

GOTTA' HAVE MONEY TO MAKE MONEY?  
BARGAINING BEHAVIOR AND FINANCIAL NEED OF MICROENTREPRENEURS

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**Abstract**

Bargaining over purchase prices with microenterprise owners in Ghana, we show that poorer microentrepreneurs agree to significantly lower prices than wealthier firm owners. This relationship is robust to controlling for a plethora of observables, including owner fixed effects across two rounds of panel data. A computerized bargaining experiment on the same sample, with randomized initial endowment, corroborates our real-bargaining panel findings. A simple extension of classic bargaining theory to include endowments with Constant Relative Risk Aversion (CRRA) preferences yields a similar prediction. Further exploration of this “need-bargaining” relationship is a key frontier in understanding barriers to the profitability of microenterprises.

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# 1 Introduction

Micro-enterprises dominate the firm size distribution and make up the majority of employment in developing countries (Hsieh and Olken, 2014; Sandefur, 2010). For these firms, bargaining over the prices of the goods and services is often an integral part of operations. The resulting surplus allocation from this process has a direct, and potentially substantial, effect on the wealth and consumption of the seller going forward.

This paper empirically documents a quantitatively large and robust relationship between the existing wealth of a microentrepreneur and their bargaining behavior. Using a sample of garment makers in Ghana, we find that a one standard deviation shift in a firm owner’s personal liquidity is associated with a  $\sim 6\%$  increase in the final price agreed upon during real bargaining exercises. This economically and statistically significant relationship is robust to controls for personal characteristics of the seller, household, firm, as well as firm owner fixed effects over a two round (year) panel.

To further test for a causal relationship, we implement a field experiment during our second round of panel data collection. During the experiment, respondents bargain with a computer, programmed to “behave like a buyer, bargaining with you over the price of a garment.” During each bargaining round, respondents are prompted to suggest a “price” which they would keep for themselves as their allocation of a potential surplus, if the computer agrees. Before the experiment, respondents are randomized into higher and lower initial wealth categories.<sup>1</sup> Receiving the higher initial endowment causes a  $\sim 13\%$  increase in the final surplus allocated to the firm owner during the first half of survey work.<sup>2</sup>

We formalize the intuition and show that such a relationship can be predicted with a simple extension of Rubinstein (1982). We develop a model with alternative offers and Constant Relative Risk Aversion (CRRA) preferences, with variation in the seller’s initial endowment. Our model predicts that, for sellers with identical preferences, beliefs, and opportunity costs, those with a lower initial endowment will accept a lower final price from the buyer.

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<sup>1</sup>Those in the higher wealth treatment group received an initial endowment of 25GHC, while those in the lower wealth treatment group received an initial endowment of 5GHC. This difference is equal to approximately a day’s income for the firm owners in our sample.

<sup>2</sup>This effect dissipates with time, as (we suspect from our experience and other studies in this context and from further data exploration in this study) firm owners shared information about the computer’s reservation price.

There is a vast and established literature from non-cooperative bargaining theory in which division of surplus is modeled to be determined by bargaining protocols, players' preferences, beliefs and outside options.<sup>3</sup> An equally vast lab experimental literature has empirically tested these theories, treating bargaining as a stand-alone activity and often abstracting away from personal and household characteristics of either player.<sup>4</sup> Our paper contributes to the growing empirical literature on bargaining in the field (Castillo et al., 2011; Balafoutas et al., 2013; Iyer and Schoar, 2015; Keniston, 2011). These papers mostly focus on the relationship between seller-perceived buyer characteristics and bargaining outcomes.<sup>5</sup> Unlike this previous work, our paper exploits data with a rich set of firm, personal, and household characteristics of the seller, and studies the role of these seller characteristics in bargaining.

This paper also contributes to the literature on barriers to microenterprise success. Previous studies have largely focused on capital and managerial constraints.<sup>6</sup> More recent studies have begun expanding this set of considerations.<sup>7</sup> This paper is the first of this literature to focus on price setting behavior, a direct determinant of markups and microenterprise profitability. The findings of this paper compel a more serious consideration of how firm owners price their goods and services as a key potential barrier to microenterprise profitability and growth.

This paper proceeds as follows: Section 2 describes the context, sample of microenterprises, and data; Section 3 present our main empirical results; Section 4 discusses a theoretical framework that illustrates why we could observe a relationship between initial endowment and price; Section 5 concludes.

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<sup>3</sup>A seminal example is Rubinstein (1982).

<sup>4</sup>See Roth (1995) and, more recently, Guth and Kocher (2014) for a survey of this literature.

<sup>5</sup>For example, Castillo et al. (2011) focus on the role between agreed price in bargaining and gender of passenger in the taxi market in Lima, Peru, and Balafoutas et al. (2013) look at passenger presumed information on the local tariff system in the taxi market in Athens, Greece.

<sup>6</sup>Seminal examples include De Mel, McKenzie and Woodruff (2008) (capital), Banerjee, Karlan and Zinman (2015) (credit), and Karlan and Valdivia (2011) (management).

<sup>7</sup>The current list of considerations include lack of business knowledge (Drexler, Fischer and Schoar, 2014; Campos et al., 2017), regulatory burden (de Mel, McKenzie and Woodruff, 2013), lack of business networks (Fafchamps and Quinn, 2016; Cai and Szeidl, 2017; Brooks, Donovan and Johnson, 2018), lack or nature of demand (Hardy and Kagy, 2019), infrastructure unreliability (Hardy and McCasland, forthcoming), and labor constraints (de Mel, McKenzie and Woodruff (2019), Hardy and McCasland (2015)).

## 2 Context, Sample & Data

The empirical work in this paper focuses on Ghana’s garment-making industry. Garment-making microenterprises in Ghana are similar to other microenterprises in low-income countries. They are small, with typically the owner being the only employee. They are numerous, with all of the firms making similar products and using similar technologies.<sup>8</sup>

Garments are made to order.<sup>9</sup> As with many other microenterprises in low-income countries, the price for a garment is determined through a haggling process, where the buyer and seller go back and forth until they have either settled and agreed on a final transaction price or one of the parties has “walked away.” To study the bargaining behavior of micro-entrepreneurs, we haggle over the prices of potential child’s shirt orders with garment making microenterprises in Hohoe, Ghana.

### 2.1 Sampling

The sample of garment making microenterprises from which a child’s shirt was ordered come from the Hohoe Garment Maker Study. The Hohoe Garment Maker Study has been collecting information on all garment making microenterprises in Hohoe since 2014, with the broader aim of providing an in-depth look into how microenterprises operate, struggle, and change over time.<sup>10</sup> At the start of the study, a census was completed that identified all operational garment making firms in Hohoe town and surrounding areas and collected some baseline information on the firm and owner characteristics.

#### 2.1.1 Attrition and Sample Characteristics

The main empirical work in this paper uses data collected in January of 2018 and 2019. There were 375 firms in operation during both January 2018 and January 2019. These rounds of data were collected as part of a class for New York University that taught students about data collection and

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<sup>8</sup>In Ghana, a mixture of human and electrically powered sewing machines are used to sew garments.

<sup>9</sup>The buyer will bring fabric to the firm and choose and specify the style/cut for the garment to be sewn. If a price is agreed upon for the garment, the buyer will leave the fabric with the seller, but will not pay the agreed upon transaction price until the completed garment is picked up.

<sup>10</sup>Hohoe is the main town in Hohoe District, and residents are considered to be middle-income by Ghanaian standards.

analysis for development economics. Out of the possible 375 firms, 271 were surveyed in both 2018 and 2019.<sup>11</sup>

The child’s shirt orders were made within a 2-day short window for completion, as they needed to be collected prior to the survey team leaving the district. For this reason, some firm owners had immovable obligations (either personal or business related) during the short order period of 24 or 48 hours (depending on their survey day), and immediately refused the order without entering into a bargaining process. A few other firm owners began the bargaining process, but a final price agreement was not reached, as their final price offer was higher than our reservation price and we “walked away.” Ultimately, we successfully agreed on a price and received the child’s shirt from 220 of the firms that were surveyed in both years. This sample of 220 firms that delivered a garment in both years is our primary sample.

