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Who does Microfinance Fail to Reach? Experimental Evidence on Gender and Microenterprise Returns[#]

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Abstract

In a recent randomized experiment we found mean returns to capital of 5.7 percent per month amongst Sri Lankan microenterprises, much higher than market interest rates. In this paper we show that this high average effect masks dramatically different returns by gender. While the average male microenterprise owner has returns in excess of 9 percent per month, we show here that average returns are *zero or negative* for female owners. This result challenges the focus of many microfinance operators on female owners. We explore different possible explanations for this lack of mean returns among female owners. The low returns do not appear to be a result of females taking the grants out of the business and spending them on household investments. Nor are they due to differences in ability of male and female owners. Part of the effect is due to females working in different industries than males, but we find female returns to be lower than male returns even for females working in the same industries as men. We then examine the heterogeneity of returns to determine whether any group of businesses owned by women benefit from easing capital constraints.

JEL codes: O12, O16, C93.
Keywords: Microenterprises; Gender; Microfinance; Randomized Experiment.

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Introduction

Many microfinance organizations lend predominately or almost exclusively to women. For example, 97 percent of Grameen Bank's seven million borrowers are women[1], as are 70 percent of FINCAs borrowers[2], and 65 percent of ACCIÓN's five million clients.[3] Many of the justifications are economic in nature. Women are argued to be poorer than men on average (e.g Burjorjee et al., 2002; FINCA, 2007), have less collateral, and hence be more credit-constrained (e.g. Khandker, 1998; SEAGA, 2002). Muhammad Yunus (2004, p. 4078) writes that "women have greater long-term vision and are ready to bring changes in their life step by step. They are also excellent managers of scarce resources, stretching the use of every resource to the maximum".

A complementary reason microfinance focuses on women is evidence that women are more likely to spend resources available to them on goods which have positive effects on economic development more broadly. For example, women have been found to spend more of their income on improving the health and educational attainment of their children and grandchildren (Duflo 2003, 2005). By increasing the income of female microenterprise owners, micro loans empower women to exert a greater influence on how income earned by the household is spent.

The first of these arguments implies that female entrepreneurs are more credit constrained and use resources more efficiently. If so, then the return to capital should, at the margin, be higher in female-owned enterprises than in male-owned enterprises. The second argument sets a lower bar with respect to returns on capital. Because women purchase goods which are more beneficial to long-run development, lending to women may leave households better off in the long run even if the marginal return to investment is lower in female-owned enterprises, provided that females still earn some positive return. But from the standpoint of efficiency, we would still like to know what the returns to capital are in male- and female-owned enterprises. In fact, we lack credible evidence on this question. Studies which look only at borrowers reflect selection decisions both on the part of enterprise owners as to whether or not to apply for a loan, and on the part of

[1] http://www.grameen-info.org/bank/index.html [Numbers as of May 2007], accessed August 15, 2007.
[2] http://www.villagebanking.org/site/c.erKPI2PCIoE/b.2604299/k.FFD9/What_is_Microfinance_What_is_Village_Banking.htm, accessed August 15, 2007.
[3] http://www.accion.org/about_key_stats.asp [all clients 1976-2006], accessed August 15, 2007.

lenders as to whether or not to lend.[4] The limited work on returns to capital in the broader population of microenterprises seldom differentiates returns by gender, and is still subject to the problem that capital stock is not exogenously determined.

In recent work (de Mel, McKenzie and Woodruff, 2007a), we report on a field experiment in Sri Lanka which randomly provided grants of cash and equipment to microenterprises in Sri Lanka. Randomization generates exogenous differences in the capital stock of firms, allowing estimation of the return to capital that is not subject to endogeneity concerns. We estimate the mean real return to capital to be 5.7 percent per month, much higher than market interest rates, and conclude that this high return largely reflects credit constraints rather than missing insurance markets.

In this paper we use the data collected in the Sri Lanka experiment to investigate how the return to capital varies by gender. We emphatically reject the view that female owners have higher returns to capital. In fact, we find that the high average return masks a large gender difference. Male firm owners are found to have a mean return to capital in excess of 9 percent per month, whereas we can not reject that the mean female owner has *zero* return to capital. Thus not only does the average female owner have a lower return than the average male owner, but on average female-owned enterprises see no return from grants which averaged 50 to 100 percent of the pre-experiment capital stock.

The remainder of the paper investigates why the returns differ by gender, and why they are so low for women. Aside from differential credit constraints, the literature suggests several reasons the returns generated from the grants we provided may differ for women and men. First, men have been found to re-invest a larger share of the profits generated into the business (Grasmuck and Espinal, 2000), perhaps reflecting the difference between men and women in spending priorities. Men may also have more power within the household, giving them more access to unpaid labor of older children or to resources generated by their spouse (Ypeij 2000). Either social conventions or the need to be near home to watch children may lead women to work in different industries than men. The same factors may limit the ability of women to travel, reducing the size of their

[4] Kevane and Wydick (2001) provide a survey of several studies of investment behavior of microenterprise owners by gender, with mixed results found. In their own work, they find no significant difference between male and female borrowers in Guatemala in their ability to generate increases in sales. (See McPherson (1996), Mead and Liedhom (1998), and Grasmuck and Espinal 2000 for additional evidence on the size and growth of enterprises owned by men and women.

sales market, and hence demand for their goods. Because women are not continually in the labor market, they may have more limited business networks (Ypeij 2000). Finally, women may differ with respect to risk aversion or ability. These latter factors may also be affected by our sample selection, as we discuss below.

We put structure to these alternative explanations with a simple model of investment. The model shows that returns could vary due to differences in access to credit, differences in access to capital and labor within the household, differences in the markets for output, differences in entrepreneurial ability, differences in risk aversion, and differences in the sector of work. We find that the gender difference in returns still appears after controlling for various measures of access to credit, wealth, risk aversion, and a rich set of ability measures. The data suggest that women invest as much of the grant in their business as men. But even after controlling for the various alternative explanations, we find that women do not obtain the same increase in profits from investing the grant in their business. Differences in sector of work appear to explain some of the difference. The gap in returns is much larger when we compare female-only industries such as lace to male-only industries such as repair services. Nevertheless, we still find women to have returns only half as high as men in industries in which both male- and female-owned enterprises both comprise at least 25 percent of the sector's firms.

While the results show zero average return for women, they do not imply that there are no female-owned enterprises which have high returns. In the final section of the paper we examine the heterogeneity of returns among female-owned enterprises, and show that returns are indeed high for the subset of high-ability, financially-constrained firms. However, at least in our data, male-owned firms are on average more constrained and have higher returns to marginal capital investments, suggesting an economic efficiency argument for directing more resources towards them.

The remainder of the paper is structured as follows. Section 2 describes the experiment and Sri Lankan context. Section 3 estimates the mean treatment effect and return to capital by gender. Section 4 provides a simple model to detail avenues through which returns may differ by gender, and Section 5 explores these empirically. Section 6

investigates the heterogeneity of returns across female-owned enterprises, and Section 7 concludes.

2. Data and Experimental Design

We summarize here the selection of microenterprises and the experiment which randomly provided grants to some microenterprise owners. More details on the basic experimental design can be found in de Mel, McKenzie and Woodruff (2007a).

