellers, and an increase in farmer earnings does not depend as much on a pass-through from sellers. Hence, we expect stronger effects of indirect rewards than of direct rewards on buyer earnings.

2.4 Procedures

The experiment was conducted during the last half of 2016 in the context of an impact evaluation of the Bangladesh Agricultural Value Chains (AVC) project. The AVC project is a USAID-supported initiative with the aim of improving agricultural productivity and food security in USAID's Feed the Future Zone of Influence in Bangladesh. The project had recently adopted a market systems development approach and had identified the weak functioning of quality signals as a barrier to the functioning of agricultural value chains in Bangladesh. Therefore, the AVC was working with private input companies to improve their branding, for instance through loyalty clubs as modeled in our experiment. We focused on jute value chains in four districts: Faridpur, Madaripur, Jhenaidah, and Narail.

Participation in the experiment was by invitation only and for a pre-specified session. Farmers were selected from a baseline survey with a representative sample of 1,000 jute farmers from 50 target villages in the four districts (see De Brauw *et al.*, 2018). From this sample, we excluded 193 farmers who were ineligible because they were either 63 years or older, or did not report planting jute in the previous season. Next, we grouped the 50 villages into 22 geographic clusters.[7] We organized two sessions per cluster with at least 30 eligible farmers, and one session per cluster with fewer potential farmer participants. We then selected 14 farmers per session, prioritizing farmers who could read and write, and farmers with larger landholdings. In clusters with two sessions, we randomly assigned selected farmers to one of the two sessions.[8]

[7] These clusters usually included all study villages from the same union, except for four unions with a sufficiently large sample size to organize more than two sessions.

[8] Specifically, within a cluster, we sorted farmers on an indicator for literacy, on landholdings, and—to resolve ties

To identify input sellers, we conducted an input seller census and listed all input sellers who were providing inputs to farmers from the 50 baseline villages. Sellers were assigned as a potential match for a cluster if (a) farmers in the cluster reported purchasing inputs from that seller, or (b) the seller was physically located in the cluster, or (c) the seller reported selling to farmers from villages in the cluster. We then assigned input sellers with only one potential match to that cluster; sellers with more than one match were assigned to the one in which they had the largest market share.

Approximately two weeks before the experiment, two research assistants would go to visit the location where the experiment was to be conducted. They would together with a local mobilizer identify a venue for the experiment, and hand out session-specific invitations to the 14 farmers and 6 sellers selected to participate. Prospective participants were told that they were invited to a three-hour interactive workshop in which researchers would study the choices made by farmers and input sellers to inform policy-makers on how to improve markets for agricultural inputs.

Potential participants were informed that this was a personal invitation (i.e. they could not send someone on their behalf). Further, because we selected 14 farmers and 7 sellers while there was only room for 12 farmers and 6 sellers to participate in order to avoid delays due to no-shows, we also informed potential participants that we had invited more of them than needed, and that participation being on a first-come first-served basis.[9] They were told that in addition to receiving a 500 Taka show-up fee, participants could earn around 600 Taka depending on their decisions and the decisions made by others in the experiment. Average earnings were 856 Taka for buyers and 874 Taka for sellers, or approximately 3.3 times the daily wage.

Upon arrival, participants would draw a ball from a bag of 6 balls numbered 1-6 for input

in landholdings—on a random number. We then selected the first 28 farmers in clusters with two sessions, and the first 14 farmers in clusters with one session. In clusters with two sessions, we then randomly allocated the 28 selected farmers between the two sessions.

[9] In a few cases, farmers unable to understand the instructions (for instance due to hearing or sight problems) were replaced by one of the two additional farmers who were invited.

sellers, and from a bag of 12 balls numbered 7-18 for farmers. This number determined the participant's badge number, which the participant carried throughout the game, and participants were seated in order of these badge numbers. We had also randomized, at the session level, which badge number belonged to which group, but neither the research assistants nor the participants knew which farmer was in which group.

Once all participants were seated, the research assistants conducted three trainings: a plenary group training to ensure a common understanding; a training for sellers and farmers in two separate rooms on how to record their decisions throughout the game; and an individual interview with each participant to repeat the instructions, to assess understanding, to clarify where necessary, and to record choices for the first round. The trainings were all conducted in Bangla and relied heavily on visual aids. The session ended with a debrief in which participants were asked for their feedback, followed by the payouts of the show-up fee and the earnings from the expectations game.[10]

Each session included 10 rounds, and each round followed the same procedure: first, sellers selected a price and brand (blue, i.e. high quality, or yellow, i.e. low quality); second, buyers chose—observing price but not quality—a seller (S1 or S2) and a product (A or B); third, sellers recorded the price and brand that they expected their competitor to choose, and buyers recorded which brands they expected seller S1 and S2 to provide; fourth, buyers and sellers received in cash their payoff for the round (excluding the 5 Taka payoff for recording the correct expectations) and were informed of the competitor price (in case of sellers) or the selected brand (in case of buyers of Product B); and fifth, buyers of Product B indicated whether they were satisfied with their purchase. In treatments with accreditation and rewards, these ratings were used to determine whether a seller was accredited in the next round.

Recording choices and disseminating information was done using choice sheets and a pre-

[10]Replacements who could not participate in the session received their show-up fee at the start of the session, and were invited to stay along for the group training if they were curious; after that, they left.

coded Excel form.[11] On the choice sheet, sellers indicated how much out of 30 Taka to return to buyers of Product B ('price'), and whether to send the additional 20 Taka ('quality'). Research assistants entered this information in an Excel form, which generated a farmer-wise overview of price (and in accreditation and rewards treatments also accreditation status for S1 and S2). They copied this onto farmers' choice sheets. To reveal their expectations, participants used a separate form. The choice sheets were also used to inform sellers of the number of buyers per product and seller, to inform buyers of Product B of the selected brand, and to elicit their seller ratings.

Communication was not permitted throughout the session. To keep participants busy during the round and avoid communication, they were given Raven's puzzles to solve, and a price was given to the input seller and the farmer with the highest score on the Raven's test within a session. To avoid communication with participants from earlier sessions, we intended to organize two sessions per day and to ensure that all participants for the second session were inside a separate room before releasing the participants for the first session. We were unable to institute this policy but will show that communication about the experiments with participants from the session one day earlier was limited.

3 Data

3.1 Sample description

In Table 2, we describe participant characteristics separately for farmers in Column (1), and for input sellers in Column (2). To test for equal means, we regress these participant characteristics on a dummy variable indicating whether the participant is an input seller using the CGM wild boostrap command with clustering by session. Column (3) presents from that regression the

[11] The Excel form was pre-coded with the assignment of badge numbers to groups, but this was hidden from the research assistants.

p-value for the hypothesis that the coefficient on the seller indicator is equal to zero.

Farmers and sellers are both on average 43 or 44 years of age. Whereas all input sellers are male, 2.1 percent of the farmers are female. The vast majority of both farmers and input sellers is married. Nearly all input sellers can read and write. Literacy rates and education levels among farmers are much significantly lower. About three quarter of farmers and a bit more than two third of input sellers have a secondary activity. Among farmers, this secondary activity can be farming, wage or salaried labor, and trade or self-employment; among input sellers, this activity is most often farming. Input sellers are significantly wealthier, as evidenced by their higher levels of food expenditures.

During the individual interviews, participants completed a number of test questions in order to assess their understanding. Research assistants would indicate whether the participant (i) gave the correct answer immediately (coded as 1 point), (ii) needed to think but then gave the correct answer (coded as 0.67 points), (iii) needed additional explanation but then gave the correct answer (coded as 0.33 points), or (iv) did not understand (coded as zero points). The average score out of 10 questions for farmers is 0.797, which is significantly lower than the understanding of the input sellers, who often did not even need to think before giving the correct answer. In the accreditation or rewards treatments, input sellers also revealed a better understanding of the accreditation procedure, and in the rewards treatments, they were more likely to understand the rewards.

4 Results

In this section, we describe our main findings. We will first analyze behavior, expectations and buyer satisfaction in benchmark markets without accreditation or rewards. We will then test whether behavior in markets with accreditation and rewards follow similar patterns.

