

Frontiers: Breaking the Glass Ceiling: Empowering Female Entrepreneurs Through Female Mentors

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Abstract. Among the millions of entrepreneurs in developing economies, few are able to earn a decent livelihood. To help these entrepreneurs succeed, governmental and nongovernmental organizations invest billions of dollars every year in providing training programs. Many of these programs involve providing entrepreneurs with mentors. Unfortunately, the effects of these programs are often muted, or even null, for woman-owned firms. Against this backdrop, we tested whether gender matching, where female entrepreneurs are randomly paired with a female mentor, could help address the gender gap. Findings from a randomized controlled field experiment with 930 Ugandan entrepreneurs show that mentor gender has a powerful impact on female entrepreneurs. Firm sales and profits of female entrepreneurs guided by a female mentor increased by, on average, 32% and 31% compared with the control group, and these estimates are even larger for female entrepreneurs with high aspirations. In contrast, female entrepreneurs guided by a male mentor did not significantly improve performance compared with the control group. We provide suggestive mechanism evidence that female mentor-mentee arrangements were characterized by more positive engagements.

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1. Introduction

Despite growing calls to improve business opportunities and outcomes for women in developing economies (e.g., De Mel et al. 2014), the handful of policies introduced to remove gender-based advancement barriers have fallen short (e.g., Bertrand et al. 2019). Worse, there has been little attention devoted to addressing “glass ceilings”¹ that exist beyond the boardrooms and management hierarchies of Western corporations. Nowhere are such barriers more egregious than in developing economies where over half of all workers are self-employed as owner-entrepreneurs of small firms,² most of which fail to survive, let alone thrive (e.g., McKenzie and Paffhausen 2017, Anderson et al. 2018). For the

female professionals in these economies, a persistent gender gap means business success and advancement are even more fleeting (e.g., Campos et al. 2019).

In an effort to help address this concerning trend, governmental and nongovernmental organizations invest billions of dollars (e.g., Campos et al. 2017) every year providing training programs to improve business outcomes in developing economies. Unfortunately, the results of this policy tool have been mixed (e.g., Berge et al. 2015, Campos et al. 2017, McKenzie 2020), and female entrepreneurs in particular tend to benefit significantly less from these training programs compared with their male counterparts (e.g., De Mel et al. 2014, Berge et al. 2015, McKenzie 2020). This raises several important

questions, including if other policy tools exist that can help overcome the glass ceiling and facilitate more inclusive growth. We address this question by examining whether mentorship gender matching (i.e., female mentors with female mentees) is an effective tool to tackle advancement barriers for female business professionals in developing economies.

2. Mentorship Gender Matching

Be it an engineer, manager, or entrepreneur, receiving guidance and advice from another professional—often someone more senior and experienced—is a common form of support offered across companies and business contexts. There is growing evidence that female (as well as male) mentees can benefit from mentorship programs (e.g., Ginther et al. 2020, Athey and Palikot 2022). Yet literature examining ways to structure these mentorship arrangements, including whether matching mentor-mentee gender matters, is sparse and offers contradictory findings. On one hand, some research suggests women benefit more from male mentors, as they are more likely to provide the mentees with resources needed for success and confer upon them legitimacy (Ragins and Sundstrom 1989, Dreher and Cox 1996, Ragins and Cotton 1999). Similarly, a descriptive study in entrepreneurship suggests female entrepreneurs may be better off having male mentors because they increase access to more profitable, traditionally male-dominated sectors (World Bank 2022). On the other hand, research in education implies the opposite mentoring structure may be more beneficial. For example, Dennehy and Dasgupta (2017) report that first-year female engineering students who were assigned a female (instead of a male) mentor experienced more feelings of belonging in the major and greater self-efficacy and were significantly more likely to continue their studies in engineering after their first year of studies. There is also evidence that female students perform better in quantitative courses when they have a female professor (e.g., Carrell et al. 2010, Krishna and Orhun 2022). At the same time, however, Carrell et al. (2010) report that professor gender has a limited effect (at best) on students' outcomes in humanities courses, and Dennehy and Dasgupta (2017, p. 5968) speculate that “female mentors' support will become less critical as women move beyond the college transition, at which point male and female mentors may be equally effective” (also see Burke and McKeen 1990).

Thus, the direction of the mentorship gender-matching effect and whether it exists at all—especially when considering female professionals who have left college and operate their own businesses—remains an open empirical question. We therefore conducted a field experiment with hundreds of entrepreneurs in which we randomly matched female (or male) mentors with female (or male) entrepreneurs. The results indicate that

female entrepreneurs performed significantly better when guided by a female mentor (as opposed to a male mentor).