Participants and Survey design

The goal of our experiment was to provide a positive shock (in the form of a grant) to the capital stock of firms, and measure the return to this shock. Our target population was low-capital microenterprise owners, those with less than 100,000 Sri Lankan rupees in capital, excluding land and buildings. The upper threshold assured that the grants our budget allowed us to provide would result in measurable changes in capital stock. Additionally, previous research had suggested that returns to capital were particularly high for enterprises with very low capital stocks (McKenzie and Woodruff, 2006). In addition to the capital stock threshold, a microenterprise owner had to fulfill all of the following conditions to be included in our sample:

(a) be self-employed full-time (at least 30 hours per week) outside of agriculture, transportation, fishing and professional services;
(b) be aged between 20 and 65; and,
(c) have no paid employees.

The 2001 Sri Lankan Census was used to select 25 Grama Niladhari divisions (GNs) in three Southern and South-Western districts of Sri Lanka: Kalutara, Galle and Matara. A GN is an administrative unit containing on average around 400 households. We used the Census to select GNs with a high percentage of own-account workers and modest education levels, since these were most likely to yield enterprises with invested capital below the threshold we had set. GNs were also stratified according to the degree of exposure of firms to the December 26, 2004 Indian Ocean tsunami. A door-to-door screening survey of 3361 households in these GNs was then conducted to identify firms whose owners satisfied the criteria listed above. In April 2005, the first wave of the Sri

Lanka Microenterprise Survey (SLMS) surveyed the 659 firm owners which the screen identified as meeting these criteria. After reviewing the baseline data, 41 firms were dropped due to exceeding the capital stock threshold, or because a follow-up visit could not verify the existence of the enterprise. This gives a baseline sample of 618 microenterprises.

In this paper we exclude the firms which suffered damage to business assets as a result of the tsunami, since recovery of assets damaged by the tsunami might affect returns to capital. This leaves 405 firms to be used in this paper, of which 197 are run by males and 187 by females. For the remaining 24 firms both husband and wife claim themselves as owner. Given their small number, we also drop these dual owner firms. The result is a sample of 384 firms almost evenly split by gender and across two broad industry categories: retail sales, and manufacturing/services. Firms in retail sales are typically small grocery stores. The manufacturing/services firms cover a range of common occupations of microenterprises in Sri Lanka, including sewing clothing, making lace products, making bamboo products, repairing bicycles, and making food products such as hoppers and string hoppers.

The SLMS then re-interviewed the owners of these firms at quarterly intervals. We use nine waves of data, with the ninth wave gathered in April 2007. In each wave firm owners were asked about profits, revenue and expenses, changes in physical capital stock, and levels of inventories on hand. Profits were obtained through direct elicitation, which we find to be more reliable than constructing profits from detailed questions on revenue and expenses (de Mel, McKenzie and Woodruff, 2007b). Nominal profits were converted into real profits using the monthly Sri Lanka Consumers' Price Index.[5] Each round also attempted to collect additional information about the firm or owner, in the form of special modules to measure owner ability, risk aversion, labor history, and other characteristics. We will discuss some of these measures in detail later in the paper. In addition, the first, fifth, and ninth waves of the panel also included a household survey,

[5] Source: Sri Lanka Department of Census and Statistics, http://www.statistics.gov.lk/price/slcpi/slcpi_monthly.htm [accessed February 17, 2007]. Inflation was low over the first year of the survey, with a 4.0 percent annual rate. Inflation was higher in the second year of the survey, with an annual rate of 18.6 percent between March 2006 and March 2007.

measuring household expenditure, school attendance, and work participation of all household members.

Attrition in the SLMS is quite low. 367 of our 384 firms reported profits in the baseline survey. By the fifth wave (one year later) we still have 346 firms reporting profits, an attrition rate of only 5.8 percent. By the ninth wave (two years after the baseline), we still have 329 firms reporting profits, for cumulative attrition of 10.4 percent. We concentrate our analysis on the unbalanced panel of 363 firms reporting at least three waves of profit data. There is no significant difference in attrition rates by gender: 73.1 percent of males are in all 9 waves, compared to 71.7 percent of females (t-test of no difference has a p-value = 0.75), 84.3 percent of males have at least 3 waves and are included in the sample we used after trimming large changes in profits, compared to 84.5 percent of females (p-value = 0.95).

The Experiment

Firms were told before the initial survey that as compensation for participating in the survey, we would conduct a random prize drawing, with prizes of cash or equipment for the business. The prize consisted of one of four grants: 10,000 Sri Lankan rupees (~$100) in equipment for their business, 20,000 rupees in equipment, 10,000 rupees in cash, or 20,000 rupees in cash. In the case of equipment grants, the equipment was selected by the enterprise owner, and purchased by research assistants working for the project.[6] Cash treatments were given without restrictions. Those receiving cash were told that they could purchase anything they wanted, whether for their business or for other purposes.

After the first round of the survey, 124 firms were randomly selected to receive a treatment, with 84 receiving a 10,000 treatment and 40 receiving a 20,000 treatment. The randomization was done within district (Kalutara, Galle, and Matara) and zone (unaffected and indirectly affected by the tsunami). A second lottery was held after the

[6] In order to purchase the equipment for these entrepreneurs receiving equipment treatments, research assistants visited several firms in the evening to inform them they had won an equipment prize. The winning entrepreneurs were asked what they wanted to buy with the money, and where they would purchase it. The research assistants then arranged to meet them at the market where the goods were to be purchased at a specified time the next day. Thus, the goods purchased and the place/market where they were purchased were chosen by the entrepreneurs with no input from the research assistants.

third round of the survey, with an additional 104 firms selected at random from among those who didn't receive treatment after the first round: 62 receiving the 10,000 treatment and 42 the 20,000 treatment. In each case half the firms receiving a treatment amount received cash, and the other half equipment. Allocation to treatment was done *ex ante*, and as a result, there were an additional seven firms who were assigned to receive treatment after round 3, but who had attrited from the survey by then. Finally, a token cash payment of 2,500 rupees (~$25) was made after round 5 to firms which had not already received a treatment. This payment was not discussed in advance with firms, and was presented as a thank-you for their continued participation in the survey.[7]

The 10,000 rupee treatment was equivalent to about three months of median profits reported by the firms in the sample, and the larger treatment equivalent to six months of median profits. The median initial level of invested capital, excluding land and buildings, was about 18,000 rupees, implying the small and large treatments correspond to approximately 55 percent and 110 percent of the median initial invested capital. By either measure, the treatment amounts were large relative to the size of the firms.

In de Mel, McKenzie and Woodruff (2007a) we show that we can not reject equality of effects of the cash and equipment treatments, nor can we reject linearity of the treatment effect with the 20,000 rupee treatment having double the effect of the 10,000 rupee treatment. We therefore pool the cash and equipment treatments, to create a single treatment variable which varies in amount.