Table 1 presents attrition analysis and sample characteristics for these three samples using firm and firm owner characteristics collected at the baseline in 2014. There are no significant differences between the sample of firms in operation during the panel (375), those surveyed in both years of data collection (271), and those who delivered a garment in both years of data collection (220). On average, in our main sample of 220, 26% of the firm owners are male, have approximately 8 years of education, and they are 36 years old with a business in operation for approximately 12 years as of 2014. Our sample, and all firms in this context, are unlikely to have any paid workers and only half have any apprentices (the majority labor type in this context). As of 2014, the average firm monthly profit for our sample was 152.30 GHC, valued around 64 USD at the time.

### **2.1.2 Survey Logistics**

A professional survey team of enumerators conducted the interviews for each round. Because these data were paid for as part of a New York University Class, enumerators were sometimes randomly shadowed by a student. The students did not participate in the interviews or collect the data, but a student was present for a little less than half of all surveys.<sup>12</sup>

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<sup>11</sup>Because the data collection was paid largely by the New York University course budget, the survey team was funded to work in the district for only the 2 days required for the students’ experience. Although our enumerator team was large enough to cover all of the sample in this 2 day time frame, the short duration of our time in district meant that not all firm owners were available during both years. The majority of firm owners not surveyed were either travelling or ill.

<sup>12</sup>The course enrolls up to 15 students and the enumerator team is set to be roughly double the class size, so that the students may estimate the impact of their own presence on respondent behavior as their final course assignment.

A stratified randomization procedure was implemented to encourage random survey timing (day 1 vs. day 2). This randomization determined the order in which the enumerators attempted to contact and locate garment makers. Although compliance on this design was imperfect given the short survey window, Table A.1 indicates observable balance on census characteristics between the two days of survey work.<sup>13</sup>

## 2.2 Data

Our data come from four sources: (1) a real bargaining exercise over a real child’s shirt completed for each respondent in January of 2018 and 2019; (2) quality assessments of all garments collected during these two rounds; (3) a short survey completed immediately after the bargaining exercises, in each round, collecting current information about the firm, firm owners, and firm owner household; (4) A bargaining game experiment, added for the 2019 round to be completed after the short survey, in which initial wealth was randomized and the firm owner bargained with the tablet over the division of a potential surplus.

### 2.2.1 Bargaining Protocol

In both years, the survey began with an enumerator approaching a garment-making microenterprise and attempting to order a child’s shirt.<sup>14</sup> If they were willing to make a shirt, the enumerator haggled with them over the price. The enumerators were trained to memorize the bargaining script<sup>15</sup> and haggle in a natural way, only making note of the prices the garment maker suggested during each iteration of the haggling process. The garment maker and enumerator went back and forth on the price, with the enumerator providing increasingly higher counter-offers in the case of disagreement. The maximum offer enumerators were able to make was 30 GHC. In the case that 30GHC was offered and rejected, our enumerator would “walk away” from the order. If an agreement was reached on the transaction price, in order to be paid, garment makers needed to produce the shirt the day after the data collection period ended, and thus had either one or two

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Student presence is controlled for in all specifications indicating “YES” for survey controls.

<sup>13</sup>Survey day is controlled for in all specifications indicating “YES” for survey controls.

<sup>14</sup>All of the shirts ordered were of the same design and size.

<sup>15</sup>This script was written so that, for the same seller-proposed price in a given iteration of the haggling process, every enumerator would respond identically with respect to the exact counter offer value, acceptance, or “walking away.”

days to complete the order.

Panel A of Table 2 reports the first and final price of bargaining for both years pooled together and then 2018 and 2019 separately. Column 4 test the difference between the years. Both the first price and the final price increased significantly from 2018 to 2019.<sup>16</sup> Our main outcome variable of interest in our panel analysis is final price.<sup>17</sup> The average final price agreed upon during the bargaining process was 14.92 GHC in 2018 and 16.66 GHC in 2019.

### 2.2.2 Garment Quality

In addition to the survey data collected from firm owners, we obtained independent quality ratings of each garment. Each shirt was evaluated for its overall quality by an expert in Accra, on a 0 - 10 scale with 10 being the highest quality. Quality was measured based on systematic considerations, including, but not limited to, how straight the lines of the garment were sewn, quality of button sewing, and symmetry from left to right.<sup>18</sup> Summary statistics of the quality measure are presented in Table 2 Panel E. Garments were given an average quality rating of 5.32.

### 2.2.3 Firm, Firm Owner and Household Characteristics

After haggling over a child's shirt, regardless of the outcome of the bargaining activity, we collected information on current firm, firm owner, and household characteristics in both 2018 and 2019. Panels B, C and D of Table 2 present the summary statistics for personal, household and firm characteristics by survey year.<sup>19</sup> While many garment makers also own another business (42%), the garment business is the primary business for most all of the individuals in our sample (97%) and for 100% of our sample, it is their primary source of income.

We use personal liquidity as a proxy to measure existing wealth of the microentrepreneur. The measure of financial need comes from the survey question: *“If you urgently needed money for your family (e.g. your child's education, someone becomes ill), how much cash can you collect in a week?”*

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<sup>16</sup>These numbers adjust for inflation. As a reference, the GHC/USD conversion rate was approximately 4.52 in January of 2018 and 4.89 in January of 2019.

<sup>17</sup>We focus on the final transaction price that is agreed upon in the exchange as our measure of bargaining behavior, as it is the direct measure of the actual value of service provided by the seller and encompasses both the labor in making the garment and the value of finishing it within a particular time frame.

<sup>18</sup>A rubric was used in all garment evaluations.

<sup>19</sup>Appendix Table A.2 reports these same characteristics on the sample of 271 firms that completed the survey in both years.

*Please include all sources, including your own savings, money you can get from other members of your household, money you can borrow from family, friends, and the bank or similar institutions.”*

We focused on this measure, as individuals may be cash poor but have other safety nets that allow them to bargain more aggressively. We use per capita personal liquidity as a measure of financial need to avoid scale effects. Average personal liquidity per capita increased from 160 GHC in 2018 to 175 GHC in 2019.

#### **2.2.4 Bargaining Game Experiment**

In 2019, we administered a bargaining game in which the firm owner haggled with a tablet over the division of a possible surplus of 30 GHC. The firm owners were told the tablet is set up to *“behave like a buyer, bargaining with you over the price of a garment.”* If the firm owner and the tablet reach a mutually agreed upon *“price”*, the firm owner receives that amount in cash.

Immediately prior to this bargaining game, participants were given an amount of initial wealth that they would be keep in addition to anything from the game, regardless of what occurred during the game. This initial endowment was randomized to either be 5 or 25 GHC (the difference of 20 GHC is around a day of wage in our sample). This randomization was designed to create a random shock to the garment maker’s wealth immediately before observing their bargaining behavior.<sup>20</sup>

The game was played through the use of two bins and 30 beans. One bin symbolized the *“price”* bin, with the beans inside indicating the amount the respondent would receive if an agreement were reached. Any beans inside the other bin symbolized what the tablet would receive if an agreement were reached. During the respondent’s turn to propose a *“price”*, they would indicate their choice by placing beans between these two bins. In the case of a counter-offer from the tablet, the enumerator would move beans between bins to reflect the counter-offer.<sup>21</sup> The final *“price”* agreed upon during this bargaining game is the main outcome of interest in the experiment.

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<sup>20</sup>Appendix Tables A.1 and A.3 show balance in baseline characteristics across payment amount and survey day. The randomization appears balanced overall, but Ravens Score show significant differences, as is expected in small samples. As robustness, we include Appendix Table A.6, showing no difference in findings when census observable characteristics are added as controls in our experiment analysis.

