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Skills in the Marketplace: Market Equilibrium, Personality and Ability in a Field-Based Experiment

Nathan Fiala

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Skills in the Marketplace: Market Equilibrium, Personality and Ability in a Field-Based Experiment[*]

Nathan Fiala[†]

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Abstract

Classic economic theory predicts that markets will clear, leaving little or no marginal gains from trade left on the table. Laboratory experiments have largely confirmed this, though the results of recent field experiments have been mixed, with some artefactual markets in developing countries performing relatively inefficiently. I create a multi-round trading market in Uganda in order to explore the efficiency of trading and test if individual traits predict market efficiency and bargaining success. I use a rich dataset on individual characteristics, including indicators on personality, wealth and human capital. I find that measures of personality and human capital of the buyers and sellers predict levels of efficiency within rounds. The personality indicators are less correlated with individual success, though human capital remains important. Finally, rents obtained in the experiment correlate with wealth levels of participants two years later. The results suggest that market prowess can predict some lifetime outcomes and suggest an important role for individual personality in social efficiency outcomes. Future work on market and social efficiency outcomes will need to include an explicit role for individual personality.

JEL codes: J24, D14, C91

Key words: Experimental market; market interactions; market efficiency; developing markets; personality; individual ability

1 Introduction

The prediction that markets in equilibrium will clear, leaving behind little or no marginal gains from trade, is a central tenant of classical economic theory. Financial and trading markets in developed countries have largely confirmed this prediction (Fama 1970), along with a number of laboratory experiments, starting with Smith (1962). In a field experiment with memorabilia traders, List (2004) found efficiency rates as high as 97% in some rounds of trading.

Evidence on market efficiency in developing countries is more mixed. Financial markets are often incomplete, but those that exist perform relatively well (Magnusson and Wydick 2002). Among small-scale traders, the results are less promising. Bulte, et al. (2013) find efficiency rates below 90% among inexperienced trading communities in Sierra Leone. Through a novel experimental design, they find that varying interaction mechanisms can increase this rate by a small amount, though there are still significant inefficiencies. Their results suggest that expanding market growth will help push out inefficiencies; however, there is still good reason to be worried about the lack of efficient outcomes and the reasons for the lack of efficiency[1].

Existing laboratory and field bargaining experiments have focused their interests on the overall efficiency of markets but have paid little attention to who is participating in the market. Within most any market, some individuals will likely obtain greater rents than others due to bargaining ability, which is itself based on a range of personal abilities and characteristics. If these characteristics affect not just individual success, but also larger market efficiency, the wrong mix of characteristics could lead to inefficient outcomes.

There is a growing literature on how individual characteristics and skills correlate with economic outcomes. DellaVigna (2009) summarizes recent research on how individuals deviate from standard economic models, including the role of social preferences, limited attention and persuasion in market outcomes. He then discusses how experience can limit the impacts of these characteristics. Heckman, Stixrud and Urzua (2006) present evidence that cognitive and noncognitive skills predict a number of economic outcomes, including employment, wages and occupational choice. Leibbrandt

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[1]Interestingly, Gode and Sunder (1993) show that computer programed zero intelligence traders can achieve equilibrium in market trading. This makes the question of why there are low efficiency rates in developing countries an even bigger concern.

(2012) finds a strong correlation between pro-social outcomes in a laboratory experimental and outcomes from a trading market in Brazil. Iyer and Schoar (2008) conduct a market experiment by sending buyers to negotiate with sellers and look at final price agreements. The authors then test if a buyer being from a different community than a seller determines the outcome. They find that prices are lower for community matches. Haushofer and Zurlinden (2013) use a double-auction experimental design in Kenya and find a convergence to classical theory, as well as a correlation between cognitive skills and experimental outcomes.

There is also some evidence on individual business owner characteristics for business outcomes. Djankov, et al (2008) look at the determinants of being an entrepreneur in Brazil and find that family characteristics are the best predictor of being self-employed. Acharya, Rajan, and Schoar (2007) explore the psychology of entrepreneur success by correlating different characteristics and economic returns. They find that self-efficacy, achievement motivation, age, and prior borrowing experience are all correlated with success. Bloom and Van Reenen (2007) collect data on management practices (and ability). They find a large heterogeneity of business quality as a lot of businesses are poorly managed. More competition decreases bad management; businesses passed down in the family are generally the worst managed. Simeon Djankov, Yingyi Qian, Grard Roland, and Ekaterina Zhuravskaya (2008) test if attitude toward risk, I.Q., self-confidence, family background and social networks predict business outcomes. They find that family characteristics have an influence on whether someone becomes an entrepreneur, though business outcomes are best predicted by intelligence and family education. They do not find that entrepreneurs are more self-confident. Finally, both Caliendo, Fossen and Kritikos (2012) and Verheul et al. (2012) find strong correlations between enterprise owners and a range of personality characteristics.

The literature on using experiments to measure individual ability is small and confined to classroom settings with single auctions. For instance, Kagel and Richard (1998) look at the prevalence of the winners curse in those with a lot of experience in markets and those with little experience, while List (2002) looks at the differential returns and equilibrium of pairing experienced buyers and sellers with inexperienced buyers and sellers. There is also a literature looking at the differences in competitive behavior across genders in market settings (Gneezy, Niederle and Rustichini

2003 and Ham and Kagel 2006) and behavior in a sealed auction (Cheny, Katuckz and Ozdenoren 2005). Researchers have also studied the role of risk aversion and discounting with cognitive ability (Benjamin, Brown and Shapiro 2006). Finally, Garvin and Kagel (1994) and Casari, Ham, and Kagel (2006) look at correlations between the winners curse and gender and ability, as measured by SAT scores. While the literature acknowledges heterogeneity of outcomes across individuals and the ability to collect direct data on individual abilities, no study has yet used this information to understand outcomes in the real world, either in a laboratory of field setting.

In this paper, I describe the results of an experiment in Uganda that merges individual outcome data from a bargaining experiment with detailed individual preferences, personality, and skills-based information. I create a private auction, multi-round trading market that reflects the actual market conditions that people in Uganda and other developing countries regularly face. I use the results to explore the efficiency of trading and test what individual traits predict market efficiency and individual bargaining success, as well as explore how the results of the experiment correlate with future outcomes.

In early rounds of trading, I find low efficiency results, similar to Bulte, et al. (2013). By the final rounds, efficiency rates are higher and close to theoretical predictions. I also find that a number of individual characteristics are important for success, both of the overall market and for individuals. The average age of participants and human capital are positively associated with market efficiency, while indecies of patience, pro- and anti-social behavior and agression are negatively associated with efficiency. Only age and human capital are consistently associated with individual success in the market, though indicies of anti-social and agressive behavior are negatively associated with outcomes for buyers. The results of the bargaining experiment are not statistically significant but are postively and consistently correlated with individual income levels two years after the experiment.

Overall, the results of the experiment suggest that market buyers and sellers in a developing country are leaving some rents behind, though not an amount much different than found in developed economies. Measures of individual personality and abilities are important for aggregate market performance, though the personality measures are not important for individual performace.

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These results suggest that there is a complementarity to individual characteristics within markets.

This paper contributes to literatures looking at market efficiency and the role of individual ability and personality on individual and market outcomes. The results suggest that future work on market and social efficiency will need to include a role for individual personality.

2   Experimental Design

The experiments described in this paper were conducted in the Langi region of northern Uganda. All of the participants come from the same ethnic group. Participants were invited from a pool of individuals taking part in a randomized evaluation of a cash grant project, described in Blattman, Fiala, and Martinez (2013). The experiments required a certain number of participants to be present, but the number who showed up out of the invited pool did not always reach this amount. When there were too few invited participants, people were selected from the local community. In total, 78.5% of the sample population is from the evaluation sample. A test of the performance between the community and evaluation sample suggests there is not a difference in performance between the groups.

In the experiment, individuals were randomly assigned as either sellers or buyers and given cards with either their costs or values, respectively. Those selected to be buyers or sellers kept their positions for the remainder of the experiment. Participants played the experiment as a private market. Individuals were allowed to freely roam around a large room and negotiate prices with opposite types. When a price was reached, participants approached an enumerator and quietly informed them of the price. The price was then recorded along with the value and costs of the two players. A total of ten rounds were played by each participant, and all information was kept private. For security reasons, players were informed that the research team would return a few days later to pay individuals the amount of their profit or surplus value from all of the experiments. This promise was credible as the team had been interviewing the individuals a number of times during the last two years and had developed a relationship with the participants.