Table 2: Farmer and input seller characteristics

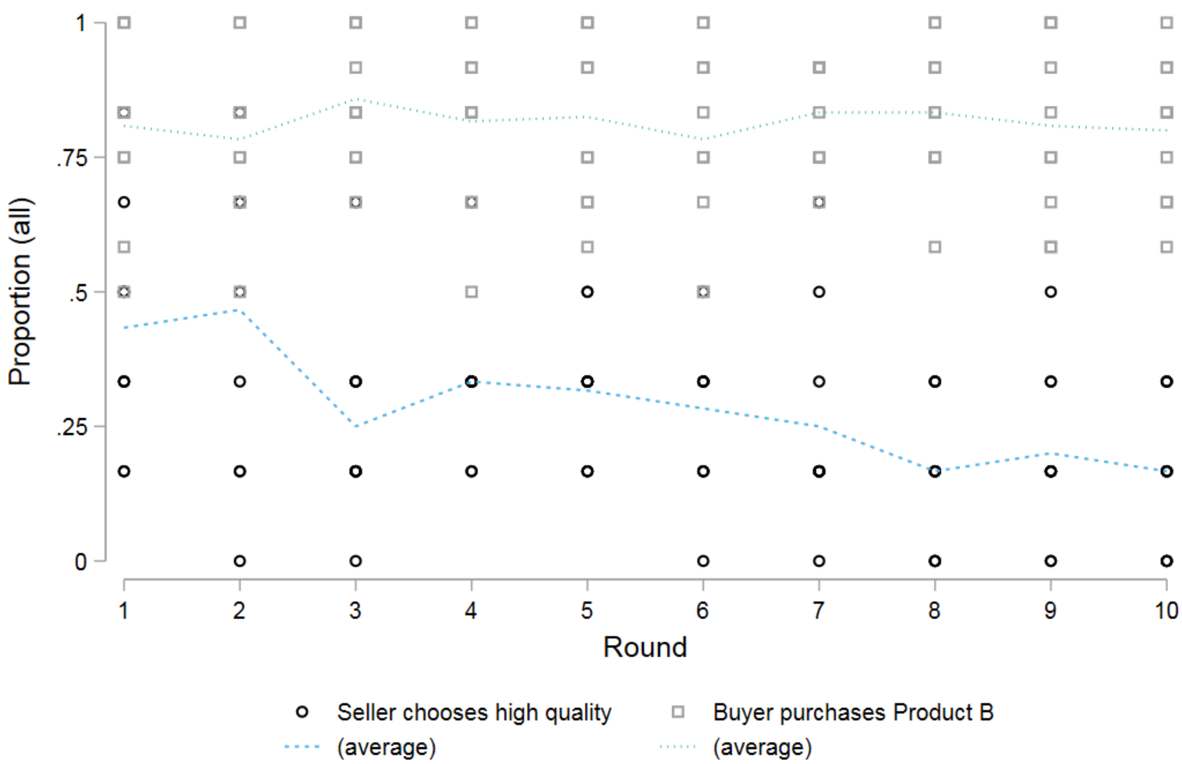
	Farmers (1)	Input sellers (2)	*p*-value (3)
Participant age	43.9	43.4	0.560
Participant is female	0.021	0.000	0.025
Participant is married	0.939	0.941	0.927
Participant is literate	0.526	0.953	0.000
Years of education	4.0	9.2	0.000
Participant has secondary activity	0.760	0.699	0.082
- Farming	0.356	0.579	0.000
- Wage/Salaried Labor	0.273	0.029	0.000
- Trade/Self-employment	0.254	0.087	0.000
Food expenditures (Taka '100s)	1,395	1,745	0.001
Average level of understanding	0.797	0.903	0.000
Understanding accreditation	0.649	0.798	0.000
Understanding rewards	0.665	0.792	0.000
Talked to former participant	0.050	0.067	0.458
Standardized Raven's test score	-0.18	0.35	0.000
Number of observations	480	240	

Notes: In Column (3), *p*-values are derived from a CGM wild bootstrap regression of participant characteristics on a dummy variable that is equal to one if the participant is a seller, and zero otherwise. We are using 1,000 replications and [...] as the random seed.

4.1 Behavior in markets without accredition or rewards

In Figure 3, we summarize our main outcome variables–buyers' decision to purchase the efficient product, and sellers' decision to provide high quality–by round, restricting our sample to the 10 control sessions without accreditation or rewards. The figure draws, for every session, the proportion of sellers that provide the high-quality product (in circles), and the proportion of buyers that purchase the efficient product (in squares), with the blue and green dotted lines representing the average across sessions for sellers and buyers, respectively. On average, around 80 percent of buyers chooses to purchase the efficient product, and demand remains constant throughout the game. By contrast, the percentage of sellers providing the high-quality product reduces from 43 percent in the first round to 17 percent in the last round.

Figure 3: Buyer and seller behavior by session and round in control markets



High demand can only be interpreted as high buyer trust if prices are sufficiently high. If prices are zero, purchasing the efficient product is a weakly dominant strategy for a self-interested buyer because the buyer is indifferent between the efficient and inefficient products if expecting sellers to provide low quality, and will prefer the efficient product if expecting sellers to provide high quality. Further, as shown earlier, at a price of 5 Taka, an inequality averse buyer may choose to purchase the efficient product even if expecting low quality in order to equalize earnings between the seller and the buyer. At a price of 10 Taka, participants with reasonable inequality aversion levels (as measured in past experiments) would not want to purchase the efficient product of low quality, and at higher prices of 15 and 20 Taka, purchasing the efficient product of low quality reduces utility even for the most inequality averse participant.

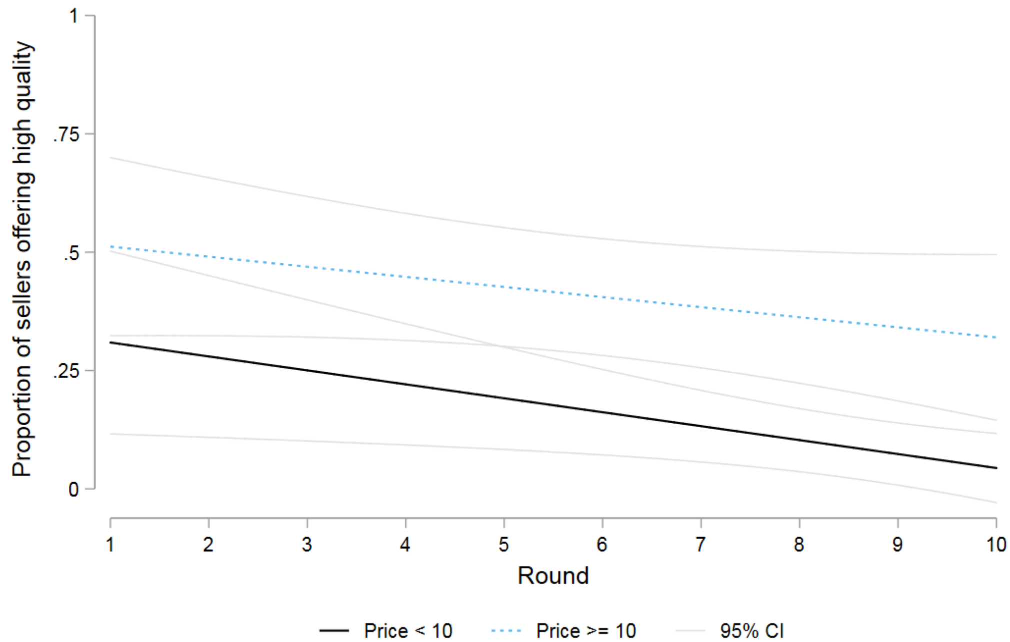
Figure 4 therefore fits the propensity to offer high quality in Panel (a), and a seller's market share in Panel (b), as a linear function of round, distinguishing between sellers with lower ($p_i \leq 5$) versus higher ($p_i \geq 10$) prices. Confidence intervals are clustered by session. In Panel (a), among sellers asking a low price, the predicted percentage of sellers offering high quality reduces from 30.9 in the first round to 4.8 in the last round (black line). Sellers asking a higher price are more likely to provide high quality (blue dotted line) than sellers asking a lower price, and during later rounds, this difference is statistically significant. Price is however not a perfect signal of quality, as less than half of all sellers asking high prices choose to offer high quality.

In Panel (b), the predicted number of buyers for sellers with low prices reduces from 2.3 in the first round to 1.9 in the last round (black line). Asking for a high price is associated with a significantly lower market share (blue dotted line); these sellers attract on average only one of the four buyers in the market. Thus, demand is price sensitive. It is however worth noting that sellers asking for higher prices do not face zero demand for their efficient product, despite their inclination to offer the low-quality product. These buyers could have earnt more by choosing the inefficient product A, and inequality aversion cannot account for their decision to purchase the efficient product. Instead, using expectations data (available upon request), we can show that these buyers were expecting to receive high quality.

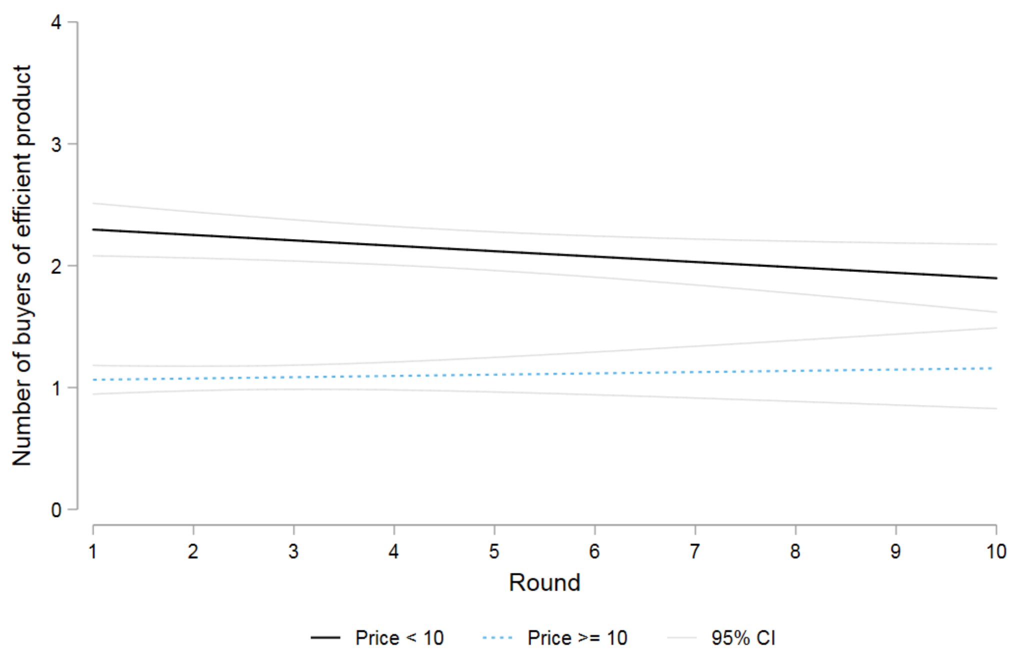
Low rates of reciprocity could be explained by an inability of sellers to signal quality by charging a higher price for their products. Figure 6 explores the existence of price signals in more detail. In Panel (a), we draw average prices for the high-quality and low-quality product as blue and yellow solid lines, respectively. Dashed lines represent the average expected competitor price conditional on whether the seller believes that his competitor selected the high-quality or low-quality product in blue and yellow, respectively. The maximum price that sellers could ask for is 20 Taka, but the average price for the high-quality product is 9.7 Taka in the first round, and remains well below this maximum price in the remaining rounds of the game. The average price for the low-quality product is not substantially lower. Sellers do not use an increase in prices to signal that they are offering the high-quality product.