Verifying Randomization

Note that allocation to treatment was not stratified by gender. Nevertheless, provided the sample sizes are large enough, randomization will still lead the treated women to be comparable in terms of pre-treatment characteristics to the untreated women, and similarly for men. We verify this for observable characteristics in Table 1. Randomization does appear to have given comparable treatment and control groups in terms of baseline observable variables. For both men and women we see no significant

[7] The initial funding covered five waves of the survey. The 2,500 rupee payment was made to limit attrition after additional funding was obtained to extend the survey for an additional four waves.

difference in baseline profits, sales, capital stock, and owner characteristics between firms which are later treated and firms which are in the control group.

3. Mean Treatment Effects and Returns to Capital by Gender

To test whether the treatment has the same mean impact on business profits for female owners as it does for male owners we estimate for firm *i* in period *t:*

$$PROFITS_{i,t} = \alpha + \beta AMOUNT_{i,t} + \gamma AMOUNT_{i,t} * FEMALE_i + \sum_{s=2}^{9} \theta_s \delta_s + \sum_{s=2}^{9} \kappa_s \delta_s * FEMALE_i + \lambda_i + \varepsilon_{i,t} \quad (1)$$

Where $AMOUNT_{i,t}$ is an indicator of how much treatment firm *i* had received at time *t*, coded in terms of 10,000 rupees. *AMOUNT* therefore takes value 1 if at time *t* the firm received the 10,000 rupee treatment, 2 if the firm received the 20,000 rupee treatment, 0.25 if they had received the 2,500 rupee payment after round 5, and 0 if they were untreated at time *t*. We include individual fixed effects to account for any time-invariant characteristics of owners that also influence profits. Since randomization appears to have held on the subsamples, including these effects is not necessary, but their inclusion can improve efficiency by accounting for more of the variation across owners in profits. The δ_s are period effects, which we also interact with the female dummy variable to allow for different time paths of profits for male and female enterprises. The coefficient β gives the mean treatment effect for males, and γ provides the differential treatment effect for females. We test

i) $\gamma \neq 0$ (female-owned businesses have a different increase in profits than male owned businesses from the treatment), and

ii) $\gamma + \beta = 0$ (there is no effect of the treatment on profits of female-owned businesses).

Equation (1) shows the impact on business profits of giving cash or equipment to firm owners. Since some of the grant may not be invested in the business (even the equipment grant may be partially decapitalized), this will not give the return to capital. Moreover, if male and female owners invest different amounts of the treatment in their business, we may find different treatment effects despite similar returns to capital. We therefore also

estimate the returns to capital directly by using the treatment amount to instrument capital stock $K_{i,t}$ in the following regression:

$$PROFITS_{i,t} = \alpha_1 + \beta_1 K_{i,t} + \gamma_1 K_{i,t} * FEMALE_i + \sum_{s=2}^{9} \theta_{1s}\delta_s + \sum_{s=2}^{9} \kappa_{1s}\delta_s * FEMALE_i + \lambda_{1i} + \upsilon_{i,t} \quad (2)$$

Capital stock is measured as the total value of capital stock and inventories, excluding land and buildings. We can then test whether the returns to capital differ by gender ($\gamma_1 \neq 0$) and whether the returns to capital are zero for female enterprises ($\gamma_1+\beta_1=0$).

We begin by using real profits as the dependent variable. However, since profits include the earnings of the firm owner, any increase in profit from the treatment will be a combination of the return to capital and of the return to the owner of any adjustment in labor hours worked. Recall that since we are including individual fixed effects, the average hours of work are already implicitly adjusted for, and it is only changes in hours that we need worry about. When we estimate equation (1) using own hours worked as the dependent variable, we find the mean treatment effect is a 3.0 hour per week increase in hours worked for males, and a 1.4 hour per week increase in hours worked for females. We can not reject that the change in hours is the same for males and females.

To isolate the impact of capital, we subtract the implicit wage earned by the firm owner. We estimate the marginal return to own labor using the baseline data to regress profits on capital stock, owner characteristics, and hours of work. Pooling males and females together gives a 4.82 rupee per hour marginal return on an hour of work. Estimating this separately by gender gives marginal returns on an hour of work of 5.20 rupees for males and 3.98 rupees for females. In order that gender differences in returns to capital not be driven by gender differences in accounting for own labor hours, we focus the majority of our analysis on adjusted profits using the 4.82 rupee per hour adjustment. However, we also examine the robustness of the results valuing male and female hours differently.

Profit data are noisy. Measurement error can cause extreme changes in profits from one period to the next, reducing our power to detect changes in profits resulting from the treatments. We therefore trim observations at the 1st and 99th percentiles of the percent change in profits distribution over the nine waves. In practice this results in

trimming observations where profits fall more than 88.8 percent between quarters, and observations where profits grow more than 860 percent between quarters.

Table 2 then reports the results of estimating equations (1) and (2). Columns 1 to 3 show the mean treatment effect for different definitions of profits, while Columns 4 through 6 display the corresponding returns to capital regressions. Column 1 shows that the treatment increases real profits for treated males by 713 Rs per month, or 7.1 percent of the treatment amount. However, there is a large negative and significant gender interaction. The overall female effect is the sum of the female interaction and overall effect, and is -66 Rs, which is not statistically significant from zero. That is, we can not reject that the treatment has no effect on mean profits for female-owned enterprises.

Columns 2 and 3 show that the gender gap is not caused by differential adjustments in labor supply after the treatment. If anything, since men increase hours worked slightly more than women after treatment, controlling for hours worked increases the gender gap (column 2). Also, as the estimated marginal wage for males is larger than that for females, this effect is amplified further in column 3 when we value hours adjustments differently by gender. In all cases we find large positive and significant treatment effects for males, whereas treatment effects for women are not statistically different from zero, with negative point estimates.

In columns 4 through 6 we examine gender differences in returns to capital. The mean real returns to capital are estimated to be 9.3-10.1 percent per month for males. These are very large and highly significant effects. In contrast, in no case can we reject that the returns to capital are zero for females, with the point estimates slightly negative. Note that the first-stage estimating the effect of treatment on capital stock levels shows a coefficient on the treatment amount of 0.78, which suggests that on average 78 percent of the treatment ended up as capital stock for the business. The first-stage coefficient on amount*female is 0.75, suggesting that almost as much of the female treatments were invested in the business as for males. We explore this in more detail below.

Robustness to Treatment Spillovers

Our earlier work (de Mel, McKenzie and Woodruff, 2007a) used only five of the nine waves used in this paper. There we found some evidence of treatment spillovers,

occurring only among the small subsample of firms in the bamboo sector. These spillovers appear to have arisen from treated firms buying up supplies of bamboo, reducing stocks available for non-treated firms. Looking over all nine waves, this appears to have been a temporary phenomenon – there is no evidence of significant treatment effect spillovers over this longer period. Table 3 controls for the number of treated firms within the same industry that are within 100 meters, 500 meters, and 1 kilometer of each firm, using the GPS coordinates of the firms to create these variables. We see that none of the spillover variables are significant, and the magnitude and significance of the gender treatment interaction does not change when we account for the possibility of spillovers. Thus our results are robust to the possibility of spillovers.

