Small farmers' preferences for the design of certification schemes: Does gender matter?

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Abstract

Farmers' preferences for sustainability certification are analyzed, building on a choice experiment conducted with smallholder coffee growers in Uganda. Farmers have positive general attitudes towards certification. While they dislike bans of productivity-enhancing inputs, benefits associated with agricultural training and special female support are appreciated. Many also see requirements that have to be met for certification as a welcome nudge to invest in better farm management and quality upgrading. Gender-disaggregated data reveal that female farmers have a higher preference for sustainability certification than male farmers. Also within households, significant preference heterogeneity between males and females is found for some certification attributes.

Keywords: *Choice experiment, farmer preferences, food standards, gender, mixed logit models*

JEL Classification: *Q01, Q12, Q13, Q18*

Introduction

Sustainable approaches to global food production and poverty alleviation have recently attracted considerable interest in the wider public. This is also reflected in the proliferation of voluntary food standards and certification schemes with a focus on sustainability, such as

Fairtrade, Organic, and UTZ. Such standards and certification schemes promise to promote environmentally-friendly production practices and to improve the livelihoods of farmers and rural workers in developing countries. From a development-policy perspective, it is important to understand whether certification is indeed beneficial and attractive for farming households. An increasing body of literature has analyzed the effects of certification on farmers in developing countries. Several studies suggest that certification can serve as a tool to improve farmers' access to lucrative export markets and agricultural services (Kleemann, Abdulai, and Buss 2014; van Rijsbergen *et al.* 2016). However, the evidence is mixed; benefits seem to vary by type of certification and context (Chiputwa, Spielman, and Qaim 2015).

Studies have also examined whether certification is feasible for smallholders. A common finding is that marginal farmers are often struggling to overcome typical entry barriers (Handschuch, Wollni, and Villalobos 2013; Kersting and Wollni 2012). Specifically, certification can require financial investments, managerial skills, and a switch to more labor-intensive farming practices. Consequently, certification is predominantly group-based in developing countries. Group certification reduces administrative and financial costs for the individual farmer. Group structures also facilitate the implementation of training sessions and other support measures. Hence, for an individual smallholder, certification is usually feasible only if she is organized in a group. Nevertheless, the decision whether or not to participate in a certification scheme remains an individual choice. Group certification does not necessarily involve all members of a previously existing farmer organization (Chiputwa *et al.*, 2015). Better understanding farmers' preferences for different certification attributes can help to improve the design of certification schemes, especially when these are aimed at improving farmer livelihoods. Here, we analyze smallholder attitudes towards different certification attributes, using data from coffee farmers in Uganda.

Recent research has shown that farmers' personal preferences and attitudes can be important drivers of participation in voluntary agreements, such as contracts with agribusiness

companies (Schipmann and Qaim 2011) or payment for environmental services schemes (Kaczan, Swallow, and Adamowicz 2013; Marenya, Smith, and Nkonya 2014). However, farmers' preferences for certification have hardly been analyzed.[1] We are aware of only three studies, all of which looked at concrete cases of existing schemes, such as Fairtrade and Organic, and their specific attributes (Hope, Borgoyary, and Agarwal 2008; Ibnu *et al.* 2015; Vlaeminck *et al.* 2015). We add to this literature by examining farmers' preferences for more generic, hypothetical certification options, involving economic, social, and environmental components. We also place more emphasis than earlier studies on preference heterogeneity, especially in terms of differences between male and female decision-makers. Our leading hypothesis is that preferences for certification vary not only between but also within households. To test this hypothesis, we build on gender-disaggregated data from a survey and choice experiment conducted with male and female household members. To our knowledge, gendered preferences for certification within farm households have not been analyzed previously.

The proposition that preferences for certification may be gender-specific is based on the household bargaining model (Alderman *et al.* 1995). Within households, heterogeneity could be driven by unequal bargaining power of individual household members, gendered tasks in crop production, or inequality in terms of access to agricultural assets and services. Such gender inequality is known to have negative consequences for household wellbeing and agricultural productivity. Depending on their particular design, certification schemes may worsen or improve the situation of females within farm households. While certain requirements may increase women's workload (Bolwig 2012), other certification attributes could help in reducing gender inequality (Chiputwa and Qaim 2016). For instance, some standard setting bodies require certified farmer organizations to introduce policies aimed at gender equality. Such aspects are explicitly considered in our choice-experimental approach.

Data and background

Our analysis draws upon a choice experiment and household survey conducted in 2015 with coffee farmers in Uganda. The example of coffee is particularly relevant, as coffee is among the most important certified products in international markets (Potts *et al.* 2014). In Africa, coffee is also important from a poverty and development perspective. In Uganda, the coffee sector provides employment and income for 1.3 million rural households, most of them poor smallholders (Uganda Bureau of Statistics 2010). Finally, coffee has interesting gender dimensions. In Uganda, as in most other African countries, coffee is a male-dominated crop (Bolwig 2012). Women have little control over coffee revenues and production decisions, even though they provide a substantial share of the manual labor.

To select households for the survey and choice experiment, we used a multi-stage sampling strategy. First, we purposively selected Luwero and Masaka, two districts in Central Uganda where a lot of Robusta coffee is grown. In terms of agroecological conditions, these districts differ from regions in higher altitudes where Arabica coffee is grown. Second, we purposively selected three locations with coffee farmer organizations holding different certificates (Fairtrade, Organic, or UTZ). Third, in these locations we randomly selected 453 coffee-producing households. As can be seen in table 1, some of these households were certified, while others were not.

[Table 1 about here]

All selected households were visited in their homestead for face-to-face interviews and the choice experiment. The interviews and the choice experiment were conducted by a team of local enumerators under the supervision of the researchers. To the extent possible, in each household we targeted primary and secondary decision-makers, defined as household members above 18 years of age who make or influence decisions for the entire household. Decision-making relates to agricultural production but also to other types of household

investments or purchases. We refer to the household head as the primary decision-maker. The secondary decision-maker is often the spouse of the household head, but can also be another family member. We asked the household head to identify the secondary decision-maker, with the additional criterion that he/she should be of the opposite sex, because we are particularly interested in analyzing possible gender differences.

[Table 2 about here]

In total, we interviewed 397 primary and 317 secondary decision-makers (table 2). Male primary decision-makers are mostly married, whereas female primary decision-makers are usually widows, divorced, or single. Secondary decision-makers are mainly female spouses of male household heads, but in some cases older children or other relatives were identified. In 261 out of the 453 total sample households we were able to conduct two interviews and choice experiments. In the other households, we could only meet one respondent, either because the other was unavailable or there simply was no second adult decision-maker of the opposite sex. All respondents were interviewed separately.

Methods

Choice experiment

We employ a choice experiment to analyze farmers' preferences for certification. Choice experiments belong to the family of attribute-based methods, used to elicit information on preferences for actual or hypothetical products, services, or policies (Holmes and Adamowicz 2003). The method draws on Lancaster's theory of consumer choice and McFadden's extension of discrete choice theory (McFadden 1973). It is assumed that individuals derive utility from the attributes of a good, rather than from the good itself. Transferred to our case, we consider certification as a combination of design attributes. These attributes can be grouped into benefits of certification (e.g. a price premium) and requirements (e.g. chemical

pesticides are banned). When deciding whether or not to participate in a particular certification scheme, farmers will evaluate the expected benefits and requirements. It is possible that the final decision is made by the household head alone or that other household members also participate in decision-making. We are interested in possible gender-specific differences, so we analyze individual preferences of male and female household members.

