

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

Bjorn Van Campenhout\*, Leocardia Nabwire†

March 2023

## 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 business may be perceived less favorable compared to their male counterparts. In this paper, we examine potential consequences of these biased perceptions on business transactions. More 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 do so using a lab-in-the-field experiment in eastern Uganda, where a representative sample of smallholder maize farmers are offered the opportunity to bargain over a bag of an improved maize seed variety from a male or female seller. We find that buyers that are confronted with a female seller are less likely to accept the initial offer price and respond with a lower counter bid price than farmers faced with a male seller. Negotiation 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 the effect of 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'

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\*Innovation Policy and Scaling Unit, IFPRI, Belgium - corresponding author: b.vancampenhout@cgiar.org

†Innovation Policy and Scaling Unit, IFPRI, Uganda

control over resources for their intra-household bargaining power and outcomes in terms of intra-household equity.

In settings characterized by strong gender norms and customs, activities within the household often have a gender dimension. For instance, men could be responsible for economic activities such as 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 the value chain, consisting of activities such as light processing and retail. Research indeed shows that informal vendors often tend to be self-employed or owner-operated 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 they would be allowed 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 favorable 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, Mieke, and Van Campenhout, 2022). 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 if this gender bias in perception extends into price bargaining processes and outcomes. In the context of rural Uganda, bargaining over prices is the rule rather than the exception. The ensuing transaction price is a function of a range of variables, such as perceptions, power relationships, well-being of negotiating partners, etc. If some of these variables are skewed against female informal vendors (such as perceptions related to the quality of what they sell), gender bias may also manifest in the strategies that negotiating parties use, and the outcome of the process. The fact that the bias in perceptions was particularly large for price related attributes of the seller leads us to suspect that there will also be effects on the bargaining process.

At the core of the study is a simple lab-in-the-field experiment. In particular, we offer the opportunity to a representative group of (both male and female) 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 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 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 randomly assign farmers to either a male or a female seller. This allows us to estimate the causal impact of the gender of the seller on the bargaining process and outcomes. Second, we also randomly assign the initial offer price that the (male or female) seller asks to the farmer, allowing us to estimate the causal impact of initial offer price on the bargaining process and outcomes. It will be interesting to compare the sizes of these two effects. Furthermore, we can look at interactions to test if eg the gender effect becomes even more important when the stakes are high (eg when the initial offer price is high).

Our experiment allows us to investigate the effect the gender of the seller and/or initial ask price on various strategies used by the buyer and outcomes of the process. These include: (1) the likelihood that the buyer immediately accepts the initial offer prices (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; (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 lead to a substantial decrease in the initial counter bid by buyers 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, ultimately resulting in transaction prices that are approximately UGX 600 lower than those with male sellers. This gender effect thus 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 several ways. First, most research on bargaining uses a WEIRD population (Western, Educated, Industrialized, Rich, and Democratic), yet bargaining is much more prevalent in non-WEIRD societies (Henrich, Heine, and Norenzayan, 2010). By implementing a lab-in-the-field experiment in the context of smallholder farmers bargaining over seed, we contribute to the knowledge on how economic transactions transpire in a more realistic setting (Fitzpatrick, 2017). Second, there is a large literature that investigates differences in bargaining behavior between men and women. Again, most of this research is situated in a Western context, often focusing on how these differences in bargaining contribute to the labour market outcomes such as the wage gap. We investigate the consequences of gendered bargaining processes in the context of informal employment in developing countries. Third, the large majority of studies that look at discrimination in the market place are mainly concerned about seller-side discrimination, whereby sellers offer different prices depending on minority membership. We focus on buyer-side discrimination, whereby buyers (are willing to) pay more to majority group members.

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. We then describe the study population. Section 5 provides the results of the analysis, and a final section concludes with discussion of the implications.

## 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 (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 an 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).

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 (in our case the seller) on bargaining behaviour of the other party (in our case 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 also an interesting question, it is much harder to investigate since gender can not 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 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, consumer-side discrimination) is more pronounced than the latter (seller-side discrimination). Note that in our experiment, we only test for consumer-side discrimination.

One of the first studies that uses 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. Also here, the focus is 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 anymore.

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 two field experiments among Indian vegetable sellers where men report earning roughly 50% more than women in terms of daily revenues. In their experiment, they keep every business aspect (eg location, opening hours, stock,...) 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 does not differ and conclude that there is no buyer-side discrimination.