Panel (b) draws seller payoffs by round, with solid lines representing average profit margins

Figure 4: Behavior by round and seller price in control markets



(a) Provision of quality by seller price and round



(b) Number of buyers by seller price and round

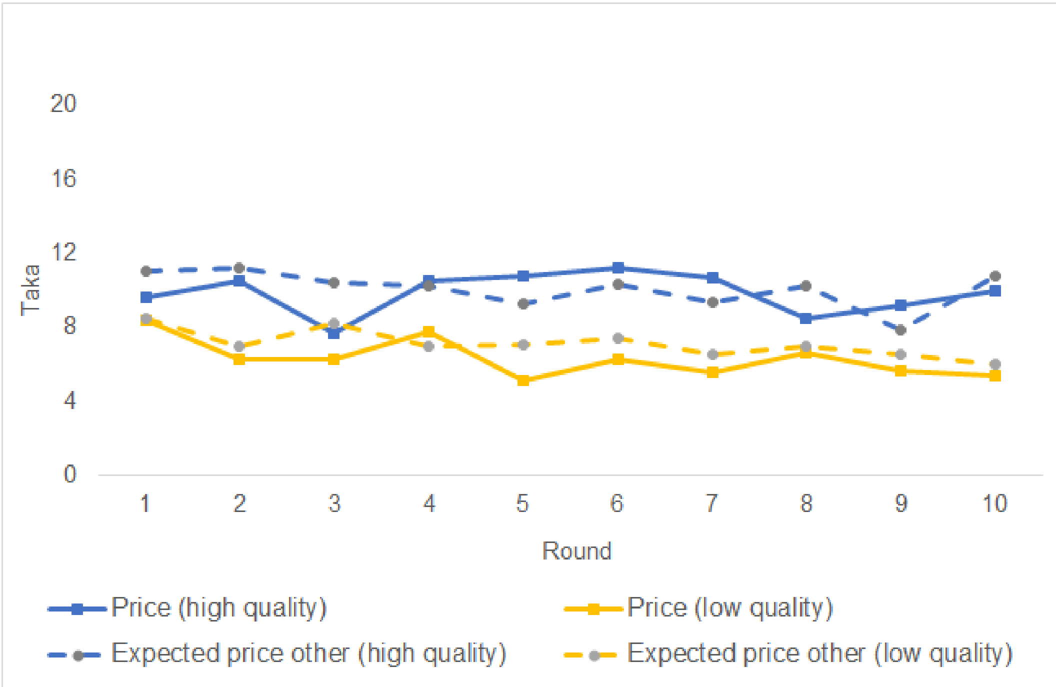
Notes: Confidence intervals are drawn based on standard errors clustered by session.

per buyer and dashed lines representing total profits, taking into consideration the number of actual buyers. Blue and yellow lines summarize payoffs conditional on selling the high-quality product, respectively. The solid lines, showing average profit margins per buyer, indicate that sellers of the high-quality product face substantially lower profit margins than sellers of the low-quality product. This is because sellers of the high-quality product are not passing through the cost of the high-quality product to their buyers. This would not be a problem if these sellers are able to attract a significantly larger share of the market, but they are unable to do so. In fact, sellers of the low-quality attract on average a larger number of buyers because they charge lower prices, and because demand is price sensitive, increasing their payoffs as indicated by the dashed lines.

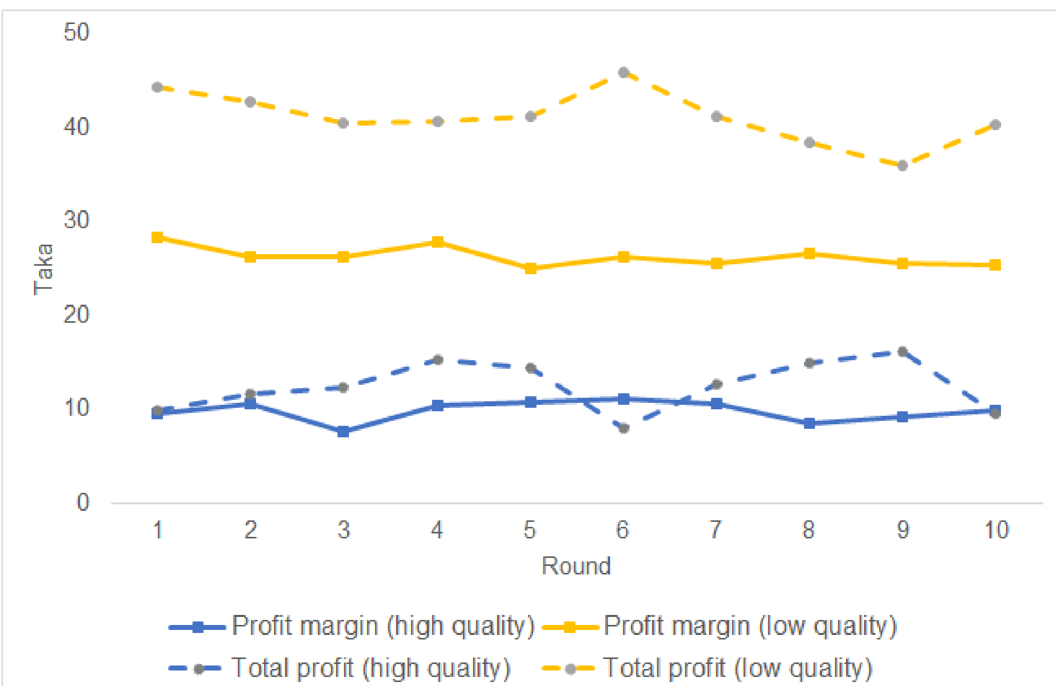
In Figure 6, we explore to what extent product price and quality influence buyers' decision to purchase the efficient product. We estimate a seller's market share as a linear function of price separately for sellers offering low quality (the solid black line) and high quality (the dotted blue line). For both high and low quality, demand is decreasing significantly in price. When asking a zero price, a seller provides the efficient product to on average around 60 percent of buyers; when asking the maximum price, the market share reduces to 20 percent. Conditional on price, the demand curves for high quality and low quality are statistically indistinguishable from one another. In other words, buyers respond to observed prices but not to unobserved quality in their decision to purchase the efficient product.

Figure 7 explores this in more detail within the sample of buyers that choose to purchase the efficient product. This figure compares the price and expected quality of a buyer's selected versus non-selected seller. Panel (a) shows that buyers choose to purchase the efficient product from sellers that ask lower prices on average. Panel (b) shows that the perceived probability of receiving high quality is higher for selected sellers only during the second to the fifth round. During the first round, this is not surprising, given that buyers have no prior information; a priori, we would however have expected to see a stronger effect of expected quality during later rounds.

Figure 5: Seller behavior and expectations by round



(a) Prices by product quality



(b) Profit margins and total profits by product quality

Figure 6: Price sensitivity by quality in control markets

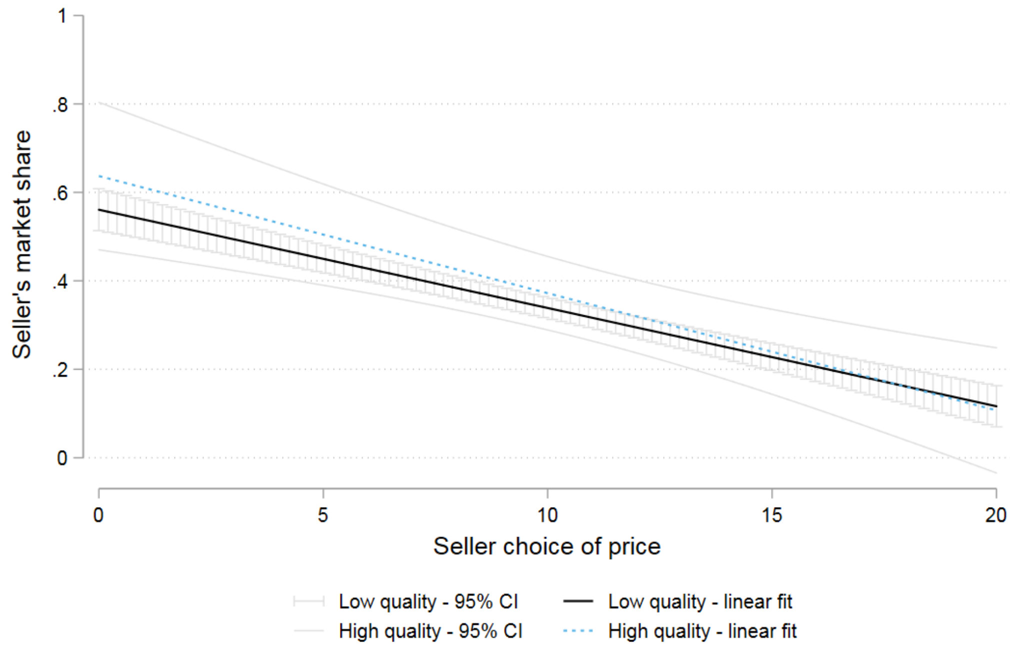
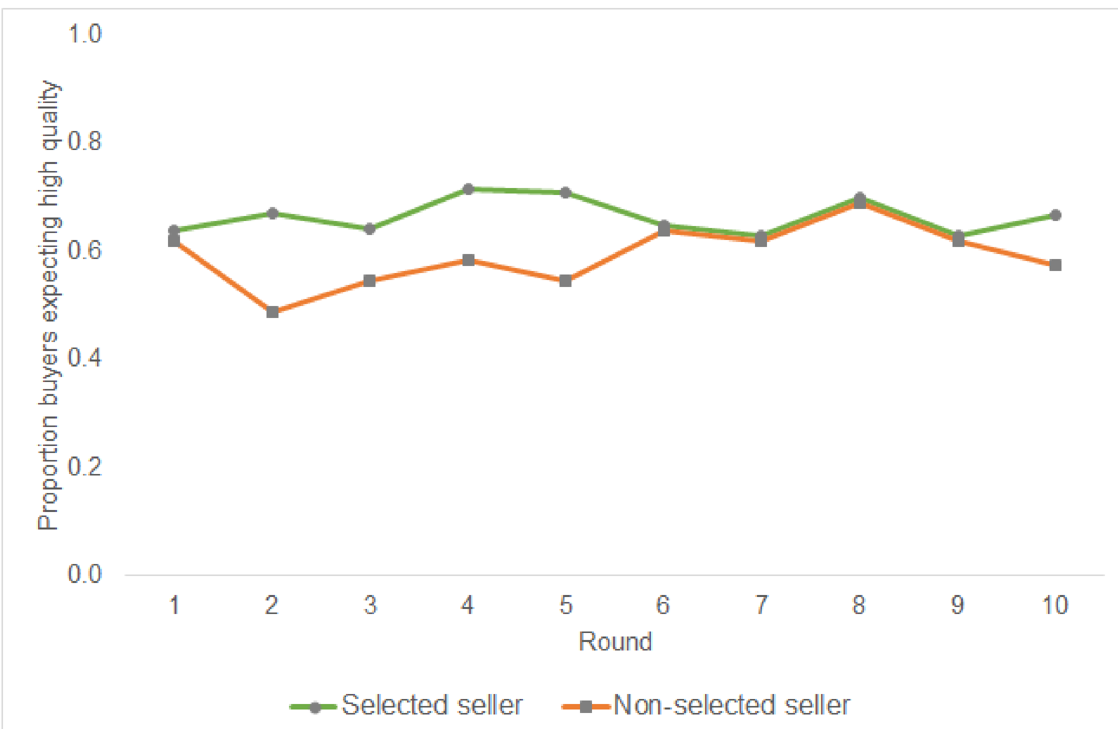