4. A simple model to explain why returns may vary by gender

With perfect markets and diminishing returns to capital, we would predict that in steady state all firms will chose their capital stock such that the marginal return to capital equals the market interest rate. In practice, however, both credit and insurance markets are imperfect, which can lead marginal returns to vary across firms and owners. A simple model can be used to identify the main potential sources of heterogeneity in returns, which can then be used to investigate gender differences in returns.

We modify the model in de Mel, McKenzie and Woodruff (2007a) to allow for differences in the production function by industry. Consider a simple one-period model in which an enterprise owner supplies labor inelastically to the business. The enterprise owner is endowed with entrepreneurial ability θ and has chosen to work in sector s. Males and females of the same entrepreneurial ability may have chosen different sectors to work in due to differences in preferences, or to societal norms. The owner can finance capital stock K through the formal credit market by borrowing (B), or through its internal household capital market, by allocating A_K of its endowment of household assets (A) or I_K of wage income nw earned by the n other working age adults.

The microenterprise owner's problem is then to choose the amount of capital stock, K, to invest in the business, subject to its budget and borrowing constraints:

Subject to:

$$c = \varepsilon f_s(K,\theta) - rK + r(A - A_K) + (nw - I_K) \quad (3)$$

$$K \le A_K + I_K + B \quad (4)$$

$$B \le \overline{B} \quad (5)$$

$$A_K \le A \quad (6)$$

$$I_K \le nw \quad (7)$$

Where ε is a random variable with positive support and mean one, reflecting the fact that production is risky, and *r* is the market interest rate. The production function of the firm, $f_s(K,\theta)$ depends on the sector s, level of capital stock, and on θ, the ability of the entrepreneur.

With incomplete markets, the solution to the owner's first-order condition for *K* is:

$$f_s'(K,\theta) = \frac{1}{1 + \dfrac{Cov(U'(c),\varepsilon)}{EU'(c)}}\left[r + \frac{\lambda}{EU'(c)}\right] \quad (8)$$

where λ is the lagrange-multiplier on condition (4), and is a measure of how tightly overall credit constraints bind. This in turn will depend on both the supply of capital available from both the external and internal sources, and on the demand for credit, which in turn depends on the production function and own ability.

Equation (8) therefore suggests that gender differences in returns to capital may arise from the following factors, which we will next investigate empirically:

(a) Differences in Access to Capital from the External Market. Ceteris paribus, returns should be higher for owners with less access to external credit. One reason given for focusing microfinance on women is that they typically have more difficulty accessing financial services.[8] If so, then women should have higher returns.

(b) Differences in the Shadow Cost of Capital within the household. Ceteris paribus, returns should be higher for owners from poorer households, who are less able to finance business investments from own savings. Advocates of focusing

[8] See e.g. Niethammer et al. (2007); SEAGA (2002)

microfinance on women also claim that women are more likely to be poor[9], in which case they should have higher returns. However, another reason for microfinance's focus on women is the belief that women are more likely than men to spend the proceeds on improving family welfare, and investing in children's health and education.[10] This may also lead to a high shadow cost of capital within the household, causing women to devote less of the treatment to their business. This could potentially explain why there is less of a mean treatment effect for women than men. Nevertheless, the higher shadow cost of capital for women should also mean higher returns on the capital than is invested.

(c) Differences in Entrepreneurial Ability. If ability and capital stock are complements in production, then, conditional on a given set of internal and external resources, individuals with higher entrepreneurial ability will be more constrained and thus have higher returns. If women entrepreneurs have less business ability, this could potentially explain the lower returns.

(d) Differences in the Sector of Production. An individual will be more constrained, and thus have higher returns, if their industry has a greater efficient scale. If women select into industries with less scope for growth, then even with the same access to credit and entrepreneurial ability as men, they will have lower returns.

(e) Differences in Risk. Finally, if insurance markets are missing, risk-averse individuals will underinvest, and hence have higher returns. Differences in risk aversion by gender could thus lead to differences in returns.

Sample selection issues

Our analysis will be based on differences in these characteristics among firm owners in our sample, which could be affected by self-selection into self-employment or by the upper limit on baseline capital stock in our sample. Not surprisingly, men are much more likely to be active in the labor market than women. According to the 2006 Sri Lankan labor force survey, the labor force participation rate of 30-39 year old urban males is 96.4 percent, compared to only 34.4 percent for the same age urban females (DCS, 2007).

[9] See e.g. Niethammer et al. (2007); Burjorjee et al. (2002); FINCA (2007).
[10] See e.g. Yunus (2004), Burjorjee et al. (2002).

Furthermore, only 22.7 percent of female workers are self-employed, compared to 30.8 percent of male workers. Thus self-employed individuals are only 7.8 percent of prime age females, compared to 29.7 percent of prime age males. We believe the impact of selection bias arising from differences in labor market participation decisions is limited. This is not to deny that selection of females into the labor market affects the distribution of attitudes toward risk, ability, and other factors. But if capital flows mainly to those with entrepreneurial experience, then those active in the labor market are the relevant sample.

The second source of potential selection bias arises from our sampling frame, and is potentially more problematic. We selected firms from certain industries and placed an upper limit of 100,000 rupees in capital stock excluding land and buildings. The most successful and ambitious entrepreneurs are more likely to grow beyond this capital stock limit, and be excluded from the sample. For both females and males, we have a truncated sample. We expect, however, that the upper limit binds more tightly for men than for women. The literature's finding that male enterprises are generally larger than female enterprises (McPherson (1996), Mead and Liedhom (1998), and Grasmuck and Espinal 2000) is consistent with our experience in drawing the sample, in which men were more likely to be excluded for enterprise size reasons. Hence, we expect the size limit to lead to a higher average ability level for women than for men.

5. Empirically investigating why returns are so low for women

The model in the last section suggests several possible explanations for the gender differences we observe in returns. We test each of these in turn.

5.1. Do Women Invest less of the Treatment in the Business, and More on Children?

A high shadow cost of capital within the household, whether driven by a desire to spend money on children's education and health, or due to husbands capturing the treatments made to females could lead to less of the treatments staying in female-owned businesses. We investigate this possibility both directly and indirectly in Table 4. First, we estimate a version of equation (1) with capital stock, rather than profits, as the dependent variable. Column 1 of Table 4 shows that on average, 74 percent of the

treatment ends up as capital stock in the business.[11] The female interaction is insignificant and close to zero, so that we can not reject that capital stock increases by the same amount in female and male owned businesses.

Columns 2 and 3 of Table 4 consider the cash and equipment treatments separately. The mean effect for males is to increase capital stock by 77 percent for the cash treatment and 75 percent for the equipment treatment, with the difference between the two insignificant. The female interaction is insignificant in both cases. Moreover, it is positive for the cash treatment, which should be the easiest to withdraw or not invest in the business, and negative (but insignificant) for the equipment treatment.

Secondly, an indirect test is to see whether the treatment has more effect on school attendance of children in households of female microenterprise owners than in households of children of male microenterprise owners. Columns 4 to 6 of Table 4 use the household surveys taken to estimate the impact of the treatment on school attendance of 5 to 12 year olds, 12 to 15 year olds, and 15 to 20 year olds respectively. School attendance information was gathered only in the April waves of the survey and the sample for these regressions is limited to those households with children of the specified age. The treatment has no effect on school attendance regardless of the gender of the owner.