The values for buyers started at 1,700 USH ($0.85) and proceeded by amounts of 300 USH ($0.15) until they reached the maximum value of 4,400 USH ($2.20). For sellers, the lowest cost

started at 1,300 USH and increased by 300 USH until they reached 4,000 USH. The most socially efficient outcome is presented in Figure 1, where equilibrium price is between 2,700 USH and 2,800 USH and equilibrium quantity traded between 5 and 6. The maximum amount of rent per round is 9,600 USH in total[2].

Participants were told that the experiment was meant to mimic the marketplaces found in large and small towns across Uganda. Buyers were to approach sellers and offer prices, with all information kept private to facilitate optimal bargaining. A time limit was imposed of 5 minutes per round, which was enough time for buyers and sellers to negotiate with a number of people.

The experiments were run in early 2010. A local research team including a manager and two assistants collected the data. All three spoke the local language, Luo, which was the main language of the experiments. The researcher and the researcher assistant trained the team, who then issued clear instructions to the team on how to explain the experiments to participants, when and how to answer questions, and how to record information. The full protocols are included in the Online Appendix.

A total of 10 sessions were run with 20 participants in each session. Ten individuals were selected as buyers and 10 were selected as sellers. The researcher predetermined all costs and values distributed. The experiment locations were in preselected areas that invited participants could easily access.

The experiment was designed to mimic normal market interaction that most participants would be familiar with. This allows for a test of whether and how quickly the prices and quantities obtained fit with classical econoic theory. While market prices and quantitiy may be optimal, there is likely significant variation within a market for individual outcomes. As there is also extensive information about the participants from other surveys, the design also allows for a test of what individual and group characteristics predict market and individual success.

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[2]The normal daily wage in northern Uganda at the time was about 6,000 USH ($3.00), though this is obtained inconsistently for most people. Average consumption per person per day is below $1.25.

3 The Role of Skills and Personality in Market Outcomes

As discussed in the introduction, the majority of the literature looking at how individual personality and other characteristics affects economic outcomes focuses mostly on entrepreneurs and the self-employed. There has not though been much focus on the role of personality for other outcomes, including market interactions. In this section I discuss how personality and skills may affect individual outcomes in bargaining situations.

In a market, the price agreed upon by a buyer and seller will lie between the cost to the seller and the value to the buyer, i.e. $cost < price < value$. The rent to the seller is thus equal to $p - c = r_S$ and the rent to the buyer is equal to $v - p = r_B$. r_S and r_B may not necessarily be equal to each other, depending on the outcome of the bargaining process. An individual's rent will thus be a function of different characteristics. For individual i during round j, obtained rents may be determined by a characteristic function composed of different personality traits. In the case described here, this would be $r_{ij} = f_{ij}(k, h, t, r, s_P, s_A, a)$, where k is individual i's physical capital, h is human capital, t is time preferences, r is risk preferences, s_P is pro-social behavior, s_A is anti-social behavior and a is aggressiveness.

The total rent obtained by all participants within the round is thus $R_j = \sum_{i=1}^{20} r_{ij}$. If individual characterisitics are additive in the way they affect rents obtained in a round, $R_j = \sum_{i=1}^{20} f_{ij}(\cdot)$. In this case, the sum of the characteristic functions is equal to it's parts.

It is possible though that total trading round outcomes could be more than the sum of the individual characteristics. If there is a complementarity of personalities within the market, the total obtained rent will instead be a function of the total personality traits. In this case, $R_j = F_j(K, H, T, R, S_P, S_A, A)$, where capitalization of individual characteristics refers to an aggregation of the total population. $F_j(\cdot)$ and $\sum_{i=1}^{20} f_{ij}(\cdot)$ could thus behave very differently. In this experiment I will test directly whether there is a complementarity of personality, and what that might look like.

There is no theory to directly relate how personality might affect individual and market outcomes. However, it is possible to conjecture what the role of these characteristics might be at the individual and aggregate levels. Physical capital is the total wealth of an individual and may proxy

for past success in dealing with the market or family wealth. In either case, one expects it to be positively associated with individual outcomes in this experiment as it reflects greater experience with bargaining. At the aggregate level, a higher level of experience of the participants suggests greater efficiency. Human capital is a measure of intelligence and is again expected to postively correlate with outcomes at both the individual and aggregate levels. Time preference reflects an individuals patience, and may be positively associated with individual and aggregate outcomes if patient individuals are more willing to search out a better price. Risk preferences could be positive or negative for individual outcomes depending on whether taking chances improves outcomes.

Pro-social behavior reflects both individual likeability, as well as positive attitudes towards others. If likeability is used to an individuals advantage, it will be positively correlated with outcomes. On the other hand, if positive attitudes dominates, it will be negatively associated as pro-social individuals will bargain less effectively for themselves and will instead bargain with the other persons outcomes greater in mind. Likewise, at the aggregate level a strongly pro-social group could perform more efficiently if this is used for advantage, or worse if concerns of fairness dominate.

Both anti-social behavior and aggressiveness are expected to be negatively associated with outcomes if other participants view these behaviors as negaitve and therefore do not interact with these individuals. If, instead, aggressive individuals are not discriminated against, this behavior could lead to higher individual and aggregate outcomes if it aids in pushing other participants to accept less returns.

4 Market Efficiency

The summary statistics for the experiment are presented in Table 1. The average price across the rounds is 2,700 USH, which is within the predicted equalibrium values of 2,700-2,800 USH. Across all of the rounds, the prices average between 90% and 98% of the predicted level, with very little change across the rounds. Individual price levels within each session, though, were quite varied and reflect a high heterogeneity in price agreement.

Individual average rents are likewise consistent around 700 USH. Twenty-two trades (less than

2% of all trades) were made with negative rents. This is likely due to some people in early stages misunderstanding the rules. In the later stages, there are no negative trades. There is a high level of heterogeneity in rent returns, with some people performing exceptionally well. As predicted, there is a large difference in returns between buyers and sellers. Buyers averaged 293 USH more rents each round than sellers, about 40% of the average rent. This suggests buyers had a large market power compared to sellers, perhaps due to the instructions to buyers to search for sellers. Sellers were observed to not search much for a buyer, but instead bargained with buyers as they came along.

Efficiency rates are calculated as the percent of total possible rents available that were obtained by the entire group in each round. In the early rounds, the rates are well below 90%, which is consistent with the results of Bulte, et al. (2013) in Sierra Leone. As can be seen in Figure 2, these rates improve over time. By the last round, efficiency has increased to 93%. In 11 of the 100 total rounds played, efficiency was at 99% or greater.

The average efficiency rate includes a small number of very poor performing sessions. Dropping the single worst performing session in the last period increases efficiency to 96%. Figure 2 also presents the results of different dropping rules, including dropping the lowest performing session each round, as well as dropping session 3, which, on average, performed the worst of all sessions. Dropping does not significantly change the interpretation of the results, though it does increase the efficiency rate by a few percent each round.

Maximizing efficiency comes from an optimal matching of buyers and sellers. By design, market equilibrium in the experiment means four buyers and four sellers would not trade. This did not happen in 31 of the 100 total rounds played. Even in the last round, there are fewer than predicted no-trades in three of the sessions. The results on market efficiency are thereofore positive overall, though there is clearly room for improvement before full efficiency is reached.

5 Measures of Individual Characteristics

The individual characteristics were collected as part of a larger evaluation of a cash transfer evaluation. The variables were collected at the baseline in 2008, or during the first follow-up in 2010,

which coincided with this experiment data collection. The data includes a wide range of economic, social and psychological indicators, as discussed in Blattman, Fiala, and Martinez (2013).

Table 2 presents the summary statistics for individual characteristics used in the analysis presented here. Note that the sample size if 143, which is the number of individuals who were invited to the experiments that actually showed up. Individuals are relatively young (25 years of age on average), with 29% being female. Compared to other young people in northern Uganda, the participants are slightly better off in terms of literacy and assets. They are still very poor by most measures and fall below the Government of Ugandas poverty threshold. All indices are constructed by normalizing each component piece to mean of 0 and variance of 1, summing the components, and then normalizing the sum. The variables and their construction are as follows.

