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Tools, Fertilizer or Cash? Exchange Asymmetries in Productive Assets

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Abstract¹

Exchange asymmetries in individual decision-making have attracted substantial attention from economists since Thaler (1980) referred to the phenomenon that losses are weighted more heavily than gains as an “endowment effect” and related it to loss aversion and prospect theory. We used a field experiment to investigate exchange asymmetries in productive assets among poor rural respondents in Ethiopia. Farmers were randomly allocated two types of productive assets (tool or fertilizer) or cash, with a choice to keep the productive asset (cash) or exchange it for cash (productive asset). Loss aversion was proxied with a separate experiment and was used to assess the importance of endowment effect theory to explain exchange asymmetries. A greater exchange asymmetry was found for the more popular tool than for fertilizer. Loss aversion could explain a small but significant part of the exchange asymmetry in tools, but trade experience did not reduce the exchange asymmetry.

Key words: exchange asymmetry, endowment effect, loss aversion, factor markets, productive assets, input demand elasticities, field experiment.

JEL codes: D03, D51, O13, Q12

Introduction

Exchange asymmetries in individual decision-making have attracted substantial attention from economists since Thaler (1980) referred to the phenomenon that losses are weighted more heavily than gains as an “endowment effect” and related it to loss aversion and prospect theory. He saw it as a situation where people underweight opportunity costs. Samuelson and Zeckhauser (1988) use the term “status quo bias” as another explanatory concept for gain and loss asymmetry, whereas exchange asymmetries are also frequently identified in the form of a Willingness-to-pay (WTP) – Willingness-to-accept (WTA) gap, a term less loaded with causal explanation than “endowment effect” (Horowitz and McConnell 2002; Plott and Zeiler 2005). More

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recently, the prospect theory explanation of the phenomenon has been critically examined and questioned (Plott and Zeiler 2005; 2007; Brown 2005; Knetsch and Wong 2009; Morewedge et al. 2009). Plott and Zeiler (2005; 2007) demonstrated that exchange asymmetry could be reduced or eliminated by invoking a set of strict controls. They use this as a basis to refute the “endowment effects theory”.

The aim of this study is to investigate whether exchange asymmetries in rural factor markets have behavioral explanations rather than material explanations in the form of high transaction costs, liquidity constraints, and information asymmetries. In light of new insights from behavioral economics, a basic question is whether we should abandon the “poor but efficient” hypothesis (Schultz 1965). Is low input demand due to loss aversion, status quo bias, procrastination and reluctance to invest rather

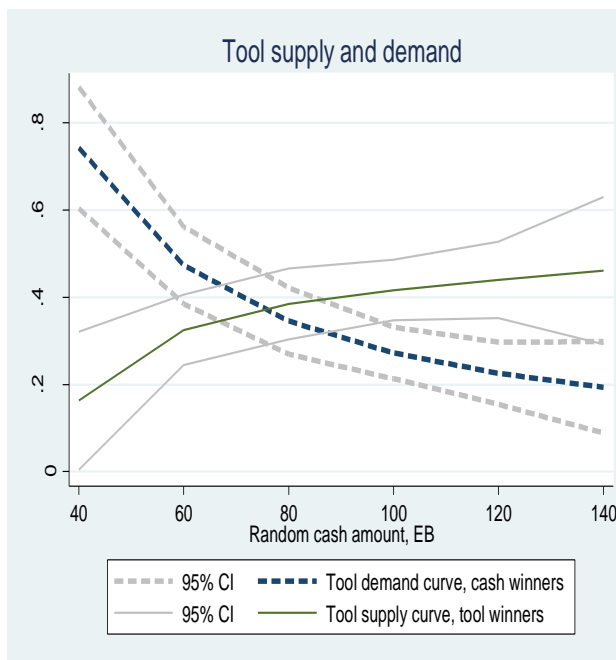
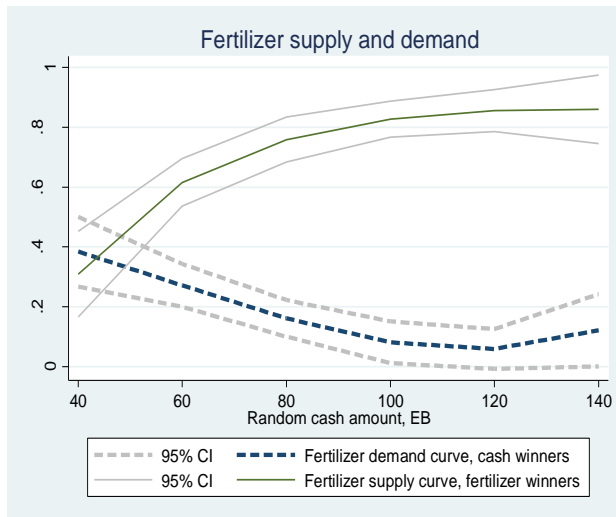
than cash constraints and limited market access (Duflo, Kremer and Robinson 2011)? If this is the case, “nudging” and “commitment device” policies may be needed as additional development policies to promote such investments as input demand will remain inelastic even after removal of market constraints.