3. Study Design

We implemented our study in a research context ideal for identifying the effects of mentorship gender matching: a developing economy in which *ex ante* exposure to business mentorship is low and where entrepreneurial ventures are often perceived as male dominated. Our sample consists of 930 Ugandan entrepreneurs who were operating from a physical building and ready to receive a business support program. Section 1 of the online appendix details the recruitment process. We conducted one-on-one interviews with these entrepreneurs between July and August 2015 and also conducted a business audit and baseline survey that year.³ Roughly 40% of the entrepreneurs were female, and 54% of them were married. The typical entrepreneur was 31 years old, had 2.3 children, and had completed high school or higher education. At baseline, the entrepreneurs' firms, on average, had been in operation for about four years, were open 6.5 days per week, and employed 1.7 paid staff. Moreover, the average firm had approximately 4.4 million Ugandan shillings (UGX) in monthly sales and 673,000 UGX in monthly profits.

The 930 entrepreneurs were randomly assigned to either a Control group ($n = 400$; 40.3% female) or a Treatment group ($n = 530$; 39.2% female). Next, the 530 treated entrepreneurs were randomly matched with a unique mentor (38.2% female). This resulted in 35.8% of female entrepreneurs (in the treatment group) exogenously matched with a female mentor. We used a computer for the randomization process, so any differences across the groups are due to chance. Tables S1 and S2 in the online appendix show that the experimental groups are reasonably balanced on entrepreneur, business, and industry observables. We include these observables in our models, however, to improve estimate precision and account for any chance imbalances.

We partnered with a nongovernmental organization (Grow Movement) that recruited and approved the 530 mentors who participated in the study. Our partner did not look for mentors with a specific background but ultimately approved those with substantial business expertise; on average, the mentors had over 14 years of professional work experience. Also, the mentors were volunteers and based in more than 60 countries (most were “advanced economies”). Overall, from the viewpoint of our study entrepreneurs, the mentors tended to be highly experienced business professionals in aspirational positions. Table S3 in the online appendix provides details about the mentors' backgrounds, as well as additional balance checks.

The study's intervention phase started in August 2015. The mentoring was carried out virtually via Skype video

conferencing as well as other virtual productivity tools (e.g., WhatsApp, Google Docs, mobile calls). Collaborations lasted for, on average, two to six months, and mentors interacted with the entrepreneurs on a regular basis, sometimes multiple times per week. Grow Movement hired and made available in-country staff who facilitated and ensured introductions and regular meetings (but who otherwise did not intervene). Besides the requirement to meet regularly and help entrepreneurs grow their businesses, the mentors had the discretion to guide the project and interactions as they saw fit. Section 2 of the online appendix provides additional information on the intervention and mentor-mentee interactions.

We conducted a follow-up business audit and end-line survey in May 2017, almost two years after the intervention started. This time gap should allow enough time for potential performance gains to manifest. Independent auditors, supervised by a research manager from Innovations for Poverty Action (IPA), collected the follow-up data at each entrepreneur's business location. The survey questions closely mirrored those in the baseline survey, and the auditors collected the same financial data as in the baseline survey. Attrition rates were fairly low, and we were able to reach 79% of the 930 included entrepreneurs at end-line. Table S4 of the online appendix shows that attrition did not differ between the control group and the focal treatment groups (i.e., female entrepreneurs), and Figure S6 of the online appendix shows the makeup of our final sample ($n = 605$) used in the analysis. Finally, Section 3 of the online appendix presents in detail how the key outcome measures were collected and also describes our estimation methodology.

4. Main Effects: Breaking the Glass Ceiling

We examined if female entrepreneurs benefit more from female mentors (versus male mentors) using multiple measures of sales and profits—the typical metrics of business success and advancement in the context of small firms in developing economies (e.g., McKenzie 2020). We included two measures of firm sales: (i) Monthly Sales in Levels (a composite computed by taking the average of two individual “total sales last month” values, each winsorized at the first and 99th percentiles), and (ii) Monthly Sales in Logs (a composite computed by taking the average of the same two individual winsorized “total sales last month” values, each transformed using the inverse hyperbolic sine (IHS) function). Similarly, we used two measures of firm profits: (iii) Monthly Profits in Levels (a composite computed by taking the average of two individual “total profits last month” values, each winsorized at the first and 99th percentiles), and (iv) Monthly Profits in Logs (a composite computed by taking the average of the same two individual

winsorized “total profits last month” values, each transformed using the IHS function). We also combined these variables to construct measures of overall firm performance: (v) Monthly Sales and Profit Index 1 (computed by averaging the standardized z-score of the four individual sales measures and the four individual profit measures), and (vi) Monthly Sales and Profit Index 2 (computed by averaging the standardized z-score of the two composite sales measures and the two composite profit measures). Using a standardized index in this manner can help improve power (i.e., for noisy dependent variables that trend in the same direction) and better represent the overall outcome of interest (i.e., by capturing different dimensions of an overarching construct), as well as reduce the chances of multiple hypothesis testing (i.e., avoiding any cherry-picking or preferential selection of one dependent variable over others) (Campos et al. 2017, McKenzie 2017). In sum, we have six variables as outcome measures that serve as proxies for business success and advancement (see Section 3 in the online appendix for more details). Using these outcome measures, we estimated the intention-to-treat effects of a female entrepreneur being randomly assigned to either a female mentor (treatment 1) or a male mentor (treatment 2). Table 1 presents the results.