Figure 8 analyzes to what extent buyer satisaction, reported at the end of a round by buyers choosing to purchase the efficient product, is determined by price, quality and payoffs. In Panel (a), we present satisfaction rates for buyers of the high-quality product in blue, and for buyers of the low-quality product in yellow. Solid lines represent products sold at a high price; dashed lines represent products sold at a low price. Buyers of the high-quality product are generally highly satisfied, even when purchasing this product at a high price. Buyers of the low-quality product are less satisfied, with lower satisfaction rates when charged a higher price.

Nonetheless, note that even among these buyers, more than 50 percent states being satisfied with their purchase, and even more so in later rounds of the game. Panel (b) shows that even when buyers' payoff is less than expected (because they were hoping to purchase the high-quality product but were offered the low-quality product instead), or when buyers earn at most 30 Taka (which they could have earnt by purchasing the inefficient product), approval ratings are over 50 percent. Although satisfaction rates are higher when buyers earn more than 30 Taka,

Figure 7: Buyer seller choice and expectations by round

(a) Product price



(b) Expected product quality

and when they earn more than expected, a substantial share of buyers reports being satisfied even when they are offered low quality, and this is not because they earnt more by purchasing the efficien product. Thus, in this context, buyer satisfaction is a noisy signal of whether to purchase the efficient product from a given seller and even more so of product quality.

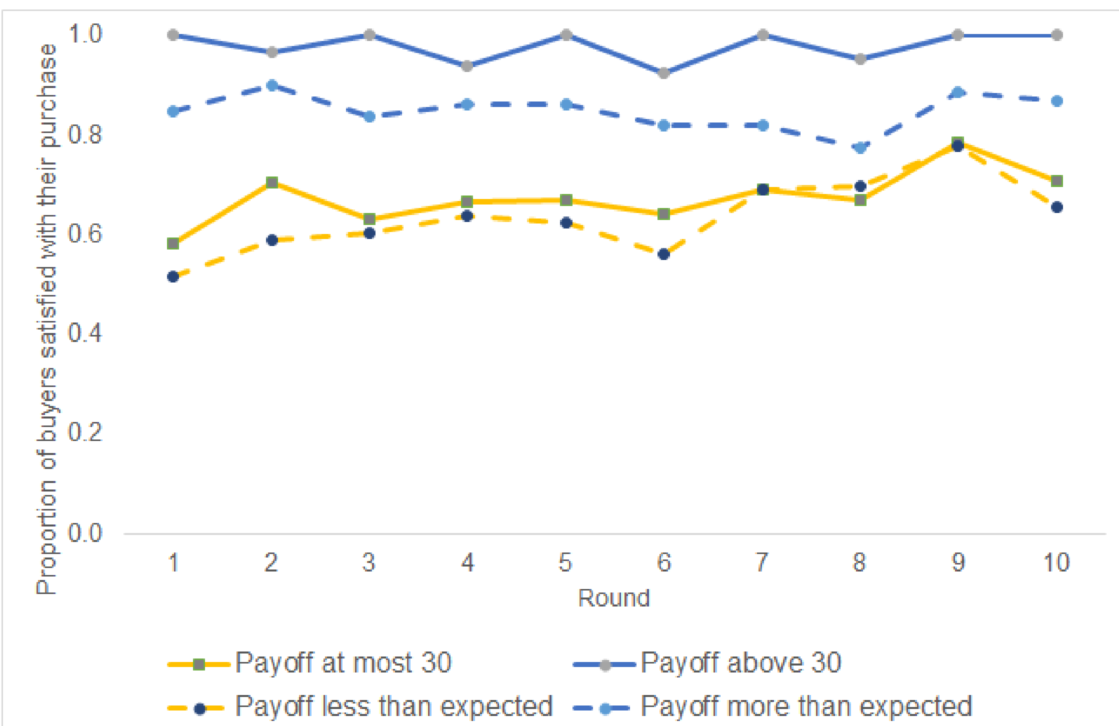
Finally, we explore whether buyers 'vote with their feet' when receiving the low-quality product or being dissatisfied with their purchase in Figure 9. The sample in this figure is restricted to buyers who purchased the efficient product in the previous round. We summarize the proportion of these buyers that switches, either by purchasing the efficient product but from a different seller, or by purchasing the inefficient product from either the same or the other seller. In Panel (a), receiving high quality in the previous round lowers the probability of switching in some rounds, but differences are not as pronounced as buyers' satisfaction, in part because of increased switching rates during the fifth and sixth round of those who previously purchased the high-quality product. Also in Panel (b), being satisfied in the previous round reduces the probability of switching only in some rounds of the game.

In sum, in the benchmark market that was simulated in the control group, we find that most buyers purchase the efficient product, but that sellers do not reciprocate by offering high quality; the probability of purchasing high quality is less than 0.5 even among sellers asking prices of 10 Taka or higher. Buyers further respond mostly respond to price, not to expected quality, meaning that sellers of the high-quality product do not attract a larger market share. Buyer satisfaction is highest among buyers of the high-quality product, but also buyers of the low-quality product are often still satisfied with their purchase, even if they purchase the product at a high price, and even if the payoff is less than expected. Thus, ratings provided by buyers are not necessarily indicative of high quality.

The question, then, is whether the experimental treatments improve quality provision, reduce price sensitivity, induce buyers to pay more attention to quality, and increase profit margins and profits for sellers providing high quality. We will explore this in the next section.

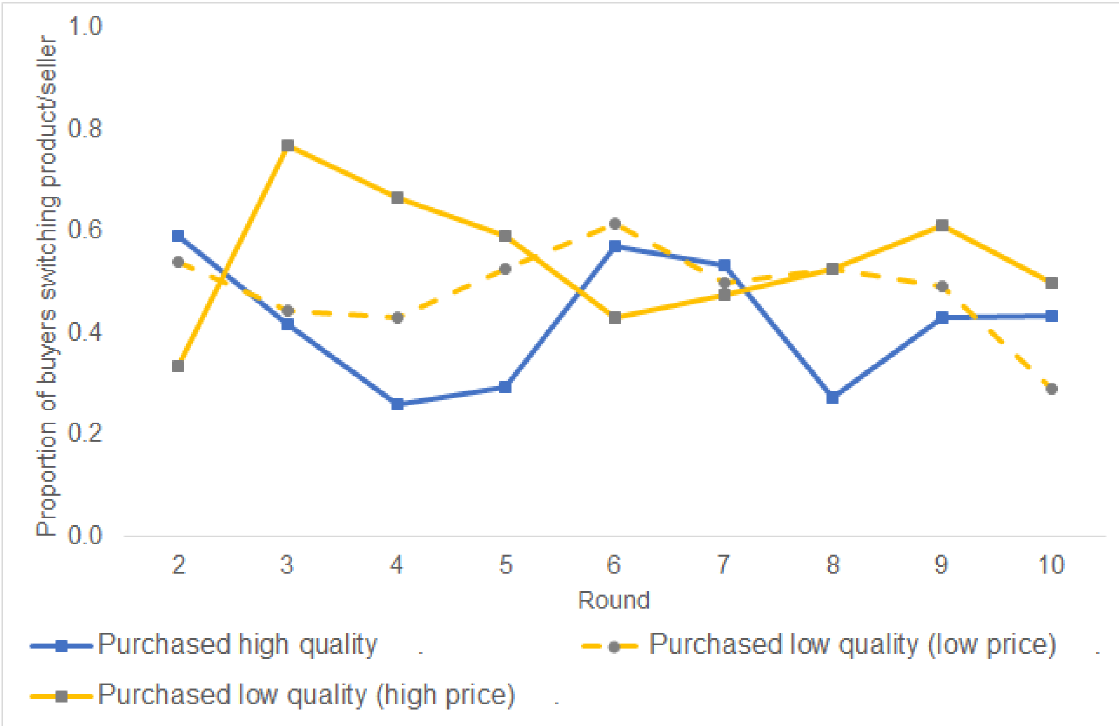
Figure 8: Buyer satisfaction by round (for buyers of efficient product)

(a) Satisfaction by price and quality



(b) Satisfaction by payoff

Figure 9: Switching of sellers and products by round (for buyers of efficient product)



(a) Switching by price and quality in previous round

(b) Switching by satisfaction in previous round

4.2 Impacts of accreditation and rewards

Next, we study to what extent accreditation and loyalty rewards can improve these outcomes. We will first analyze average treatment effects on participant decisions and payoffs. Table 3 estimates effects of any treatment combined (Panel A), the three treatments separately (Panel B), and the rewards treatments combined (Panel C). This table focuses on seller decisions in Columns (1)-(4), and buyer decisions in Columns (5)-(8). Due to the small number of sessions, we report in parentheses p-values from a wild bootstrap clustered by session. We exclude the first round in order to focus on outcomes during rounds in which sessions with treatment had a preferred seller.

