The role of gender in bargaining: evidence from selling seed to smallholders in Uganda

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Abstract

In rural societies with strong gender norms and customs, small informal agribusinesses may often be one of the few ways in which women can independently generate revenue. However, previous research has indicated that female run businesses may be perceived less favorably compared to their male counterparts. In this paper, we examine potential consequences of these biased perceptions on business transactions. In particular, we test whether the gender of the seller has an impact on buyers' negotiation strategies and eventual outcomes in bilateral price negotiations. We use a lab-in-the-field experiment in eastern Uganda, where a representative sample of smallholder maize farmers is offered the opportunity to bargain over a bag of maize seed of an improved variety from a male or female seller. We find that buyers confronted with a female seller are less likely to accept the initial offer price and respond with a lower counter-bid than farmers faced with a male seller. Negotiations take on average one round longer when the seller is a woman and the transaction price is almost 9 percent lower. For comparison, we also look at the effect of the starting price on the same bargaining outcomes and find that the gender disadvantage is roughly equal to a 20 percent higher starting price.

Keywords: gender bias, bargaining, maize seed, Uganda

1 Introduction

Over the past few decades, attention has shifted from considering farm households as a single unit to studying the structure and organization of the household as an institution comprised of different actors, each with their own preferences, which may or may not align (Agarwal, 1997). In the context of collective bargaining models, research has established the importance of household members' control over resources for their intra-household bargaining power and outcomes in terms of intra-household equity.

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In settings characterized by strong gender norms and customs, roles and responsibilities within households often have a gendered dimension. For instance, men could be responsible for economic activities like maize production, while women take care of reproductive activities such as fetching water and firewood. In settings characterized by subsistence agriculture, entry points for women in food supply chains are generally downstream, consisting of activities such as light processing and retail. Research indeed shows that informal vendors often tend to be self-employed or owner-operatored women. As such, these forms of informal self-employment often constitute a crucial source of income that women can earn independently from the husband (Giroux et al., 2021).

Unfortunately, even though women would be allowed to participate in these roles, perceptions may still be stacked against them. For instance, previous research with agro-input dealers in Uganda showed that female managed agro-input shops are perceived less favorably on a range of attributes than their male counterparts. This includes perceptions that female-managed shops sold seed of lower quality, while in reality the reverse seemed to be true (De, Miehe, and Van Campenhout, 2024). The difference in perceptions was largest when customers were asked to rate agro-dealers in terms of price competitiveness, again despite the fact that we found no difference between average prices charged by male- and female-managed agro-input shops.

In this paper, we investigate whether this gender bias in perception extends into price bargaining processes and outcomes. In the context of rural Uganda, haggling over prices is the rule rather than the exception. The bargaining strategies that parties use and the ensuing transaction price is a function of a range of variables, such as (perceptions about) the purchasing power of parties involved, power relationships, (beliefs about) preferences, etc. If some of these variables are skewed against female informal vendors (such as perceptions related their ability to properly store and handle the goods they sell), gender bias may also manifest in the strategies that negotiating parties use, and the outcome of the process.

At the core of our study is a simple lab-in-the-field experiment. In particular, we offer the opportunity to a representative group of maize farmers to buy a bag of hybrid maize seed. A trained enumerator, guided by a script implemented on a tablet computer, acts as a seller. After briefly explaining the virtues of hybrid maize seed to the buyer, the seller asks if the buyer wants to buy the seed at an initial offer price. If the buyer rejects the offer, he or she is encouraged to call out a first counter-bid. The algorithm on the tablet then determines if the seller agrees on the counter-bid (depending the difference between the two bids being small enough) or to enter into a second round of negotiations and name a second offer price (which is lower than the previous offer price but higher than the farmer's previous counter-bid). This process continues until the farmer accepts an offer price, or the seller is instructed to accept a bid because the difference between last bid price and new offer price is lower than a particular threshold.

We provide exogenous variation along two dimensions. First, we assign farmers to either a male or female seller in a way that is as good as random. This allows us to estimate the causal impact of the seller's gender on the bargaining process and outcomes. Second, we also randomly assign the initial offer price that the seller (male or female) asks of the farmer, allowing us to estimate the causal impact of initial offer price on the bargaining process and outcomes, and to compare the sizes of these two effects.