Following the random utility framework, we can express utility associated with participation in a given certification scheme as follows:

$$\boldsymbol{U_{ij} = V_{ij} + e_{ij} = \alpha X_j + \beta Z_i + e_{ij}} \text{ where } \boldsymbol{U_{ij}} = \begin{cases} \boldsymbol{U_{M_{ij}}}; \text{ Utility for men} \\ \boldsymbol{U_{F_{ij}}}; \text{ Utility for women} \end{cases} \quad \textbf{(1)}$$

Utility *(U)* for male (U_M) or female (U_F) farmer *i* associated with certification scheme *j* can be decomposed into a deterministic element *(V)* and a stochastic element *(e)*, where the latter captures unobserved factors that determine farmers' choices. The deterministic part can be further decomposed into a choice-specific part (*X*) and an individual-specific part (*Z*). *X* is the vector of attributes of certification scheme *j* for which we want to measure farmers' preferences. *Z* is a vector of individual, farm, household and contextual characteristics that determine preferences and thus preference heterogeneity.

Selection of certification attributes and attribute levels

Certification schemes usually encompass a set of detailed requirements concerning farming practices, post-harvest management and, in some cases, community development projects. Based on expert interviews and focus group discussions with coffee farmers in Uganda[2] we selected certification attributes that are relevant in the local context but also beyond. The selected attributes have two to six levels (table 3). The last level for each attribute is referred to as the base scenario, characterizing the situation of non-certified farmers. We classify attributes as benefits or requirements, as explained in the following.

The first attribute is the price received for the coffee sold. The most apparent benefit of certification is a price premium. The price attribute has six levels, each one representing a different price premium per kilogram of red, sundried coffee cherries, locally referred to as kiboko[3]. In the base scenario, farmers would receive the usual market price. At the time of the survey, the average price for kiboko was about 2000 Ugandan shillings (UGX) per kilogram, which corresponds to about US$ 0.58. To determine a range of realistic price premiums, we used information provided by farmer organizations, traders and homepages of certification bodies. We assume that farmers have homogenous preferences for higher prices.

The second attribute relates to agricultural training. Most certification bodies require certified organizations to offer training on different topics, such as plant nutrition, pest control or soil management. We expect that farmers have positive preferences for training as this may help to increase yields.

As the third attribute we consider two gender policies: credits for women[4] and specific training on gender equality. We expect women to have stronger preferences than men for both these policies. Most certification bodies do not require their members to introduce such policies, so this is a hypothetical attribute that we considered to be interesting from a social development perspective.

[Table 3 about here]

The fourth attribute concerns coffee quality, where we focus on harvesting and post-harvest management. Practices such as picking unripe coffee cherries and drying cherries on the bare soil are common practice but can reduce coffee quality. However, avoiding such practices can be time-intensive and costly for farmers. Picking only ripe cherries requires repeated picking in the same plot since not all cherries are ripe simultaneously. And drying coffee on tarpaulins or cemented floorboards is more expensive than drying on bare soil. Thus, we hypothesize that farmers dislike these quality requirements.

As the fifths attribute we include requirements on the handling of chemical pesticides. Most schemes do not prohibit pesticides in general but restrict the use of chemicals that are known to be particularly harmful for the environment and/or human health. Because of health concerns, many schemes also require the use of protective clothing during pesticide application. We expect that farmers dislike such restrictions since costs and labor requirements may increase, whereas yields may possibly decrease when chemical pesticides are completely banned.

The last attribute in the choice experiment is record keeping. Documentation is a precondition to ensure traceability – and thus to maintain consumers' trust in the sustainability label. While most of the documentation for certification is undertaken at the level of farmer organizations, some schemes also require individual farmers to keep records about the type and quantity of inputs used, the timing of applications, and the costs and revenues of farm production. Record keeping is a challenge for illiterate farmers, but even literate farmers are often not used to formal paperwork. Hence, we expect farmers to dislike record-keeping requirements.

Experimental design

The six attributes and their different levels imply a full factorial design with 648 ($6 \times 3^3 \times 2^2$) combinations, each representing a theoretically possible certification scheme. This large number is impracticable to use in a choice experiment. There are different approaches to reduce the number of alternatives, including orthogonal fractional and d-optimal designs. The decision between these approaches represents a trade-off between statistical efficiency (d-optimal design) and non-correlation between attributes (orthogonal design) (Hensher, Rose, and Greene 2005). We consider statistical efficiency more important. Hence we used the d-optimal design, accounting for the possibility that attributes might be correlated. Additionally, we excluded combinations that only had base scenario levels for either benefits or requirements, as these combinations would represent dominant and not very realistic

alternatives. For instance, a price premium without any strings attached would be an unlikely offer in reality.

The remaining alternatives were randomly assigned to five blocks, each block containing six choice sets. Respondents were randomly assigned one block, so each farmer was asked to make six consecutive decisions. Each choice set had three alternatives to choose from. On the choice cards that we used (figure 1), the first two options with variations of the attribute levels were labelled 'certification scheme'. The third option on every choice card was the 'non-certification' alternative with base scenario levels for all attributes.

[Figure 1 about here]

Econometric approach

For the econometric analysis, we develop mixed logit models (random parameter logit) that we estimate using maximum simulated likelihood (Train 2009). The mixed logit is frequently used in choice modelling as it relaxes some of the potentially unrealistic assumptions of the standard logit. Specifically, mixed logit models allow for preference heterogeneity and correlation of unobserved factors over time. Mixed logit models also relax the independence from irrelevant alternatives property (Train 2009).

Our models include an alternative specific constant (ASC) to account for the fact that the choice sets include a base scenario. The ASC is a dummy variable, coded 0 for the base scenario and 1 for the certification alternatives. By using effect-coding instead of dummy-coding we avoid correlation of the attribute estimates with the ASC (Bech and Gyrd-Hansen 2005). Thus, the ASC reflects general attitudes towards certification, yet only capturing factors not included as attributes in the choice experiment. Such omitted variables may influence decision-making because sample farmers are familiar with actual certification schemes and may possibly think about attributes beyond those explicitly included.

After testing for correlated structures using the likelihood ratio test, we run all models with the specification that the random coefficients are correlated. Since we assume that farmers have a homogenous preference for higher coffee prices, we specify the price attribute to have a fixed coefficient. All other attributes are specified as random and normally distributed, assuming that preference heterogeneity exists.

We run different model specifications. The base specification includes only the ASC and the attribute level as explanatory variables:

$$Y_{ijk} = \beta_0 ASC + \beta_1 PricePremium_{ijk} + \beta_2 AgrTraining_{ijk} + \beta_3 GenderTraining_{ijk} + \beta_4 CreditWomen_{ijk} + \beta_5 PesticidesProhibited_{ijk} + \beta_6 ProtectiveGear_{ijk} + \beta_7 OnlyRipeCherries_{ijk} + \beta_8 NoDryingSoil_{ijk} + \beta_9 RecordKeeping_{ijk} + e_{ijk} \quad \textbf{(2)}$$

where *Y* denotes the binary decision made by the male or female farmer *i* for alternative *j* and choice set *k*. This base specification allows us to assess if a given attribute level increases or reduces farmers' willingness to participate in certification, as indicated by the sign of the coefficient.