In Columns (1)-(2), the dependent variable is the selected price (as a proportion of the maximum price of 20 Taka). We find no significant effect of treatment on price in Panels A and B, but when pooled, the rewards treatments increase prices by 6.7 percentage points in Panel C ($p < 0.10$). Treatment effects are more pronounced for the quality variable in Columns (3)-(4). In Panel A, any treatment increases the probability that a seller offers high quality by 10.1 percentage points ($p < 0.01$). This effect is mainly driven by the rewards treatment; compared with the accreditation treatment, sellers in the direct rewards treatments are 8.1 percentage points more likely to offer high quality ($p < 0.10$, Panel B). Because indirect rewards do not further improve quality, Panel C pools the two rewards treatments, and shows that rewards increase the probability of providing high quality by 11.3 percentage points ($p < 0.01$).

Turning to buyer decisions in Columns (5)-(8), we find no significant treatment effect on the probability that a buyer chooses Product B, but treatment does have a significant effect on repeat purchases. Combined, the experimental treatments increase the probability that a buyer of Product B purchases that same product from the same seller again by 8 percentage points ($p < 0.01$, Panel A). We find that this effect is driven in part by accreditation, which increases the probability of a repeat purchase by 5.4 percentage points ($p < 0.10$). Introducing rewards increases the effects compared with the accreditation alone, but not significantly so ($p = 0.286$, Panel B). Rewards nevertheless do increase repeat purchases compared with the control and accreditation arms combined (Panel C, $p < 0.01$).

Table 4 estimates similar models but now for buyer payoff, seller margins and seller profits. We only find a significantly positive effect of the direct rewards treatment on seller margins and profits in Columns (3)-(6); buyers' average profits increase, especially in the indirect rewards treatments, but not significantly so. Thus, the experimental treatments—and especially the rewards—improve quality, and although this quality improvement is not entirely offset by an increase in prices, prices increase sufficiently for buyer payoffs not to improve. Buyers, despite improved quality, are not more likely to purchase Product B, but we do observe an increase in repeat purchases of Product B.

This raises the question what determines buyer purchasing decisions. It could be that buyers do not reap the benefits of the indirect rewards treatment because they do not take expected quality sufficiently into consideration when choosing their sellers and products. Table 5 therefore estimates determinants of demand, using a seller fixed effects model in which we regress the seller's market share (i.e., the proportion of buyers purchasing Product B from this seller) on (a) the price difference with the competitor, (b) the difference in the proportion of buyers that expect high quality between the seller and his competitor, (c) the difference in preferred status, and (d) an indicator for whether the seller provided high quality in the previous round. We interact these variables with the treatment variables to test for treatment effects on the demand curves.

First, note that in the four treatment arms combined, the strongest determinant of demand is price. Increasing one's price by 20 Taka relative to the competitor price, i.e. charging the maximum price whereas the competitor charges the minimum price, reduces one's market share by 31 percentage points ($p < 0.01$), from an average market share of 41.5 percent. Being the preferred seller increases the market share by a marginally significant 2.2 percentage points ($p < 0.10$), and providing high quality in the last round increases the market share by 4.4 percentage points ($p < 0.01$). Having a larger number of buyers expecting to receive high quality does not significantly improve demand in the full sample.

Table 3: Average treatment effects on seller and buyer behavior

	Seller behavior				Buyer behavior			
	Selected price		Offers high quality		Buys Product B		Repeat purchase	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A								
Any treatment	0.084	0.057	0.106**	0.101***	0.019	0.021	0.072**	0.080***
	(0.158)	(0.264)	(0.030)	(0.008)	(0.710)	(0.580)	(0.020)	(0.008)
R-squared	0.019	0.147	0.041	0.087	0.001	0.080	0.009	0.026
Panel B								
Any treatment	0.058	0.015	0.044	0.035	-0.011	0.012	0.035	0.054*
	(0.398)	(0.724)	(0.430)	(0.336)	(0.834)	(0.790)	(0.280)	(0.082)
Rewards	0.036	0.065	0.089	0.081*	0.044	0.020	0.042	0.036
	(0.594)	(0.118)	(0.198)	(0.094)	(0.494)	(0.694)	(0.174)	(0.286)
Indirect rewards	0.006	-0.013	0.006	0.030	0.002	-0.015	0.044	0.035
	(0.918)	(0.802)	(0.906)	(0.680)	(0.970)	(0.696)	(0.260)	(0.412)
R-squared	0.021	0.152	0.047	0.094	0.004	0.081	0.012	0.026
Panel C								
Rewards	0.068	0.067*	0.114**	0.113***	0.040	0.019	0.081***	0.078***
	(0.154)	(0.062)	(0.022)	(0.000)	(0.316)	(0.544)	(0.000)	(0.002)
R-squared	0.017	0.152	0.046	0.093	0.004	0.080	0.011	0.024
Controls		✓		✓		✓		✓
Nr. observations	2160	2160	2160	2160	4320	4320	3588	3588
Mean	0.421	0.421	0.350	0.350	0.830	0.830	0.568	0.568

Dependent variables: Selected price as a proportion of the maximum price in Columns (1)-(2); Dummy variable equal to one if and only if the seller offers high quality in Columns (3)-(4); Dummy variable equal to one if and only if a buyer purchases Product B in Columns (5)-(6); Dummy variable equal to one if and only if a buyer purchases Product B from the same seller as in the previous round, conditional on purchasing Product B in the previous round, in Columns (7)-(8). Model estimated using linear least squares, controlling (in all columns) for round fixed effects and (in even columns only) the following characteristics: order in session, order of cluster, session order within cluster, Ravens score and dummy variable indicating that Ravens score is missing, understanding of the baseline game, talked to earlier participant and dummy variable indicating a missing, above-median understanding, above-median connected with farmers in the session. In Columns (2) and (4), we also control for a dummy variable indicating that the seller is denoted as "Seller S1". First-round observations have been excluded. *p*-values shown in parentheses are based on a wild bootstrap clustered at the session level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Treatment effects on buyer and seller payoffs

	Buyer payoff (Taka per round)		Seller margins (Taka per round)		Seller profits (Taka per round)	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Any treatment	0.972	1.175	0.494	0.245	1.688	1.661
	(0.346)	(0.168)	(0.750)	(0.802)	(0.210)	(0.374)
R-squared	0.010	0.098	0.018	0.130	0.003	0.032
Panel B						
Any treatment	-0.019	0.525	0.269	-0.279	-0.407	-1.002
	(1.000)	(0.518)	(0.882)	(0.782)	(0.822)	(0.678)
Rewards	1.486	0.942	0.338	0.749	3.144	3.813
	(0.344)	(0.380)	(0.844)	(0.498)	(0.226)	(0.152)
R-squared	0.015	0.099	0.018	0.131	0.005	0.034
Panel C						
Rewards	1.199	0.669	1.847	2.266***	5.157**	6.409***
	(0.374)	(0.436)	(0.314)	(0.008)	(0.022)	(0.002)
Indirect rewards	0.556	1.135	-2.750	-3.585**	-4.435	-6.707**
	(0.852)	(0.592)	(0.196)	(0.042)	(0.104)	(0.032)
R-squared	0.015	0.101	0.027	0.144	0.007	0.039
Controls		✓		✓		✓
Nr. observations	4320	4320	2160	2160	2160	2160
Mean	30.50	30.50	22.12	22.12	34.35	34.35

Model estimated using linear least squares, controlling for round fixed effects and the following seller characteristics: order in session, order of cluster, session order within cluster, dummy variable indicating seller is denoted as "Seller S1", Ravens score and dummy variable indicating that Ravens score is missing, understanding of the baseline game, talked to earlier participant and dummy variable indicating a missing, above-median understanding, above-median connected with farmers in the session. First-round observations are excluded from the analyses. p-values shown in parentheses are based on a wild bootstrap clustered at the session level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Of course, these patterns may vary across treatment arms. We find that price sensitivity is stronger in the control group than in the treatment arms: the interaction of the price difference with one's competitor and 'any treatment' bears a significant and positive coefficient ($p < 0.05$). In the rewards treatments, buyers appear to pay attention to a seller's preferred status and expected quality ($p < 0.10$), which is not the case in control markets. In other words, the treatments reduce price sensitivity, and encourage buyers to pay more attention to other considerations, particularly quality. As such, the treatments do attain their goals, but estimated coefficients are only marginally significant. This could provide a potential explanation for why buyer payoffs do not sufficiently improve.