Our experiment allows us to investigate the effect of the seller's gender (and the initial offer price) on various strategies used by the buyer as well as on outcomes of the process. These include: (1) the likelihood that the buyer immediately accepts at the initial offer price (and hence no bargaining takes place); (2) the first counter-bid following the initial offer price; (3) the likelihood that this first counter-bid is the minimum admissible counter-bid; (4) the likelihood that the buyer sticks with the initial counter-bid throughout the bargaining process (that is, the buyer plays a non-concessional strategy); (5) the number of negotiation rounds before any party accepts; (6) the likelihood that the buyer accepts at any point (as opposed to ending negotiations because of convergence); and (7) the transaction price.

Results show that the likelihood that the buyer immediately accepts is reduced when the seller is a woman. Negotiations with female sellers also leads to a substantial decrease in buyers' initial counter-bids and a higher percentage of buyers starting with the lowest possible bid. The bargaining process with female sellers tends to involve more negotiation rounds, indicating increased resistance from buyers, and ultimately resulting in transaction prices that are approximately UGX600 lower than transaction prices that emerge when the seller is a man. In sum, we find that the gender effect seems to manifest early in the negotiation process, influencing initial counter-bids and setting the stage for subsequent interactions, emphasizing the significant impact of seller gender on bargaining dynamics.

This article contributes to the existing literature in different ways. Most research on bargaining uses a WEIRD population (Western, Educated, Industrialized, Rich, and Democratic), yet bargaining is much more prevalent in non-WEIRD societies, and may also differ in these settings (Henrich, Heine, and Norenzayan, 2010; Andersen et al., 2018). By implementing a lab-in-the-field experiment in the context of smallholder farmers bargaining over seed, we contribute to an emerging literature that studies how economic transactions transpire in more realistic settings (Fitzpatrick, 2017; Bhattacharya and Dugar, 2023). Furthermore, the majority of studies that look at discrimination in the market place are mainly concerned about seller-side discrimination, where sellers offer different prices depending on minority membership (Castillo et al., 2013; Ayres and Siegelman, 1995; Fitzpatrick, 2017). We focus on buyer-side discrimination, where buyers are willing to pay different prices to minority group membership.

The remainder of this article is organized as follows. In the next section, we provide a brief overview of the related literature. We then proceed with an in-depth description of the bargaining experiment, followed by a description of the study population. Section 5 provides the results of the analysis, and a final section provides a conclusion, points out some limitations of the study, and gives suggestions on ways forward.

2 Related literature

A large number of studies—based on observational data and more rigorous field experiments alike—find overwhelming evidence of differences in the outcomes of market transactions when minorities (including women) are involved as a transacting party (as compared to cases where all transaction parties come from the majority, see Riach and Rich (2002)). This unsettling regularity has led to a search for the sources of this apparent discrimination, generating an equally large body of research.

Research on the causes of discrimination is particularly prominent in labour economics, where so-called situation or audit tests have been used to estimate the effect of race on the likelihood of being invited for a job interview (eg: Bertrand and Mullainathan, 2004). The fact that women generally earn less than men is also a fertile breeding ground for research. Potential explanations include sorting (where women end up in companies that pay lower wage premiums), the fact that women are offered lower wages, and/or the fact that women negotiate worse wage bargains (Card, Cardoso, and Kline, 2015; Leibbrandt and List, 2015). However, recent research also suggests interesting dynamics, where an initial gender disadvantage turns into an advantage over time (Bohren, Imas, and Rosenberg, 2019).

Given the large volume of research, we focus on a specific set of studies. First, we are interested in the effect of gender of one party (the seller) on bargaining behaviour of the other party (the buyer). This is different from studies that look at the impact of gender on own behavior (for instance, testing if female buyers' initial bid price is different from male buyers' initial bid price *ceteris paribus*). While the impact of gender on own behaviour is certainly an interesting question, it is much harder to investigate since gender cannot be randomized. Second, we will focus on studies that capture at least some elements of bilateral bargaining. This excludes studies where only the outcome of the transaction is recorded; most studies we review here involve some kind of lab-in-the-field component where actual bargaining between partners for real stakes is observed.