<sup>21</sup>To help respondents better internalize the value of each bean, we handed them their initial randomized endowment first in beans that they then handed back to the enumerator in exchange for cash.



### 3 Empirical Findings

#### 3.1 Panel Data Findings

Subfigure A of Figure 1 visually depicts the cross-sectional relationship between per capita personal liquidity and the final transaction price, pooled across both years of data collection.<sup>22</sup> The figure shows a strong relationship between final transaction price and personal liquidity per capita. As the garment makers personal liquidity per capita rises, so does the final price that is agreed upon in the bargaining exercise.

Subfigure B of Figure 1 leverages the panel nature of the data to look at how the change in personal liquidity per capita is related to the change in final price between the two years. A decrease in personal liquidity from 2018 to 2019 is strongly associated with a decrease in final transaction price, while an increase in personal liquidity from 2018 to 2019 is strongly associated with an increase in final transaction price. This relationship suggests that personal liquidity may have a causal influence on how sellers haggle over prices, and what they are willing to accept.

Table 3 shows how per capita personal liquidity relates to the final transaction price in a regression framework. Pooling our 2018 and 2019 data, we use the following specification:

$$Pr_{i,t} = \alpha + \beta \cdot L_{i,t} + \delta \cdot S'_{i,t} + \mu \cdot P'_{i,t} + \gamma \cdot H'_{i,t} + \rho \cdot F'_{i,t} + \theta_i + \epsilon_{i,t}$$

where  $Pr_{i,t}$  is the final agreed upon price for the child's shirt and  $L_{i,t}$  is the z-score for personal liquidity for respondent  $i$  in year  $t$ . The vectors of controls <sup>23</sup> and  $\theta_i$ , the firm owner fixed effect, are stepped in progressively moving from left to right in the table. Standard errors are clustered at the firm level.

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<sup>22</sup>The upper tail of per capita personal liquidity is winsorized at the 1% level, to alleviate concerns of outliers driving the results. Results are similar if per capita personal liquidity is winsorized at the 5% level.

<sup>23</sup> $S'_{i,t}$  is a vector of survey characteristics that includes the day of the survey and whether a student was present for the survey of respondent  $i$  in year  $t$ , as well as a fixed effect for year  $t$ .  $P'_{i,t}$  is a vector of firm owner characteristics that include time-invariant baseline gender, age, education, ravens score, identification as Ewe ethnic group, marriage and whether the respondent had children for respondent  $i$  and time varying indicators for if respondent  $i$  has another business, considers garment making their primary business, and consider garment making their primary source of income in year  $t$ .  $H'$  is a time varying vector including the number of people in the household, the ratio of wage earners within the household, and if the respondent views themselves as the breadwinner for the household, for respondent  $i$  in year  $t$ . Finally,  $F'_{i,t}$  is a vector containing time-invariant baseline profits, tenure, number of paid workers for respondent  $i$ 's firm, as well as time variant indicators of current profits and number of orders completed in last 7 days for respondent  $i$ 's firm in year  $t$ .

Column 1 of Table 3 shows that, when no covariates are included, a one standard deviation increase in per capita personal liquidity is associated with a 0.896 GHC increase in final transaction price, significant at the 1% level. Columns 2 - 5 systematically step in covariates to help to account for potential omitted variable bias. The magnitude and significance of the relationship between personal liquidity per capita and final transaction price hold as we include a robust set of survey, personal, household, and firm characteristics in the specification. When all covariates are included (column 5), a one standard deviation increase in personal liquidity per-capita is associated with a 0.73 GHS increase in final price, significant at the 1% level. This robust relationship indicates that, even when controlling for a plethora of other characteristics, the level of financial need of the seller is associated with how they bargain, as indicated by the ultimate transaction price they are willing to accept.

Analysis in Columns 1-5 are prone to time-invariant unobservables, such as the seller's ability to bargain. Column 6 adds firm owner fixed effects, to look at within firm owner variation. Even with firm owner fixed effects, a one standard deviation increase in personal liquidity per-capita is associated with a 0.947 GHS increase in final price, significant at the 1% level. This results shows reasonably strong evidence that a change in an individual's personal liquidity over the course of a year influences how that individual bargains.

It is still possible that we might observe the results of Column 6 due to some time varying firm or owner characteristic that remains unobserved, rather than the firm owner's bargaining behavior itself. Two possibilities that we have considered are changes in an owner's reservation price and changes in production quality.

An owner's reservation price is surely correlated with final price and also may be correlated with personal liquidity. For example, garment makers who have had a relatively busier year may have increased personal savings, leading to higher personal liquidity, and bargain more aggressively because of an increased personal value of leisure. To test for this possibility, we look for a relationship between personal liquidity and garment completion. If this mechanism were driving our result, we would expect to see a negative relationship between personal liquidity and garment completion. Appendix Table A.4 shows that per-capita personal liquidity is not significantly associated with whether or not the garment maker delivered the final product, this relationship is robust to the inclusion of survey controls, personal characteristics, household characteristics, and

firm characteristics.

An owner's production quality is another possible time-varying omitted variable. For example, a garment maker could have accumulated more savings over the past year because they have significantly improved the quality of their work. This also allows them to charge a higher price. If this were true, we should expect to see a positive relationship between personal liquidity and the quality of the delivered garment. However, we do not see such a relationship. Appendix Table A.5 shows that per-capita personal liquidity is not significantly associated with quality of the shirt delivered.

### 3.2 Experimental Findings

To further corroborate our panel results, we examine data from our experiment. Recall that we randomized payments to participants and therefore generated random small variations in endowment prior to having the firm owner bargain with a tablet. This completely abstracts away from opportunity cost and other individual and firm characteristics related to garment making. Instead, the experiment arguably focuses more directly on the seller's ability to negotiate a division of surplus.

Table 4 reports the estimated causal impact of a 20GHC increase in a respondents wealth immediately prior to the bargaining game on the final price agreed upon with the tablet. As shown in column 1, this increase in wealth is associated with a 1.56 GHC increase in final price on Day 1, significant at the 5% level.

As shown in Column 2, this positive and significant relationship disappears after the first day of data collection. This disappearance of the effect is unlikely to be explained by sample differences across the two days, as intended survey timing was randomized and baseline characteristics appear balanced across the two days. This, instead, could be a result of contamination of the control group between day 1 and day 2 of the experiment. As suggested by previous work in this same sampling context, Hardy and McCasland (2016), word could spread quickly about what was arguably a large deviation from normal life of a garment maker (the negotiation of a surplus with a tablet).

Figure 2 provides empirical evidence for this spillover hypothesis. On day 1 of the survey, the higher endowment group negotiates an average price of 13.84GHC, while the lower endowment group negotiates a price of 12.28GHC. By day 2, both groups have increase their final price, with the higher endowment group now negotiating an average price of 14.52GHC and the lower endowment group

having completely “caught-up” at an average final price of 14.72GHC. This pattern is consistent with the spread of information about the tablet’s reservation price and contamination of the lower endowment “control” group.

It is this contamination of the control group between day 1 and day 2 that we believe ultimately leaves our pooled sample estimate to be marginal insignificant at .86GHC increase for a 20GHC increase in wealth. However, during the uncontaminated period of data collection, participants who randomly received a higher endowment were able to extract economically and statistically significantly more money in the bargaining game. We interpret this finding as causal evidence of a relationship between the amount of money a microentrepreneur has and how they bargain.

## 4 Theoretical Framework

We now present a simple bargaining framework that is a straight-forward extension of canonical models, to help formalize an intuition for why we may observe a relationship between financial need and bargaining behavior.

### 4.1 Set-up

Suppose sellers and buyers bargain over the price of a good after being matched randomly. Let  $p$  be the transaction price,  $v > 0$  the buyer’s valuation, and  $w$  the level of seller’s personal liquidity, i.e. the seller’s initial endowment.