In other model specifications, we additionally include interaction terms between the ASC or specific attributes levels and household or individual characteristics to explore what factors drive preference heterogeneity. We are particularly interested in gender effects across and within households, the latter of which we explore by differentiating between primary and secondary decision-makers. Furthermore, we expect that farmers' experience with existing certification schemes may also influence their attitudes towards particular certification attributes.

Descriptive Statistics

Gender-specific differences

Table 4 displays descriptive statistics. Column (1) shows the full sample of 714 individuals, whereas the other columns differentiate by gender. We compare men to female primary decision-makers and female secondary-decision makers[5]. On average, female primary decision-makers are older, whereas female secondary decision-makers are younger than men. Further, both types of female decision-makers are less educated and less likely to have a personal savings account than men. Females are also less likely to participate in training sessions and farmer group meetings. However, female primary decision-makers are as likely as men to be member of a farmer group.

[Table 4 about here]

Table 4 also provides an overview of gender-specific responsibilities in coffee production. In male-headed households, men usually hold the main responsibility in terms of production, harvesting, and sales. In most cases, they also control the revenues. However, in some of the households these responsibilities are shared with other household members, including female secondary decision-makers. Harvesting in particular often requires labor input from all household members. In female-headed households, the situation is different; female primary decision-makers usually take on responsibilities that are traditionally held by males.

Differences between certified and non-certified households

Table 5 also shows descriptive statistics, but now referring to the household level. In addition to the full sample of 453 households shown in column (1), we differentiate between non-certified households (column 2) and those that are certified under Fairtrade, Organic, and UTZ (columns 3-5). On average, the heads of certified households are better educated, except for Organic households that are more often headed by females. Fairtrade households have

higher living standards (in terms of per capita expenditures and household assets), whereas UTZ households tend to have higher off-farm incomes.

[Table 5 about here]

There are also significant differences in terms of farm characteristics and coffee production practices: certified households have larger landholdings and larger areas grown with coffee. Further, Fairtrade households are more likely to use pesticides than the other subsamples, whereas for Organic households the opposite holds true. In comparison to non-certified households, certified households are more likely to keep records and less likely to dry coffee on bare soil. Organic households are less likely to pick unripe cherries. These numbers are based on farmers' own reporting. As many of the listed practices are either recommended or discouraged by farmer organizations, the possibility of social desirability bias in these responses cannot be ruled out.

Estimation results and discussion

Estimation results for the first set of mixed logit models are shown in table 6. Regardless of the exact specification, the ASC has a positive and significant coefficient, indicating that farmers have positive attitudes towards certification in general. Furthermore, the significant mean parameters for all certification attributes suggest that these attributes are relevant to farmers and affect their utility. Finally, the standard deviation parameters, which are shown in the lower part of table 6, confirm that significant preference heterogeneity exists. In the following, we discuss the model results in more detail, starting with preferences for the average farmer, before taking a closer look at the factors influencing preference heterogeneity.

General preferences for certification attributes

The base specification of the mixed logit model – with only the certification attributes included – is shown in column (1) of table 6. The coefficients of all attributes referred to as benefits (i.e. price premium, agricultural training, training on gender equality, and credits for women) have the expected positive sign. Farmers prefer certification schemes that offer higher coffee prices, agricultural training, and gender policies. The latter result is particularly noteworthy; it suggests that promoting gender equality through certification is possible and appreciated.

Turning to the attributes referred to as requirements (i.e. handling of pesticides, quality requirements, and record keeping), only the coefficient of 'pesticides prohibited' has the expected negative sign. About half of the households in our sample use chemical pesticides, primarily herbicides. If pesticides are prohibited, more time would have to be spent on weeding or yields would decrease. A negative preference for pesticide bans is therefore very plausible. More surprising is that the other attributes on requirements have significantly positive coefficients. As discussed, compliance with these requirements can be associated with costs. Buying tarpaulins for drying coffee cherries or protective clothing for pesticide applications requires capital. Picking only ripe cherries entails additional labor, and record keeping requires some degree of discipline, or, for illiterate farmers, finding someone else to assist.

[Table 6 about here]

However, these requirements are also associated with potential benefits that may accrue irrespective of an immediate price premium through the certification scheme. More precisely, record keeping allows farmers to keep track of inputs and outputs and thus helps managing farm resources more efficiently. Similarly, compliance with safety and quality requirements can pay off: protective clothing for pesticide sprays can reduce possible health hazards;

practices to improve coffee quality may help to fetch higher prices and reduce rejection rates by buyers. Hence, positive preferences for these attributes are not implausible. The question arising is why not more farmers use these practices, even without being a certification requirement, when the benefits are appreciated. For instance, only about 30% of the farm households keep records.

One reason might be that – in spite of a general willingness – compliance is simply not feasible for every farmer due to low skills or human capital constraints. Other possible reasons are self-control problems and present-biasedness, especially because the expected benefits do not occur immediately. In that case, certification may be seen as a welcome nudge to make investments, keep records or allocate more labor to harvesting and post-harvest handling. It is well known that people often accept third-party monitoring to incentivize beneficial behavior. For instance, people attempt to overcome self-control problems through deadlines (Ariely and Wertenbroch 2002) or through binding contracts (Thaler and Benartzi 2004). In the small farm sector, Duflo *et al.* (2011) found that farmers are willing to join programs helping to overcome present-biasedness and make beneficial investments in time.

An additional factor that may also explain positive preferences for certain requirements is that certification is often associated with support through farmer organizations (e.g. trainings or provision of equipment or credits). Such measures and collective learning may facilitate compliance and reduce possible psychological barriers for the individual. Sample farmers are mostly familiar with the general principles of certification and may thus know that such support is often provided to certified farmers.

Willingness to accept

The model estimates can also be used to calculate farmers' willingness to accept (WTA) or willingness to pay (WTP) for the different attributes. Since the general idea is that the price premium in a certification scheme compensates farmers for complying with particular

requirements, we focus on the WTA. WTA estimates were obtained by dividing each attribute by the negative of the price coefficient. This approach is known as calculation in the preference space. Results are shown in column (1) of table 7. Values may be biased when the price attribute is specified to be random (Hole and Kolstad 2012). Since we specified the price to be fixed, this should not be of concern here. However, as a robustness check we also calculated the WTA in the WTP space, which is the preferred method with a random price specification (see column 2 in table 7). Results do not differ substantially.

[Table 7 about here]

WTA estimates are interpreted as the amount of money by which the price per kilogram had to be raised (or could be reduced) for farmers to opt for – or accept – a certification scheme that includes the respective attribute. As indicated, the average coffee price during the time of our survey was about 2000 UGX. Regarding benefits, farmers would accept a price reduction of about 360 UGX if agricultural training was provided; about 200 UGX if training on gender was offered; and about 160 UGX if credits targeted at women were made available. This implies a range of 8-18% of the average coffee price, which seems reasonable.