Table 6 explores to what extent the treatments result in increased loyalty or repeat purchases, focusing on buyers who purchased the efficient product, *B*, in the previous round. Columns (1)-(3) include as a dependent variable an indicator for whether the buyer purchases from the same seller. Columns (4)-(6) focus on an indicator for whether the buyer purchases product *B* from the same seller. We find that treatment is associated with significantly more repeat purchases, and the effects are largest in the rewards treatments. This suggests that in the treatments, sellers and buyers started to form longer-lasting relationships, consistent with the objective of a market systems development approach.

Table 7 studies to what extent the increased demand for preferred sellers was justified by an increase in quality. The risk with a buyer-driven accreditation scheme is that the ratings provided by farmers will be noisy, and that in addition, sellers cannot be held to provide high quality. Indeed, we find that the preferred retailer is not significantly more likely to provide high quality than the other seller. The willingness to provide high quality is also not significantly higher in the accreditation or rewards treatments. Price is the main predictor of providing high quality in both the control group and in treatment markets.

Table 8 finally shows that buyer satisfaction is determined by quality and by price, and that although attention to quality is stronger in the rewards treatments in Columns (1)-(3), the interaction is only marginally significant, and significance disappears when controlling for price

Table 5: Dimensions on which sellers are competing by treatment

	Seller's market share			
	(1)	(2)	(3)	(4)
Preferred status	0.022*	-0.024	-0.021	-0.019
	(0.090)	(0.156)	(0.247)	(0.271)
... *X* Any treatment		0.030	0.028	0.027
		(0.206)	(0.251)	(0.255)
... *X* Rewards		0.050*	0.049*	0.047*
		(0.065)	(0.066)	(0.073)
Price difference	-0.310***	-0.448***	-0.312***	-0.310***
	(0.000)	(0.000)	(0.000)	(0.000)
... *X* Any treatment		0.175**		
		(0.046)		
... *X* Rewards		-0.003		
		(0.958)		
High quality last round	0.044***	0.042***	0.040	0.040***
	(0.007)	(0.004)	(0.297)	(0.009)
... *X* Any treatment			-0.030	
			(0.542)	
... *X* Rewards			0.045	
			(0.214)	
Expected quality difference	0.047	0.044	0.047	0.003
	(0.122)	(0.134)	(0.109)	(0.962)
... *X* Any treatment				-0.016
				(0.842)
... *X* Rewards				0.116*
				(0.094)
Nr. observations	2160	2160	2160	2160
R-squared within	0.200	0.220	0.212	0.214
Mean	0.415	0.415	0.415	0.415

Model estimated using linear least squares, controlling for round fixed effects and the following seller characteristics: order in session, order of cluster, session order within cluster, dummy variable indicating seller is denoted as "Seller S1", Ravens score and dummy variable indicating that Ravens score is missing, understanding of the baseline game, talked to earlier participant and dummy variable indicating a missing, above-median understanding, above-median connected with farmers in the session. p-values shown in parentheses are based on a wild bootstrap clustered at the session level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Loyalty among buyers of Product B in the last round

	Buys from same seller			Buys Product B from same seller		
	(1)	(2)	(3)	(4)	(5)	(6)
Any treatment	0.091***	0.058**		0.095***	0.057**	
	(0.004)	(0.032)		(0.004)	(0.050)	
Rewards		0.048*	0.075**		0.053*	0.078**
		(0.076)	(0.028)		(0.100)	(0.030)
Indirect rewards			0.001			0.007
			(1.000)			(0.926)
Number of observations	3586	3586	3586	3586	3586	3586
R-squared	0.015	0.017	0.015	0.023	0.024	0.023
Mean dependent variable	0.638	0.638	0.638	0.592	0.592	0.592

Model estimated using linear least squares, controlling for round fixed effects and the following seller characteristics: order in session, order of cluster, session order within cluster, dummy variable indicating seller is denoted as "Seller S1", Ravens score and dummy variable indicating that Ravens score is missing, understanding of the baseline game, talked to earlier participant and dummy variable indicating a missing, above-median understanding, above-median connected with farmers in the session. p-values shown in parentheses are based on a wild bootstrap clustered at the session level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

and price interacted with treatment in Columns (4)-(6). This indicates that even in the rewards treatments, buyers do not pay sufficient attention to quality for the accreditation mechanism to work as a signaling device.

5 Conclusion

Improving the quality of agricultural inputs is an important instrument to improve smallholder farmers' productivity, incomes and food security. In order to increase the availability of high-quality inputs, it is essential for markets to signal the benefits to justify their higher costs to smallholder farmers. However, most inputs are experience goods, meaning that quality is unobservable to buyers before purchase. In the presence of such asymmetric information about quality, sellers need to use price or reputation to signal quality.

We tested to what extent sellers can signal quality through prices and reputation through

Table 7: Preferred status and the provision of quality

	Provides high quality					
	(1)	(2)	(3)	(4)	(5)	(6)
Any treatment	0.103***	0.049		0.085***	0.049	
	(0.004)	(0.266)		(0.002)	(0.192)	
Rewards		0.078*	0.099***		0.053	0.064**
		(0.066)	(0.000)		(0.166)	(0.036)
Indirect rewards			0.007			0.028
			(0.940)			(0.654)
Preferred retailer	-0.007	-0.007	-0.014	0.022	0.022	0.007
	(0.858)	(0.848)	(0.608)	(0.612)	(0.624)	(0.812)
... *X* Any treatment	0.014	-0.014		0.002	-0.028	
	(0.736)	(0.822)		(0.906)	(0.614)	
... *X* Rewards		0.038	0.031		0.043	0.042
		(0.412)	(0.516)		(0.336)	(0.328)
... *X* Indirect rewards			0.000			-0.023
			(1.000)			(0.690)
Selected price				0.505***	0.496***	0.439***
				(0.000)	(0.000)	(0.000)
... *X* Any treatment				-0.114	-0.118	
				(0.298)	(0.316)	
... *X* Rewards					0.010	-0.014
					(0.922)	(0.914)
... *X* Indirect rewards						-0.070
						(0.644)
Number of observations	2400	2400	2400	2400	2400	2400
R-squared	0.100	0.106	0.105	0.165	0.169	0.168
Mean dependent variable	0.370	0.370	0.370	0.370	0.370	0.370

Model estimated using linear least squares, controlling for round fixed effects and the following seller characteristics: order in session, order of cluster, session order within cluster, dummy variable indicating seller is denoted as "Seller S1", Ravens score and dummy variable indicating that Ravens score is missing, understanding of the baseline game, talked to earlier participant and dummy variable indicating a missing, above-median understanding, above-median connected with farmers in the session. p-values shown in parentheses are based on a wild bootstrap clustered at the session level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Determinants of buyer satisfaction

	Proportion of satisfied buyers					
	(1)	(2)	(3)	(4)	(5)	(6)
Any treatment	-0.047	-0.024		-0.031	-0.021	
	(0.374)	(0.622)		(0.566)	(0.682)	
Rewards		-0.037	-0.049		-0.018	-0.024
		(0.398)	(0.300)		(0.730)	(0.668)
Indirect rewards			0.001			-0.007
			(0.978)			(0.916)
Provides high quality	0.303***	0.302***	0.304***	0.362***	0.362***	0.356***
	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
... *X* Any treatment	0.072	0.007		0.058	-0.010	
	(0.260)	(0.884)		(0.362)	(0.938)	
... *X* Rewards		0.097*	0.085		0.098	0.070
		(0.098)	(0.138)		(0.150)	(0.306)
... *X* Indirect rewards			0.035			0.045
			(0.646)			(0.608)
Selected price				-0.274***	-0.278***	-0.302***
				(0.006)	(0.004)	(0.002)
... *X* Any treatment				0.007	-0.057	
				(0.906)	(0.702)	
... *X* Rewards					0.093	0.147
					(0.422)	(0.206)
... *X* Indirect rewards						-0.172
						(0.134)
Number of observations	1866	1866	1866	1866	1866	1866
R-squared	0.246	0.249	0.249	0.284	0.289	0.291
Mean dependent variable	0.753	0.753	0.753	0.753	0.753	0.753

Model estimated using linear least squares, controlling for round fixed effects and the following seller characteristics: order in session, order of cluster, session order within cluster, dummy variable indicating seller is denoted as "Seller S1", Ravens score and dummy variable indicating that Ravens score is missing, understanding of the baseline game, talked to earlier participant and dummy variable indicating a missing, above-median understanding, above-median connected with farmers in the session. p-values shown in parentheses are based on a wild bootstrap clustered at the session level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

a lab-in-the-field experiment with input retailers, who take on the role of sellers, and farmers, who take on the role of buyers, in Bangladesh. In addition, we analyzed whether a buyer-driven accreditation and loyalty reward scheme, which a market systems development program was considering to introduce, can help improve market outcomes. In the experiment, we created competitive input markets with repeated interactions. Each round, sellers chose a price and quality for their input. Buyers would choose between the two sellers, observing price but not quality.

In the benchmark game, without accreditation and rewards, we found that sellers provided mostly low-quality products, and buyers revealed low demand for more expensive, high-quality inputs. Accrediting sellers based on buyer satisfaction led to higher input quality and more repeat purchases only when combined with loyalty rewards for accredited sellers of the high-quality product, or for their buyers. The scheme improved average earnings for sellers but not for buyers due to weak performance of quality signals. Thus, although small incentives may be particularly effective at improving market outcomes, we did not find them to enhance quality signals and farmer welfare.

We make the following suggestions out of these results. First, although accreditation may be a necessary component in the design of the loyalty rewards scheme, it did not have an impact on its own; in the accreditation treatment, the majority of sellers were providing low quality, even when farmers were expecting to receive high quality. High prices and accreditation were not necessarily a signal of high quality, reducing the scope for market functioning to improve. By contrast, the rewards treatments were more effective in increasing product quality and buyers' loyalty towards their sellers, suggesting this could potentially be a powerful market systems intervention.