5.1   Human Capital

The human capital index is composed of measures of individual intelligence and education. It includes years of education and whether the person felt she could read and/or write in her native language or English. It also includes whether the person ever received vocational training, which is a common supplemental education after finishing public schooling. To test for intelligence, researchers administers a number recall to individuals to test how well they remember a string of numbers read by an enumerator, as well as a numeracy test, which asked simple math questions.

5.2   Wealth

The wealth index includes a principle component analysis index of assets, which is constructed from a list of over 50 common household assets. Assets were asked one-by-one to participants to ensure there was no issue with recall of ownership. The index also includes current cash savings, which are not common in this context. Finally, it includes cash earned in the last month from all economic activities. Again, to avoid recall errors, the enumerator provided a list of 25 common activities with the respondent noting whether they engaged in that activity in the last four weeks and how much income they received from it.

5.3 Risk

The risk index is constructed from a set of localized questions to test daily risk preferences. A common type of question was as follows:

Suppose you have a severe pain in your leg. You have the choice between two options.

Option A: You can get some medicine that will reduce the pain but will not cure you.

Option B: You can get surgery that will cure you; however, there is a small risk of death.

Which option would you choose?

Participants then chose which option they preferred. These questions were constructed to mimic real-life risk situations people faced.

Participants were also asked the following at the end of the questionnaire:

You have a choice between the following two options.

Option A: You can receive 2000 USH for sure.

Option B: We play Labyeka. If you win, you get 3000 USH. If you lose, you get 1000 USH.

Which option do you choose?

Labyeka is a well-known local game of chance with a 50% chance of winning. After they made their decision, individuals then played the game and were paid based upon their choices and the outcomes.

5.4 Patience

Patience was also determined through a questionnaire using a set of localized questions. An example question to test patience is as follows:

Suppose you are sick. The illness is not life-long, but it will last for a few months. You have the choice between two options.

Option A: You can get some medicine today, which will make you feel somewhat better.

Option B: You can wait a week until a better medicine is available that will make you feel entirely good again. You can only choose one medicine.

Which option do you choose?

It was decided not to include incentivized questions that include a time lag as there was no credible way to pay participants after the questionnaire was completed.

5.5 Pro- and Anti-Social

The pro-(anti-)social variables are constructed from a set of localized questions designed to test positive (negative) interactions with other people and the community. The pro-social questions addressed how many groups the individual participated in with other community members, such as religious and sports groups. It also tries to measure the quality of interactions with community members, i.e. whether community members were helpful to them, and vice versa. Anti-social questions focused on problems interacting in the community. For example, individuals were asked "Do you keep to yourself when you are worried?" and rated this as often, sometimes, rarely, and never.

5.6 Aggression

The aggression index is a construct of self-reported actual fights and arguments with family, neighbors and police. These communities are not prone to high levels of fighting or aggression; nonetheless, there were some issues reported. While it is possible that this variable is the most prone to being misreported by respondents, the individuals were generally open to discussing such incidents.

6 Individual Market Outcomes

As described earlier, individuals were selected to be either buyers or sellers and assigned specific ID numbers, which, unknown to them, corresponded to what value (buyers) or cost (sellers) they would be given throughout the experiment. These values (costs) were staggered such that each

person received each value (cost) once throughout the 10 rounds. As the ID numbers were distributed randomly, it is unlikely there is selection among the timing of the received values (costs). Table 3 presents a test of balance across a range of individual indicators. None of the individual characteristics are statistically significantly related to whether a person was selected as a buyer or seller (the ommitted category). This suggests there was little or no selection into the individual roles.

6.1 Who Trades?

To test who engages in trade, I estimate the following model on those that trade and those that do not:

$$T_{ir} = \alpha V_{ir} + \beta S_{ir} + \delta R_{ir} + \gamma X_i + \epsilon \tag{1}$$

where i is the individual, r is the round, T is a dummy for whether the individual traded, V is a dummy for whether the value (cost) they received is too low (high) and so will not be traded in the theoretical equilibrium, S is a matrix of dummies for the session an individual played in, R is the matrix of dummies for the round played, X is the full set of individual characteristics, and ϵ is the error term. The standard errors are robust and clustered at the session level as individual outcomes may be correlated with the other participants of the experiment.

The results of this analysis are presented in Table 4. The largest predictor of who trades is whether the individual received a price outside of equilibrium. As classic equilibrium analysis would suggest, the effect of receiving a bad price is large, negative, and very significant. Human capital is positive and significantly associated with trading but is only significant when pooling the buyers and sellers. Likewise for the risk aversion index, which is negative but only significant when pooling.

6.2 Market Trader Characteristics

To test what characteristics predict the level of rents achieved for individuals, I estimate the following model:

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$$Y_{ir} = \beta X_i + \epsilon \tag{2}$$

where i is the individual, r is the round, Y is the amount of rent person i receives in round r, X is the full set of individual characteristics, and ϵ is the error term. Standard errors are again robust and clustered at the session level. As the prices were given randomly, and it is only prices that consistently predicts who trades, I also use outside of equilibrium price to identify a two-step Heckman selection model for whether someone traded, as in List (2004) and Bulte, et al. (2013). The results are very similar to the OLS model.

Results for the full sample are presented in Table 5, columns 1 and 2. The difference in rents between buyers and sellers is large and very significant. This is likely due to two reasons. First, the instructions were meant to mimic a market found in developing countries, with buyers seeking out sellers, which could lead to larger market power for the buyers. Second, the design put a 400 USH higher average value for buyers over sellers, which buyers appear to have taken advantage of. In either case, it is clear that buyers had significantly higher power in bargaining than sellers did.

Columns 3 and 4 present the results of the Heckman selection model, with buyers and sellers separated. Age is very significant and negative for buyers but not sellers. Human capital is significant and positively associated with outcomes for sellers, but not buyers. The coefficient on the female dummy is negative and large, but not sigificant for any of the specifications. The pro-social index is positve across all specifications, though it is only significant for the pooled Heckman model. Finally, the anti-social and aggression indecies are significant and negative for buyers. Wealth, risk aversion and pateince are not significant for any specification[3].

These results suggest that classic measures of ability, here being age, which proxies for experience, and human capital, which proxies for ability, are important for individual bargaining success. There is also some evidence that negative social personality indicators decrease returns for

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[3]The results of including a lag in the specification for previous round rent, i.e. $Y_{ir} = \alpha Y_{i,r-1} + \beta X_i + \epsilon$, is presented in the Online Appendix. The lag is not significant and does not change the results. The results of including the individual components of the indeces is also included in the Online Appendix and likewise does not change the general results.

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individual buyers. None of the personality measures though are correlated with seller outcomes.

7   When Are Markets Efficient?

A total of 10 sessions were organized. Within each session, 20 participants played 10 rounds. As discussed in section 4, efficiency rates varied per round and by sessions. Figure 3 presents the incidence of efficiency rates. The majority are quite good, though there is some important variation. In this section, I look at what aggregate average individual characteristics correlate with the realized efficiency rates. To do so, I estimate the following model:

$$E_r = \gamma \bar{X}_s + \mu r + \epsilon \tag{3}$$

where r is the round, s is the session, E is the efficiency rate in round r, $\bar{X}$ is the full set of individual characteristics, averaged per session, and ϵ is the error term. All standard errors are clustered at the session level.

The average value of individual characteristics by round is used as an aggregate measure of indivuals within the experiment. The use of the average values is motivated by the discussion in Section 3, where the question of complementarities of personality are discussed. This specification therefore allows for a test of the difference between individual personality and outcomes, versus group outcomes. I present the results of estimating Equation 3 using OLS in Table 6. Column 1 presents the results for the entire sample. Columns 2 to 4 explore different truncations of the data, including trimming either 5% of the top or bottom performing rounds, or trimming both.

The results are very striking in the level of significance of aggregate individual characteristics for efficiency rates by round. Most of the measures are significant and do not change much between the different truncations. Mean age is positively associated with efficiency, as is the percentage of participants who are female, human capital, wealth and risk aversion. Patience, pro-social, anti-social and aggression are all negatively associated with round efficiency.