Regarding requirements, negative WTA estimates can be interpreted as farmers' willingness to invest in order to follow specified practices. Accordingly, the average farmer would be willing to invest 83 UGX in tarpaulins (per kilogram of coffee sold), used for drying coffee. Similarly, farmers would be willing to invest 380 UGX in hiring additional laborers for only picking ripe cherries. These values are above the actual costs for tarpaulins and labor, so the precise numbers should be interpreted with caution. However, price differences in the range of 80-400 UGX between high and low quality coffee are realistic. This supports our argument that farmers who are currently drying coffee on bare soil or pick unripe cherries may lack incentives to make investments in time – or may lack capital to make investments at all.

Finally, the average farmer is willing to invest about 190 UGX in protective clothing and about 120 UGX in record keeping. In contrast, farmers would only accept pesticide bans if the coffee price was raised by about 160 UGX, which could cover the cost of hiring additional laborers for weeding.

Preference heterogeneity due to certification status

We now explore the drivers of preference heterogeneity in more detail. In this subsection, we look at the role of farmers' actual certification experience. In the next subsection, we focus on possible gender differences. In a first variation of the model's base specification we interact the ASC with the certification dummy. Results are shown in column (2) of table 6. The interaction term is insignificant, suggesting that certification experience does not influence farmers' general preference for certification. Also when further disaggregating by type of certification (Fairtrade, Organic, or UTZ), no significant interaction effects with the ASC are found (column 3 of table 6).

However, certification experience explains preference heterogeneity for several attributes. We tested all possible interaction terms, but eventually excluded those that were individually or jointly insignificant. Column (4) of table 6 shows that Fairtrade and UTZ farmers have particularly strong preferences for the attribute 'record keeping', possibly because they are more likely to keep records anyway (see summary statistics). Further, we find that Organic farmers have less negative preferences for pesticide bans; the positive interaction term (0.50) is similar in magnitude to the negative 'pesticide prohibited' coefficient (-0.53), suggesting that Organic farmers would not require a significant price premium to be compensated for a pesticide ban. This is plausible, given that Organic farmers hardly use chemical pesticides anyway. Fairtrade farmers, on the other hand, have particularly negative attitudes towards a pesticide ban, which is in line with their higher actual pesticide use.

These results suggest that experience matters. Farmers seem to have particularly positive preferences for requirements that they know and already comply with. As a robustness check, we ran an additional model where we interacted certification attributes with dummy variables for farmers' actual production and management practices. Results are shown in column (5) of table 6. Indeed, pesticide users have particularly negative attitudes towards for pesticide bans, whereas record keepers have particularly positive preferences for record keeping. Similarly, farmers who have actually participated in agricultural or gender training have more positive preferences for such kinds of services.

Gender-specific differences in preferences

To explore possible gender differences, we specify a set of additional models, results of which are shown in table 8. In column (1), we interact the ASC with a simple female dummy. The interaction term is positive and significant, implying that women have a higher general preference for certification than men. In column (2), we further differentiate between female primary and female secondary decision-makers. While both interactions with the ASC produce positive estimates, only the coefficient for female secondary decision-makers is significant. This could mean that gender roles within the household and differences in decision-making power may be more relevant than the respondent's sex *per se*. Primary decision-makers are usually the ones who control revenues. Irrespective of their sex, they might be more concerned about the financial risk associated with certification. In the worst case, investments may not pay off, contributing to more conservative attitudes. In contrast, female secondary decision-makers may not have a perfect overview of financial issues and may therefore give greater weight to the potential benefits of certification.

[Table 8 about here]

In a next step, we run a model with attribute-gender interaction terms, results of which are shown in column (3) of table 8. While we hypothesized women to have particularly strong

preferences for gender policies, the interaction terms for 'training on gender equality' turned out to be insignificant. We conclude that such training is generally accepted by both male and female farmers. For the credit attribute, however, we do find gendered differences. Female primary decision-makers have a greater preference for credit access, probably because they are particularly suffering from constraints in formal credit markets.

We also find significant gender differences in terms of other attributes. Female primary decision-makers have less negative attitudes towards the prohibition of pesticides. This is probably related to the fact that only about 30% of the female-headed households in our sample use pesticides. As discussed above, non-users of pesticides tend to be more willing to accept a pesticide ban. Interestingly, compared to men female secondary decision-makers have a less positive attitude towards the requirement to pick only ripe cherries. This is likely because spouses and other female members of the household are strongly involved in harvesting, so that more labor-intensive quality requirements may increase their workload. In addition, female secondary decision-makers are often not involved in coffee sales, implying that they may be less aware of the financial benefit of supplying a higher-quality product.

So far, we have analyzed within-household heterogeneity only implicitly, by exploring differences due to gender and decision-making power. To analyze within-household heterogeneity more explicitly, in an additional model we restrict the sample to only those households where we interviewed two respondents. In these households, we focus on the choices of the female respondents, usually the secondary decision-makers, but test whether preferences of male members of the same household have a significant influence. Specifically, we interact ASC and attribute levels for female and male members of the same household, whereby individual-level point estimates for males were obtained from the model base specification (column 1 in table 6).

Results of this within-household analysis are shown in column (4) of table 8. A positive correlation between male and female preferences is observed for certification in general and for the attributes record keeping and requirements on pesticide use. For all other attributes, the female-male interaction terms were found to be insignificant. This confirms our earlier findings and the hypothesis that preferences for specific elements of certification are influenced by gender and decision-making power – and may therefore vary within households.

Conclusion

Despite a growing body of literature, there is disagreement whether certification is beneficial and feasible for smallholder farmers in developing countries. We have contributed to this literature by analyzing farmers' preferences for certification and specific certification attributes. We have conducted a choice experiment with coffee growers in Uganda. Gender-disaggregated data have also allowed us to explore possible differences in preferences between male and female decision-makers.

Certification is often understood as a compensation scheme, where farmers are compensated for complying with requirements that matter to consumers in developed countries. Our results suggest that a more differentiated consideration may be worthwhile. Some requirements are indeed seen by farmers as restrictions that are primarily associated with costs. A ban of chemical pesticides was found to be one example that the average farmer would only accept if she was compensated through a price premium. Even though not tested explicitly, we would expect negative attitudes also for bans on other productivity-enhancing inputs such as chemical fertilizers or certain types of seeds. This is consistent with Vlaeminck *et al.* (2015) who found negative preferences for some of the requirements associated with Organic farming.

However, other certification requirements may be beneficial for farmers, at least in the longer run. We have particularly analyzed requirements related to harvesting and post-harvest handling to improve coffee quality, record keeping to help manage farm resources more efficiently, and pesticide safety requirements to reduce health hazards for farmers and their families. Our results show that farmers have positive attitudes towards such requirements and are willing to make related investments, even without an immediate output price premium. Certification schemes that stipulate such practices are apparently seen by farmers as a welcome nudge to make investments that can pay off in the long run. In other words, certification could potentially be used more widely in the small farm sector to incentivize desirable investments and address possible issues of self-control and present-biasedness.