In this paper, we investigated the existence of exchange asymmetries in two types of productive assets among poor rural men and women in Ethiopia with a field experiment that eliminates standard high transaction costs and information asymmetries that are so dominant in these environments. The study therefore reveals whether there are additional behavioral and preference-related constraints to the adoption of these technologies and whether loss aversion lends support to endowment effects theory as an explanation of exchange asymmetries after removal of physical barriers.

Table 1. Overview of experimental outcomes and choices

	Initial endowment is commodity	% choose commodity	Initial endowment is cash	% choose commodity
Tool versus Cash	258	62.8	302	35.8
Fertilizer versus Cash	261	26.4	221	15.8

Note: Pearson $\chi^2(1) = 40.71$, Pr. = 0.000 for tool versus cash experiment. Pearson $\chi^2(1) = 7.95$, Pr. = 0.005 for fertilizer versus cash experiment.



Figures 1 and 2. Supply and demand for tool and fertilizer

Treatments

The experiment was set up to first elicit the preference ordering of the respondents. What each respondent received was then determined through coin tosses, first, to determine whether

the commodity was a tool or a small bag (6 kg) of fertilizer, and second, to determine whether they would first receive the commodity or a random amount of cash. The random amount of cash for each player was identified in advance through a random number generator, within the range 40 to 140 EB. The market value of the commodities was 100 EB (5 US\$). After this commodity or cash outcome was identified, they had one chance to exchange the lottery outcome for cash if the outcome was the commodity, and vice versa. The commodity and cash were placed in front of them so that they could see what they would potentially obtain. They decided to keep or exchange without any follow-up questions.

Findings

Substantial exchange asymmetries were found, especially for the more popular tool as can be seen from Table 1 and Figures 1 and 2. The econometric analysis revealed that loss aversion was found to play a significant but small role in explaining observed exchange asymmetries. The experience of the respondents did not reduce the exchange asymmetries; rather the opposite was found as the men revealed greater exchange asymmetries than did the women; however, the men have more experience with trade and use of the productive assets under consideration in this study. We also found no difference between probabilistic ownership and certain ownership. A

random allocation process was used to eliminate the danger of experimental enumerators imposing value judgments that could otherwise have influenced the respondents. Controlling for the preference ranking of commodities and cash did not eliminate the exchange asymmetries. Our study contributes to the limited research on exchange asymmetries in a development context by investigating the relevance of behavioral economics theories to the analysis of the behavior of poor people.

The findings have relevance for rural development policies. Substantial exchange asymmetries exist after removing hard constraints and may point in the direction of commodity transfers as a method of enhancing technology adoption but only if the technology is in high demand. Perhaps surprisingly, our study revealed a high demand for agricultural tools, whereas fertilizer was less popular. In many agricultural extension programs fertilizer has had a central role as an input that often has been promoted and subsidized while farm tools seldom receive any focus in such programs. It may be worth investigating the potential productivity benefits from promoting use of better tools. The preference ranking showed that cash was in high demand and was as popular as receiving the tool and particularly among women, whereas fertilizer was substantially less popular even though the experiments were implemented close to the beginning of the rainy season. This contrasts with

the study by Holden and Lunduka (2014) in Malawi, where a very high demand for small bags of fertilizer was revealed in experiments of a similar type. This illustrates that caution should be exercised when generalizing findings. Our study covered diverse agro-ecological conditions such as cash cropping and subsistence oriented farming systems and annual crop and perennial crop areas in Ethiopia and may therefore be of development relevance in other parts of the country. Our study revealed significant gender differences in exchange asymmetries and response elasticities, with the men revealing higher exchange asymmetries and more non-linear price response elasticities. More studies are needed to assess the external validity of these gender-related findings.

Full paper link:

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