The impact of the mentoring intervention was not significant for sales, profits, or the aggregated indices of these measures when female entrepreneurs were matched with male mentors (see treatment 2 in Table 1). In contrast, the mentoring intervention had a statistically significant and positive impact on these measures when *female entrepreneurs were matched with female mentors* (see treatment 1 in Table 1). For example, compared with the control group, the monthly sales of female-led firms increased by 1,512,013 UGX (~\$414 USD in October 2017), or 32.4%, when mentored by female professionals. These female entrepreneurs also improved their monthly profits by 266,383 UGX (~\$73 USD), or 31.4%, relative to the control group.

Moreover, mentorship gender-matching resulted in a 0.21- to 0.23-standard deviation increase on the aggregated performance indices for female-led firms. These effects were not only significant relative to the control group but also when compared against the treatment group in which female entrepreneurs were matched with male mentors.⁴

Section 4 of the online appendix provides model-free evidence and several robustness checks pertaining to the main effect. For example, one potential explanation for the observed effect is that females are simply better mentors. However, as shown in Table S5 in the online appendix, female mentors did not generally outperform male mentors, ruling out this alternative explanation.

In summary, mentorship gender matching improves business success and advancement for women (but not men). It appears to be an effective policy tool for breaking

Table 1. Impact of Mentorship Gender Matching on Entrepreneurs' Firm Performance

	(1)	(2)	(3)	(4)	(5)	(6)
	Monthly sales		Monthly profits		Monthly sales and profits	
	(Levels: UGX)	(Logs: IHS)	(Levels: UGX)	(Logs: IHS)	(Index 1)	(Index 2)
Treatment 1: <i>Female Mentor</i> × <i>Female Entrepreneur</i> (yes = 1)	1,512.013*	0.220	266.383**	0.791**	0.208**	0.234**
	(912.326)	(0.153)	(117.960)	(0.321)	(0.089)	(0.095)
Treatment 2: <i>Male Mentor</i> × <i>Female Entrepreneur</i> (yes = 1)	320.261	0.140	8.524	0.169	0.052	0.057
	(601.250)	(0.136)	(108.560)	(0.352)	(0.078)	(0.085)
Treatment 3: <i>Male Mentor</i> × <i>Male Entrepreneur</i> (yes = 1)	2,220.802**	0.269**	191.949	0.131	0.162*	0.168*
	(1,030.098)	(0.123)	(181.911)	(0.214)	(0.094)	(0.099)
Treatment 4: <i>Female Mentor</i> × <i>Male Entrepreneur</i> (yes = 1)	1,251.029	0.153	63.002	−0.047	0.073	0.080
	(1,027.091)	(0.124)	(171.042)	(0.249)	(0.093)	(0.099)
<i>p</i> -Value from test of equality between treatments 1 and 2	0.216	0.589	0.040	0.062	0.085	0.068
<i>p</i> -Value from test of equality between treatments 3 and 4	0.419	0.410	0.528	0.499	0.406	0.437
<i>p</i> -Value from test of equality between treatments 1 and 3	0.581	0.804	0.721	0.087	0.712	0.623
<i>p</i> -Value from test of equality between treatments 1 and 4	0.847	0.729	0.316	0.040	0.282	0.251
<i>p</i> -Value from test of equality between treatments 2 and 3	0.128	0.489	0.400	0.927	0.375	0.404
Baseline value of dependent variable included	Yes	Yes	Yes	Yes	Yes	Yes
Mentor gender unknown condition control included	Yes	Yes	Yes	Yes	Yes	Yes
15 Business controls included	Yes	Yes	Yes	Yes	Yes	Yes
10 Entrepreneur controls included	Yes	Yes	Yes	Yes	Yes	Yes
10 Industry fixed effects included	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	605	605	605	605	605	605
<i>R</i> ²	0.367	0.455	0.296	0.143	0.371	0.361
Control group mean	4,662.5	8.292	848.98	6.279	0.000	0.000

Notes. The table summarizes analysis for the main effects (vs. the control group) of mentorship gender matching on the performance of female- and male-led firms (from baseline to endline). Values listed in levels represent Ugandan shillings (in thousands). Robust standard errors are in parentheses.

Statistically significant *p*-values are highlighted by * (10% significance level) and ** (5% significance level).

glass ceilings that many female entrepreneurs face in developing economies.