If the buyer and seller reach an agreement, the seller receives price  $p$  from the transaction and achieves consumption  $c = w + p$ . If they cannot agree to a price, the seller consumes her initial endowment  $c = w$ . The buyer’s disagreement payoff is normalized to be 0.

We assume that the seller has utility function  $u(c)$ , concave in consumption  $c$  and exhibit prudence, with  $u'(c) \geq 0$ ,  $u''(c) \leq 0$  and  $u'''(c) \geq 0$ . An example of such a utility function is CRRA, which has the property that as  $c$  increases, agent’s absolute risk aversion decreases.

The timing of the game is as follows:

- At time 1, seller proposes price  $p_1$ . If buyer accepts, then buyer's payoff is  $v - p_1$  and seller's payoff is  $u(p_1 + w) - u(w)$ .
- If no agreement is reached at time 0, there is a cost of delay: the game ends with probability  $1 - \delta$ .<sup>24</sup> With probability  $\delta$ , the buyer gets to make an offer of price  $p_2$ , to which seller can respond.
- The game continues, with buyers and sellers make alternating offers, until either an offer is accepted or bargaining breaks down exogenously.

## 4.2 Subgame Perfect Equilibrium

With a direct application of results in Rubinstein (1982) and the analysis with risk aversion in Roth (1989), we have the buyer's indifference condition Equation 1 and the seller's indifference condition Equation 2:

$$v - p_1 = \delta(v - p_2) \tag{1}$$

$$u(p_2 + w) - u(w) = \delta(u(p_1 + w) - u(w)) \tag{2}$$

These conditions ensure that the seller (buyer) is indifferent between accepting the equilibrium offer from the buyer (seller) or receiving their own equilibrium offer in the next period.

Combining equations 1 and 2, the subgame perfect equilibrium can be characterized by price  $p^*$  that satisfies:

$$u(v - (v - p^*)/\delta + w) - u(w) = \delta(u(p^* + w) - u(w)) \tag{3}$$

In other words, the unique subgame perfect equilibrium is such that the seller offers  $p_1 = p^*$  and buyer would make an offer of  $p_2 = v - (v - p_1)/\delta$ , but accepts the seller's offer immediately.

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<sup>24</sup>Under our setting, price offers are made quickly and it is hard to justify impatience as the cost of delay. Instead, the cost of delay can be interpreted as arising from exogenous breakdown in each round, following Binmore, Rubinstein and Wolinsky (1986).

### 4.3 Sellers with Constant Relative Risk Aversion

For a clear example, we assume sellers have CRRA preferences,  $u(c) = \frac{c^{1-\sigma}}{1-\sigma}$ , equation (3) now becomes:

$$(v - (v - p^*)/\delta + w)^{1-\sigma} - w^{1-\sigma} = \delta((p^* + w)^{1-\sigma} - w^{1-\sigma}) \quad (4)$$

The value of  $\sigma$  is a measure of relative risk aversion. For  $\sigma = 0$ , the agent is risk-neutral. For all values of  $\sigma > 0$ , the agent is risk-averse, with higher values representing greater relative risk aversion.

Implicitly differentiating (3) and re-arranging, we get:

$$\frac{dp^*}{dw} = \frac{\delta u'(p^* + w) + (1 - \delta)u'(w) - u'(v - (v - p^*)/\delta + w)}{u'(v - (v - p^*)/\delta + w)^{\frac{1}{\delta}} - \delta u'(p^* + w)} \quad (5)$$

Because  $v - (v - p^*)/\delta \leq p^*$  for  $\delta \leq 1$  and  $u$  is concave, we have a positive denominator.

Now the numerator of (5) becomes

$$\delta(p^* + w)^{-\sigma} + (1 - \delta)w^{-\sigma} - (v - (v - p^*)/\delta + w)^{-\sigma} \quad (6)$$

Combining (4) and (6), and noting that  $x^{-\sigma}$  is more convex<sup>25</sup> than  $x^{1-\sigma}$ , we have  $\frac{dp}{dw} \geq 0$ .

We plot 4 values of RRA in Figure 3. If the seller is risk-neutral, then financial need is not relevant and sellers at all levels of liquidity will transact at the same price. With higher levels of risk-aversion, sellers receive lower price and low  $a$  sellers receive relatively lower prices.

## 4.4 Discussions

### 4.4.1 Key Assumptions

The key assumption in our model is that the sellers have a preference with a sufficient degree of prudence.<sup>26</sup> This is satisfied by CRRA preferences with its property of decreasing absolute risk

<sup>25</sup>Another way to think about this is to consider certainty equivalent: the convex combination of  $(p^* + w)^{-\sigma}$  and  $w^{-\sigma}$  is equal to the value of  $x^{-\sigma}$  at the certainty equivalent, let's say,  $z$ . By equation (4), if  $v - (v - p)/\delta + w$  is the certainty equivalent of a less convex function  $x^{1-\sigma}$ , it must be larger than  $z$ . So we have  $\delta(p^* + w)^{-\sigma} + (1 - \delta)w^{-\sigma} - (z + w)^{-\sigma} = 0$ . Since the function  $x^{-\sigma}$  is decreasing in  $x$ , it must be that  $\delta(p^* + w)^{-\sigma} + (1 - \delta)w^{-\sigma} - (v - (v - p^*)/\delta + w)^{-\sigma} \geq 0$

<sup>26</sup>Kimball (1990) first coined this term studying precautionary savings. The concept is related to the third derivative. A concave functions  $f$  exhibiting prudence has the property that  $f'''(x) > 0$ .

aversion. Intuitively, sellers with less cash on hand and therefore lack of financial means sell at lower prices because a bargaining breakdown is more costly for them than wealthier sellers. Therefore, poorer sellers are willing to accept lower price offers from buyers to secure the sale. This, in turn, forces the sellers to offer and accept lower prices in the bargaining game equilibrium. A similar concept applies to consumption-saving and investment decisions, and here we use it to understand the strategic decision when the seller interacts with a potential customer.

As microenterprises in a developing country often employ only one person (the owner herself/himself), these businesses are closely tied with the individual entrepreneurs. Firms are often modelled as profit-maximizing and risk-neutral, while households as risk-averse. From anecdotal evidence (for example, see Karlan, Knight and Udry (2015)), microenterprises in developing countries act more as an individual than the broadly defined firm and therefore the sellers are assumed to have CRRA preferences.

The buyer's utility function is standard as the difference between valuation and price. This simplifying assumption that buyers are risk-neutral is made to focus on seller business and household characteristics and understand their implications for microenterprise owners.<sup>27</sup> We could extend the model to risk-averse buyers, buyers with non-zero disagreement payoff, or introduce buyer heterogeneity. These extensions do not change our main theoretical prediction about the bargaining behavior of sellers under full information.

The expression  $u(p + w) - u(w)$  represents the difference between the seller payoff and outside option, where we take into consideration financial need explicitly through the parameter  $w$  for liquidity. This parameter enters in both the bargaining outcome and outside option, different from just an outside option.

We can also derive a similar relationship between financial need and bargaining behavior from a static model with Nash bargaining solution. This axiomatic approach would allow us to abstract from the particular details of the bargaining protocol, but the non-cooperative bargaining model above better highlights the trade-offs faced by sellers of different financial needs and the strategic interaction between the players.

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<sup>27</sup>It is well-established in the literature that risk aversion is disadvantageous for bargaining with riskless outcomes (see Kihlstrom and Schmeidler (1981) and Kannai (1977)). However our results compare among sellers, not between seller and buyer.

#### 4.4.2 Alternative Mechanisms

There are also many other mechanisms that could drive a relationship between initial endowment and final price. One possible mechanism is through aspirations. Financial need and wealth have direct psychological effects on choices. Genicot and Ray (2017), for example, provides a theoretical framework for the link between poverty and aspirations. If poorer sellers have lower reference price than rich sellers, possibly due to different past experiences and/or peer groups, the same relationship between personal liquidity and final price would hold.