Finally, we can also test whether the treatment has more effect on household expenditures on groceries, education, and health when females are treated compared to when males are treated. Columns 7 through 9 of Table 4 test this. None of the gender interactions are significant, and the point estimates are all small relative to the mean. Thus we can conclude that females invest a comparable portion of the treatments in their enterprises, and do not spend differentially more on health, education, or groceries.

The lack of any impact of the treatment on health and education expenditures may be due to the fact that Sri Lanka has a good, inexpensive, state system of schooling and health care. Schooling is compulsive up to age 14, and over 91 percent of children in our sample of this age are actually attending school. In countries where education and health

[11] This differs slightly from that in the first-stage of Table 2, since we are not trimming firms with extreme changes in profits here.

expenses are larger burdens on households, we might find more of the treatment being spent on these categories.

We also checked whether hours worked by family members in the enterprise changed after treatment. The results are shown on Table 5. While we find no significant effect of the treatments on the number of hours worked family members in the full sample, we do find that the probability at least one family member works in the enterprise increases by about 5 percent following treatment. When we allow for different responses by females and males, we find differences on the intensive and extensive margins. Total hours worked by other family members increase by about 1.7 hours for males, and decreases by about 1 hour for females. The difference between the response in female- and male-owned enterprises is significant at the 10 percent level. However, the probability of having any family member working in the enterprise increases for females, and is unchanged for males. The changes in hours worked are small and unable to explain differences in returns to capital.

5.2. Differences in Access to Capital

One of the main reasons for the traditional emphasis of microfinance on women is a belief that women have less access to formal finance than men. However, it could be that the expansion of microfinance directed towards women may result in women having more access to external finance than men. In the baseline survey, firms were asked whether they had ever had a loan from banks, the government, microfinance, and different government programs. Only 1.8 percent have had a loan from a private bank, and 2.1 percent from a microfinance organization. 9.4 percent have had a loan from the government, 4.2 percent from the Sanasa Development Bank (an umbrella organization of small credit unions), 6.5 percent from the government's Samurdhi program, and 0.5 percent from other government programs such as IDRP and REAP. Combined across all of these sources, we find no significant gender difference: 23.4 percent of females and 23.5 percent of males have ever had a loan from one of these formal sources (Table 6).

Most firm owners in our sample financed the start-up capital and any ongoing capital investments through own savings and loans from family. Our survey contains two measures of the household internal capital market: the number of paid wage workers in

the household, and an asset index constructed as the first principal component of baseline indicators of ownership of durable assets such as fans, radios, cameras, televisions and motorcycles. Table 6 shows that on average female owners have more wage workers and higher household assets to draw upon. As a result, we would expect females to be less constrained, and hence earn lower returns.

To investigate whether differences in access to capital can explain the gender difference in treatment effects, we examine the gender interaction term after controlling for interactions between measures of access to credit and the treatment amount. That is, we estimate the following equation, for a given set of *H* potential explanators X_s'

$$PROFITS_{i,t} = \alpha + \beta AMOUNT_{i,t} + \gamma AMOUNT_{i,t} * FEMALE_i + \sum_{h=1}^{H} \pi_h AMOUNT_{i,t} * X_{h,i} + \sum_{s=2}^{9} \theta_s \delta_s + \sum_{s=2}^{9} \kappa_s \delta_s * FEMALE_i + \sum_{h=1}^{H} \left(\sum_{s=2}^{9} \varphi_{h,s} \delta_s * X_{h,i} \right) + \lambda_i + \varepsilon_{i,t} \quad (9)$$

We demean all the X's, so that β will give the mean treatment effect for males, and γ the differential effect for females, evaluated at the mean of the other potential explanatory variables. We then examine how sensitive γ is to the inclusion of these other variables, to determine whether the gender interaction is really reflecting gender differences in access to capital.

Table 7 shows the results. The first column repeats the basic result from Table 2. Columns 2 through 4 then show the impact of controlling for treatment interactions with access to bank loans, the number of wage workers, and household assets. Each of these controls shows a negative interaction effect, consistent with less constrained owners earning lower returns. However, controlling for these interactions does not lead to a significant change in the size of the negative female interaction term. We still find high returns for males, and can not reject the return is zero for females after these controls for differences in access to credit. Therefore it seems the supply side of the external and internal credit markets can not explain the difference in returns.

5.3 Differences in Entrepreneurial Ability and Reasons for Going into Business

The demand for credit will depend on the optimal size of the enterprise. If capital and ability are complements in production, more able owners will have higher optimal

sizes. Hence, for a given supply of credit, more able owners will be further away from their optimal size and have higher marginal returns to capital.

Entrepreneurial ability is a multifaceted and nebulous concept, which is unlikely to be captured fully by general measures of ability such as years of education. The SLMS has an extremely rich set of measures of ability, allowing us to consider an array of possible measures for entrepreneurial ability. In Table 7 we show three such measures. Column 5 shows the standard measure, years of education. Column 6 shows Digit-span recall, a measure of short-term processing power, used in Djankov et al. (2005). Table 6 shows females to have significantly more education than males, but significantly less Digit-span recall. Table 7 finds that both these measures are strongly significant in their interactions with the treatment amount, showing larger treatment effects to more able individuals.

Our survey also contains many measures developed by industrial psychologists to measure different facets of the entrepreneurial personality. In column 7 we show one such measure, polychronicity (the extent to which people prefer to be engaged in two or more tasks or events simultaneously) based on three questions taken from Bluedorn et al. (1999). While this measure is not significant in this regression, we later see it is when we consider only female owners.

Table 8 examines the robustness of the female interaction term to 20 alternative measures of owner ability and motivation. These include measures commonly found in economic studies, such as mother's and father's education and previous business experience; the time taken for individuals to solve a maze (median time was 53 seconds); entrepreneurial traits such as passion for work, tenacity (both from Baum and Locke, 2004); entrepreneurial self-efficacy; trust (taken from the General Social Survey); the achievement and power motivations of McClelland (1985); Work centrality (Mishra et al, 1990); Impulsiveness, from three questions on the Barratt Impulsiveness Scale; Financial Literacy (from Lusardi and Mitchell, 2006); internal locus of control (Rotter, 1966) and our own questions on reasons for going into business, on whether or not the business operates out of the home, and on whether or not their friends and family consider the owner an organized person. None of these characteristics are significant when interacted with the treatment effect, and the female interaction stays large, negative, and significant.

We thus conclude that differences in entrepreneurial ability, however measured, do not explain the low returns to females.

5.4. Differences in Risk Aversion

We measure risk aversion as the implied coefficient of relative risk aversion obtained by playing lottery games for real money with the firm owners (see de Mel, McKenzie, and Woodruff 2007a for details). Although there is a common presumption that women are more risk averse than men in many countries, we find that Sri Lankan female microenterprise owners are more likely to take risky gambles in these lottery games than male owners (Table 6). Since theory would predict that returns are higher for more risk averse individuals if missing insurance markets cause them to underinvest, the results of these lottery games suggest that differences in risk aversion will not explain the low returns for females. Indeed, we see this in column 8 of Table 7, where controlling for the interaction with risk aversion does not change the female interaction. This result is also robust to an alternative measure of risk aversion. We also followed the German Socioeconomic Panel in asking firm owners about the overall willingness to take risks in life, on a 10 point scale. This variable has a coefficient of 15.3 (s.e. 89) when interacted with the treatment amount, and the female interaction with treatment amount is -720.3 (s.e. 382), which is not significantly different from the baseline model. Thus differences in risk aversion do not explain the low returns to females.