List (2004) studies bilateral negotiation in the US sports card market, and observes that 1) sellers from minority groups (in terms of gender, race, and age) receive initial and final bids that are lower than those received by majorities and that 2) buyers from minority groups receive initial and final offers that are higher than those received by majority groups. He further finds that the former type of discrimination (that is, buyer-side discrimination) is more pronounced than the latter (seller-side discrimination). Note that in our experiment, we only test for buyer-side discrimination.

One of the first studies to use identical scripted bargaining strategies to study the impact of gender (and race) is Ayres and Siegelman (1995). In their study, seller-side discrimination in the market for new cars is investigated. Ayres and Siegelman (1995) carefully selected mock buyers to resemble each other as closely as possible, and trained them to bargain uniformly through a prespecified bargaining script. From over 300 negotiations at new car dealerships in the US, they conclude that dealers quoted significantly lower prices to white males than to black or female test buyers.

Castillo et al. (2013) report on a sequential bargaining experiment in the market for taxi rides in Lima. Here, the focus is also on seller-side discrimination, as they are interested in the impact of gender of the customer on the bargaining strategies and outcomes of the taxi driver (which are all men). They use a fixed-offer bargaining script that both male and female potential passengers follow when interacting with (male) taxi drivers. Interestingly, they find that men are offered and pay higher prices than women.

Fitzpatrick (2017) tests whether women pay more or less than men in the Ugandan market for antimalarial drugs in yet another seller-side discrimination audit study. To do so, she started from a census of outlets selling antimalarial drugs in 5 parishes and sent mystery shoppers to purchase an antimalarial drug according to randomly assigned scripts. She finds evidence that women are offered higher prices for the same product as men. However, women are more successful at bargaining, and as a result the transaction price does not differ between male and female buyers.

The only study that investigates buyer-side discrimination is Delecourt and Ng (2021), who start from the observation that women-owned micro-businesses are generally less profitable than male-owned businesses. To separate the effect of differences in business characteristics from the gender effect, they conduct a field experiment among Indian vegetable sellers where men report earning roughly 50 percent more daily revenue than women. In their experiment, they keep every business aspect (e.g., location, opening hours, stock, etc.) the same except for the gender of the seller. After controlling for supply side factors in this way, they find that earnings between male and female vendors do not differ and conclude that there is no buyer-side discrimination.

3 Bargaining Experiment

In our experiment, farmers are offered the opportunity to buy a bag of seed from a seller through a bargaining process. Compared to a one-shot take-it-or-leave it approach (such as the Becker–DeGroot–Marschak method that is often used to measure willingness to pay, see for instance Burchardi et al. (2021)), a bargaining experiment is more realistic in settings where haggling over prices is the norm. An initial offer price is randomly drawn from a set of four prices (UGX12,000, 11,000, 10,000, and 9,000), with higher probability on the extremes (probabilities are 0.3, 0.2, 0.2, and 0.3 respectively).[1] This price is then presented to the farmer as the price of the bag of seed. The seller explains what

[1] The price at which seed was sold in shops was 12,000. As farmers thus receive a discount on the price of seed (unless they draw the highest price and immediately accept), we did not offer any additional incentives to participate to farmers.

kind of seed it is and what the advantages are, and the farmer is asked if they want to buy the seed for this price. If the farmer says no, then they are encouraged to name their counter-bid price. The minimal bid price was UGX3,000, but this lower limit was not communicated to the farmer in advance. Only if the farmer's initial counter-bid was lower than 3,000 it was communicated that this was the lowest acceptable price and the farmer could revise the first counter-bid to 3,000 or above, or abandon the game.[2][3]

Sellers then follow a concession script where they split the difference between the offer price and the farmer's bid (List, 2004). The tablet computer guiding the seller uses an algorithm to determine a counter-offer that the enumerator asks in a second round of negotiation. This new offer price is determined as the farmer's bid price plus 80 percent of the difference between the (initial) offer price and the farmer's bid price, and this is rounded to the nearest multiple of 500. This updated (lower) offer price is then compared to the last bid price of the farmer. If the difference is smaller than 500, the seller is instructed to accept the bid price. If the difference between the updated (lower) offer price and the bid price is larger than 500, then the updated offer price is presented to the farmer and the farmer gets a second opportunity to accept or reject. If the farmer does not accept, the farmer is encouraged to make a second bid that should be equal to or higher than the first bid the farmer made. Based on this second bid, a third offer price is determined as the farmer's second bid price plus 80 percent of the difference between the second offer price and the farmer's second bid price.