The results suggest that the characteristics of market participants are very important for the

overall efficiency of the market. Greater experience and intelligence are predictive of efficient markets, while patience, pro-social, anti-social and aggressive behaviors are bad characteristics for market efficiency. The negative role for pro-social outcomes may be surprising, though this could be interpreted as similar to the results found by Bulte, et al. (2013), who show that market anonymity increases efficiency.

The results are also positive for the rounds variable. Efficiency rates increased by 0.6% per round for the full sample, suggesting there was learning over time.

8 Long-Term Correlations

Finally, I explore the association between the bargaining experiment and future outcomes for individuals. I next estimate the following model.

$$W_i = \alpha Y_i + \beta X_i + \epsilon \tag{4}$$

where i is the individual, W is a wealth index collected two years after the bargaining experiment was run, Y is the amount of total rent person i received in all rounds, X is the full set of individual characteristics and ϵ is the error term. Standard errors are again robust and clustered at the session level.

The results are presented in Table 7 and are again presented as pooled and separated by buyers and sellers. Human capital and starting wealth are positively associated with future buyer wealth, while risk aversion is negatively associated. None of the other characteristics are predictive. For sellers, only sex is associated with future outcomes.

The results for total rents from the experiment shows a positive association with income, though it is not significant for any of the specifications, due perhaps to low sample size. An increase of 1,000 USH in rents from the bargaining experiment is associated with between a 0.03 and 0.11 standard deviation increase in wealth. Alternatively, a one standard deviation increase in performance in the bargaining experiment (1,700 USH) is associated with between a 0.04 and 0.18 standard deviation

increase in wealth. The results are not significantly different between buyers and sellers, though the outcome for sellers is slightly higher, perhaps reflecting the extra effort that sellers would have needed to perform well in the experiment.

9   Discussion

This study uses a classic experiment from economics in a novel way to explore if and how individual characteristics correlate with market and individual outcomes. The experiment was designed to closely mimic local market interactions, but in a controlled setting. By randomizing prices and values, I am able to identify who does and who does not trade, allowing for an unbiased use of the Heckman selection model to explore what individual characteristics predict individual outcomes. I am also able to then identify what group characteristics predict general market efficiency.

Overall, the results suggest that market buyers and sellers in a developing country are leaving some rents behind, though not an amount much different than found in developed economies. Measures of personality and other characteristics are found to be important for aggregate market performance, though personality appears to be much less important for individual outcomes. This surprising outcome is likely due to the complementarity of individual characteristics, meaning that together people can affect outcomes in a way greater than the simple summation of their individual characteristics.

Per the discussion in Section 3, human capital and wealth are positvely correlated with aggregate outcomes. Risk preferences are also positively correlated, suggesting that having a greater number of people willing to take chances in the market improves outcomes. Patience is however negatively associated with outcomes, suggesting that a group of people that take too long to make bargains is inefficient. Pro-social behavior is likewise negatively correlated, suggesting that other regarding preferences led to concerns of fairness to dominate over efficient outcomes. Unsurprisingly, both anti-social behavior and aggressiveness are negatively associated with outcomes.

It is somewhat surprising that aggregate characteristics are significant for market efficiency outcomes, but individual characteristics do not well determine individual outcomes. As noted in Section 3, there is no reason to believe a priori that these characteristics would behave the same at

individual and aggregate levels. It appears that a high concentration of certain characteristics can affect market outcomes.

Finally, the results of the experiment correlate positively, though not significantly, with future wealth. Bargaining ability is important for, but perhaps not a key determinant of, individual economic outcomes. Never-the-less, the results suggest that such experiments can offer a clue as to future outcomes for individuals.

The role of personality in economic outcomes is being explored by economists with increasing interest. This work suggests that models of markets that do not include individual personality are missing an important factor for market performance. The role of personality in market outcomes is an area that deserves more attention.

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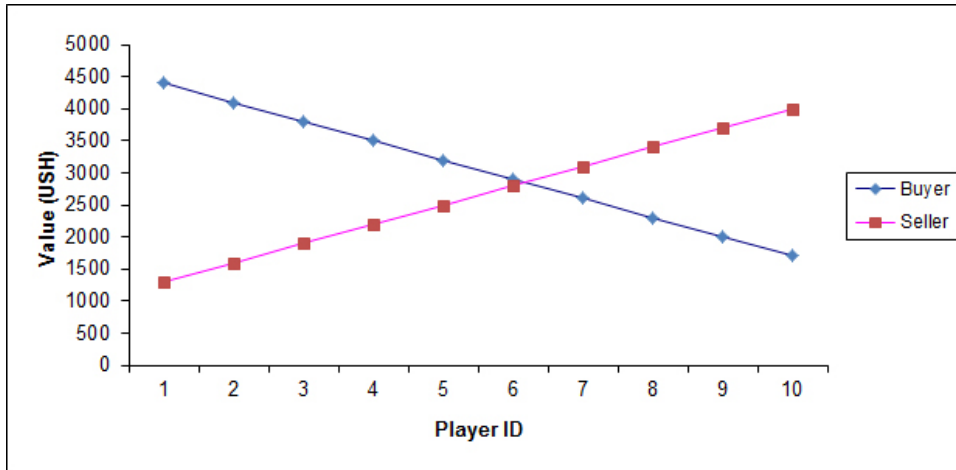
Fig. 1: The classical theoretical outcome prediction from the experiment. Individuals were randomly assigned as either a buyer or seller and given values that varied according to the figure. The equilibrium price is between 2,700 and 2,800 USH, while the equilibrium quantity is between 4 and 5.
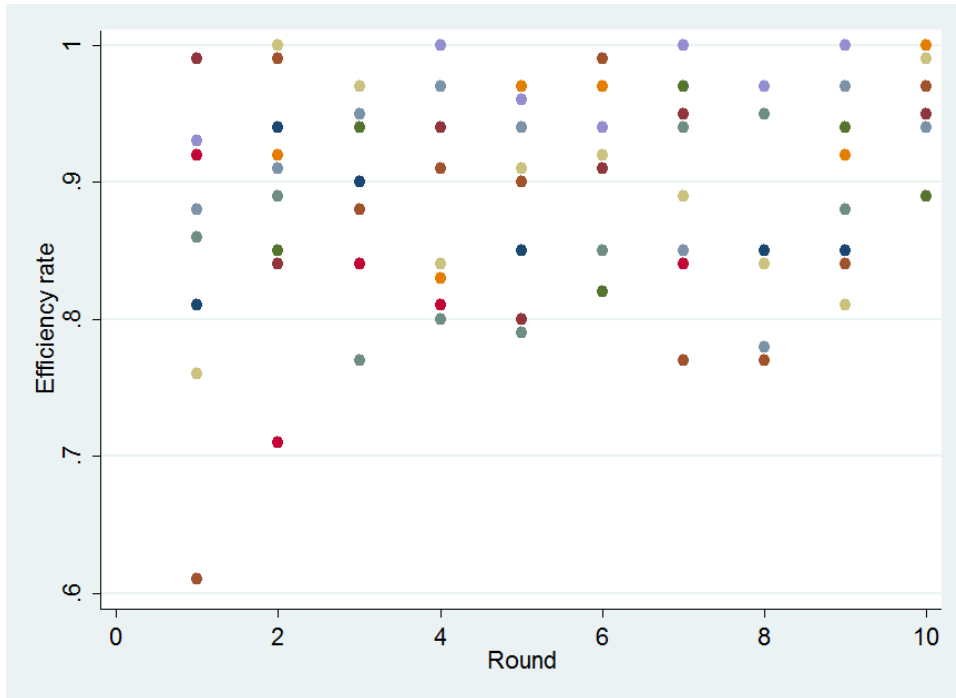
Fig. 2: Efficiency rates for each session and round. Efficiency is defined as the total rents obtained per round divided by the total theoretical rents obtainable.
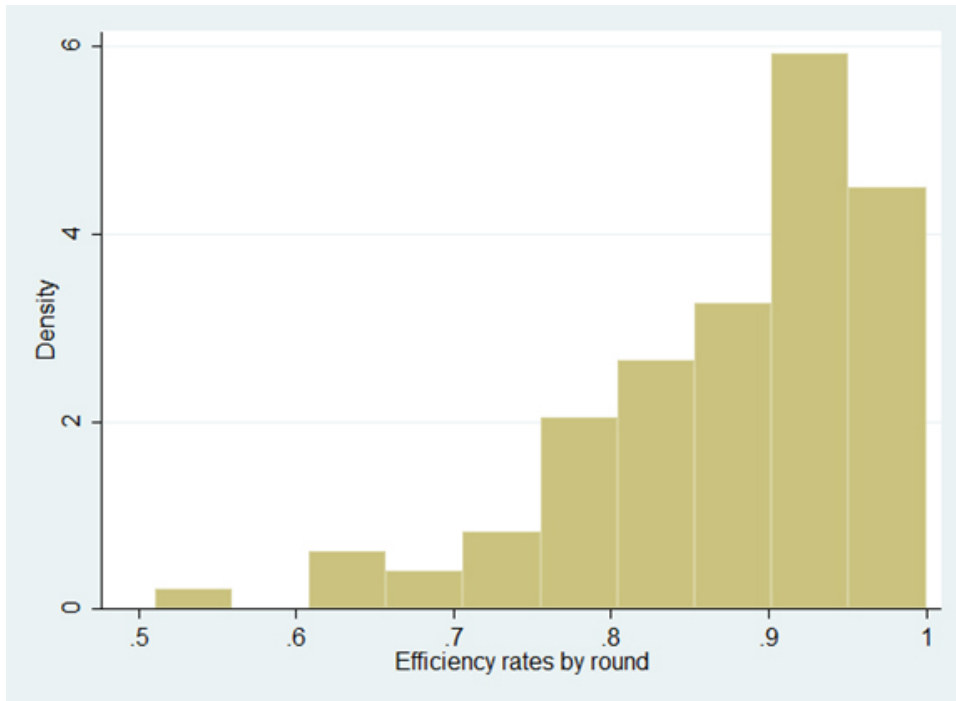
Fig. 3: Density of efficiency rates by round. Efficiency is defined as the total rents obtained per round divided by the total theoretical rents obtainable.