5.5. Differences in Industry and Ability to Expand

The large differences in treatment effects by gender do not appear to be due to differences in the amount of the treatment invested, differences in access to capital, differences in ability, or differences in risk aversion. The remaining potential reason for differences in returns according to our theoretical model is that they represent differences in the sector of production. This could lead to differences in production technologies across gender.

We investigate whether differences in sector of work help account for gender differences in returns in Table 9. The first column repeats the treatment effect and return to capital regressions found in Table 2. The next column then estimates a version of

equation (9), which interacts the treatment amount with eight different industry dummy variables (to cover nine industries: retail sales, food sales, clothing, sales of non-food, lace, repair services, manufacturing, personal services and other services). The regression also allows the wave effects to vary with industry. This therefore involves adding eight interactions with amount and 64 additional wave effects. The results then show whether, within industry, females on average have different effects of the treatment than males. The results show that the results are robust to controlling for differences across industry, with the female interaction becoming even more negative, and remaining significant.

We take a different approach in the last three columns of Table 9, considering more detailed industry coding. We classify firms into 73 industry classifications. For example, the broader industry of food sales gets divided into finer classifications such as fish sales, cashew nut sales, and fruit sales. In column 3 of Table 9 we then re-estimate the treatment effects restricting analysis to the narrow industries that both male and female owners operate in our sample. This involves dropping industries such as lace, in which only women work, and industries such as various types of repair services, in which only men work. This cuts about one-third of the sample, but comparing the results to column 1, shows only a slight narrowing of the gender gap.

In column 4 of Table 9 we get even more restrictive, and consider only narrow industries in which both men and women constitute at least 25 percent of the firm owners in our sample. In this reduced sample the gender interaction is insignificant. The point estimates suggest that for this subsample, women have average returns of 3.1 percent, compared to 8.9 percent for men. So differences in industry can account for only some of the difference.

Finally, as a further check, in the last column of Table 9 we consider narrow industries in which only men or only women operate in our sample. The gender difference is much larger in this subgroup – while male owners in industries without females have returns to capital of 10 percent, female owners in industries without males have returns to capital of *negative* 10 percent! Female-dominated occupations therefore appear to have poor returns to capital.

One plausible explanation for the difference in returns across sectors relates to the potential for expanding the customer base after investing additional capital. On average

female owners report that 68 percent of their customers are within 1km of their business, compared to 60 percent for male owners (p-value of 0.027 for testing equality). Moreover, 48 percent of female firms have *all* their customers within 1km, compared to only 30 percent of men (the difference is significant with $p<0.001$). However, male only industries such as repairs also have quite local demands, averaging 48 percent of customers within 1km, similar to female only businesses such as lace (averaging 49 percent of customers within 1km). Moreover, women are not statistically more likely to report that demand is a constraint on their business growth: 36 percent of men and 33 percent of women report that demand is a major constraint. Furthermore, only 28 percent of owners in female-only industries report demand to be a constraint on their business growth. Thus it appears unlikely that the main explanation for the gender difference in returns across sectors is due to demand constraints.

A second potential sector-related explanation is that female-owned businesses are more likely to be operated out of the home, where owners may be carrying out other tasks such as caring for family members or doing housework at the same time as operating their business. 74 percent of female-owned businesses in our sample operate out of the home, compared to 51 percent of male-owned businesses. However, Table 8 shows no significant interaction between treatment amount and dummy variables for operating a business out of the home, or for going into business to care for family members. The female-interaction coefficient does not significantly change when we control for either explanation. Thus industry differences also appear unlikely to be due to some firms being operated out of the home.

6. Which women benefit from the treatment?

The above results show that the mean treatment effect is zero for female-owned businesses. However, Table 7 also showed that the treatment effect does significantly vary with access to capital and ability. We therefore explore the heterogeneity of treatment effects within the subsample of female-owned businesses. Table 10 re-estimates the specifications in Table 7 on the female-owned sub-sample.

Column 1 of Table 10 shows the negative and insignificant mean treatment effect for females. Columns 2 through 4 show insignificant effects of different measures of

access to credit among the female-owned businesses. Columns 5 through 7 again show higher returns to higher ability owners, and column 8 shows no significant effect of risk aversion. Once we include all the controls in column 9, we see that Digit-span recall and polychronicity are associated with higher returns, but conditional on these, more formal education is associated with lower returns. Column 10 keeps only the significant interactions.

We use these specifications to estimate the mean treatment effect by set of observed characteristics. The foot of Table 10 then reports the percentage of female-owned businesses with mean returns lying in different ranges. For example, column 6 shows a large positive and significant coefficient for Digit-span recall. The standardized Digit-span recall has mean zero and ranges from -2.67 to 5.32. 48 percent of female-owners have low enough Digit-span recall that their mean treatment effect is estimated to lie below zero. In contrast, 30 percent have estimated mean treatment effect between 200 and 500 rupees, and 20 percent have estimated mean treatment effect of 501 rupees or more. When we include multiple interactions in columns 9 and 10, we find 47 to 48 percent of firms have mean treatment effects less than zero, 10 to 12 percent have them in the 0 to 500 rupee range, and 41 to 42 percent have mean treatment effects in excess of 500. Thus there is a sizeable share of female firms with high mean treatment effects, even though the mean treatment effect for females as a whole is negative.

7. Discussion and Conclusions

The economic argument for microfinance's focus on female-owned businesses is that female owners are likely to be poorer, more credit constrained, and use resources more efficiently. If this is the case, we would expect returns to capital to be higher in female-owned firms. This paper provides evidence against this view, finding mean returns to capital to be zero among female-owned microenterprises in Sri Lanka. In contrast, returns to capital for male-owned enterprises are in excess of 9 percent per month. These large returns show that, on average, male-owned enterprises are more likely to generate the return on investment necessary to repay microloans. Since the experiment gave grants, rather than loans, we are unable to provide evidence on another

of microfinance's claims - that women are more likely to repay (in part because they are less mobile and have less alternative options for financing).[12]

The experience with the grants does indicate that permanently raising the income of women running small microenterprises may be more difficult than raising the income of men in a similar position. This suggests that the challenge of empowering women through income creation may be even more difficult than is generally understood. We do find returns to be heterogeneous, with as many as 40 percent of female-owned firms having a mean treatment effect of 5 percent or more. Thus there is still a subset of female-owned firms which do generate returns sufficient to cover the cost of loans.