We find some evidence for this mechanism: rich sellers are more likely to answer higher prices to the question “How much do you think other garment makers in Hohoe are charging us for a child’s shirt today?” This alone, however, cannot explain our within-individual results. We find the relationship between liquidity and reference price positive and significant in the cross-section, but not with firm fixed effect.

Subsistence consumption is another mechanism through which non-homothetic preferences and heterogeneity in financial need lead to different bargaining behavior among sellers. This need for a minimum level of consumption  $\underline{c}$  with borrowing constraint could generate similar result even for a risk-neutral seller: a seller who is desperate in meeting  $\underline{c}$  will reap lower surplus in order to secure the transaction.

These mechanisms could work simultaneously to lead to the same relationship. All of these results highlight the relevance of individual and household characteristics in bargaining.

## 5 Conclusion

Bargaining is a daily necessity in the lives of the world’s poor. Existing bargaining theory and empirical work does not highlight nor consider the variation in initial endowment of the bargainers. In developing countries, where socioeconomic status of individuals is a key focus of researchers and policy makers, the initial endowment of buyers and sellers may be, through an impact on bargaining behavior, a key determinant of one’s wages, consumption, and overall livelihood. This variation in initial endowment may be equally important in explaining firm behavior in the context of microenterprises in developing countries, where the firm and the individual are closely linked.

This paper provides a first set of empirical evidence that the personal wealth of a microent-



preneur predicts that microentrepreneur's bargaining behavior in an economically meaningful and statistically significant way. Namely, better endowed sellers negotiate better final prices, both during real price-bargaining exercises and during a computer-bargaining experiment. This paper also shows a similar theoretically predicted relationship, with a simple extension of the non-cooperative bargaining framework to include variation in seller endowment with CRRA preferences.

Our work is the first to document the existence of a potential poverty multiplier in strategic interactions. The occupational choice and employment literature<sup>28</sup> have shown that poor people have to choose working for others over becoming entrepreneurs and are at higher risk of becoming involuntarily unemployed. Our findings suggest that, even conditional on owning a business, lower wealth individuals may be bargaining their way into a lower surplus.

Further research is needed in both theory and empirical work to better untangle the various mechanisms leading to this quantitatively meaningful contributor to the profits of microentrepreneurs. This lower surplus may leave poorer bargainers relatively poorer than richer bargainers, a cycle likely to perpetuate inequality in the developing country context. Understanding how this bargaining gap can be closed may be key to mitigating inequality in the developing world.

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<sup>28</sup>Examples include Banerjee and Newman (1993) and Dasgupta and Ray (1986).

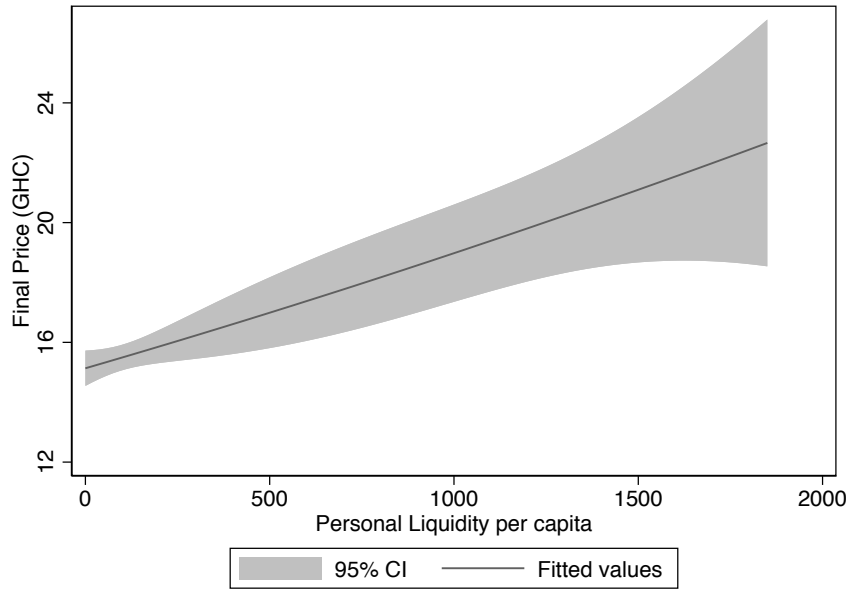
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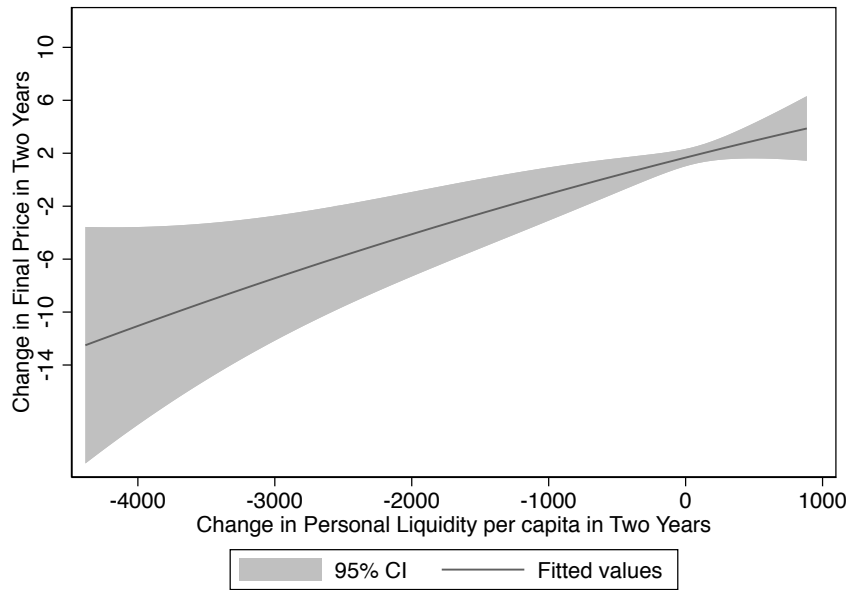
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Figure 1: Relationship between final price and personal liquidity



(a) Final Price by personal liquidity per capita

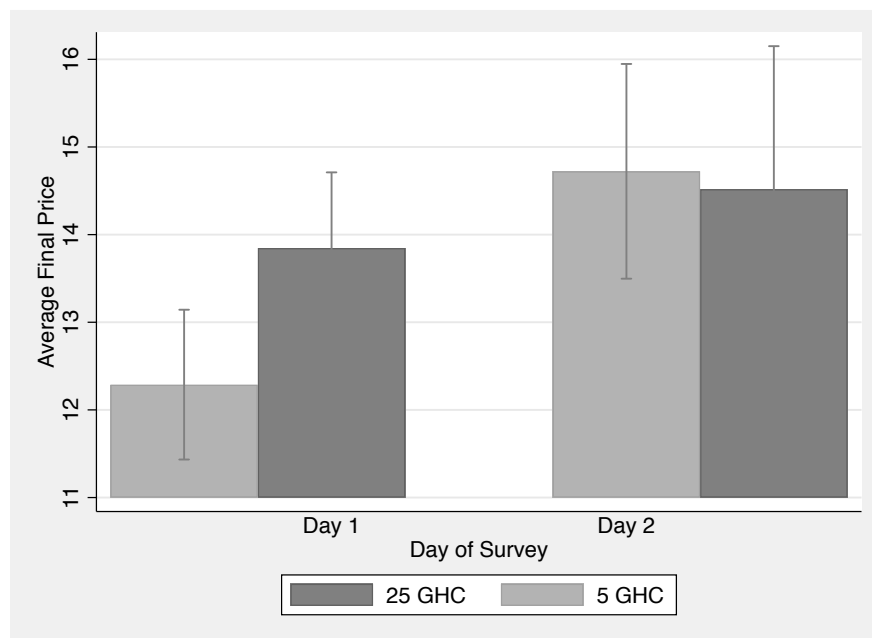
This figure shows the relationship between personal liquidity per capita and final price. Personal liquidity per capita is winsorized at the 1% level.



