

Eliciting willingness to pay for quality maize and beans: Evidence from experimental auctions in Tanzania

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Introduction

Food safety hazards are associated with food and nutritional insecurity, trade disruption disease burden, reduced productivity and loss of human life, and impose costs on the food economy and public health system. In developing countries, these problems are often worsened by the fact that some of the food safety issues such as aflatoxin and chemical contamination are unobserved, and regulations to manage them are weakly enforced leading to sale of unsafe food. Observable quality attributes of grains such as damaged maize grains are also correlated with the unobservable toxins that are problematic to remove even by processing. Evidence showing how consumers value these quality aspects is thin, yet they constitute an important part in quantifying the demand for food products. Therefore, the question to ask is that if high-quality maize and common beans were differentiated from the unsorted maize and common beans through sorting and food safety labeling, are consumers willing to pay a premium?

Objective

The main objective of the study was to measure the relative demand for three grades of maize and beans products that differ in price and quality: unsorted, sorted, and sorted and labeled. In so doing we quantified the observable and unobservable maize and beans grain quality premiums. The unsorted, grade was mixed with damaged grain, dust, and chaff. The sorted and; sorted and labeled grades were the same, but the latter grade had a food safety label showing the grains were tested for aflatoxin and safe (in the case of maize) and safe (for beans).

Data and Methods

The study used socioeconomic and experimental auction data collected in 2021 cropping season from 555 households in four districts (i.e., Babati, Kilolo, Kongwa, and Mbozi). In these districts, which are predominantly maize and beans growing, there have been significant postharvest interventions promoted by the Africa RISING project. Using probability proportional to size sampling (PPS), 10 wards were selected from which 14 villages were selected randomly. With the help of the extension agents from the selected villages, households were listed, and a sampling frame was developed. Finally, 579 households were selected randomly, of which 50% of the respondents were male household members (mostly the head), and in the remaining cases, female household members (mostly spouses or female heads) based on a prior random assignment. Using the Becker-DeGroot-Marschack experimental auctions, we elicited the willingness to pay (WTP) for the different quality grades of maize and beans.

Results and Discussion

The demand curves (Fig. 1) were estimated as the share of households whose bid was greater than or equal to the price of maize and beans. The vertical distance between any of the two curves depicts the quality premium farmers are WTP a discount or a premium for the different quality maize and beans grades. The difference encompasses the unobservable and observable quality premiums. Most of the auction participants placed a premium on the sorted and labeled maize as compared to the unsorted maize with demand curves of the two quality grades lying to the right of the unsorted grade (Fig. 1a). For instance, 40% of the farmers are WTP Tsh 300 for the unsorted maize, Tsh 350 for sorted and about Tsh 380 for the labeled maize. It is interesting to note that though unobservable, farmers attach a higher premium to the labeled, as compared to the sorted maize. The average market price of beans between January and July 2021 was Tsh 1750 but only 11% of the farmers were WTP for the unsorted beans at this price, 24% for the sorted and 25% for the labeled beans (Fig. 1b).

The vertical distance between the unsorted curve and those of the sorted and labeled grades was significant while that of the sorted and labeled is not, pointing to the importance the farmers' place on the visual attributes of the different grades of beans as opposed to the unobservable attributes.