Second, the impact of the rewards treatments was driven by changes in seller behavior, not in buyer behavior or better quality signals. We note that retailers behaved much more in line with economic theory than farmers. In part, this could be because farmers were less educated, and not as quick to grasp the game, as sellers. This persisted over time, and was hence not only due to inexperience on part of farmers. As such, this experiment shows the importance of playing the game with actual market actors; an experiment with only retailers or only farmers, or more conventional subject pools (university students) would potentially have yielded very different results.

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A Parameter restrictions

The model parameters y, c, δ and η must be set to satisfy these conditions. The next section will discuss how to set the parameters such that the conditions are satisfied.

Before setting parameter ranges, we go back to conditions that must be satisfied for a BTG.

Exposure Exposure is satisfied for all $p_i \in (p_{min}, p_{max})$, even $p_{min} = c + \delta$, if and only if $\delta \geq (1-\eta)(y-c)$.

Improvement Improvement is satisfied for all $p_i \in (p_{min}, p_{max})$, even $p_{max} = y$, if and only if $\delta \geq \eta(y-c)$.

Temptation Temptation is satisfied by definition of δ;

Mutual Gain Mutual gain is also satisfied by definition of p_{min}.

Therefore, due to the restrictions for exposure and improvement, the game represents a BTG so long as:

$$\delta \geq \max \eta, 1 - \eta(y-c)$$

Because $\eta \in (0,1)$, these conditions also imply the second market condition, $\delta \geq (y-c)/2$.

There must further be mutual benefit to trade while avoiding inequality aversion. *Reciprocity* is satisfied, even at the maximum price, when

$$\alpha(y-c) - \beta(2\delta - (y-c)) \leq \delta \Leftrightarrow \delta \geq \frac{\alpha+\beta}{1+2\beta}(y-c)$$

Note that because $\alpha \leq 1$, and $\alpha < \beta$, the maximum value of the numerator is 2β for $\beta \leq 1$, and $1+\beta$ for $\beta \geq 1$. At $\beta = 1$, the right-hand term hence takes a maximum value of $2(y-c)/3$. As β is further increasing, this expression converges to $(y-c)/2$. To ensure the *reciprocity* condition is satisfied, it must be that $\delta \geq \frac{2(y-c)}{3}$; in other words, the additional cost of providing high instead of low quality is greater than or equal to two thirds of the farmer's and seller's combined payoff. For all $\eta \in (1/3, 1/2)$, this condition restricts δ further than the standard assumptions in the BTG.

Finally, we discuss under which condition the third market condition is satisfied. If we set $\delta = 2(y-c)/3$, this condition reduces to

$$\frac{2}{3} < \frac{1+xN_I}{2+xN_I} \Leftrightarrow 2(2+xN_I) < 3(1+xN_I) \Leftrightarrow xN_F > N_F/N_I.$$

In words, selling B_H is profitable only when this attracts at least xN_F additional farmers, which is greater than the number of farmers when the market is equally distributed, N_F/N_I. If $N_I = 2$ and $x > 1/2$. This means that for all $x \leq 1/2$, the increased market share from providing B_H instead of B_L does not exceed the reduction in profit margin. If $N_I = 3$ and $x > 1/3$, the seller needs to attract more than two thirds of the market in order to earn more compared to the low-quality equilibrium. Only the latter is feasible.

We therefore include $N_I = 3$ input sellers and either $N_F = 3$ or $N_F = 6$ farmers in a group. We also want to maximize the possible price range, $y - c - \delta = (y-c)/3$, and thus maximize the difference between y and c. Suppose we set $y = 70$, and $c = 10$; in that case, $\delta = 40$, $\pi = 30$, and $p_i \in \{50, 70\}$, and all conditions above are satisfied.

Table 9: Payoffs in the game - real numbers

I provides:	High quality (B_H)		Low quality (B_L)	
	Payoff *F*	Payoff *I*	Payoff *F*	Payoff *I*
F chooses:				
Input A	30	0	30	0
Input B	$110 - p_i$	$p_i - 50$	$70 - p_i$	$p_i - 10$

B Inequality aversion

This section analyzes under which conditions an inequality averse input seller can decide to provide high quality. Doing so, we build on the widely used Fehr and Schmidt (1999) model of inequality aversion. Following their model, if the seller makes more money than the farmer, the seller derives disutility from the difference, so $U(I) = \Pi_I - \alpha(\Pi_I - \Pi_F)$, where Π_j represents the payoff of actor j. If the farmer makes more than the seller, then $U(I) = \Pi_I - \beta(\Pi_F - \Pi_I)$.

The model assumes that the seller's marginal disutility from earning more than the farmer, is less than one ($\alpha \leq 1$), which means that the seller will never give up more than x to improve the farmer's payoff by x. Further, $\beta \geq 0$, meaning that the seller will always dislike earning less than the farmer. The seller suffers more from inequity when earning less, so it must be that $\beta > \alpha$.[12]

Recall the payoffs in the game:

		I provides:			
		High quality (B_H)		Low quality (B_L)	
		Payoff F	Payoff I	Payoff F	Payoff I
F chooses:	Input A	$\eta(y-c)$	0	$\eta(y-c)$	0
	Input B	$y+\delta-p_i$	$p_i-c-\delta$	$y-p_i$	p_i-c
	$p_i \in [p_{min}, p_{max}]$	$p_{min} = \delta + c$		$p_{max} = 2\delta + c$	

For an inequality averse seller, utility depends not only on whether he offers high quality or low quality, but also on whether he makes more or less money than the farmer. When the seller offers high quality, the difference in payoff between the seller and the farmer is equal to $p_i - c - \delta - (y + \delta - p_i) = 2(p_i - \delta) - (y + c)$. When the seller offers low quality, the difference in payoff between the seller and the farmer is equal to $p_i - c - (y - p_i) = 2p_i - (y + c)$. The

[12] It could be that α is negative, which would mean the seller is inequality seeking. If I sells to more than one farmer and provides high quality, potentially at a price below the maximum price, he may do so to attract a larger market share, or to avoid inequality and reduce his total profit from farmers' individual payoff.

utilities associated with each of the four scenarios are:

$$(B_H, \Pi_I > \Pi_F) : U(I) = p_i - c - \delta - \alpha(2(p_i - \delta) - (y + c)) \tag{3}$$

$$(B_L, \Pi_I > \Pi_F) : U(I) = p_i - c - \alpha(2p_i - (y + c)) \tag{4}$$

$$(B_H, \Pi_F > \Pi_I) : U(I) = p_i - c - \delta - \beta((y + c) - 2(p_i - \delta)) \tag{5}$$

$$(B_L, \Pi_F > \Pi_I) : U(I) = p_i - c - \beta((y + c) - 2p_i) \tag{6}$$

We will analyze under which conditions a seller provides high quality because of inequality aversion. First, we can rule out any situation in which the seller earns less than the farmer when selling low quality, but more from selling high quality, because $\delta > 0$. Second, we consider the scenario in which the seller earns less than the farmer both when providing high and low quality. This scenario is feasible for all $\eta > 1/2$.[13] In that case, the difference in the utility from providing high and low quality would be strictly negative, because $\delta > 0$ and $\beta > 0$:

$$(B_H, \Pi_F > \Pi_I) - (B_L, \Pi_F > \Pi_I) = -\delta - 2\beta\delta = -\delta(1 + 2\beta) < 0$$

Hence, when the seller earns less than the farmer when providing either low or high quality, an inequality averse retailer will never provide high quality.

Third, we consider the scenario in which the seller earns *more* than the farmer when providing either low or high quality. This scenario is feasible when $\eta \leq 1/2$. In that case, a seller providing high quality at the maximum price earns $2\delta + c - \delta - c = \delta$ and the farmer earns $y + \delta - 2\delta - c = y - c - \delta < \delta$ if and only if $y - c < 2\delta$, that is, $1 < 2(1 - \eta) \Leftrightarrow 1 - \eta > 1/2$

[13]More generally, a seller earns less than the farmer, even when providing low quality, if and only if $p_i - p_{min} < (\eta - 1/2)(y - c)$. To see this, note that when the seller provides low quality, the difference in payoffs between the seller and the farmer is $2p_i - (y + c)$. Rewrite this as $2p_{min} - (y + c) + 2(p_i - p_{min})$. Because $p_{min} = c + \delta$, this equation reduces to $2\delta - (y - c) + 2(p_i - p_{min}) = (1 - 2\eta)(y - c) + 2(p_i - p_{min})$. This is strictly negative if and only if $2(p_i - p_{min}) < (2\eta - 1)(y - c)$, which yields the condition above. When asking the minimum price, $p_i - p_{min} = 0$ so that the seller earns less than the farmer for all $\eta > 1/2$.

or $\eta < 1/2$. In this case, an inequality averse seller would offer high quality if the utility from selling high would exceed the utility from selling low, while earning more in both cases. This is true if and only if:

$$p_i - \delta - c - \alpha(2(p_i - \delta) - (y + c)) - (p_i - c - \alpha(2p_i - (y + c))) > 0 \Rightarrow -\delta(1 - 2\alpha) > 0$$

implying that an inequality averse seller with $\alpha > \frac{1}{2}$ would provide high quality. Note that for all $\eta \geq 1/2$, the seller can never earn *more* than the farmer when providing high quality.

