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From personalized exchange towards anonymous trade: A field experiment on the workings of the invisible hand

Erwin Bulte[a,*], Andreas Kontoleon[b], John List[c], Ty Turley[d], Maarten Voors[a]

[a] Development Economics Group, Wageningen University and Research, P.O. Box 8130, 6700 EW Wageningen, The Netherlands
[b] Department of Land Economy, University of Cambridge, 19 Silver Street, Cambridge, CB3 9EP, United Kingdom
[c] Department of Economics, The University of Chicago, 1126 E. 59th Street, Chicago, Illinois 60637, United States of America and NBER
[d] Marriott School of Management, Brigham Young University, 760 Tanner Building, Provo, Utah 8460, United States

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ABSTRACT

The experimental literature has shown the tendency for experimental trading markets to converge to neoclassical predictions. Yet, the extent to which theory explains the equilibrating forces in markets remains under-researched, especially in the developing world. We set up a laboratory in 94 villages in rural Sierra Leone to mimic a real market. We implement several treatments, varying trading partners and the anonymity of trading. We find that when trading with co-villagers average efficiency is somewhat lower than predicted by theory (and observed in different contexts), and markets do not fully converge to theoretical predictions across rounds of trading. When participants trade with strangers efficiency is reduced more. Anonymizing trade within the village does not affect efficiency. This points to the importance of behavioral norms for trade. Intra-village social relationships or hierarchies, instead, appear less important as determinants of trading outcomes. This is confirmed by analysis of the trader-level data, showing that individual earnings in the experiment do not vary with one's status or position in local networks.

1. Introduction

A central tenet of neoclassical economics is that in equilibrium there are no unexploited gains to trade. The workhorse model within economics implies that in a perfectly competitive market, the first function of the equilibrium price is to efficiently allocate scarce resources to market participants. This principle, embodied in Adam Smith's invisible hand metaphor, represents the backbone of the measurement of the gains to trade, provides guidance into optimal tax policy, and embodies why market-based interventions are often proposed as a key element of policy reform agendas for developing countries. The theoretical consistency of the efficient outcome of market allocations has been substantiated through experimental studies conducted in a developed world social context (Smith, 1962; Roth, 1995; Holt, 1995; List, 2002, 2004).

We explore the limits of the applicability of this theoretical prediction for rural inhabitants in developing countries, and test whether outcomes in market-trading games remain efficient when participants originate from communities with little

* Corresponding author at: Development Economics Group, Wageningen University and Research, P.O. Box 8130, 6700 EW Wageningen, The Netherlands.
E-mail address: erwin.bulte@wur.nl (E. Bulte).

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exposure to markets. In addition, participants in our sample are more socially connected than most market experimental studies which typically include college students. Specifically, we report on a double-sided decentralized oral auction that was run as a lab-in-the-field experiment in 94 villages in Eastern Sierra Leone. Our subjects live in areas that are between 2 and 6 h walk away from market towns. Market trading in these areas occurs at low volumes and over a small range of products. On average, only 43 percent of our subjects reported to buy or sell something more than once a week.,[1] Most are subsistence farmers with, most of the time, hardly any cash to spend at a market. Indeed, 12 percent of our subjects reports that they never go to markets.

Our approach enables us to consider whether exchange patterns are driven by forces other than profit motives. Rural life in Africa is to an important extent governed by social norms (linked to social status, kinship norms, social ties etc.) and institutions that are distinct from those (implicitly) assumed in neoclassical economics. This might matter for the efficiency of markets. Granovetter (2005), for example, argues that the impact of social relations on trading prices may vary with the nature of the relationship, the cost of shifting to other partners, and the market situation: "*The theoretical issue is often not one of economic and sociological arguments conflicting, but rather of the weakness of both in understanding how actors with simultaneous economic and non-economic motives will act.*" (2005: 38)

The objectives of this paper are twofold. First, we extend the work of Smith etc. into the field and explore the efficiency of market behavior by conducting intra- and inter village trading experiments with subjects from one of the poorest regions in the world. Second, we intend to make a methodological contribution and probe whether social dimensions are a potential impediment to trade, interfering with the workings of the invisible hand.[2] We try to distinguish between behavioral norms associated with exchange behavior within the village, and person-specific social relations – one's position in local networks or hierarchies. For example, we ask whether status and social relationships (patron-client networks, kinship relations, or trust-based relations) interact with market structures to cause inefficient trading behavior. While most experimental papers on status and efficiency are based on status randomly induced *within* the experiment (e.g., Ball et al., 2001; Moxnes and van der Heijden, 2003; Frey and Meier, 2004; Kumru and Vesterlund, 2010)[3] we use subjects who are socially connected in real life and take advantage of the existing, endogenously formed status hierarchies in their community. In our set up, we experimentally vary the social distance between buyers and sellers, as well as the trading technology and the anonymity of partners trading.

We report three key insights. First, earlier experimental findings reported in Smith (1962) and List (2002, 2004) do not fully extend to our environment. Specifically, when using a conventional double auction setting, overall efficiency levels are lower than previously observed, and aggregate behavior *across* trading rounds in experimental markets does not seem to fully converge towards theoretical predictions of efficiency.

Second, we find that there exists a social dimension to trade, and speculate that norms about intra-village behavior affect economic efficiency. While one's own position in local hierarchies does not explain profits from trade, we observe that trading efficiency is higher in samples drawn from the same social network than in samples where trading partners are strangers. Eliminating face-to-face interaction from the within-village treatment, or making within-village trade anonymous, does not matter for efficiency, but affects the number of trades and the distribution of the surplus.

Third, based on analyses of trader behavior and realized trades in the experiment, we find that some observable personal characteristics affect market outcomes. For instance, literate people are more likely to trade. We also find that men and younger agents earn higher profits in the experiment than women or older participants. Status and one's position in local networks or hierarchies, instead, does not matter for experimental earnings.

This paper is organized as follows. Section 2 provides theoretical background, introduces conceptual foundations and discusses the academic [or scientific] contributions of the study. In Section 3 we explain the experimental design and develop a series of exploratory hypotheses. In Section 4 we analyze the aggregate data, focusing on efficiency levels and differences across experimental treatments. In Section 5 we consider how individual characteristics drive results. Conclusions and discussion of our results ensue in Section 6.

2. Conceptual foundations

Our experiment speaks to various literatures. First, given our sample of subsistence farmers with very little trading experience, the results speak to the literature on the transition from personalized exchange to anonymous trade (see also Fafchamps, 2011; Kimbrough et al., 2008). This issue is not merely a theoretical nicety. For example, the dominant agricultural development paradigm in current policy circles is to enhance the efficient operation of markets and to link producers (and consumers) to regional or international markets and value chains (Byerlee et al., 2009). However, according to some theories, there are complementarities in exchange modalities, which imply that such a transition might not easily occur. If most

[1] Typically, food crops (cassava, rice, beans), cash crops (palm oil, cocoa, coffee), animals (fish, bush meat) are brought to the markets and imported essentials, such as salt, sugar, and soap, are brought back to the villages.

[2] Previous studies in Western societies indicate that social distance and the degree of anonymity affects play in dictator and ultimatum games (e.g., Hoffman et al., 1996; Bohnet and Frey, 1999; Charness and Gneezy, 2008). Baldassari and Grossman (2013) focus on the effects of group attachment and social position on prosocial behavior (measured via dictator games) in Uganda.

[3] See Chandrasekhar et al. (2013) for an example of the use of real-life social networks in a field experiment.