Bargaining continues in this way until the farmer accepts an offer price, or the price difference between the bid and offer price is smaller than 500 Ugandan shilling, in which case the computer instructs the enumerator to sell at the last bid price. If the highest initial offer price of UGX12,000 was drawn and a farmer sticks to the lowest possible bid price (UGX3,000), the program accepts this bid after 10 negotiation rounds. Farmers were not informed about the algorithm. That is, they did not know that the seller would eventually accept even if they stick to the lowest price. We do not expect that farmers would be able to learn about the offer price formation algorithm from a single bargaining experiment, and we also made sure that farmers could not communicate with each other by making sure the experiments were run in parallel in villages. All parameters in the experiment were informed by extensive testing in the field.

[2] As UGX3,000 is less than a dollar and participating farmers were told to bring some money to the experiment (see next section), virtually all farmers stayed in the game.

[3] To reduce potential bias from tester behaviour, the seller was instructed to follow a standard script: "Take one bag of seed and show it to the farmer. Read out the following: 'Hello, as part of the research project we introduced earlier [during consent], we are giving you the opportunity to buy a bag of maize seed of an improved variety to try out in your fields. The seed is a popular hybrid variety called Bazooka. Bazooka is high yielding, tolerant to drought, tolerant to pests and diseases for example resistant to kayongo. The seed has been obtained from a certified agro-input dealer and we can guarantee you that it is fresh and has not been tampered with in any way. Would you be interested in buying this? You can use cash or mobile money to pay. We offer you the seed at [insert randomly selected initial offer price]. Do you want to buy the seed at this price?'"

The experiment was timed to coincide with the start of the harvest season to ensure high demand for the seed. We had a team of 26 enumerators, of which 10 were female and 16 were male. While a 50-50 split would have resulted in highest statistical power for the comparison we are interested in, the fact that we have more men than women does not affect the estimate of the treatment effect which is simply the difference in average outcomes in the group of farmers that was confronted by a male seller and the group that was confronted by the female seller.

4 Sample

The total sample consists of a representative sample of 760 households, drawn from 4 districts in southeastern Uganda (Mayuge, Kamuli, Iganga, and Bugiri). These districts were chosen because maize is an important crop for both food and cash for smallholder farmers living there. In these 4 districts, 76 villages were randomly selected from a list of all villages, with the likelihood of a village being selected proportional to the number of households that live in the village. Within each village, 10 households were randomly selected.

Enumerators visited these sampled households and asked to speak with the person within the household that generally makes the most decisions related to growing maize and input use, such as what type of maize seed to use. An appointment was then made with these individuals for a follow-up visit. The farmers were told to "bring some small money to this follow-up meeting as there may be an opportunity to buy something". During the follow-up meeting, individuals were subjected to the bargaining experiment and after completing the experiment, a short survey was administered. We find that 22 percent of interviewed individuals were women. The average age of the person that participated in the bargaining experiment was 49 years. The sampled households consisted of about 8 people. The average household in our sample has about 1.5 maize plots of on average about 1.1 acres each. Yields on an average plot was about 436 kilograms per acre in the previous agricultural season (Nsambya of 2022). As such, the average household produced about 700 kilograms of maize.

A significant share of farmers have experience with improved seed varieties. We find that about 40 percent of farmers in our sample used seed of an open pollinated or hybrid variety in the previous season on any of their plots. However, farmers have less experience with the type of seed that we offer in the field experiment (a type popularly known as bazooka). Only about 9 percent of farmers indicate that they used this type of seed on any of their plots in the previous season. We also asked broader questions related to the seed we use in the experiment. For instance, we find that while 53 percent of sampled farmers know bazooka, only 13 percent ever tried it. This may be because farmers consider bazooka to be an expensive variety.