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Table 1: Verification of Randomization by Gender

	Total number of observations		Means by treatment: Males			Means by treatment: Females		
	Male	Female	Control	Treatment	T-test p-value	Control	Treatment	T-test p-value
Profits March 2005	188	179	4,638	4,838	0.710	2,839	2,872	0.938
Revenues March 2005	197	187	16,397	14,480	0.439	8,966	8,685	0.876
Total invested capital March 2005	197	187	156,855	174,077	0.669	111,924	144,087	0.204
Total invested capital excluding land and buildings March 2005	197	187	3.41	2.98	0.265	2.08	2.07	0.989
Own hours worked March 2005	197	187	58.72	57.19	0.621	49.71	46.05	0.272
Family hours worked March 2005	197	187	12.29	14.07	0.632	17.30	21.66	0.302
Age of entrepreneur	197	187	43.86	42.05	0.294	40.33	42.01	0.292
Age of firm in years	197	185	9.50	10.73	0.446	8.11	8.80	0.643
Years of schooling of entrepreneur	197	187	8.26	8.82	0.206	9.75	9.13	0.173
Proportion whose father was an entrepreneur	197	187	0.45	0.41	0.639	0.36	0.33	0.707
Proportion of firms which are Registered	197	187	0.25	0.29	0.550	0.16	0.15	0.838
Number of household members working in wage jobs	197	187	0.86	0.95	0.525	1.40	1.56	0.274
Household asset index	197	187	0.06	-0.34	0.131	0.34	0.05	0.257
Number of Digits recalled in Digit Span Recall test	179	176	5.86	5.90	0.822	5.60	5.74	0.448
Implied coefficient of relative risk aversion from lottery game	193	186	0.27	0.41	0.563	-0.13	-0.11	0.925
P-value from Chi-squared (16) test of joint significance:					0.629			0.381

Table 2: Treatment Effect and Returns to Capital with Gender Interactions

	Real Profits FE (1)	Adjusted Real Profits FE (2)	Gender Adjusted Real Profits FE (3)	Real Profits IV-FE (4)	Adjusted Real Profits IV-FE (5)	Gender Adjusted Real Profits IV-FE (6)
Treatment Amount	713.0***	651.5***	646.7***			
	(243)	(241)	(241)			
Treatment Amount*Female	-779.5**	-750.6**	-740.1**			
	(376)	(373)	(374)			
Capital Stock				1007***	933.9***	928.2***
				(345)	(340)	(340)
Capital Stock *Female				-1069**	-1040**	-1027*
				(536)	(529)	(528)
Constant	3888***	2871***	2904***	2327***	1457**	1495**
	(185)	(184)	(184)	(719)	(709)	(709)
Observations	2766	2766	2766	2587	2587	2587
Number of firms	324	324	324	319	319	319
Testing the overall female effect is zero (p-values)						
Amount+Amount*Female=0	0.817	0.728	0.743			
Capital + Capital*Female=0				0.878	0.793	0.808
First-stage Coefficients:						
First-stage for Capital						
Amount				0.784	0.784	0.784
(p value)				0.00	0.00	0.00
*First-stage for Capital*Female*						
Amount*Female				0.754	0.754	0.754
(p value)				0.00	0.00	0.00

Notes:
Robust Standard errors in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively.
Results shown trim firms with extreme changes in profits (below the 1st percentile, above the 99th)
Returns to Capital results also trim the top and bottom 1% of baseline capital stock.
Adjusted profits adjust real profits by subtracting own hours valued at 4.82 Rs per hour
Gender adjusted profits value male hours at 5.20 Rs per hour and female hours at 3.78 Rs per hour.

Table 3: Robustness to Treatment Spillovers

Dependent Variable: Real profits adjusted for own hours at 4.82 per hour.

	FE (1)	FE (2)	FE (3)	FE (4)
Capital Stock	933.9***	929.9***	932.2***	934.6***
	(340)	(338)	(339)	(340)
Capital Stock*Female	-1040**	-1033**	-1036**	-1042**
	(529)	(521)	(526)	(527)
Number of firms in industry treated				
Within 100 meters		-109.6		
		(244)		
Within 500 meters			-20	
			(52)	
Within 1 km				6.168
				(34)
Constant	1457**	1462**	1459**	1457**
	(709)	(710)	(709)	(710)
Observations	2587	2587	2587	2587
Number of sheno	319	319	319	319

Robust Standard errors in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively.

Results shown trim firms with extreme changes in profits (below the 1st percentile, above the 99th) and the top and bottom 1% of baseline capital stock.

Table 4: Do Women invest less in the business and more on children?

	Capital Stock FE (1)	Capital Stock FE (2)	Capital Stock FE (3)	School Attendance 5 to 12 FE (4)	School Attendance 12 to 15 FE (5)	School Attendance 15 to 20 FE (6)	Monthly Household Expenditure Groceries FE (7)	Monthly Household Expenditure Health FE (8)	Monthly Household Expenditure Education FE (9)
Treatment Amount	0.742***			-0.0079	-0.0141	-0.0167	-137.2	29.9	5.7
	(0.150)			(0.046)	(0.047)	(0.057)	(91.613)	(75.442)	(53.138)
Amount*Female	0.0111			-0.0264	0.0371	-0.0710	72.1	73.3	-93.1
	(0.230)			(0.070)	(0.070)	(0.083)	(135.656)	(111.438)	(78.278)
Cash Amount		0.771***							
		(0.210)							
Cash Amount*Female		0.0879							
		(0.340)							
Equipment Amount			0.747***						
			(0.170)						
Equipment Amount*Female			-0.246						
			(0.250)						
Baseline mean of dependent variable	3.731	3.851	3.318	0.919	0.917	0.518	1502	583	424
Observations	2670	1860	1895	457	330	458	1004	1004	1003
Number of Firms	324	226	229	200	145	186	358	358	358

Notes: Robust Standard errors in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively.

Table 5: Treatment effect on hours worked by family members working for the business

	waves 1 to 9 **Hours worked by other family members**		waves 1 to 9 **At least one Hour worked by other family members**	
	FE (1)	FE (2)	FE (3)	FE (4)
Treatment Amount	0.237	1.748*	0.0473***	-0.00623
	(0.73)	(0.96)	(0.01)	(0.02)
Amount*Female		-2.794*		0.136***
		(1.51)		(0.03)
Constant	15.50***	14.81***	0.363***	0.350***
	(0.71)	(0.71)	(0.03)	(0.03)
Observations	3041	2892	3041	2892
Number of firms	383	363	383	363
R-squared	0.03	0.04	0.01	0.03

Notes: Robust Standard errors in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively.

Table 6: How do the characteristics of male and female owners differ?

	Mean value		T-test
	Males	Females	p value
Ever had a formal loan	0.235	0.234	0.987
Number of Wage Workers	0.548	0.873	0.000
Asset Index	-0.197	0.203	0.042
Years of Education	8.566	9.405	0.015
Digitspan Recall	5.883	5.610	0.061
Entrepreneurial Self-efficacy	31.512	30.791	0.215
Polychronicity	7.758	7.317	0.062
In Self-employment to care for children	0.395	0.490	0.090
In Self-employment for business growth	0.315	0.346	0.553
Risk Aversion	0.366	-0.072	0.011

Table 7: Does treatment heterogeneity explain gender differences?
Dependent Variable: Real profits adjusted for own hours at 4.82 per hour.