Finally, we consider the scenario in which the seller earns more when providing low quality, but less when providing high quality (which is a relevant case for all $\eta \in (1/2, 3/4)$. Using the four functions above, even an inequality averse seller would provide low quality if and only if:

$$p_i - \delta - c - \beta((y + c) - 2(p_i - \delta)) - (p_i - c - \alpha(2p_i - (y + c))) \leq 0$$

Reducing and rearranging this condition, we can write:

$$\alpha(2p_i - (y + c)) - \beta(y + c - 2(p_i - \delta)) \leq \delta$$

Because the left-hand side is increasing in p_i, the condition is satisfied for all prices if it is satisfied at the maximum price, yielding the following sufficient condition:

$$\alpha(2(2\delta + c) - (y + c)) - \beta(y + c - 2(c + \delta)) \leq \delta \Leftrightarrow -(\alpha + \beta)(y - c) \leq \delta(1 - 4\alpha - 2\beta).$$

Using $\delta = (1 - \eta)(y - c)$, we can rewrite this condition as follows:

$$-(\alpha + \beta) \leq (1 - \eta)(1 - 4\alpha - 2\beta) \Leftrightarrow \alpha(3 - 4\eta) - \beta(2\eta - 1) \leq 1 - \eta.$$

Because $\eta \in (1/2, 3/4)$, the left-hand side of the last inequality is increasing in α, and decreasing in β. The maximum of the left-hand side is hence given at the point where $\beta = \alpha \leq 1$. If $\beta = \alpha$, we can write the condition as follows:

$$\alpha(4 - 6\eta) \leq 1 - \eta \Leftrightarrow \eta \geq \frac{4\alpha - 1}{6\alpha - 1}$$

Since $\alpha \leq 1$, the right-hand side of the last inequality has a maximum value of $3/5$. Thus, if $\eta \geq 3/5$, even an inequality averse seller will always prefer selling low quality.

It is also possible that farmers are inequality averse, and that they purchase the efficient product because they dislike their own more advantageous position relative to sellers in the game. Thus, the buyer may in that case purchase the efficient input not because he trusts the input seller to provide high quality, but because he wants to minimize the difference in earnings between himself and the input seller. Consider the Fehr-Schmidt model:

$$U_i = x_i - \alpha_i \max(x_j - x_i, 0) - \beta_i \max(x_i - x_j, 0)$$

in which we assume that $\alpha_i \geq \beta_i > 0$, and $\beta_i \leq 1$. If $\beta_i = 0.5$, a participant is, when earning less than the other player, indifferent between keeping one Taka to himself and giving it to the other player. Beranek, Cubitt and Gachter (2015) compare four studies in which the mean level of α_i is around 1.2 (with one exception, 0.754) and the mean level of β is about 0.5 (with a mean of 0.6 in one study), so people are more averse to inequality that is disadvantageous to themselves.

Now, the buyer's utility from purchasing the inefficient product (which generates 30 Taka for the buyer and 0 Taka for the seller) is $30(1 - \beta)$, whereas the utility from the efficient product with price p_i is:

$$U_i = \begin{cases} 30 - p_i - \beta_i(10 - 2p_i) \;\; if \;\; p_i \leq 5 \\ 30 - p_i - \alpha_i(2p_i - 10) \;\; if \;\; p_i \geq 10 \end{cases}$$

Table 10: Buyer and seller behaviors including additional controls

	Seller behavior				Buyer behavior			
	Selected price		Offers high quality		Buys Product B		Repeat purchase	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any treatment	0.016	0.009	0.034	0.018	0.013	-0.007	0.040	0.047
	(0.722)	(0.890)	(0.348)	(0.676)	(0.766)	(0.914)	(0.286)	(0.192)
Rewards	0.059*	0.073*	0.096**	0.095**	0.013	0.001	0.059*	0.048
	(0.080)	(0.062)	(0.028)	(0.014)	(0.770)	(0.988)	(0.080)	(0.140)
Participant badge number	0.004	0.004	-0.007	-0.007	-0.002	-0.003	0.001	0.001
	(0.572)	(0.596)	(0.472)	(0.444)	(0.430)	(0.372)	(0.740)	(0.882)
Order of cluster	0.001	-0.015	0.008*	0.015	0.009**	0.006	0.005*	0.015
	(0.742)	(0.260)	(0.090)	(0.282)	(0.010)	(0.234)	(0.086)	(0.176)
Order of session in cluster	-0.047	-0.052	-0.002	0.007	-0.017	-0.025	-0.018	-0.015
	(0.134)	(0.126)	(0.946)	(0.868)	(0.570)	(0.408)	(0.530)	(0.634)
Seller S1	0.019	0.021	-0.020	-0.023				
	(0.380)	(0.386)	(0.630)	(0.604)				
Ravens score	-0.041***	-0.043**	0.001	0.008	0.034**	0.031*	-0.015	-0.008
	(0.004)	(0.010)	(0.946)	(0.626)	(0.028)	(0.082)	(0.400)	(0.696)
Ravens score is missing	-0.231***	-0.232**	-0.111**	-0.052	0.050	0.067	0.001	-0.030
	(0.002)	(0.018)	(0.016)	(0.426)	(0.204)	(0.264)	(0.952)	(0.382)
Understanding of benchmark game	-0.196**	-0.160**	0.028	0.020	0.013	0.031	-0.032	0.002
	(0.022)	(0.044)	(0.872)	(0.922)	(0.788)	(0.584)	(0.490)	(0.982)
Talked with player from earlier session	0.089	0.077	0.157	0.175	-0.115	-0.118	-0.277**	-0.317***
	(0.108)	(0.280)	(0.356)	(0.400)	(0.138)	(0.126)	(0.024)	(0.002)
Talked with player from earlier session is missing	0.281***	0.218***	-0.026	0.028	-0.104**	-0.074	-0.021	0.045
	(0.000)	(0.010)	(0.644)	(0.776)	(0.020)	(0.166)	(0.508)	(0.380)
High understanding	-0.025	-0.022	0.004	-0.010	0.001	-0.004	0.035	0.023
	(0.286)	(0.386)	(0.892)	(0.820)	(0.970)	(0.894)	(0.234)	(0.430)
High connectedness	0.039	0.047	-0.052	-0.046	-0.005	-0.026	-0.009	0.030
	(0.240)	(0.300)	(0.206)	(0.328)	(0.844)	(0.560)	(0.704)	(0.392)
Faridpur		0.088		-0.002		0.084		-0.022
		(0.510)		(0.976)		(0.336)		(0.794)
Jhenaidah		0.046		-0.102		-0.003		-0.007
		(0.592)		(0.290)		(1.000)		(0.900)
Madaripur		0.235		-0.115		0.074		-0.152
		(0.310)		(0.544)		(0.496)		(0.340)
Log consumption		-0.033		-0.038		-0.004		-0.033
		(0.232)		(0.280)		(0.830)		(0.222)
Log age		0.069		0.056		-0.054		0.063
		(0.208)		(0.452)		(0.336)		(0.318)
Married		-0.099		-0.002		-0.096		-0.080*
		(0.208)		(0.988)		(0.120)		(0.080)
Literate		0.014		0.056		-0.066*		-0.056
		(0.840)		(0.628)		(0.056)		(0.170)
Years of education		-0.003		0.000		0.003		0.003
		(0.446)		(0.910)		(0.464)		(0.596)
Has secondary income		0.006		-0.012		0.002		-0.005
		(0.794)		(0.728)		(0.906)		(0.868)
Social proximity to others in general		0.015		0.000		-0.247*		-0.109
		(0.190)		(1.000)		(0.050)		(0.372)
Social proximity to others in session		-0.021		-0.007		0.170		-0.075
		(0.686)		(0.970)		(0.108)		(0.356)
Nr. observations	2160	2160	2160	2160	4320	4320	3588	3588
R-squared	0.152	0.166	0.093	0.103	0.080	0.100	0.028	0.039
Mean value	0.421	0.421	0.350	0.350	0.830	0.830	0.568	0.568

Dependent variables: Selected price as a proportion of the maximum price in Columns (1)-(2); Dummy variable equal to one if and only if the seller offers high quality in Columns (3)-(4); Dummy variable equal to one if and only if a buyer purchases Product B in Columns (5)-(6); Dummy variable equal to one if and only if a buyer purchases Product B from the same seller as in the previous round, conditional on purchasing Product B in the previous round, in Columns (7)-(8). Model estimated using linear least squares with round fixed effects. First-round observations have been excluded. *p*-values shown in parentheses are based on a wild bootstrap clustered at the session level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

At a price of $p_i = 0$, an inequality averse buyer will always prefer the efficient product, given that the utility from the inefficient product, $30(1-\beta)$, is strictly lower than the utility from the efficient product, $30-10\beta_i$. At a price of $p_i = 5$, an inequality averse buyer will prefer the efficient product for all β such that $30(1-\beta) < 25$, i.e. for all $\beta > 1/6$. At a price of $p_i = 10$, the condition for purchasing the efficient product when expecting low quality becomes $30(1-\beta) < 20-10\alpha$, or $\beta > (1+\alpha)/3$. For the mean participant, with $\alpha_i = 1.2$ and $\beta_i = 0.5$, this condition is violated. For a price of $p_i = 15$, the condition becomes $30(1-\beta) < 15-20\alpha$, or $\beta > 15/10$, which is violated by the condition that $\beta_i \leq 1$. Thus, for $p_i \geq 10$, it is implausible (and for $p_i \geq 15$ even ruled out by $\beta_i \leq 1$) that participants who expect low quality purchase the efficient product out of inequality aversion.[14] It is therefore important to distinguish buyer behavior when $p_i \leq 5$ from behavior when $p_i \geq 10$, and we can interpret purchases of the efficient product as 'trust' only in the latter case.

[14]If the buyer expects the seller to have income from another buyer, then an inequality-averse buyer will have higher utility from the inefficient product even if the price is zero, because the seller earns 20 when the buyer purchases the inefficient product (20 Taka times one buyer), and 40 when the buyer purchases the efficient product (20 Taka times two buyers), while the buyer earns 30 Taka in both cases. Thus, the difference in earnings is 10 Taka in both cases, but for all $\alpha_i > \beta_i$, the buyer will prefer the inefficient product.