Model estimates also showed that preference heterogeneity exists. Positive preferences for particular requirements are more pronounced among farmers that already use related practices, for instance because they participate in an existing certification scheme with corresponding standards. This points at the important role of training, awareness building and other support measures often provided by certified farmer organizations. However, especially for very poor farmers, who may lack skills and capital, nudges, and training support through certification schemes may not suffice. Previous studies indicated that disadvantaged farmers may not be able to participate (Handschuch, Wollni, and Villalobos 2013)(Chiputwa and Qaim 2016). Hence, depending on the conditions, certification may not be the most effective tool to target particularly marginalized rural households.

Beyond possible participation constraints, our results suggest that voluntary certification could possibly serve as a tool to reduce gender inequality. Gender equality can be promoted through specific training and awareness-building elements, through services tailored to the needs of women (e.g. credit provision), or the introduction of gender-sensitive rules in farmer organizations. Model estimates showed that such attributes of certification schemes are accepted and appreciated my male and female farmers alike. While some existing schemes

include related elements, a stronger focus on gender policies could be an interesting option to further explore in some situations.

The analysis also revealed that preferences for certification can be gender-specific. Female respondents showed a stronger general preference for certification than male respondents, which is likely due to differences in the weighting of costs and benefits. We also identified preference heterogeneity with respect to certain attributes. Especially requirements related to harvesting and post-harvest handling to improve coffee quality were found to be less preferred by female spouses of male household heads, probably because these requirements can increase women's workload. Various certification attributes may affect male and female household members differently. Often, such differences are more related to gender-specific roles and tasks within the household rather than the sex of a person *per se*. Analysis of such nuances is not possible by comparing male-headed and female-headed households alone, but requires gender disaggregation of data within households, as was done here.

This is the first study that has analyzed gendered preferences for certification within farm households. Further work to refine the methodological approaches will be useful. It should be noted that – beyond certification experience and gender, which were examined in this study – there may be other factors contributing to preference heterogeneity. Finally, we were only able to capture selected certification attributes, even though many more are conceivable. Follow-up research should extend the focus and thus contribute to a deeper understanding of how certification schemes can be designed for them to contribute to socially desirable developments in the small farm sector.

References

Alderman, H., Chiappori, P.-A., Haddad, L., Hoddinott, J., and Kanbur, R. (1995). Unitary versus collective models of the household: Is it time to shift the burden of proof. *World Bank Research Observer* 10: 1–19, doi: 10.1093/wbro/10.1.1.

Ariely, D. and Wertenbroch, K. (2002). Procrastination, deadlines, and performance: Self-control by precommitment. *Psychological Science* 13: 219–224, doi: 10.1111/1467-9280.00441.

Bech, M. and Gyrd-Hansen, D. (2005). Effects coding in discrete choice experiments. *Health Economics* 14: 1079–1083, doi: 10.1002/hec.984.

Bolwig, S. (2012). Poverty and gender effects of smallholder organic contract farming in Uganda. *USSP Working Paper* 8, International Food Policy Research Institute (IFPRI). Washington, D.C.

Chiputwa, B. and Qaim, M. (2016). Sustainability standards, gender, and nutrition among smallholder farmers in Uganda. *Journal of Development Studies*, doi: 10.1080/00220388.2016.1156090.

Chiputwa, B., Spielman, D. J., and Qaim, M. (2015). Food standards, certification, and poverty among coffee farmers in Uganda. *World Development* 66: 400–412, doi: 10.1016/j.worlddev.2014.09.006.

Duflo, E., Kremer, M., and Robinson, J. (2011). Nudging farmers to use fertilizer: Theory and experimental evidence from Kenya. *American Economic Review* 101: 2350–2390, doi: 10.1257/aer.101.6.2350.

Handschuch, C., Wollni, M., and Villalobos, P. (2013). Adoption of food safety and quality standards among Chilean raspberry producers – Do smallholders benefit? *Food Policy* 40: 64–73, doi: 10.1016/j.foodpol.2013.02.002.

Hensher, D. A., Rose, J. M., and Greene, W. H. (2005). *Applied Choice Analysis: A Primer*. Cambridge: Cambridge University Press.

Hole, A. R. and Kolstad, J. R. (2012). Mixed logit estimation of willingness to pay distributions: A comparison of models in preference and WTP space using data from a health-related choice experiment. *Empirical Economics* 42: 445–469, doi: 10.1007/s00181-011-0500-1.

Holmes, T. P. and Adamowicz, W. L. (2003). Attribute-based Methods. In P. A. Champ, K. J. Boyle and T. C. Brown (eds), *A Primer on Nonmarket Valuation*. Dordrecht: Springer Netherlands, 171–219.

Hope, R., Borgoyary, M., and Agarwal, C. (2008). Smallholder preferences for agri-environmental change at the Bhoj wetland, India. *Development Policy Review* 26: 585–602, doi: 10.1111/j.1467-7679.2008.00424.x.

Ibnu, M., Glasbergen, P., Offermans, A., and Arifin, B. (2015). Farmer preferences for coffee certification: A conjoint analysis of the Indonesian smallholders. *Journal of Agricultural Science* 7, doi: 10.5539/jas.v7n6p20.

Kaczan, D., Swallow, B. M., and Adamowicz, W. L. (2013). Designing a payments for ecosystem services (PES) program to reduce deforestation in Tanzania: An assessment of payment approaches. *Ecological Economics* 95: 20–30, doi: 10.1016/j.ecolecon.2013.07.011.

Kersting, S. and Wollni, M. (2012). New institutional arrangements and standard adoption: Evidence from small-scale fruit and vegetable farmers in Thailand. *Food Policy* 37: 452–462, doi: 10.1016/j.foodpol.2012.04.005.

Kleemann, L., Abdulai, A., and Buss, M. (2014). Certification and access to export markets: Adoption and return on investment of Organic-certified pineapple farming in Ghana. *World Development* 64: 79–92, doi: 10.1016/j.worlddev.2014.05.005.

Marenya, P., Smith, V. H., and Nkonya, E. (2014). Relative preferences for soil conservation incentives among smallholder farmers: Evidence from Malawi. *American Journal of Agricultural Economics* 96: 690–710, doi: 10.1093/ajae/aat117.

McFadden, D. L. (1973). Conditional logit analysis of qualitative choice behavior. In P. Zarembka (ed.), *Frontiers in econometrics*. New York: Academic Press, 105–142.

Meas, T., Hu, W., Batte, M. T., Woods, T. A., and Ernst, S. (2015). Substitutes or complements? Consumer preference for local and Organic food attributes. *American Journal of Agricultural Economics* 97: 1044–1071, doi: 10.1093/ajae/aau108.

Potts, J., Lynch, M., Wilkings, A., Huppé, G. A., Cunningham, M., and Voora, V. A. (2014). *The State of Sustainability Initiatives Review 2014: Standards and the Green Economy*. Winnipeg, Manitoba, London, Beaconsfield, Quebec: International Institute for Sustainable Development, International Institute for Environment and Development; Canadian Electronic Library.