Table 1: Summary statistics of the experiments by round

| | Round | | | | | | | | | | |
	1	2	3	4	5	6	7	8	9	10	All
Average price	2,729	2,631	2,565	2,634	2,708	2,764	2,717	2,782	2,773	2,725	2,703
Max price	4,000	4,100	4,000	3,800	3,900	4,000	4,100	4,150	4,100	4,100	
Min price	1,500	1,600	1,500	1,500	1,400	1,900	1,600	1,600	1,800	1,400	
SD price	571	608	539	534	577	507	542	544	556	432	
Average rent	694	705	728	693	671	714	703	647	686	746	699
Min rent	-2,000	-900	-800	-1,100	-1,500	-600	-2,000	100	50	50	
Max rent	2,900	2,200	2,800	1,900	2,200	2,200	2,400	1,800	2,100	2,700	
SD rent	661	506	562	532	579	506	540	449	467	515	
Actual group rent	7,980	8,320	8,450	8,380	8,190	8,780	8,510	8,410	8,440	8,880	8,434
% of max rent	83%	87%	88%	87%	85%	91%	89%	88%	88%	93%	88%

Notes: This table presents the summary statistics for each round, averaged across all of the sessions. While the average prices and rents are close to the theoretical predictions, within each round there is significant variation in the individual prices and rents.

Table 2: Individual summary statistics

	N	Mean	Std. Dev.	Min	Max
Total rents in '000 USH	143	4.042	1.723	0.5	8.9
Age	143	25.413	5.879	16	56
Female	143	0.287	0.452	0	1
Human capital index	143	0	1	-3.284	2.719
Wealth index	143	0	1	-1.244	4.409
Risk aversion index	143	0	1	-2.898	1.992
Patience index	143	0	1	-2.264	2.760
Pro-social index	143	0	1	-2.210	1.716
Anti-social index	143	0	1	-3.107	2.309
Aggression index	143	0	1	-1.314	3.128

Notes: The sample size is based on the number of invited participants that showed up to the sessions. In total, 143 invited participants participated in the experiments.

Table 3: Balance test

	Age	Female	Human capital index	Wealth index	Risk aversion index	Patience index	Pro-social index	Anti-social index	Aggression index
Buyer dummy	-0.748	0.022	0.129	-0.078	0.168	0.120	0.039	-0.148	0.197
	[1.047]	[0.096]	[0.091]	[0.166]	[0.136]	[0.088]	[0.130]	[0.138]	[0.145]
N	1,430	1,430	1,430	1,430	1,420	1,410	1,430	1,430	1,430
R^2	0.004	0.001	0.004	0.002	0.007	0.004	0.000	0.005	0.010

Notes: Robust standard errors, clustered at the session level, are in brackets. Statistical significance is reported as: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The sample size is based on the number of invited participants that showed up to the sessions, totaling 143, who each played 10 rounds.

Table 4: Correlates of who trades

	Pooled	Buyer	Seller
Bad price	-0.672***	-0.644***	-0.696***
	[0.024]	[0.036]	[0.030]
Age	0.002	0.003	0.000
	[0.002]	[0.002]	[0.002]
Female	0.012	-0.007	0.041
	[0.029]	[0.052]	[0.037]
Human capital index	0.023*	0.027	0.026
	[0.012]	[0.018]	[0.021]
Wealth index	0.002	0.001	-0.013
	[0.016]	[0.022]	[0.019]
Risk aversion index	-0.025*	-0.016	-0.024
	[0.014]	[0.021]	[0.015]
Patience index	-0.015	-0.017	-0.011
	[0.012]	[0.016]	[0.014]
Pro-social index	-0.009	0.011	-0.023
	[0.015]	[0.017]	[0.019]
Anti-social index	-0.020	-0.067	0.033
	[0.058]	[0.073]	[0.057]
Aggression index	-0.032	-0.043	-0.011
	[0.062]	[0.068]	[0.059]
N	1,410	670	740
R^2	0.460	0.428	0.501

Notes: Robust standard errors, clustered at the session level, are in brackets. Statistical significance is reported as: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The sample is described in Table 3.

Table 5: Correlates of individual rents from the experiment

	Pooled OLS	Pooled Heckman	Buyer Heckman	Seller Heckman
Bad price	-407.502***	-2.109***	-2.016***	-2.198***
	[24.177]	[0.080]	[0.103]	[0.099]
Buyer dummy	368.278***	218.491*		
	[82.324]	[128.564]		
Age	-6.975***	-7.216***	-15.162***	-1.614
	[1.873]	[1.899]	[4.857]	[2.865]
Female	-46.596	-49.827	-18.749	-34.298
	[39.492]	[39.165]	[62.829]	[46.020]
Human capital index	54.211**	53.661***	1.099	93.033***
	[18.675]	[18.757]	[46.867]	[14.440]
Wealth index	-24.536	-24.022	16.707	-32.864
	[15.109]	[14.732]	[34.158]	[21.044]
Risk aversion index	-5.001	-4.878	10.774	-32.656
	[17.675]	[17.447]	[24.959]	[23.784]
Patience index	12.805	12.368	51.912	-16.006
	[23.320]	[23.101]	[36.453]	[24.216]
Pro-social index	27.730	27.672*	34.616	16.708
	[17.564]	[16.653]	[29.968]	[18.337]
Anti-social index	-39.732	-37.782	-174.360*	70.963
	[59.502]	[59.845]	[90.829]	[57.849]
Aggression index	-39.760	-37.901	-185.281*	88.947
	[64.796]	[65.366]	[97.690]	[58.030]
N	824	1,400	663	737
R^2	0.225			

Notes: Robust standard errors, clustered at the session level, are in brackets. Statistical significance is reported as: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The sample is described in Table 3.