### 3 Bargaining Experiment

Farmers are offered the opportunity to buy a bag of seed from a seller in a way that is as close as possible as how this happens in a real life setting where bargaining is the norm. The seller follows a standard script. An initial offer (or ask) price is randomly drawn from a set of four prices (12000,11000,10000,9000), with higher probability on the extremes (probabilities are 0.25, 0.125, 0.125, and 0.25 respectively).<sup>1</sup> This price is then presented to the farmer as the price of the bag of seed. The seller then explains what kind of seed it is and what the advantages are. The farmer is then asked if they want to buy the seed

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<sup>1</sup>The price at which seed was sold in shops was 12000. 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.

for this price. If the farmer says no, then they are encouraged to name their counter bid price. The minimal bid price was 3000, but this lower limit was not communicated to the farmer in advance. Only if the farmer’s initial counter-bid was lower than 3000, it was communicated that 3000 was the lowest acceptable price and the farmer could revise the first counter bid to 3000 or above, or abandon the game.

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 that guides the seller uses an algorithm to determine a counter-offer that the enumerator asks in a second round of negotiation. This new ask price is determined as the farmer’s bid price plus 80 percent of the difference between the (initial) ask price and the farmer’s bid price, and this is rounded to the nearest multiple of 500. This updated (lower) ask 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) ask price and the bid price is larger than 500, then the updated ask 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 ask price is determined as the farmer’s second bid price plus 80 percent of the difference between the second ask price and the farmer’s second bid price.

Bargaining continues in this way until the farmer accepts an ask price, or the price difference between the bid and ask price is smaller than 500 Ugandan shilling, in which case the computer instructs the enumerator to sell at the last price the farmer bids. If the highest initial offer price of 12000 was drawn and a farmer sticks to the lowest possible bid price (3000), 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 expected 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.

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 where female and 16 where male.

## 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, both for food and cash. 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. In each village, 10 households were then randomly selected.

Enumerators visited these households and asked to speak with the person that generally makes most decisions related to maize growing and input use such as what maize seed to use. These individuals were then subjected to the bargaining experiment and after completing the experiment, we administered a survey. We find that 22 percent of interviewed individuals were women, and the average age was 49 years old. They live in households 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 is about 436 kilogram per acre. As such, the average household produces about 700 kilograms of maize.

A significant share of farmers have experience with seed of an improved variety. We find that about 40 percent of farmers in our sample used seed of an open pollinated or hybrid variety in the previous season (Nsambya of 2022) on any of their plots. However, farmers have less experience with the type of seed that we are offering them 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 are using in the experiment. For instance, we find that 53 percent of our farmers know bazooka, but only 13 percent ever tried it. This may be because farmers consider bazooka to be an expensive variety.

## 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 UGX 5000. When the seller is a man, there is also some bunching around 5,000, but the likelihood that the eventual transaction price is around 5000 does not differ all that much from the likelihood that the negotiation ends up at a price around 10,000.

The bottom panel show that the disadvantage of the female seller already manifests itself at the very 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, the most likely price to start from is 5,000. When the seller is a woman, farmers are more inclined to quote the absolute minimum. As, in addition to the first offer price, the first counter bid price is likely to be an important anchoring point for the rest of the negotiation, the gender effect is likely affect a range of other outcomes in the bargaining process (Galinsky and Mussweiler, 2001).

We now turn to a more formal analysis of various outcomes and strategies using regression analysis. In a first model, we exploit the fact that the initial offer price was randomly assigned and regress outcomes on an indicator variable for “high initial price” that takes the value of one if the initial price was 12,000 or 11,000, and zero if it was 9,000 or 10,000. In this regression, we control for the gender of the seller as the orthogonal treatment. Furthermore, 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.