(b) Change in Final Price by Change in personal liquidity per capita

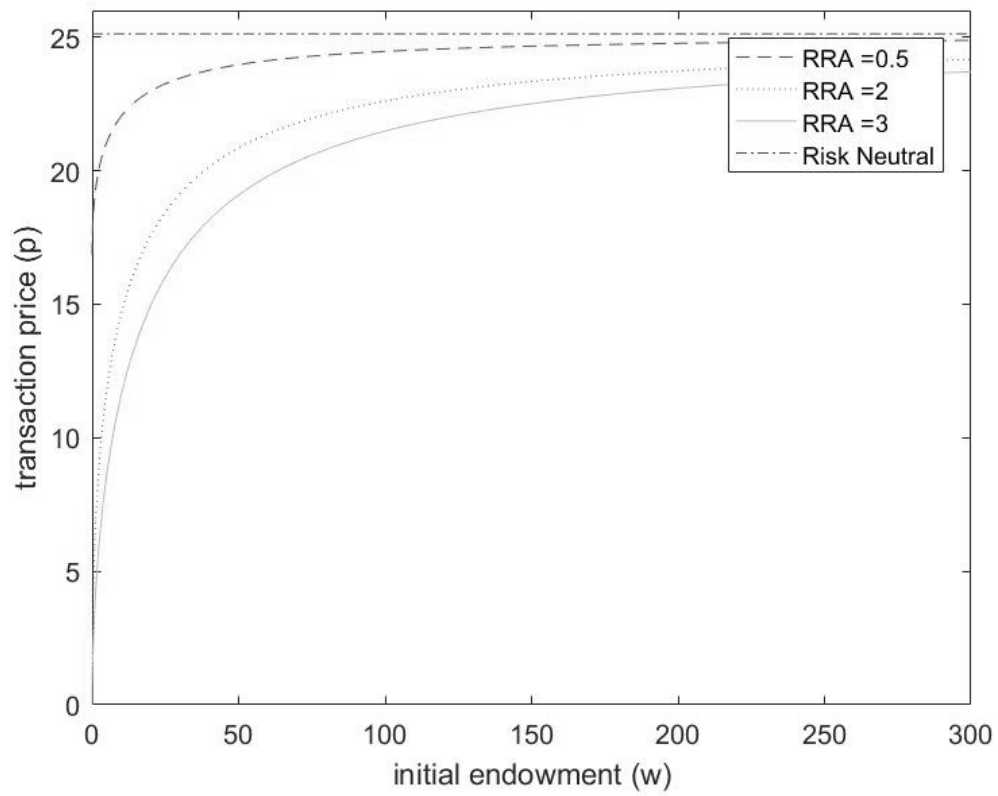
This figure shows the relationship between change in personal liquidity per capita and the change in final price across two years. Personal liquidity per capita is winsorized at the 1% level.

Figure 2: Final Price in Experimental Bargaining Game by Survey Day and Payment Amount



This figure graphs the average final price in the experimental game played by the firm owner and tablet by day of the survey and random payment amount.

Figure 3: Price and Liquidity for Different Relative Risk Aversion



This figure graphs the relationship between liquidity and transaction price according to our bargaining model, varying the levels of Relative Risk Aversion.

Table 1: Attrition

This table reports baseline characteristics collected in 2014 for the three samples of interest. The mean is reported followed by the standard deviation in parentheses. Column one includes all firms in operation during both years of data collection 2018 and 2019, Column two includes all firms surveyed in both years of data collection, and Column three includes only those firms surveyed in both years who also delivered a child's shirt in both years. Columns 4 and 5 display the differences between the samples.

|   | (1)                | (2)                | (3)                | (4)              | (5)             |
|---|--------------------|--------------------|--------------------|------------------|-----------------|
|   | Firm in Operation  | Surveyed           | Delivered Garment  | Diff             | Diff            |
|   | during Panel       | Both Years         | Both Years         | (1) - (2)        | (2) - (3)       |
| Male                                      | 0.23<br>(0.42)     | 0.26<br>(0.44)     | 0.26<br>(0.44)     | -0.02<br>(0.03)  | 0.00<br>(0.04)  |
| Age of G.M.                               | 38.01<br>(12.34)   | 37.30<br>(12.99)   | 36.58<br>(13.10)   | 0.72<br>(1.02)   | -0.72<br>(1.18) |
| Years of Schooling                        | 8.45<br>(2.95)     | 8.29<br>(3.07)     | 8.22<br>(3.18)     | 0.16<br>(0.24)   | -0.07<br>(0.28) |
| Ravens Score<br>(correct out of 12)       | 5.66<br>(2.69)     | 5.53<br>(2.65)     | 5.54<br>(2.74)     | 0.13<br>(0.21)   | 0.01<br>(0.24)  |
| Ethnic group is Ewe                       | 0.75<br>(0.43)     | 0.76<br>(0.43)     | 0.77<br>(0.42)     | -0.00<br>(0.03)  | 0.01<br>(0.04)  |
| Married or living<br>with partner in 2014 | 0.73<br>(0.45)     | 0.73<br>(0.45)     | 0.75<br>(0.43)     | 0.00<br>(0.04)   | 0.03<br>(0.04)  |
| G.M. had at least<br>one child in 2014    | 0.85<br>(0.36)     | 0.85<br>(0.36)     | 0.86<br>(0.35)     | -0.00<br>(0.03)  | 0.01<br>(0.03)  |
| Age of business                           | 13.08<br>(8.44)    | 12.97<br>(8.43)    | 12.38<br>(7.62)    | 0.11<br>(0.67)   | -0.59<br>(0.73) |
| Profits Last Month                        | 143.51<br>(157.38) | 149.42<br>(167.91) | 152.30<br>(175.46) | -5.90<br>(13.04) | 2.88<br>(15.62) |
| Paid Workers                              | 0.08<br>(0.34)     | 0.07<br>(0.34)     | 0.07<br>(0.32)     | 0.00<br>(0.03)   | -0.01<br>(0.03) |
| Observations                              | 375                | 271                | 220                |                  |                 |



Table 2: Summary Statistics

This table reports the mean and standard deviation of bargaining, personal, household, firm and quality characteristics of each microenterprise in the final sample that delivered a garment both years. Column 1 pools together both years, Column 2 and 3 are for 2018 and 2019, whereas column 4 shows the difference between the two years.