Table 6: Correlates of round efficiency

	Full sample	Truncated top 5%	Truncated bottom 5%	Truncated top and bottom 5%
Mean age	0.019**	0.019**	0.013*	0.013*
	[0.009]	[0.009]	[0.007]	[0.007]
Percent female	0.162	0.141	0.111	0.096
	[0.128]	[0.130]	[0.104]	[0.105]
Mean human capital index	0.121*	0.086	0.155***	0.137**
	[0.070]	[0.077]	[0.056]	[0.063]
Mean wealth index	0.053	0.048	0.030	0.024
	[0.034]	[0.035]	[0.027]	[0.028]
Mean risk aversion index	0.019	0.036	-0.018	-0.008
	[0.080]	[0.082]	[0.063]	[0.064]
Mean patience index	-0.240**	-0.231**	-0.154*	-0.152*
	[0.111]	[0.113]	[0.089]	[0.090]
Mean pro-social index	-0.713**	-0.653**	-0.522**	-0.495**
	[0.272]	[0.280]	[0.216]	[0.224]
Mean anti-social index	-1.256***	-1.159**	-0.959***	-0.926**
	[0.448]	[0.467]	[0.358]	[0.376]
Mean aggression index	-1.478***	-1.370**	-1.083**	-1.046**
	[0.537]	[0.557]	[0.428]	[0.447]
Round	0.006*	0.006*	0.004	0.004
	[0.003]	[0.003]	[0.003]	[0.003]
	0.304	0.309	0.513***	0.516***
N	[0.242]	[0.244]	[0.192]	[0.194]
R^2	0.153	0.121	0.203	0.153

Notes: Robust standard errors, clustered at the session level, are in brackets. Statistical significance is reported as: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The data is averaged at the level of the round by session. The dependent variable is the total acheived rents in each round by session, divided by the total possible rents.

Table 7: Correlates of wealth 2 years after bargaining experiment

	Pooled	Pooled	Buyers	Buyers	Sellers	Sellers
Total rents in '000 USH	0.074	0.037	0.066	0.028	0.089	0.114
	[0.057]	[0.043]	[0.090]	[0.083]	[0.074]	[0.080]
Age		0.015		0.010		0.006
		[0.023]		[0.024]		[0.029]
Female		0.338		0.122		0.497**
		[0.189]		[0.270]		[0.211]
Human capital index		0.258**		0.359*		0.124
		[0.108]		[0.164]		[0.116]
Wealth index		0.081		0.331***		-0.080
		[0.056]		[0.092]		[0.097]
Risk aversion index		-0.083		-0.340***		0.029
		[0.084]		[0.093]		[0.103]
Patience index		0.057		-0.005		0.141
		[0.134]		[0.120]		[0.184]
Pro-social index		-0.007		-0.140		-0.005
		[0.056]		[0.141]		[0.125]
Anti-social index		-0.244		-0.088		-0.462
		[0.283]		[0.247]		[0.470]
Aggression index		-0.304		-0.382		-0.356
		[0.251]		[0.281]		[0.449]
N	1,280	1,280	630	630	650	650
R^2	0.163	0.268	0.199	0.486	0.118	0.218

Notes: Robust standard errors, clustered at the session level, are in brackets. Statistical significance is reported as: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Note sample size. The sample is described in Table 3 and is further reduced due to missing data at the final follow-up data collection.

ONLINE APPENDIX

A   Additional analysis

A.1   Correlates of variance of individual characteristics and market outcomes

As discussed in Section 5 and Figure 3, there is significant variation across rounds and sessions for efficiency rates. Section 5 presents the results of correlating average values of individual characteristics with the realized efficiency rates by round and session. In this section, I also estimate the effect of variance of individual characteristics within rounds and sessions on obtained efficiency rates. I use the following estimation model:

$$E_r = \gamma \tilde{X}_s + \mu r + \epsilon \tag{5}$$

where r is the round, s is the session, E is the efficiency rate in round r, $\tilde{X}$ is the variance of the full set of individual characteristics per session round, and ϵ is the error term.

The results of estimating Equation 5 using OLS are presented in Table A1. Column 1 again presents the results for the entire sample, while columns 2 to 4 explore different truncations of the data. As was found in Table 6, efficiency rates increased by 0.6% per round. In none of the specifications though is variance of the characteristics statistically signifiant. While average participant characteristics are correlated with market outcomes in this experiment, the variation in these characteristics is not.

A.2   Learning and disaggregate outcomes

As the experiment lasted 10 rounds, there may have been some learning by participants over time. Table A2, columns 1 and 2, looks at individual outcomes and includes a lag for the rents, i.e. rent from the previous round. The lag value is not significant for the buyers, though it is significant for the sellers. However, the main results in Table 5 from the paper still hold: for buyers, all of the variables are positive, though not significant, except for the anti-social and agression indeces, which are negatively associate with rents and statistically significant. For sellers, only human capital is significant and positive.

In columns 3 and 4 of Table A2 I have separated the individual indeces into their components and left each one in the regression. I also include the lag of game rents as in columns 1 and 2. The results change slightly, as might be expected, though given the different ranges of values, the interpretation does not necessarily change.

The first major change is that the negative coefficient on age is larger and very significant for both buyers and sellers. For buyers, the pro-social index is now significant. Many of the components of human capital, wealth, risk aversion, patience, anti-social behavior and aggression are significant, though they often cancel each other out, which is what leads the main index to not be significant.

Table A.1: Correlates of round efficiency

	Full sample	Truncated top 5%	Truncated bottom 5%	Truncated top and bottom 5%
Variance in age	-0.001	0.000	-0.003	-0.002
	[0.003]	[0.003]	[0.002]	[0.002]
Variance in percent female	-0.149	0.061	-0.543	-0.436
	[0.722]	[0.754]	[0.571]	[0.602]
Variance in human capital index	-0.195	-0.085	-0.335	-0.275
	[0.275]	[0.292]	[0.218]	[0.233]
Variance in wealth index	0.098	0.024	0.202	0.160
	[0.190]	[0.200]	[0.150]	[0.159]
Variance in risk aversion index	-0.176	-0.087	-0.334*	-0.283
	[0.251]	[0.262]	[0.198]	[0.208]
Variance in patience index	0.229	0.102	0.409*	0.341
	[0.286]	[0.305]	[0.227]	[0.245]
Variance in pro-social index	0.229	0.041	0.505	0.408
	[0.541]	[0.570]	[0.427]	[0.454]
Variance in anti-social index	0.472	0.048	1.138	0.909
	[1.197]	[1.255]	[0.945]	[1.000]
Variance in aggression index	-0.390	-0.048	-0.908	-0.725
	[1.005]	[1.051]	[0.793]	[0.837]
Round	0.006*	0.006*	0.004	0.004
	[0.003]	[0.003]	[0.003]	[0.003]
N	100	95	95	90
R^2	0.153	0.121	0.203	0.153

Notes: Robust standard errors, clustered at the session level, are in brackets. Statistical significance is reported as: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The data is the variance of each varibale at the level of the round by session. The dependent variable is the total acheived rents in each round by session, divided by the total possible rents.

Table A.2: Additional correlates of individual rents from the experiment

	Buyer Heckman	Seller Heckman	Buyer Heckman	Seller Heckman
Bad price	-2.017***	-2.202***	-2.027***	-2.214***
	[0.117]	[0.109]	[0.118]	[0.116]
Age	-15.432***	-1.637	-26.850**	-67.599***
	[5.572]	[4.320]	[11.466]	[23.386]
Female	-24.146	-36.544	180.010	-300.551
	[70.958]	[49.656]	[196.266]	[337.347]
Lag game rent	0.004	0.113***		
	[0.043]	[0.041]		
Pro-social index	38.813	16.727	132.803**	-2.913
	[31.418]	[21.917]	[64.624]	[70.605]
Human capital index	4.577	84.214***		
	[42.364]	[26.048]		
Education			31.077	144.031***
			[30.962]	[46.928]
Literate			-555.731***	283.990**
			[163.124]	[116.306]
Prior vocational training			33.851	-666.534**
			[260.090]	[265.236]
ADL Index (additive bad)			-98.239***	212.993***
			[21.617]	[62.341]
Number recall			45.474	-103.154**
			[37.030]	[47.502]
Wealth index	14.566	-33.454		
	[33.866]	[21.224]		
PCA wealth index			152.248**	139.773**
			[67.839]	[59.784]
Value of savings			0.666	-3.269***
			[0.684]	[1.099]
Cash earned last 4 weeks			-0.716	-0.189
			[1.014]	[0.489]
Risk aversion index	13.403	-28.674		
	[32.251]	[20.795]		
Will sleep under mosquito net if available			-414.270	2,790.997***
			[313.510]	[1,005.280]
Will walk alone at night			-75.027	949.236**
			[276.842]	[430.214]
Will invest money in a business that is safe but has low profits			-14.024	-415.102*
			[337.596]	[232.952]
Investing money in a business that could fail but has high profits			-462.547**	-438.862***
			[184.358]	[159.504]
Will take a motorcycle after dark			599.077**	234.880
			[267.261]	[346.981]
Will engage in unprotected sex			243.882	100.463
			[701.659]	[400.359]
Patience index	51.298*	-17.077		
	[29.056]	[24.942]		
2500 USH or 5000 vs. 0 (get)			-29.891	-1,250.949***
			[291.087]	[412.143]
2500 USH or 5000 vs. 0 (give)			193.059	612.601***
			[150.344]	[193.531]
Good at resisting temptation			185.765	135.941
			[290.600]	[209.240]