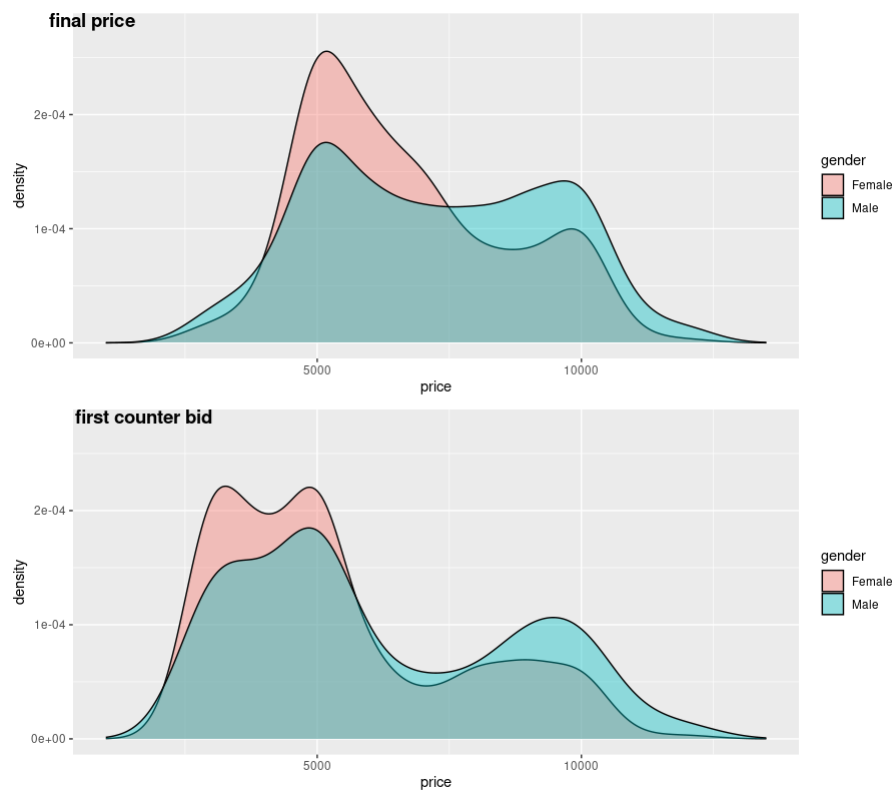


Figure 1: Prices



In a second model, we look at differential bargaining behaviour based on seller gender and regress outcomes and strategies on an indicator of the sex of the seller that takes the value of 1 if the seller was a women (and zero if it was a man). Also here, we control for the gender of the buyer in the regressions to control for treatment imbalance in this dimension and for level of initial offer price as the orthogonal treatment.

The first and second model are estimated using a single specification. 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 the farmer.  $x_i$  is the gender of the farmer,  $\varepsilon_i$  is a buyer specific residual, and  $T_i^p$  and  $T_i^g$  are indicator function for the initial offer price and the gender of the seller respectively.  $\alpha$  is a constant to be estimated,  $\beta_p$  is the estimate of the impact offered a high starting price and  $\beta_g$  is the estimate of the effect of the gender of the seller.

$$y_i = \alpha + \beta_p T_i^p + \beta_g T_i^g + \gamma x_i + \varepsilon_i \quad (1)$$

In a third model, we also isolate the interaction effect and include an indication variable that is one if both the “high initial price” indicator is one and the seller is a women. This allows us to test if a gender effect (in any) is stronger or weaker when higher initial prices are quoted. As in previous models, we control for the gender of the buyer in the regressions as well. As such, the third model simply adds an interaction term to equation 1:

$$y_i = \alpha + \beta_p T_i^p + \beta_g T_i^g + \beta_{pg} T_i^p T_i^g + \gamma x_i + \varepsilon_i \quad (2)$$

where now  $\beta_{pg}$  becomes the coefficient of interest.

For the independent variables, we consider the following outcomes and strategies: (1) the likelihood that the buyer accepts the initial offer of the seller (and so 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 (UGX 3,000), (4) the likelihood that the buyer sticks to his or her 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 price at which the transaction took place (ie. the transaction price).

The first column of Table 1 shows overall averages for the control group (the subset of buyers that negotiated with a male seller that started from a low initial offer prices (9,000 or 10,000)). The second 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 those where the initial offer price was low (9,000 or 10,000). The third column in Table 1 reports differences in the dependent variable between negotiations with a female seller and those where the seller is a man. The fourth column shows the interaction effect.

As a first outcome of interest, we see that about 30 percent of buyers immediately accept to buy the seed pack at the initial offer price. The likelihood that farmers immediately accept reduces substantially when the initial offer is

Table 1: Effect of gender of seller

	mean	high offer price	seller woman	seller is woman and high offer price
Intial accept (-0.112**	0.110* (0.458)	(0.024)	(0.026)	(0.051)
Starting price (UGX)	6138.889 (2529.223)	-84.549 (180.222)	-806.531** (189.679)	-54.451 (378.367)
Bottom price (0.060 <sup>+</sup>	0.025 (0.380)	(0.029)	(0.031)	(0.061)
Sticky strategy (-0.090*	0.011 (0.490)	(0.037)	(0.039)	(0.077)
Rounds (number)	4.774 (3.096)	1.982** (0.209)	0.908** (0.220)	-0.093 (0.439)
Buyer accepts (-0.116**	0.154* (0.490)	(0.030)	(0.032)	(0.064)
Transaction price (UGX)	7033.865 (2023.820)	334.915* (152.743)	-603.550** (160.705)	-42.104 (320.585)