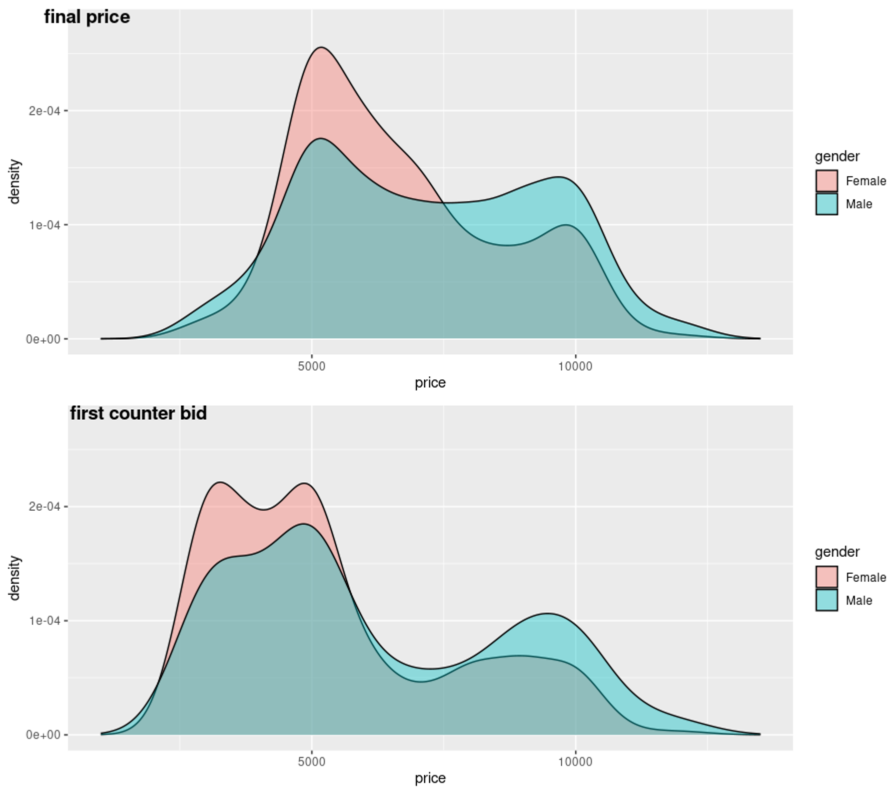

Figure 1: Prices

5 A gendered analysis of the bargaining process

Figure 1 shows that the bargaining process is more likely to converge to a low price when the seller is a woman than when the seller is a man. When the seller is a woman, there is a clear peak in the density around UGX5,000. When the seller is a man, there is also some bunching around 5,000, but the likelihood that the eventual transaction price is around 5,000 does not differ all that much from the likelihood that the negotiation ends up at a price around 10,000.

The bottom panel shows that the disadvantage of the female seller immediately manifests itself at the start of the negotiation process when the buyer names their first counter-bid after the seller named the initial (randomly assigned) offer price. When the seller is man, a first counter bit of 5,000 is most likely. When the seller is a woman, farmers are equally likely to quote the absolute minimum as 5,000. As with the first offer price, the first counter-bid price is likely to be an important anchoring point for the rest of the negotiation, and the gendered effect is likely to affect a range of other outcomes in the bargaining process (Galinsky and Mussweiler, 2001).

We now turn to a more formal analysis of various bargaining outcomes and strategies using regression analysis. First, we exploit the fact that the initial offer price was randomly assigned and look at differences in bargaining outcomes and strategies between farmers that were offered a high initial price and those that received a lower initial offer. To do so, we construct an indicator variable (T_i^p) which takes the value of 1 if the initial price was 12,000 or 11,000, and zero if it was 9,000 or 10,000. Second, we look at differences in bargaining outcomes and strategies between farmers that were confronted by male and those that faced female sellers. To do so, we also construct an indicator variable of the gender of the seller (T_i^g) which takes the value of 1 if the seller was a woman and zero if it was a man.

The effect of the gender of the seller is estimated using Equation 1. In this equation, y_i represents the outcome of interest (for instance, the initial bid price or an indicator that describes the use of a particular strategy such as sticking to the initial bid throughout the entire negotiation process) of farmer i. ε_i is a buyer specific residual, and T_i^p and T_i^g are indicator functions for the initial offer price and the gender of the seller respectively. There parameter of interest in this equation is β_g, the estimate of the effect of the seller being a woman.