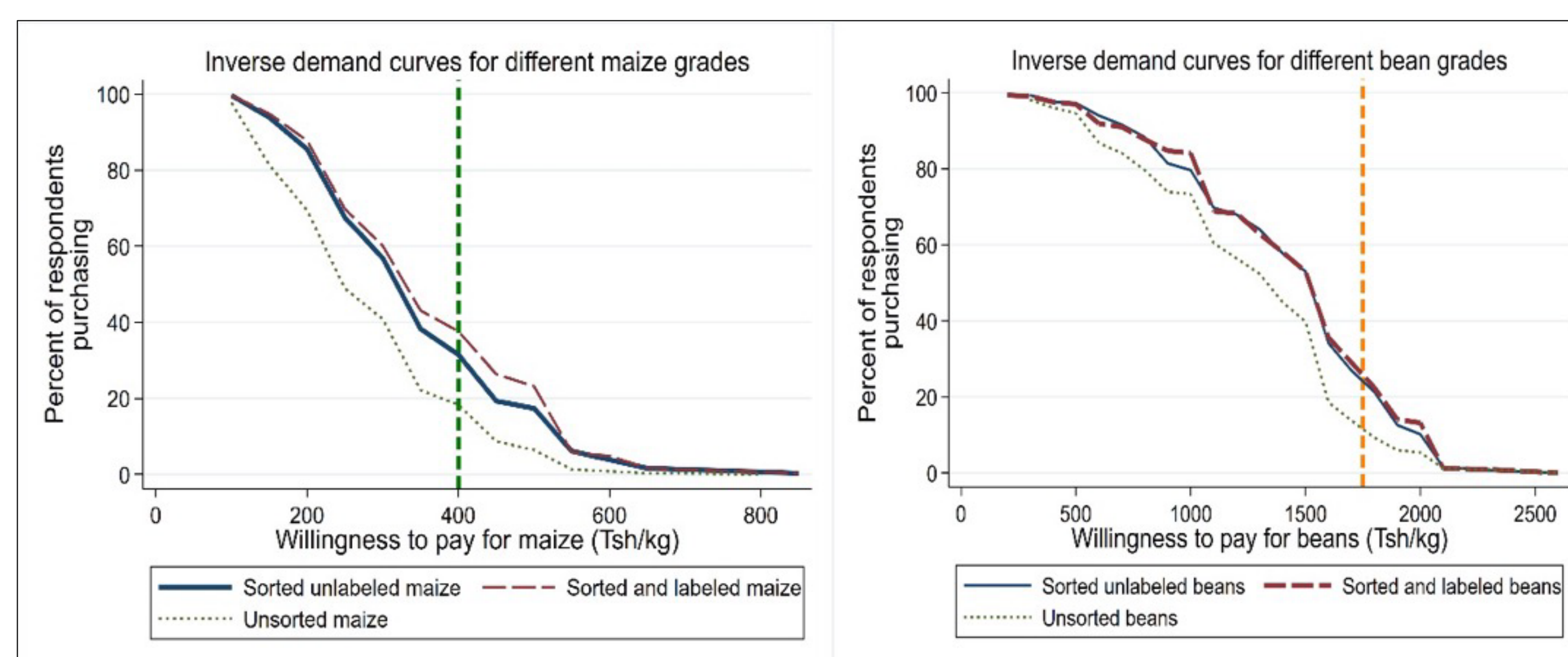


Fig. 1: Inverse demand curves for different quality maize (a) and beans (b)

Table 1 shows the Ordinary Least Squares (OLS) estimates of the sorted and; sorted and labeled maize with the unsorted grade as the base. The dependent variable is the WTP for all the quality grades. Consistent with the demand curves, auction participants were WTP Tsh 73 (25%) and Tsh 191 (14%) more for observable quality attributes over the unsorted grades for maize and beans respectively and the results are significant at a 1% significance level. The constant indicates the amount auction participants were willing to pay for the unsorted grades implying that the participants were willing to Tsh 364.36 and Tsh 1569.37 per kg for the sorted grades of maize and beans. The results in Table 1 also indicate that participants valued observable more than unobservable quality attributes with a Tsh 12.87 difference between the sorted and labeled maize grades while that of beans was Tsh 23.24, (although not significant).

Table 1: Observable and unobservable quality premiums for maize and beans

Variable	Maize WTP	Beans WTP
Sorted maize [Q1]	72.97***	
Sorted and labeled maize [Q2]	85.84***	
Sorted beans [Q1]		191.17***
Sorted and labeled beans [Q2]		214.41***
Constant	291.39***	1378.20***
Observations	1665	1665
Observable quality premium [Q1]	72.973***	191.171***
Unobservable quality premium [Q2-Q1]	12.865*	23.243
F-test: Observed quality premium = unobserved quality premium	F = 3.61*	F = 2.12
$p < 0.10$, * $p < 0.05$, *** $p < 0.01$		

Conclusion

The findings of this study show that the respondents were WTP premiums for the sorted and sorted and labeled grades of maize and beans but asked for a huge discount for the unsorted grade. We also find that the premium associated with the observable quality is much higher than the value on the unobservable quality. Results point to the need for policies that would increase access information on unobservable quality attributes such as aflatoxin for consumers to understand the value of and to promote the consumption of safe food.