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 as which the transaction was concluded.

high: If the seller asks for at least 11,000, only about 11 percent of buyers accept immediately. Interestingly, we see that the likelihood that farmers immediately accept also reduces substantially when the seller is a woman. Finally, for this outcome we also find a significant interaction effect. The interaction effect counteracts the main effects. The fact that the interaction effect is very similar to the main gender effect suggests no difference in the likelihood of initial acceptance between male and female sellers when the initial offer price is high. The large reduction in the likelihood emanating from a high initial offer price leaves little room for an additional gender effect.

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 UGX 6,000. For this outcome, there is no significant impact from the initial price level. However, we do see 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. For this outcome, the interaction effect is not significantly different from zero.

We also find that about 17 percent of buyers started negotiating from UGX 3,000, the lowest possible bid. The level of the initial offer price does not seem to affect this share. However, in line with the previous finding, we do 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). We do not find evidence of a significant interaction effect.

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. The use of this strategy does not depend on the initial offer price. However, we do find that a significantly lower share of farmers use this strategy when the woman is a seller. Apparently, the lower base price that is started from in this subgroup increases the likelihood that farmers increase bid prices over time. Also for this strategy, there is no significant interaction effect.

The average negotiation took almost 5 rounds before the buyer agreed or the difference between the last bid and the last offer smaller than the threshold where the seller was instructed to agree. We find that this 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 interesting is the finding that the seller being a woman 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 ask price and bid price was less than UGX 500). While in about 40 percent of cases the buyer eventually accepts, this percentage

is indeed almost 12 percentage points lower when the seller is a woman. A high offer price also leads to lower likelihood that the buyer accepts. There is also an interaction effect that counteracts the reduction in the likelihood that the buyer accepts. Also here, this may indicate that if a higher offer price already substantially reduced the likelihood that the buyer accepts, there may be less room for an additional reduction due to the gender effect.

Finally, we look at arguably the most important outcome. The average transaction price was about 7,000, which was about 70 percent of the maximum initial offer price, and 2.3 times the minimal bid price. We see that an initially high offer price increases the final price by UGX 334. If the seller is a woman, however, we see that the transaction price is about UGX 600 lower than when the seller is a man.

Looking at these results together shows a clear and substantial effect emanating from the gender of the seller. The effect has its origin 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 serves as an anchor for subsequent strategies—with buyers less likely to accept and hence more negotiation rounds—eventually leading to a significantly lower final price.

## 6 Discussion, limitations, and way forward

In this paper, we examined the potential consequences of biased perceptions 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 an improved maize seed 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 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 "consumer-side" discrimination appears to be more pronounced than "seller-side" discrimination. Delecourt and Ng (2021), in contrast, find no evidence of consumer side discrimination in a context that is 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 the discrimination is already there 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 hand. 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, this would mean that buyers think that women, would be willing to accept lower prices than men.<sup>2</sup>

Our study has several limitations. One limitations 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 persons to do the transactions), and a reason why these days 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 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 to not assign enumerators to farmers in a systematic fashion. While we assume this happened as good as random, we do find that women sellers had a significantly higher probability of being paired with women buyers than male sellers. To account for this problem, we include the gender of the buyer in all specifications. 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 (unobservable) characteristic.

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 intent to do so in the near future. Our study should therefore be regarded as somewhere 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

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<sup>2</sup>There are several reason why this could be the case. During qualitative field work with agro-dealers as a followup for De, Mieke, and Van Campenhout (2022), buyers mentioned that they thought "women are not serious, they do not need the money. They have husbands that should provide for the money".

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 prices (both initial and transaction price) that is due to the seller being a women is largest for female buyers. This suggests that female buyers appear to 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 believe more studies are needed on both seller-side and consumer-side discrimination to find out how context matters (eg. perishable versus non-perishable commodities, characteristics of actors,...).

## Acknowledgments

We would like to thank Charles Marc Wanume, Richard Ariong, and Wilberforce Walukano for their support in the field. The research received funding from the CGIAR Seed Equal Research Initiative, the CGIAR Market Intelligence Research Initiative, and the CGIAR Gender Impact Platform, which are funded by contributors to the CGIAR Fund (<https://www.cgiar.org/funders/>).

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