Schipmann, C. and Qaim, M. (2011). Supply chain differentiation, contract agriculture, and farmers' marketing preferences: The case of sweet pepper in Thailand. *Food Policy* 36: 667–677, doi: 10.1016/j.foodpol.2011.07.004.

Thaler, R. H. and Benartzi, S. (2004). Save More Tomorrow™: Using behavioral economics to increase employee saving. *Journal of Political Economy* 112: 164–187, doi: 10.1086/380085.

Train, K. (2009). *Discrete Choice Methods with Simulation*. Cambridge: New York.

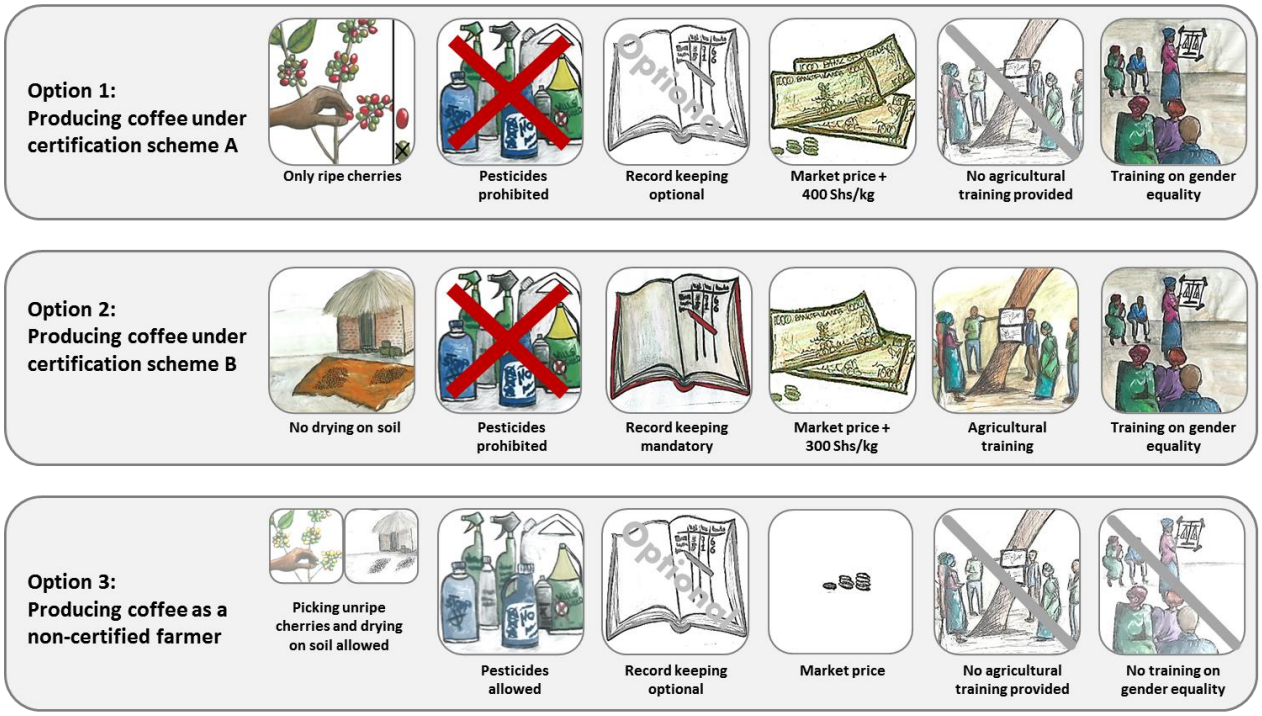
Uganda Bureau of Statistics (2010). Uganda census of agriculture 2008/2009, Uganda Bureau of Statistics and Ministry of Agriculture, Animal Industry and Fisheries. Kampala.

van Rijsbergen, B., Elbers, W., Ruben, R., and Njuguna, S. N. (2016). The ambivalent impact of coffee certification on farmers' welfare: A matched panel approach for cooperatives in central Kenya. *World Development* 77: 277–292, doi: 10.1016/j.worlddev.2015.08.021.

Vlaeminck, P., Vranken, L., van den Broeck, G., Vande Velde, K., Raymaekers, K., and Maertens, M. (2015). Farmers' preferences for Fair Trade contracting in Benin. *Bioeconomics Working Paper Series* 225931, Katholieke Universiteit Leuven. Leuven.

Figures

Figure 1: Example of a choice card



Source: Authors

Tables

Table 1: Number of sample households by certification status

Certification status	Number of households	Number of individuals
Never certified	193	302
Fairtrade & UTZ	120	196
Organic & formerly UTZ	70	106
UTZ	70	110
Total	453	714

Table 2: Number of individual respondents by gender and decision-making power

Respondent category	Number
Male primary decision-maker (household heads)	307
Male secondary decision-maker (e.g. adult sons in female-headed households)	19
Female primary decision-maker (household heads, mainly widows)	91
Female secondary decision-maker (e.g. spouses)	297
Total	714

Table 3: Overview of attributes and attribute levels used in the choice experiment

Attributes	Attribute levels
Benefits	
Price/price premium	1. Market price + 500 UGX/kg
	2. Market price + 400 UGX/kg
	3. Market price + 300 UGX/kg
	4. Market price + 200 UGX/kg
	5. Market price + 100 UGX/kg
	6. Market price
Agricultural training	
	1. Agricultural training
	2. No agricultural training offered
Gender policies	
	1. Training on gender equality
	2. Credits for women
	3. No training on gender equality and/or no credits for women offered
Requirements	
Quality requirements	1. Only ripe cherries
	2. No drying on soil
	3. Picking unripe cherries optional and/or drying on soil optional
Handling of pesticides	
	1. Pesticides prohibited
	2. Protective clothing mandatory
	3. Pesticides allowed and/or protective clothing optional
Record keeping	
	1. Record keeping mandatory
	2. Record keeping optional

Table 4: Summary statistics by gender (individual level)

	(1) Full sample	(2) Males	(3) Female primary decision-makers [a]	(4) Female secondary decision-makers [b]
Personal characteristics				
Age in years	49.23	52.34	59.74***	42.60***
	(15.13)	(14.94)	(13.02)	(12.89)
Years spent in school	6.47	7.29	4.86***	6.06***
	(3.48)	(3.58)	(3.23)	(3.19)
Literate (dummy)	0.84	0.90	0.68***	0.84**
	(0.36)	(0.31)	(0.47)	(0.37)
Personal savings account (dummy)	0.32	0.39	0.24***	0.26***
	(0.47)	(0.49)	(0.43)	(0.44)
Social participation				
Farmer group membership (dummy)	0.51	0.68	0.65	0.28***
	(0.50)	(0.47)	(0.48)	(0.45)
Participation farmer meetings (dummy)	0.70	0.81	0.64***	0.61***
	(0.46)	(0.40)	(0.48)	(0.49)
Participation in agricultural training (dummy)	0.49	0.58	0.46**	0.39***
	(0.50)	(0.49)	(0.50)	(0.49)
Participation in training on gender equality (dummy)	0.27	0.33	0.22**	0.22***
	(0.45)	(0.47)	(0.42)	(0.42)
Coffee production				
Responsible for coffee production (dummy)	0.68	0.91	0.92	0.34***
	(0.47)	(0.28)	(0.27)	(0.48)
Responsible for coffee harvest (dummy)	0.82	0.90	0.92	0.70***
	(0.38)	(0.29)	(0.27)	(0.46)
Responsible for coffee marketing (dummy)	0.63	0.91	0.92	0.22***
	(0.48)	(0.29)	(0.27)	(0.42)
Control of coffee revenues (dummy)	0.66	0.90	0.92	0.32***
	(0.47)	(0.30)	(0.27)	(0.47)
Responsible for record keeping (dummy)	0.16	0.26	0.12***	0.05***
	(0.36)	(0.44)	(0.33)	(0.23)
Observations	714	326	91	297

Note: Standard deviations in parenthesis

[a] Significance level in this column refers to the difference between males and female primary decision-makers.