The second experimental factor, the initial offer price, is crossed into the design (much like in factorial designs). It is well know that the most agnostic specification to estimate parameters in crossed designs it to control for the orthogonal experimental factor, as well as for potential interaction effects between the experimental factors (Muralidharan, Romero, and WÃŒthrich, 2023). The problem is that modeling interaction effects in a regression with binary treatments essentially splits the sample into four treatment cells, significantly reducing statistical power for comparisons. However, if we treat the orthogonal factor as a co-variate and control for it by entering it in deviations from its mean (and interacted with the main experimental factor) we can pool treatment cells to boost power and obtain an unbiased estimate of β_g even if there is an interaction between the two experimental factors. Therefore, in Equation 1 where the effect of the gender of seller (β_g) is the effect of interest, the treatment indicator for a initial offer price is entered in deviation from its mean $\left(T_i^p - \overline{T^p}\right)$. A similar equation is estimated for when the effect of a high initial offer price (β_p) is of primary interest (Equation 2). In that case the treatment indicator for the gender of the seller is entered in deviation from its mean $\left(T_i^g - \overline{T^g}\right)$. Finally, as we found some indications of gender matching in the negotiation pairing (see section 6), we control for the gender of the buyer in the regressions as well (x_i).

The effect of the initial offer price and the effect of the gender of the seller are estimated using a single specification (Equation 1).. α is a constant to be estimated, β_p is the estimate of the impact of a high starting price and β_g is the estimate of the effect of the seller being a woman.

$$y_i = \alpha + \beta_g T_i^g + \beta_{cp}\left(T_i^p - \overline{T^p}\right) + \beta_{gp} T_i^g \left(T_i^p - \overline{T^p}\right) + \gamma x_i + \varepsilon_i \tag{1}$$

\

$$y_i = \alpha + \beta_p T_i^p + \beta_{cg}\left(T_i^g - \overline{T^g}\right) + \beta_{pg} T_i^p \left(T_i^g - \overline{T^g}\right) + \gamma x_i + \varepsilon_i \tag{2}$$

The central parameter in this research is the effect of gender the the seller (β_g). The effect of the initial offer price was included as a benchmark to which the effect of the gender of the seller can be compared to judge economic significance. However, we also added the randomized starting price to compensate for the fact that we did not do ex-ante power calculations for the gender comparison. Adding a treatment that is known to work to an experiment is a strategy that is sometimes used in clinical trials to demonstrate that a particular implementation of a design with a given sample size is powered to detect a treatment effect that is at least as as large as the effect of the treatment that is known to work. In our case, we thus argue that being able to replicate an established finding (that the initial offer price affects the entire bargaining process that follows—see for instance Chertkoff and Conley (1967); Ochs and Roth (1989); Kahneman (1992)) means that we are powered to detect effects that are at least as large.

We consider the following outcomes and strategies to judge impact of the gender of the seller (and initial offer price): (1) the likelihood that the buyer accepts the initial offer of the seller (and thus no negotiation ensues); (2) the counter-bid price that the buyer calls after the initial offer by the seller; (3) the likelihood that the initial counter bid is the lowest admissible bid (UGX3,000); (4) the likelihood that the buyer sticks to their initial bid; (5) the number of negotiation rounds before the buyer accepts or the seller is instructed to accept by the algorithm; and (6) the final transaction price.

Results of the analysis are in Table 1, which shows different outcomes and strategies as rows, and control group means and differences in these outcomes between treatment groups in columns. More in particularly, the first column of Table 1 shows overall averages for the control group (the subset of buyers that negotiated with a male seller and started from a low initial offer prices of UGX9,000 or 10,000). The second column in Table 1 reports differences in the dependent variable between negotiations with a female seller and a male seller, corresponding to β_g in equation 1. The third column in Table 1 reports differences in the dependent variable between negotiations that started with a high initial offer price (12,000 or 11,000) and negotiations where the initial offer price was low (9,000 or 10,000), corresponding to β_p in equation 2.

As a first outcome of interest, we see that about 30 percent of buyers immediately accept buying the seed pack at the initial offer price. Interestingly, we see that the likelihood that farmers immediately accept reduces substantially when the seller is a woman. The likelihood that a farmer immediately accepts reduces even more when the initial offer is high: If the seller asks for at least 11,000 Ugandan shilling, only about 11 percent of buyers accept immediately.