	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)	FE (6)	FE (7)	FE (8)	FE (9)
Amount	**651.5*** **	**681.2*** **	**581.7** **	**626.3** **	**699.7*** **	**642.8*** **	**607.1** **	**660.8*** **	**518.9***
	(241)	(244)	(246)	(243)	(243)	(244)	(251)	(244)	(268)
Amount*Female	**-750.6** **	**-790.4** **	**-614.9**	**-704.3***	**-752.1** **	**-633.6***	**-688.8***	**-772.2** **	**-356.9**
	(373)	(376)	(387)	(377)	(375)	(379)	(394)	(377)	(431)
Amount*Ever had a formal loan		-798.8*							-907.5*
		(455)							(475)
Amount*Number of Wage Workers			-330.6						-280.7
			(240)						(261)
Amount*Household Asset Index				-114.5					-215.9*
				(107)					(126)
AmountI*Years of Education					134.6**				175.3***
					(57)				(66)
Amount*Digitspan recall						331.4**			182
						(159)			(178)
Amount*Polychronicity							47.66		41.69
							(94)		(96)
Amount*Risk aversion								-58.17	29.68
								(119)	(128)
Observations	2766	2766	2766	2766	2766	2734	2646	2766	2631
Number of sheno	324	324	324	324	324	317	302	324	300

Robust Standard errors in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively.
All variables used in the interaction apart from gender are standardized to have mean zero by subtracting off their mean.

Table 8: Robustness of Gender Interaction to Alternative Measures of Ability and Motivation

Characteristic	Amount		Amount* Female		Amount* Characteristic	N
Baseline Specification						
	651.5	***	-750.6	**		324
	(241)		(373)			
Adding the interaction between amount and:						
Time taken to solve a maze	713.1	***	-838.0	**	6.6	322
	(245)		(380)		(5)	
Father's Education	559.2	*	-736.2		-49.6	202
	(307)		(498)		(79)	
Mother's Education	543.3	*	-733.1		90.2	195
	(307)		(476)		(68)	
Father owned a Business	665.7	***	-745.0	**	-71.4	324
	(242)		(377)		(382)	
Mother owned a Business	645.0	***	-740.2	**	13.1	324
	(244)		(377)		(557)	
Optimism	613.6	**	-720.1	*	87.6	323
	(243)		(374)		(135)	
Went into self-employment to care for family members	697.0	***	-854.3	**	118.2	315
	(249)		(390)		(107)	
Went into Self-employment for business growth reasons	680.7	***	-781.7	**	-296.8	315
	(247)		(381)		(269)	
Business operated out of the home	674.7***		-785.4**		-13.24	324
	(243)		(376)		(390)	
Entrepreneurial Self-efficacy	650.0***		-788.2**		-29	315
	(246)		(382)		(36)	
Financial Literacy	615.2	**	-711.5	*	-100.3	315
	(247)		(381)		(195)	
Impulsiveness	582.5	**	-726.2	*	43.8	302
	(251)		(391)		(127)	
Passion for Work	627.3	**	-690.7	*	217.8	302
	(252)		(396)		(289)	
Tenacity	632.6	**	-784.2	**	97.0	302
	(249)		(393)		(196)	
Locus of Control	667.1	***	-780.8	**	-15.4	302
	(251)		(395)		(111)	
Trust	672.6	***	-749.1	*	351.0	302
	(250)		(391)		(216)	
Achievement Motivation	641.5	**	-750.7	*	42.9	302
	(250)		(393)		(77)	
Power Motivation	683.9	***	-790.0	**	77.8	302
	(254)		(396)		(98)	
Work Centrality	621.5	**	-743.4	*	-140.4	302
	(252)		(395)		(218)	
Organized Person	693.7	***	-760.0	*	-40.8	302
	(253)		(391)		(312)	

Notes: Results in Rows show the coefficients from adding the interaction between a particular proxy for ability and the treatment amount to the baseline specification (column 1 of Table 5). Regressions also include the interaction between this characteristics and wave effects.
Robust Standard errors shown in Parentheses, *, **, and *** interact significance at the 10, 5 and 1% levels.

Table 9: Do Differences in Sector of Work explain Gender Differences?

	All Firms	All Firms	Only industries with participants of both genders	Only industries with participaton from both genders above 25%	Only industries with participaton below 25% from one gender
Panel A: Treatment effect					
Amount	651.5***	598.5	563.6*	611.1**	675.7*
	(241)	(448.0)	(290)	(306)	(390)
Amount*Female	-750.6**	-860.9**	-688.1*	-368.7	-1417**
	(373)	(419.0)	(410)	(452)	(650)
Obs.	2766	2766	1859	1597	1169
Firms	324	324	218	187	137
Panel B: Returns to Capital					
Capital Stock	933.9***	706.5	760.8*	885.8*	1015*
	(340)	(456.0)	(396)	(455)	(557)
Capital Stock*Female	-1040**	-1058*	-900.3*	-578.8	-2071**
	(529)	(587.0)	(541)	(647)	(1005)
Obs.	2587	2587	1787	1543	1044
Firms	319	319	215	184	135
Industry*Wave effects	no	yes	no	no	no
Industry*Amount controls	no	yes	no	no	no

Robust Standard errors in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively.

Table 10: Heterogeneity of Returns Amongst Female-Owned Enterprises
Dependent Variable: Real profits adjusted for own hours at 3.98 per hour.

	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)	FE (6)	FE (7)	FE (8)	FE (9)	FE (10)
Amount	**-42.75**	**-64.26**	**-48.46**	**-35.15**	**-9.292**	**124.3**	**-33.91**	**-43.96**	**126.5**	**185.8**
	(212)	(213)	(213)	(213)	(216)	(215)	(221)	(213)	(234)	(231)
Amount*Ever had formal loan		79.71							195.3	
		(485)							(502)	
Amount*Number of Wage Workers			-179.6						378	
			(282)						(314)	
Amount*Household Asset Index				-169					-199.3	
				(124)					(138)	
AmountI*Years of Education					72.3				-180.6**	-171.9**
					(67)				(89)	(81)
Amount*Digitspan recall						723.8***			1235***	1103***
						(194)			(259)	(246)
Amount*Polychronicity							263.8**		430.4***	352.7***
							(113)		(128)	(120)
Amount*Risk aversion								-174.6	-44.07	
								(145)	(165)	
Observations	1363	1363	1363	1363	1363	1346	1293	1363	1286	1286
Number of sheno	162	162	162	162	162	158	149	162	148	148
% with mean treatment less than or equal to 0		100.0	66.8	56.1	38.5	48.3	53.0	46.8	47.88	46.67
% with mean treatment between 0 and 200		0.0	33.2	22.5	43.9	0.0	17.5	53.2	6.06	5.45
% with mean treatment between 200 and 500		0.0	0.0	16.6	17.6	30.1	13.9	0.0	3.64	7.27
% with mean treatment of more than 500		0.0	0.0	4.8	0.0	21.6	15.7	0.0	42.42	40.61

Notes:
Robust Standard errors in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively.
All variables used in the interaction apart from gender are standardized to have mean zero by subtracting off their mean.