[b] Significance level in this column refers to the difference between males and female secondary decision-makers.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Summary statistics by certification scheme (household level)

	(1) Full sample	(2) Non-certified [a]	(3) Fairtrade [b]	(4) Organic [c]	(5) UTZ [d]
Household characteristics					
Female-headed household (dummy)	0.21	0.20	0.15	0.31**	0.24
	(0.41)	(0.40)	(0.36)	(0.47)	(0.43)
Years household head spent in school	6.70	6.27**	7.97***	5.17**	7.21*
	(3.62)	(3.53)	(3.25)	(3.73)	(3.65)
Household size	6.41	6.29	6.33	6.86	6.43
	(3.11)	(2.84)	(2.73)	(3.79)	(3.68)
Total expenditure/day/pc (1000 UGX)	4.02	3.64***	4.41***	4.23*	4.19
	(2.44)	(2.43)	(2.48)	(1.70)	(2.86)
Off-farm income per year (1000 UGX)	1268.92	1135.70	1290.36	1144.01	1724.39**
	(1992.19)	(1895.19)	(1894.34)	(2025.92)	(2331.16)
Total value of household assets (1000 UGX)	1346.44	1019.00***	2071.52***	1184.34	1178.72
	(1503.78)	(1175.96)	(1962.42)	(1045.18)	(1411.61)
Farm characteristics					
Cultivated land (acres)	4.68	4.34*	5.19**	5.14*	4.28
	(3.45)	(3.56)	(3.80)	(2.96)	(2.78)
Area under coffee (acres)	2.80	2.25***	3.91***	3.03**	2.18
	(2.77)	(1.75)	(3.39)	(3.96)	(1.75)
Pesticide user (dummy) [e]	0.55	0.53	0.81***	0.14***	0.59
	(0.50)	(0.50)	(0.40)	(0.35)	(0.50)
Keeps records (dummy)	0.29	0.16***	0.57***	0.17	0.26*
	(0.45)	(0.37)	(0.50)	(0.38)	(0.44)
Drying coffee on bare soil (dummy)	0.23	0.32***	0.19**	0.11***	0.13***
	(0.42)	(0.47)	(0.40)	(0.32)	(0.34)
Bought tarpaulin in past 12 months (dummy)	0.25	0.18***	0.36***	0.24	0.24
	(0.43)	(0.38)	(0.48)	(0.43)	(0.43)
Picking unripe cherries (dummy)	0.10	0.11	0.13	0.03**	0.10
	(0.31)	(0.32)	(0.34)	(0.17)	(0.30)
Observations	453	193	120	70	70

Note: Standard errors in parentheses

[a] Significance level in this column refers to the difference between non-certified and certified households (all certification schemes).

[b] Significance level in this column refers to the difference between Fairtrade and non-certified households.

[c] Significance level in this column refers to the difference between Organic and non-certified households.

[d] Significance level in this column refers to the difference between UTZ and non-certified households.

[e] Chemical pesticides are prohibited in Organic coffee plots. However, Organic farmers may still use pesticides on non-certified plots grown with other crops.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Mixed logit – base specification and differences by certification status

Mean parameters	(1)	(2)	(3)	(4)	(5)
ASC (certification)	4.14*** (0.83)	1.63*** (0.42)	1.87*** (0.66)	1.83*** (0.45)	2.04*** (0.42)
Price premium (in 100 UGX)	0.34*** (0.05)	0.33*** (0.04)	0.33*** (0.04)	0.34*** (0.04)	0.35*** (0.04)
Agricultural training (dummy) [a]	0.87*** (0.08)	0.85*** (0.07)	0.87*** (0.07)	0.87*** (0.07)	0.77*** (0.09)
Training on gender equality (dummy) [b]	0.68*** (0.12)	0.68*** (0.11)	0.66*** (0.11)	0.72*** (0.10)	0.65*** (0.12)
Credits for women (dummy) [b]	0.54*** (0.09)	0.50*** (0.08)	0.50*** (0.08)	0.53*** (0.08)	0.63*** (0.09)
Pesticides prohibited (dummy) [c]	-0.54*** (0.11)	-0.52*** (0.11)	-0.52*** (0.11)	-0.53*** (0.12)	-0.04 (0.14)
Protective clothing mandatory (dummy) [c]	0.65*** (0.10)	0.67*** (0.09)	0.66*** (0.09)	0.74*** (0.10)	0.65*** (0.10)
Only ripe cherries (dummy) [d]	1.28*** (0.14)	1.38*** (0.13)	1.42*** (0.13)	1.44*** (0.13)	1.49*** (0.14)
No drying on soil (dummy) [d]	0.28*** (0.10)	0.31*** (0.10)	0.30*** (0.10)	0.36*** (0.11)	0.27*** (0.10)
Record keeping (dummy) [e]	0.40*** (0.07)	0.42*** (0.07)	0.42*** (0.07)	0.25*** (0.08)	0.40*** (0.07)
ASC interactions (dummies)					
ASC x Certified		0.38 (0.26)			
ASC x Fairtrade			0.00 (0.53)		
ASC x Organic			1.10 (0.87)		
ASC x UTZ			1.34 (0.83)		
Attribute interactions (dummies)					
Pesticides prohibited x Fairtrade				-0.37** (0.17)	
Pesticides prohibited x Organic				0.50*** (0.19)	
Record keeping x Fairtrade				0.39*** (0.13)	
Record keeping x UTZ				0.39*** (0.15)	
Agricultural training x participation ag. training					0.31*** (0.11)
Training gender x participation gender training					0.39** (0.19)
Pesticides prohibited x pesticide user					-0.85*** (0.15)
Record keeping x keeps records					0.39** (0.15)
Standard deviation parameters					
ASC	2.75*** (0.71)	0.82 (0.65)	0.13 (0.46)	1.74*** (0.46)	1.89*** (0.50)
Agricultural training	0.46*** (0.13)	0.47*** (0.08)	0.48*** (0.08)	0.50*** (0.09)	0.57*** (0.10)
Training on gender equality	0.53*** (0.14)	0.61*** (0.16)	0.58*** (0.14)	0.55*** (0.16)	0.61*** (0.17)
Credits for women	0.81*** (0.14)	0.89*** (0.14)	0.87*** (0.14)	0.66*** (0.12)	0.99*** (0.14)
Pesticides prohibited	1.55*** (0.16)	1.62*** (0.15)	1.64*** (0.14)	1.52*** (0.13)	1.58*** (0.16)
Protective clothing mandatory	1.06*** (0.17)	1.02*** (0.16)	1.05*** (0.16)	1.01*** (0.15)	1.11*** (0.18)
Only ripe cherries	0.99*** (0.25)	1.00*** (0.14)	1.04*** (0.13)	1.09*** (0.14)	1.15*** (0.16)
No drying on soil	0.90*** (0.17)	0.83*** (0.15)	0.92*** (0.14)	0.95*** (0.14)	0.91*** (0.17)
Record keeping	0.73*** (0.16)	0.71*** (0.12)	0.72*** (0.11)	0.78*** (0.11)	0.81*** (0.12)
Log Likelihood	-2375.33	-2381.85	-2381.24	-2365.85	-2352.05
Chi squared	596.76***	572.75***	571.85***	568.48***	548.74***
Observations (6*3*no. of respondents)	12852	12852	12852	12852	12852

Note: Standard errors in parentheses

[a] Reference category is no agricultural training.