|  | (1)                | (2)                | (3)                | (4)               |
|--|--------------------|--------------------|--------------------|-------------------|
|  | Pooled             | 2018               | 2019               | Diff              |
| <i>Panel A: Bargaining Characteristics</i> |                    |                    |                    |                   |
| First price                                | 19.83<br>(7.33)    | 18.61<br>(6.97)    | 21.06<br>(7.48)    | 2.45<br>(0.69)*** |
| Final price                                | 15.79<br>(4.43)    | 14.92<br>(4.25)    | 16.66<br>(4.44)    | 1.74<br>(0.41)*** |
| <i>Panel B: Personal Characteristics</i>   |                    |                    |                    |                   |
| G.M. owns another business                 | 0.42<br>(0.49)     | 0.41<br>(0.49)     | 0.42<br>(0.50)     | 0.01<br>(0.05)    |
| Garment business is primary business       | 0.97<br>(0.18)     | 0.96<br>(0.19)     | 0.97<br>(0.18)     | 0.00<br>(0.02)    |
| G.M. works for pay elsewhere               | 0.05<br>(0.22)     | 0.03<br>(0.18)     | 0.07<br>(0.26)     | 0.04<br>(0.02)*   |
| Garment business is primary income         | 1.00<br>(0.07)     | 1.00<br>(0.00)     | 0.99<br>(0.10)     | -0.01<br>(0.01)   |
| <i>Panel C: Household Characteristics</i>  |                    |                    |                    |                   |
| Num. of people in HH excluding G.M.        | 4.12<br>(2.32)     | 3.97<br>(2.22)     | 4.27<br>(2.41)     | 0.30<br>(0.22)    |
| Num. of people in HH receiving a wage      | 0.10<br>(0.14)     | 0.09<br>(0.13)     | 0.10<br>(0.16)     | 0.02<br>(0.01)    |
| Income per capita (household)              | 134.48<br>(162.20) | 132.24<br>(166.48) | 136.72<br>(158.16) | 4.49<br>(15.48)   |
| Personal liquidity per capita in HH        | 167.95<br>(357.28) | 160.75<br>(413.83) | 175.15<br>(290.72) | 14.40<br>(34.10)  |
| Pct. contribution to HH income             | 0.53<br>(0.32)     | 0.55<br>(0.33)     | 0.51<br>(0.32)     | -0.04<br>(0.03)   |
| <i>Panel D: Firm Characteristics</i>       |                    |                    |                    |                   |
| Profits last month                         | 345.93<br>(347.43) | 360.97<br>(364.58) | 330.89<br>(329.52) | -30.08<br>(33.13) |
| Orders completed in last 7 days            | 5.09<br>(6.56)     | 4.88<br>(6.25)     | 5.30<br>(6.87)     | 0.42<br>(0.63)    |
| <i>Panel E: Quality Characteristics</i>    |                    |                    |                    |                   |
| Quality of garment (1-10)                  | 5.32<br>(0.91)     | 5.20<br>(0.84)     | 5.44<br>(0.96)     | 0.23<br>(0.09)*** |
| Observations                               | 440                | 220                | 220                | 440               |

Table 3: Relationship Between Final Price and Personal Liquidity

This table regresses final price on personal liquidity per capita. Personal liquidity per capita is winsorized at the 1% level and include as a z-score. Columns 2, 3, 4, and 5 step-in controls, while column 6 adds firm fixed effects. All standard errors are clustered at the firm-level. Survey controls include whether or not a student from NYU-Abu Dhabi was present, whether the survey was completed on the first day, and year of survey. Personal Characteristics include gender, age, years of education, marital status, whether or not the garment maker had a child as of 2014, ethnic group, ravens score, whether or not garment maker has another business, whether or not he/she has another source of income, whether the garment business is his/her primary business, and primary source of income. Household Characteristics include the number of people in the household, the wage earners ratio, and whether or not the garment maker is the primary breadwinner. Firm Characteristics include tenure of the firm, profits, number of orders completed in the past week, and number of paid employees.

|  | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Z-score of Personal Liquidity Per Capita | 0.896***<br>(0.190) | 0.952***<br>(0.181) | 0.821***<br>(0.188) | 0.813***<br>(0.190) | 0.730***<br>(0.204) | 0.947***<br>(0.278) |
| Survey Controls                          | NO                  | YES                 | YES                 | YES                 | YES                 | YES                 |
| Personal Characteristics                 | NO                  | NO                  | YES                 | YES                 | YES                 | YES                 |
| Household Characteristics                | NO                  | NO                  | NO                  | YES                 | YES                 | YES                 |
| Firm Characteristics                     | NO                  | NO                  | NO                  | NO                  | YES                 | YES                 |
| Firm Fixed Effects                       | NO                  | NO                  | NO                  | NO                  | NO                  | YES                 |
| Observations                             | 440                 | 440                 | 440                 | 440                 | 440                 | 440                 |

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 4: Experimental Bargaining Game Results

This table regresses the final price agreed upon in the experimental bargaining game on receiving a random payment amount of 25 GHC. Results are reported by each survey day, and then pooled together. All standard errors are clustered at the firm-level.

|                | (1)                | (2)                | (3)                |
|----------------|--------------------|--------------------|--------------------|
|                | Day 1              | Day 2              | All Days           |
| 25 GHC Payment | 1.56**<br>(0.61)   | -0.20<br>(1.01)    | 0.86<br>(0.54)     |
| Constant       | 12.29***<br>(0.43) | 14.72***<br>(0.61) | 13.23***<br>(0.37) |
| Observations   | 137                | 83                 | 220                |

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A.1: Experimental Bargaining Game Balance by Survey Day

This table reports baseline characteristics collected in 2014 by Day 1 or Day 2 of the survey.

|  | Day 1              | Day 2              | Diff              |
|--|--------------------|--------------------|-------------------|
| Male                                   | 0.25<br>(0.43)     | 0.28<br>(0.45)     | -0.03<br>(0.06)   |
| Age of G.M.                            | 37.39<br>(13.11)   | 37.70<br>(13.69)   | -0.31<br>(1.87)   |
| Years of Schooling                     | 8.31<br>(3.15)     | 8.07<br>(3.23)     | 0.23<br>(0.45)    |
| Ravens Score (correct out of 12)       | 5.74<br>(2.76)     | 5.20<br>(2.68)     | 0.54<br>(0.38)    |
| Ethnic group is Ewe                    | 0.80<br>(0.40)     | 0.72<br>(0.45)     | 0.07<br>(0.06)    |
| Married or living with partner in 2014 | 0.74<br>(0.44)     | 0.78<br>(0.41)     | -0.05<br>(0.06)   |
| G.M. had at least one child in 2014    | 0.86<br>(0.35)     | 0.86<br>(0.35)     | 0.01<br>(0.05)    |
| Age of business                        | 12.80<br>(7.16)    | 14.13<br>(8.60)    | -1.33<br>(1.12)   |
| Profits Last Month                     | 142.26<br>(155.24) | 168.86<br>(204.47) | -26.59<br>(26.05) |
| Paid Workers                           | 0.08<br>(0.30)     | 0.05<br>(0.35)     | 0.03<br>(0.05)    |
| Observations                           | 137                | 83                 | 220               |

Table A.2: Summary Statistics on Sample of Firms Surveyed in Both Years

This table reports the mean and standard deviation of bargaining, personal, household, firm and quality characteristics of each microenterprise in the sample of microenterprises that were surveyed in both years. Column 1 pools together both years, Column 2 and 3 are for 2018 and 2019, whereas column 4 shows the difference between the two years.

|  | (1)                | (2)                | (3)                | (4)               |
|--|--------------------|--------------------|--------------------|-------------------|
|  | Pooled             | 2018               | 2019               | Diff              |
| <i>Panel A: Bargaining Characteristics</i> |                    |                    |                    |                   |
| First price                                | 19.90<br>(7.65)    | 18.56<br>(7.42)    | 21.31<br>(7.64)    | 2.75<br>(0.67)*** |
| Final price                                | 15.85<br>(4.50)    | 15.00<br>(4.33)    | 16.68<br>(4.52)    | 1.69<br>(0.40)*** |
| <i>Panel B: Personal Characteristics</i>   |                    |                    |                    |                   |
| G.M. owns another business                 | 0.42<br>(0.49)     | 0.43<br>(0.50)     | 0.41<br>(0.49)     | -0.01<br>(0.04)   |
| Garment business is primary business       | 0.96<br>(0.19)     | 0.96<br>(0.19)     | 0.96<br>(0.19)     | 0.00<br>(0.02)    |
| G.M. works for pay elsewhere               | 0.05<br>(0.22)     | 0.03<br>(0.18)     | 0.07<br>(0.25)     | 0.03<br>(0.02)*   |
| Garment business is primary income         | 0.99<br>(0.07)     | 1.00<br>(0.06)     | 0.99<br>(0.09)     | -0.00<br>(0.01)   |
| <i>Panel C: Household Characteristics</i>  |                    |                    |                    |                   |
| Num. of people in HH excluding G.M.        | 4.05<br>(2.33)     | 3.96<br>(2.27)     | 4.15<br>(2.39)     | 0.19<br>(0.20)    |
| Num. of people in HH receiving a wage      | 0.09<br>(0.15)     | 0.09<br>(0.13)     | 0.10<br>(0.16)     | 0.01<br>(0.01)    |
| Income per capita (household)              | 135.33<br>(157.30) | 135.45<br>(164.00) | 135.21<br>(150.60) | -0.24<br>(13.53)  |
| Personal liquidity per capita in HH        | 168.01<br>(340.12) | 154.98<br>(379.93) | 181.03<br>(295.14) | 26.05<br>(29.22)  |
| Pct. contribution to HH income             | 0.54<br>(0.33)     | 0.56<br>(0.33)     | 0.52<br>(0.32)     | -0.04<br>(0.03)   |
| <i>Panel D: Firm Characteristics</i>       |                    |                    |                    |                   |
| Profits last month                         | 335.64<br>(349.96) | 351.97<br>(366.46) | 319.31<br>(332.53) | -32.65<br>(30.06) |
| Orders completed in last 7 days            | 4.80<br>(6.72)     | 4.57<br>(6.04)     | 5.03<br>(7.35)     | 0.46<br>(0.58)    |
| <i>Panel E: Quality Characteristics</i>    |                    |                    |                    |                   |
| Quality of garment (1-10)                  | 5.32<br>(0.91)     | 5.18<br>(0.86)     | 5.45<br>(0.94)     | 0.27<br>(0.08)*** |
| Observations                               | 542                | 271                | 271                | 542               |