Spend afternoon waiting for free med exam			-57.373	-656.757**
			[81.269]	[263.111]
Take warnings now for many years in advance			164.544	805.214**
			[283.906]	[370.072]
Sometimes not able to stop doing something that is wrong			-50.496	224.190**
			[83.969]	[95.473]
Keep postponing activities			97.914	-498.539***
			[113.110]	[174.254]
If get money, spend it too quickly			17.410	-232.045
			[127.573]	[151.562]
Sometimes act quickly and not think about results of actions			-147.087	-205.595
			[118.674]	[225.722]
Regret many choices made in the past			-30.795	-387.372**
			[78.053]	[186.720]
Do easy task first, hard later			-383.423	-25.013
			[263.287]	[114.341]
Medicine today vs. medicine in one week that will cure			-113.798	-462.898**
			[146.485]	[200.653]
Anti-social index	-182.125**	58.165		
	[92.370]	[80.357]		
Jumpy			-201.025*	502.539***
			[106.893]	[194.369]
Destroy things that belong to others			-4.062	153.776
			[247.692]	[147.722]
Do not value own life			191.922	-373.853***
			[190.453]	[107.029]
Quarrelsome			466.832**	-383.862**
			[199.856]	[188.807]
Feel unloved			149.443	-57.390
			[119.608]	[96.184]
Everything do is wrong			-81.993	-266.143***
			[120.783]	[67.833]
Lie or behave in a dishonest way			99.617	432.939
			[284.754]	[349.642]
Take things from other places without permission			-155.576	435.316**
			[158.938]	[211.395]
Disobey own parents/guardians, teachers or elders			54.513	-582.262***
			[109.427]	[221.007]
Curse or use abusive language			-603.845**	-531.935
			[280.125]	[462.577]
Threaten to hurt others			-245.384	145.592
			[360.741]	[124.687]
Any angry non-family disputes in past two weeks			60.178	-4,497.037***
			[659.304]	[1,538.923]
Aggression index	-190.403**	82.779		
	[93.489]	[85.523]		
Quarrelsome			143.333	-389.485**
			[165.244]	[175.090]
Petty theft			177.492	341.253
			[266.356]	[309.558]
Uses abusive language			-79.819	225.237
			[86.269]	[566.638]
Threatens others			551.930	-2,148.692**
			[665.665]	[904.711]
Disputes with neighbors			-23.869	-1,024.620***
			[239.461]	[377.982]

Disputes with community leaders			692.735	373.652
			[731.629]	[481.504]
N	663	737	638	653

Notes: Robust standard errors, clustered at the session level, are in brackets. Statistical significance is reported as: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The sample size is based on the number of invited participants that showed up to the sessions, totaling 143, who each played 10 rounds.

B Experimental Protocols

B.1 Introductions and general instructions

Protocol Checklist

1. Have you found a private location for the group activities away from other people?

2. Do you have an open location for members to bargain?

3. Do you have the completed roster and the set of verification question data for this group?

4. Do you have all of the following materials required for the auction game and the net-work/price game?

    (a) Completed roster
    (b) Sign-in sheet
    (c) Initial pay-out form
    (d) Buyer and seller nametags
    (e) Pins to attach nametags
    (f) Individual feedback sheets
    (g) Folders/clipboards for feedback sheets
    (h) Pens for individual use during feedback process
    (i) Buyer and seller price cards (Rounds 1-10)
    (j) Transaction report forms (Have 100 available)
    (k) Trade failure report forms (Have 10 available)
    (l) Large envelope for completed forms
    (m) Stapler and extra staples
    (n) Network information game introduction form
    (o) Money for network allowance and transport refund
    (p) Allowance sign-out sheet

Speak to the entire group:

Thank you all for taking the time to come today. Before we start todays activity, I would like to speak with each of you individually for registration. When everyone has registered, we will begin our activity together.

B.2 Registration and identity verification procedure

Call players to the front table individually. Discuss the consent information on the following page with each respondent and complete the check-in roster using the steps outlined below: Collect the invitation letter from each respondent and make sure he/she has come to the correct session. Match each individual registering with the invitation roster and check them off on the list.

Next complete the check-in form: Ask the respondent the verification questions provided and check that their answers match with the baseline data you have been given. Also ask the respondent to sign the check-in roster. Compare the signature on the check-in roster with the signature on the registration form. If the signatures do not match or the verification answers are incorrect, please probe further to ensure that this individual is the same person who was to be invited.

Should you find that this person is a different individual, ask the individual to please wait until the registration process has been completed. A number of alternates have been invited to each session. If you are able to confirm the identity of 20 individuals, then you may dismiss those who have not passed the identity verification. If there are less than 20 confirmed respondents, unconfirmed individuals may remain to ensure there is a full set of participants, but their data will not be used. Make sure to note clearly on the check-in roster that their identity was not verified.

After an individual has consented to the survey and his/her identity has been verified, invite the participant to choose a buyer/seller card from the bucket. This will be the individuals Player Number. Record the number in the last column on the check-in sheet. It is essential that the player remembers this number, as it will be used to identify him/her throughout the auction and network games, and will be how we identify players for their payment the following week.

Provide the player with a pin and instruct him to display his buyer/seller number in an obvious way on his shirt. Also provide a pen and the folder/clipboard with the individual feedback form (folded to hide responses for privacy). Make sure to record the player number on the feedback form before giving it to the respondent. In case less than 20 individuals arrive by 30 minutes after the scheduled game start time, you will need to find alternative participants from around the sub-county center. Invite any available youth-aged individuals so that you have 20 available participants.

Should more than 20 confirmed individuals arrive on-time for the game, complete the check-in process with respondents in the order of their arrival. Do not dismiss anyone until you have 20 confirmed and verified players. Once 20 players have checked in, you may send any other individuals home. We will still provide transport refunds to additional players who arrived on-time with their original invitation cards. These players should sign for their transport allowance on the Initial Payout Register form, which you will attach to the check-in roster at the end of the game session.

At the conclusion of the check-in process, be sure to save both the invitation roster and the check in sheet. You will add these to the payment receipt sheet at the end of the games. These forms are essential to track respondents for payment and data analysis.

B.3   Individual player consent script

I want to ask you if you will participate in a special activity. This activity involves real money, some of which you will take home.

Before we continue, let me stress something that is very important. I know you were invited here without understanding very much about what we are planning to do today. If at any time you find that this is something that you do not wish to participate in for any reason, you are free to leave whether we have started the activities or not. This activity will take about 2 hours to complete, so if you think you will not be able to stay that long without leaving please let me know now. Will you be able to stay for two hours? The money you receive today will depend on the decisions you make and the decisions other members present today make. We will not give out money after each activity. Instead, we will process your payments in the next week and will return to your sub-county exactly one week from today. We will announce the exact date and time for

each sub-county at the end of todays session. You will receive the money you made based on the decisions in the activities today.

Everything you do and say will remain confidential. Only the lead researcher will know your identity. No one else, including local staff or any government agencies, will know your identity.

Do you have any questions, or would you like more information about the activities?

[Answer questions]

If I have answered all of your questions, may I ask you to participate in the activities?

IF NO, DO NOT CONTINUE: I understand. Thank you for coming today.

IF YES:

Are you sure you will be available for the next two hours? If you think you may have to leave sooner, please let me know now.

[Politely inform the individual that they must be able to stay for the entire 2 hour session in order to participate. If they are unable to do so, thank them for their time, but dismiss them.]

Thank you. Remember, if at any time you wish to stop, you are free to leave.