[b] Reference category is no gender policies (i.e. no training on gender equality and no credits for women).

[c] Reference category is no restrictions on pesticide use (i.e. pesticides allowed and protective clothing optional).

[d] Reference category is no quality requirements (i.e. picking only ripe cherries and drying on tarpaulins both optional).

[e] Reference category is record keeping optional.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Willingness to accept (WTA) estimates for certification attributes (UGX per kg of coffee)

	(1) Mean WTA calculated in the preference space	(2) Mean WTA calculated in the WTP space
Benefits		
Agricultural training	-257	-268
	[-311, -202]	[-262, -274]
Training on gender equality	-199	-179
	[-261, -136]	[-173, -186]
Credits for women	-159	-164
	[-209, -109]	[-159, -169]
Requirements		
Pesticides prohibited	159	152
	[99, 219]	[170, 134]
Protective clothing	-192	-179
	[-251, -133]	[-177, -182]
Only ripe cherries	-378	-394
	[-479, -277]	[-389, -399]
No drying on soil	-83	-101
	[-142, -24]	[-94, -107]
Record keeping	-117	-112
	[-163; -72]	[-102, -121]
Number of respondents	714	714

Note: WTA estimates were derived from mixed logit model parameter estimates (base specification), using the delta method. 95% confidence intervals in brackets.

Table 8: Mixed logit estimates – specifications to analyze gender differences

	Full sample			Reduced sample
Mean parameters	(1)	(2)	(3)	(4)
ASC (certification)	1.27*** (0.43)	1.70** (0.77)	1.02** (0.52)	-0.59 (0.77)
Price premium (in 100 UGX)	0.32*** (0.04)	0.34*** (0.04)	0.33*** (0.04)	0.26*** (0.06)
Agricultural training [a]	0.84*** (0.07)	0.89*** (0.07)	0.86*** (0.07)	0.71*** (0.09)
Training on gender equality [b]	0.67*** (0.10)	0.67*** (0.11)	0.71*** (0.11)	0.57*** (0.14)
Credits for women [b]	0.51*** (0.08)	0.54*** (0.08)	0.42*** (0.10)	0.48*** (0.11)
Pesticides prohibited [c]	-0.52*** (0.10)	-0.55*** (0.11)	-0.56*** (0.11)	-0.12 (0.15)
Protective clothing mandatory [c]	0.70*** (0.09)	0.65*** (0.09)	0.69*** (0.09)	0.24 (0.16)
Only ripe cherries [d]	1.39*** (0.13)	1.41*** (0.13)	1.61*** (0.16)	1.08*** (0.17)
No drying on soil [d]	0.35*** (0.10)	0.28*** (0.10)	0.29*** (0.10)	0.24* (0.13)
Record keeping [e]	0.43*** (0.07)	0.42*** (0.07)	0.44*** (0.07)	0.22** (0.11)
ASC and attribute interactions				
ASC x Female	0.93** (0.46)			
ASC x Female primary		0.87 (0.78)	0.06 (0.74)	
ASC x Female secondary		1.02** (0.52)	1.07** (0.51)	
Credits for women x Female primary			0.40* (0.21)	
Credits for women x Female secondary			0.13 (0.12)	
Pesticides prohibited x Female primary			0.39* (0.22)	
Only ripe cherries x Female secondary			-0.38*** (0.15)	
No drying on soil x Female primary			0.31 (0.24)	
ASC x Point estimate partner				0.64*** (0.18)
Pesticides prohibited x Point estimate partner				0.38*** (0.10)
Protective clothing x Point estimate partner				0.35** (0.15)
Record keeping x Point estimate partner				0.28* (0.15)
Standard deviation parameters				
ASC	0.41 (039)	0.16 (0.52)	0.60** (0.44)	1.69*** (0.69)
Agricultural training	0.49*** (0.09)	0.48*** (0.08)	0.46*** (0.08)	0.31*** (0.11)
Training on gender equality	0.51*** (0.14)	0.61*** (0.14)	0.55*** (0.13)	0.63*** (0.21)
Credits for women	0.85*** (0.13)	0.86*** (0.14)	0.88*** (0.14)	0.64*** (0.19)
Pesticides prohibited	1.58*** (0.14)	1.63*** (0.15)	1.59*** (0.14)	1.08*** (0.17)
Protective clothing mandatory	0.90*** (0.13)	1.04*** (0.15)	0.97*** (0.16)	0.62*** (0.20)
Only ripe cherries	1.12*** (0.14)	1.04*** (0.13)	1.02*** (0.12)	0.88*** (0.18)
No drying on soil	0.97*** (0.14)	0.94*** (0.16)	0.94*** (0.14)	0.82*** (0.18)
Record keeping	0.70*** (0.10)	0.68*** (0.10)	0.67*** (0.09)	0.53*** (0.17)
Log Likelihood	-2384.38	-2379.85	-2370.72	-880.98
Chi squared	566.15***	574.37***	571.35***	107.80***
Observations (6*3*No of respondents)	12852	12852	12852	4698

Note: Standard errors in parentheses

[a] Reference category is no agricultural training.

[b] Reference category is no gender policies (i.e. no training on gender equality and no credits for women).

[c] Reference category is no restrictions on pesticide use (i.e. pesticides allowed and protective clothing optional).

[d] Reference category is no quality requirements (i.e. picking only ripe cherries and drying on tarpaulins both optional).

[e] Reference category is record keeping optional.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes

[1] Several recent studies have looked at consumer preferences for sustainability labels such as Fairtrade and Organic. One recent example is Meas *et al.* (2015)

[2] During gender-separated and gender-mixed focus group discussions, participants were asked to list and rank benefits and requirements associated with certification.

[3] Farmers in Uganda sell their coffee as red cherries, kiboko, or FAQ (dried and shelled coffee beans). Since most farmers sell their coffee as kiboko, we use the kiboko price as the reference point, even though we explained to participants that selling coffee in other forms is also possible with certification.

[4] In the descriptions, credit conditions were specified such that female farmers can obtain credits at an interest rate of 3%. The money is handed out to women only and has to be paid back within a period of three months.

[5] Given the small number of male secondary decision-makers (N=19), we do not disaggregate the group of men.