Table A.3: Experimental Bargaining Game Balance by Payment Amount

This table reports baseline characteristics collected in 2014 by the two random payment amounts received in the experimental bargaining game.

|  | 5 GHC              | 25 GHC             | Diff              |
|--|--------------------|--------------------|-------------------|
| Male                                   | 0.25<br>(0.43)     | 0.27<br>(0.45)     | 0.02<br>(0.06)    |
| Age of G.M.                            | 36.72<br>(12.91)   | 38.28<br>(13.69)   | 1.56<br>(1.79)    |
| Years of Schooling                     | 8.17<br>(3.18)     | 8.26<br>(3.19)     | 0.09<br>(0.43)    |
| Ravens Score (correct out of 12)       | 5.19<br>(2.70)     | 5.88<br>(2.74)     | 0.69<br>(0.37)*   |
| Ethnic group is Ewe                    | 0.79<br>(0.41)     | 0.75<br>(0.44)     | -0.04<br>(0.06)   |
| Married or living with partner in 2014 | 0.75<br>(0.43)     | 0.76<br>(0.43)     | 0.00<br>(0.06)    |
| G.M. had at least one child in 2014    | 0.85<br>(0.36)     | 0.86<br>(0.34)     | 0.01<br>(0.05)    |
| Age of business                        | 13.42<br>(7.93)    | 13.19<br>(7.59)    | -0.23<br>(1.05)   |
| Profits Last Month                     | 159.35<br>(197.23) | 145.37<br>(151.67) | -13.98<br>(23.75) |
| Paid Workers                           | 0.08<br>(0.39)     | 0.05<br>(0.23)     | -0.03<br>(0.04)   |
| Observations                           | 109                | 111                | 220               |

Table A.4: Relationship Between Completed Garment Status and Personal Liquidity

This table regresses an indicator for whether a garment was completed on personal liquidity per capita. The sample includes all firms who were surveyed in both years. Personal liquidity per capita is winsorized at the 1% level and reported as a z-score. Columns 2, 3, 4, and 5 step-in controls, while column 6 adds firm fixed effects. All standard errors are clustered at the firm-level. Survey controls include whether or not a student from NYU-Abu Dhabi was present, whether the survey was completed on the first day, and year of survey. Personal Characteristics include gender, age, years of education, marital status, whether or not the garment maker had a child as of 2014, ethnic group, ravens score, whether or not garment maker has another business, whether or not he/she has another source of income, whether the garment business is his/her primary business, and primary source of income. Household Characteristics include the number of people in the household, the wage earners ratio, and whether or not the garment maker is the primary breadwinner. Firm Characteristics include tenure of the firm, profits, number of orders completed in the past week, and number of paid employees.

|  | (1)                 | (2)                   | (3)                 | (4)                 | (5)                    | (6)                  |
|--|---------------------|-----------------------|---------------------|---------------------|------------------------|----------------------|
| Z-score of personal Liquidity Per Capita | 0.00260<br>(0.0107) | -0.000996<br>(0.0107) | 0.00107<br>(0.0118) | 0.00263<br>(0.0119) | -0.0000102<br>(0.0111) | -0.00443<br>(0.0183) |
| Survey Controls                          | NO                  | YES                   | YES                 | YES                 | YES                    | YES                  |
| Personal Characteristics                 | NO                  | NO                    | YES                 | YES                 | YES                    | YES                  |
| Household Characteristics                | NO                  | NO                    | NO                  | YES                 | YES                    | YES                  |
| Firm Characteristics                     | NO                  | NO                    | NO                  | NO                  | YES                    | YES                  |
| Firm Fixed Effects                       | NO                  | NO                    | NO                  | NO                  | NO                     | YES                  |
| Sample Mean                              | 0.89                | 0.89                  | 0.89                | 0.89                | 0.89                   | 0.89                 |
| Observations                             | 542                 | 542                   | 542                 | 542                 | 542                    | 542                  |

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A.5: Relationship Between Garment Quality and Personal Liquidity

This table regresses garment quality on personal liquidity per capita. Garment quality is rated on a 0-10 scale. Personal liquidity per capita is winsorized at the 1% level and reported as a z-score. Columns 2, 3, 4, and 5 step-in controls, while column 6 adds firm fixed effects. All standard errors are clustered at the firm-level. Survey controls include whether or not a student from NYU-Abu Dhabi was present, whether the survey was completed on the first day, and year of survey. Personal Characteristics include gender, age, years of education, marital status, whether or not the garment maker had a child as of 2014, ethnic group, ravens score, whether or not garment maker has another business, whether or not he/she has another source of income, whether the garment business is his/her primary business, and primary source of income. Household Characteristics include the number of people in the household, the wage earners ratio, and whether or not the garment maker is the primary breadwinner. Firm Characteristics include tenure of the firm, profits, number of orders completed in the past week, and number of paid employees.

|  | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Z-score of personal Liquidity Per Capita | -0.0600<br>(0.0365) | -0.0624<br>(0.0379) | -0.0435<br>(0.0403) | -0.0442<br>(0.0433) | -0.0565<br>(0.0426) | -0.0825<br>(0.0616) |
| Survey Controls                          | NO                  | YES                 | YES                 | YES                 | YES                 | YES                 |
| Personal Characteristics                 | NO                  | NO                  | YES                 | YES                 | YES                 | YES                 |
| Household Characteristics                | NO                  | NO                  | NO                  | YES                 | YES                 | YES                 |
| Firm Characteristics                     | NO                  | NO                  | NO                  | NO                  | YES                 | YES                 |
| Firm Fixed Effects                       | NO                  | NO                  | NO                  | NO                  | NO                  | YES                 |
| Observations                             | 440                 | 440                 | 440                 | 440                 | 440                 | 440                 |

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A.6: Experimental Bargaining Game Results with Controls

This table regresses the final price agreed upon in the experimental bargaining game on receiving a random payment amount of 25 GHC with controls from the 2014 baseline survey. Results are reported by each survey day, and then pooled together. All standard errors are clustered at the firm-level.

|                | (1)                | (2)                | (3)                |
|----------------|--------------------|--------------------|--------------------|
|                | Day 1              | Day 2              | All Days           |
| 25 GHC Payment | 1.40**<br>(0.61)   | -0.31<br>(1.03)    | 0.74<br>(0.55)     |
| Constant       | 10.91***<br>(2.08) | 18.54***<br>(4.20) | 13.50***<br>(1.89) |
| Observations   | 137                | 83                 | 220                |

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$