We already touched upon the importance of the initial counter-bid in the negotiation process and revisit the first counter-bid of the buyer here (see starting price in Figure 1). The average counter-bid by farmers in response to this initial offer was just over UGX6,000. We find a significant reduction in the first bid price when the seller is a woman. The effect is also economically significant, amounting to only 87 percent of the initial bid price that male sellers are confronted with. For this outcome, there is no significant impact from the initial

Table 1: Effect of high price and gender of seller on bargaining

	mean in Ctrl	seller is women	offer price is high
Intial accept (%)	0.298	-0.113**	-0.192**
	(0.458)	(0.026)	(0.024)
Starting price (UGX)	6139	-806**	-85
	(2529)	(190)	(180)
Bottom price (%)	0.175	0.060+	0.016
	(0.380)	(0.031)	(0.029)
Sticky strategy (%)	0.395	-0.091*	-0.038
	(0.490)	(0.039)	(0.038)
Rounds (number)	4.774	0.909**	1.982**
	(3.096)	(0.220)	(0.209)
Buyer accepts (%)	0.397	-0.118**	-0.172**
	(0.490)	(0.032)	(0.030)
Transaction price (UGX)	7034	-603**	335*
	(2024)	(161)	(153)
Number of Observations	760	760	760

Note: **,* and + denote significance at the 1, 5 and 10% levels.
"Initial accept" is the likelihood that the buyer immediately accept to buy the seed pack at the initial offer price of the seller; "Starting price" is the initial counter bid by the buyer following the initial offer price of the seller; "Bottom price" is the likelihood that the buyer responds to the initial offer price of the seller with the lowest admissible bid price (UGX 3000); "Sticky strategy" is the likelihood that the buyer sticks to his or her initial counter-bid throughout the bargaining process; "Rounds" is the number of negotiation rounds; "Buyer accepts" is the likelihood that the buyer accepts (as opposed to situations where negotiation ends because the last bid and offer price is smaller than the threshold and the seller accepts); and "Transaction price" is the price at which the transaction was concluded.

price level.

We also find that about 17 percent of buyers started negotiating from UGX3,000, the lowest possible bid. In line with the previous finding, we see that the share of buyers going for the lowest possible counter-bid is significantly higher if the seller is a woman (although only at the 10 percent level). The level of the initial offer price does not seem to affect this share.

Another interesting negotiation strategy some buyers seem to use is to name an initial counter-bid and stick to this price. A surprisingly large share of farmers (40 percent) uses this strategy. We find that a significantly lower share of farmers use this strategy when the woman is a seller. Apparently, the lower base price this subgroup starts from increases the likelihood that farmers increase bid prices over time. The use of this strategy does not depend on the initial offer price.

The average negotiation took almost 5 rounds before the buyer agreed or the difference between the last bid and the last offer was smaller than the threshold at which the seller was instructed to agree. We find that negotiation increases to about 7 rounds if the seller started with a high initial offer price. The significant and positive effect is not surprising given that sellers follow a concessional script where the steps are a direct function of the initial offer price. More interestingly, when the seller is a woman, this adds an additional round to the negotiation process.

The fact that female sellers face an additional round of bargaining seems to suggest that farmers that negotiate with a woman are less likely to agree with an offer price. We thus also look at the share of negotiations that were concluded with the buyer agreeing (as opposed to instances where the negotiations ended because the difference between offer price and bid price was less than UGX500). While in about 40 percent of cases the buyer eventually accepts, this percentage is almost 12 percentage points lower when the seller is a woman. A high offer price also leads to a lower likelihood that the buyer accepts.

Finally, we look at what is arguably the most important outcome. The average transaction price was about UGX7,000, which was about 70 percent of the maximum initial offer price, and 2.3 times the minimal bid price. If the seller is a woman, we see that the transaction price is about UGX600 lower than when the seller is a man. An initially high offer price increases the final price by UGX335.

Together, these results show a clear and substantial effect emanating from the seller's gender. The effect originates early in the bargaining process, with a lower first counter-bid and a higher share of buyers that start off at the lowest possible bid price when the seller is a woman. This lower bound appeasers to serve as an anchor for subsequent strategies—with buyers less likely to accept and hence more negotiation rounds—eventually leading to a significantly lower price at which the transaction takes place.

6 Discussion, limitations, and way forward

In this paper, we examined the potential consequences of gender related discrimination on market transactions. Specifically, we tested whether the gender of seed sellers had an impact on seed buyers' negotiation strategies and eventual outcomes in bilateral price negotiations. This was done through a lab-in-the-field experiment in eastern Uganda, where a representative sample of smallholder maize farmers was given the opportunity to bargain over a bag of maize seed of an improved variety from either a male or female seller. The findings revealed that buyers confronted with a female seller were less likely to accept the initial offer price and responded with a lower counter-bid compared to farmers faced with a male seller. Negotiations, on average, took one additional round longer when the seller was a woman and resulted in a transaction price that was almost 9 percent lower.