Now complete the check-in roster and follow the procedures outlined above.

B.4 Game description

Once again, thank you all for coming today. I am [NAME], this is [NAME] and [NAME], and we are working with an international research NGO based in the United States. Our team is trying to understand the way people plan and make business decisions, how people work together, and what networks people have. There are no right or wrong answers. We are going to play a market game. If at any time you have questions, please feel free to ask any member of our team.

We will be simulating a market in town. Ten of you are going to be buyers and ten of you are going to be sellers. The card you drew from the bucket during registration identifies your role. Please make sure this is pinned somewhere very visibly on your shirt.

In our market today, our sellers will be selling a number of items, trying to get the best possible price from the buyers. Each of you will get a card before each round. This card will have a price on it. Sellers, this represents the amount that you paid for the item. You cannot sell the item for less than the amount on your card. If you were to sell it any lower, you would be losing money. It is to your advantage to sell the item for as high a price as possible. The higher a price you sell the item for, the more you will profit. After each round we will record your profits. You will get to keep this money at the end of the game. The better you are at negotiating, the more money you will win.

For example, lets say you are selling slippers and your card says 2,000 shillings. The amount on your card indicates how much you paid for that pair of slippers. The more you are able to charge above this price, the greater your profit will be. For example, if you sell the slippers for 2,800 shillings, your profit will be 800 shillings and you will get to actually keep this money. You could sell the slippers to your customer for any price more than 2,000 shillings, but this is the absolute minimum you could charge. You could not possibly sell the slippers for less than 2,000 because then you would be losing money.

Buyers, you will attempt to buy these items for the best price you can negotiate. The card you receive lets you know how much money you have in your pocket. You can spend up to that amount of money, but no more than what it says on the card. If you spend less money than the amount on the card, you will get to keep anything that is remaining. For example, lets say you are in the market for a new pair of slippers. If your card says 3,000 shillings, then that would be

the maximum amount of money you could spend. If you are able to negotiate with a seller who will give you the slippers for 2,300 shillings, you will get to keep 700 shillings. You will get to go with this money at the end of the day. You could not possibly pay more than 3,000 shillings for the slipper because you only have 3,000 in your pocket.

Lets do one example to get us started. If Seller As card says 2,400 shillings that means that he bought the slippers from the wholesaler for 2,400 shillings. Buyer Bs card says 3,500 shillings, so she has exactly 3,500 shillings in her pocket. If Seller A and Buyer B meet in the market, they can begin to negotiate for the slippers.

Now try some questions to test the groups understanding:

Lets say after negotiating that Buyer B agrees to pay seller A 3,000 shillings for the slippers. How much money would Seller A have made as profit? (The correct answer is 600 shillings.)

How much money would Buyer B have remaining in his pocket? (The correct answer is 500 shillings).

Can anyone name another price that Buyer B and Seller A could have agreed upon to sell the slippers? (Any price between 2400 and 3500 is acceptable). Follow-up by asking different participants to calculating profits for each player at the second price. Repeat if many participants still seem unsure.)

What if Seller A really wants to make a sale, so he agrees to sell them to Buyer B at 2,200 shil-lings? (This would be an illegal trade. Make sure all participants understand why such a trade would not be allowed.)

Lets think about one more example. In this case, Seller As card still says 2,400 shillings, but this time Buyer Bs card says 2,000 shillings. Can anyone name a price now where Buyer B and Seller A could agree upon? (In this case, Seller A and Buyer B will not be able to reach an agreement at any price.) As you can see, you may not always be able to transact with every other buyer or seller in the game. If you find yourself in a situation where you cannot agree on a trade, you are free to begin negotiating with any other buyer or seller.

You see that there are ten buyers and sellers. In every round, the buyers will be free to negotiate with all of the sellers. Sellers, you are welcome to try to convince any buyer to purchase from you. We will give you five minutes to negotiate and come to an agreement. In that time you can talk to as many different buyers or sellers as you would like. I will give you a 1 minute warning when time is almost up. This will be your notification to finalize any transactions.

The card that you receive with your price on it is private information for you alone. When you are negotiating, do not show that card to any other buyers or sellers. When a buyer and a seller agree to make a trade, both of you should come up to the front to-gether and tell us what price you have agreed on so we can record your profits. Please make an ORDERLY QUEUE behind the table and do not crowd the front. Remember that all trades are private; please be respectful of your fellow players. When you are in line and talking with our clerk, make sure you still do not show your card to anyone else, including the person with whom you have just traded.

You dont have to make a deal or agree with a buyer or seller in every round. Sometimes you may feel like you are not being offered a fair price. Other times, you and your trading partner might not have compatible prices. If you arent satisfied with the prices you are being offered by the buyers/sellers or if you are unable to reach an agreement, you can choose not to trade. There is no penalty for not trading, but you will not make a profit or win any money in the round if you fail to make a trade.

Remember that it is against the rules to buy at a price above the amount on your card or sell

for price less than the amount on your card. Should anyone make an illegal trade, that person will be disqualified from the round and will receive no profit. The trading partner will receive the difference between the two cards as profit.

After each round, we will ask just a couple of questions about the game so far. Save the pens and papers we have given you to answer those questions. Make sure to keep the papers folded so no one else sees your answers. I will explain these in a bit more detail after our first round.

We will play the game for a total of ten rounds. We will keep records of every trade that happens today. Our team will then total up your profits when we return to town. XXX will be back to pay you exactly one week from today, at a time we agree upon at the end of this session.

Does anyone have any questions about how this game will work?

[Answer questions]

Okay, now lets begin. You have 5 minutes to discuss with other buyers and sellers. If you choose to make a deal, then once it is completed, come up to the front with your cards. Make sure you have finalized all of your negotiations before I say time. We will not accept any deals made after time is called.

In the first two rounds, we will allow a small amount of extra time to allow people to become accustomed to the game (but do not tell them this). Allow people to trade for six minutes. Then, give a one minute warning. After 7 minutes, stop any negotiations in progress. Beginning in the third round, strictly keep to time. It is okay to allow a few seconds for pairs to finalize their negotiations after time is called, but if negotiations remain unresolved, the deal should not be recorded.

As players make a deal, collect their cards in pairs. For each successful transaction, complete the Transaction Report. Record the transaction price and the buyer and seller numbers in the appropriate boxes, and staple the buyer card and seller card onto the report as indicated.

Before releasing the pair, ensure that the trade was a legal transaction and circle yes or no accordingly on the transaction report form. The agreed upon price should be equal to or somewhere between the buyer and seller prices. If both the buyer and seller prices are above or below the agreed upon price, then there is something wrong with the trade. Determine who has made the error and explain to that player that his profit for the round will be zero. Inform the other trading partner that while he did not make an error, the maximum profit he can receive is the difference between the buyer and seller cards. Inform him of this amount so that he can update his feedback form accordingly. On the report form, record the appropriate amended price.

In each round it is likely that for whatever reason, at least two people will fail to trade. When players fail to trade in any round, complete the Trade Failure Report. List all buyers and sellers who were unable to reach an agreement during the round and staple their cards at the bottom of the page. The order you record the buyers and sellers does not matter; you do not need to keep track of which players attempted to trade with each other. At the end of every round, ensure that all 20 players have been recorded either on a transaction report or the trade failure report. If you do not count 20 cards stapled to the report forms, do not continue with the game until all cards are accounted for. Ensure all reports from the round are inserted together in the record collection envelope.

After Round 1:

As I mentioned, we would like you to answer just a few follow up questions after each round. The first question is: Were you satisfied with the price you agreed upon in that last round? If you are satisfied, it means you feel you are happy with the outcome of the negotiation and the profit

you earned. Please circle Yes or No in the space on your answer sheet. If you did not trade, please circle DNT signifying Did not Trade.

Second, how many different buyers/sellers did you talk to during round before you made the agreement? If you did not trade, how many people did you attempt to trade with before you decided not to make a deal? Do not count any fellow buyers/sellers you spoke with and only count each person one time. This means that if you spoke with three people and then went back to finalize a trade with the first person you talked to, you would still only record having spoken with three people.

Does anyone have any questions now?

[Answer any remaining questions.]

Then lets continue to play the remaining rounds of the game.

[Game proceeds for 10 rounds. Ask the same two questions listed above after each round.]