Our results are in line with List (2004) who finds that buyer-side discrimination appears to be more pronounced than seller-side discrimination. Delecourt and Ng (2021), in contrast, find no evidence of buyer-side discrimination in a context closer to ours. However, an important difference with our study is that in their context—the Indian market—transactions tend to be fast-paced, short and without chit-chat, and bargaining is uncommon. Exley, Niederle, and Vesterlund (2020) make the argument that since discrimination is already present from the initial counter-bid, it is unlikely that differences in outcomes are due to differences in negotiation. Our study indicates that differences in final outcomes have their origin in both the initial counter-bid and the ensuing negotiations.

As is generally the case, our experiment only establishes the existence of discrimination, but it does not tell us anything about the nature of discrimination. In the economic literature, a distinction is generally made between discrimination that involves some kind of animus on the one hand and statistical discrimination on the other. While in the former case there is some kind of general distaste for minorities or a "social custom" of discrimination (Riach and Rich, 2002), in the latter case the apparent discrimination is simply the result of market actors using average group characteristics as a proxy of reservation value. In our case, statistical discrimination would mean that buyers think that women would be willing to accept lower prices than men.[4]

Our study has several limitations. One limitation of the study is potential bias from tester behavior. For instance, it could be that male sellers bargain harder than female sellers. Confounding by tester behavior is a known problem in audit studies that involve actual people to do the transactions, and a reason why correspondence studies (where personal contact is avoided, such as in the Bertrand and Mullainathan (2004) study, where CVs of imaginary job candidates with white and non-white sounding names are sent to potential employers

[4]There are several reason why this could be the case. As an example, during qualitative field work with agro-dealers as a followup for De, Miehe, and Van Campenhout (2022), buyers mentioned that they thought "women, they do not need the money. They have husbands that should provide for the money".

to screen on discrimination) are preferred. We tried to mitigate this problem by instructing our enumerators to strictly stick to a script on the tablet computer. However, we can not completely rule out the fact that male sellers behave differently during the field experiment than their female counterparts.

A second limitation lies in the fact that, for logistical consideration, we did not randomize ex-ante the gender of the seller. Sellers were sent to farmers based on who was available (hence the larger group where the seller was a man). As in Fitzpatrick (2017), supervisors were instructed not to assign enumerators to farmers in a systematic fashion. While we assume this happened randomly, we do find that women sellers had a significantly higher probability of being paired with women buyers than male sellers. To account for this, we include the gender of the buyer in as a control variable in the regression model. We further looked at balance on a range of characteristics (such as age, education level, etc.) between farmers that were paired to male and female sellers and generally found no significant differences. That said, we can not completely rule out that sellers and buyers were matched on some other (unobservable) characteristics.

Third, our study population may not be representative for real live situations. For instance, List (2004) works with subjects that endogenously select into the market and likely have previous experience in the transactions he is studying. In our case, it may be that participants have never bought seed in the past and did not intend to do so in the near future. Furthermore, it is not common for seed sellers to approach potential buyers at their homes; normally farmers would go to agro-input shops to buy seed. Our study should therefore be regarded as somewhere in-between an experimental study in a lab environment where certain behavioral patterns and roles are endogenously imposed on study subjects, and studies that observe actual individual behaviour in an existing market.

Fourth, our study does not look at heterogeneity in bias. One obvious sources of heterogeneity in this context would be the gender of the buyer, as gender homophily effects have been found in a wide range of interactions (McPherson, Smith-Lovin, and Cook, 2001). If we consider the gender of the buyer, we see that the reduction in both initial and transaction prices due to the seller being a woman is largest for female buyers. This suggests that female buyers appear to be even more biased than men. However, the difference is insignificant and the parameter estimate is likely to suffer from small sample size.

In light of the above, we can only echo Baranski et al. (2023) that more studies are needed on both seller-side and consumer-side discrimination to better understand how context matters (e.g., perishable versus non-perishable commodities, characteristics of actors, etc.).

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