5. Mechanism Evidence

So why is it that female entrepreneurs benefit more from female mentors (than male mentors)? Although they do not test it formally, Carrell et al. (2010) speculate that gender differences in teaching styles (e.g., amount of feedback offered), engagement approaches (e.g., extent to which interactions are social), and tone of advice (e.g., degree of positive reinforcement and encouragement) may be the reason why female students perform better in quantitative courses when they have a female professor. Furthermore, as mentioned earlier, Dennehy and Dasgupta (2017) note that first-year female engineering students who were assigned a female (instead of a male) mentor reported experiencing greater self-efficacy, that is, enhanced beliefs in their capacity to execute behaviors necessary to produce specific performance objectives (Bandura 1977, 1997). Athey and Palikot (2022) also propose that mentoring can reinforce self-efficacy. These insights and predictions suggest that the female mentor-female mentee arrangements in our study may have been characterized by more positive engagement (compared with male mentor-female mentee ones). This, in

turn, may have influenced the self-efficacy of female entrepreneurs, resulting in the observed performance gains. We investigate these mechanism explanations next.

5.1. Positive Engagement

To shed at least some light on the notion that female mentor-female mentee arrangements were characterized by more positive engagement, we analyzed the written meeting summaries provided by mentors (see Section 5 of the online appendix for details). The words people use reflect who they are and the social relationships they are in. Also, people use language to translate their internal thoughts and emotions (Tausczik and Pennebaker 2010). Against this backdrop, we first used structural topic modeling (STM) to identify general topics emerging from the meeting summaries, as well as differences in the extent to which the two focal treatment groups (female entrepreneur and female or male mentor) focused on these topics.⁵ We then used Linguistic Inquiry and Word Count (LIWC-22) analysis to detect additional individual differences in the mentors' descriptions of their interactions with entrepreneurs.

For the STM, we removed stop words and names and employed stemming. We used the *stm* R package

developed by Roberts et al. (2017) and combined statistical measure results with researcher judgment to select $K = 5$ topics (Berger et al. 2020). Table 2 presents the five topics extracted, along with the frequent and exclusive (FREX) words, that is, the identifying words that distinguish topics. When paired with a female entrepreneur, female mentors (compared with male mentors) devoted significantly more text ($M_{\text{Female-Female}} = 23.6\%$ versus $M_{\text{Male-Female}} = 13.9\%$; $t = 2.29$, $p < 0.05$) to topic 5, which seems to capture *mentor and mentee engagement* based on the FREX words (e.g., call, email, write, schedule, phone). In contrast, when paired with a female entrepreneur, male mentors (compared with female mentors) devoted significantly more text ($M_{\text{Male-Female}} = 32.3\%$ versus $M_{\text{Female-Female}} = 20.9\%$; $t = 2.54$, $p < 0.05$) to topic 1, which appears to capture *customer profitability* (FREX words: client, profit, margin, increase).

Next, we analyzed the meeting summaries using LIWC-22. In an effort to avoid cherry-picking any LIWC categories, we started by examining the four prespecified standard LIWC summary measures: Analytical Thinking, Clout, Authenticity, and Emotional Tone (the resulting four scores are standardized scores converted to percentiles). When paired with a female entrepreneur, female mentors used significantly fewer words indicative of analytical thinking than male mentors ($M_{\text{Female-Female}} = 75.0$; $M_{\text{Male-Female}} = 81.4$; $t = -2.11$, $p < 0.05$). Language scoring lower in *analytical thinking* tends to be viewed as less cold and rigid, and friendlier and more personable (e.g., Jordan et al. 2019). In addition, when paired with a female entrepreneur, female mentors used significantly more words suggestive of *clout* than male mentors ($M_{\text{Female-Female}} = 68.5$, $M_{\text{Male-Female}} = 62.0$; $t = 1.77$, $p < 0.08$). Clout refers to the relative social

status, confidence, or leadership that people display through their writing (e.g., Kacewicz et al. 2014). There were no significant differences between the focal treatment groups in the remaining two summary measures, that is, *authenticity* and *emotional tone* (see Section 5 in the online appendix, where we also include the scores of the other two treatment groups on the four LIWC summary measures).

Given these results on the standard summary measures, we then considered several other individual LIWC-22 measures. In particular, we examined the following subcategories: (1) Personal Pronouns (e.g., she, we); (2) Social Referents (e.g., family, friends); (3) use of Big Words (percentage of words seven letters or longer); and (4) Money (e.g., price, pay).⁶ Female mentors used significantly more words that fall into the *personal pronouns* ($M_{\text{Female-Female}} = 7.26$, $M_{\text{Male-Female}} = 4.93$; $t = 3.26$, $p < 0.01$) and *social referents* ($M_{\text{Female-Female}} = 8.63$, $M_{\text{Male-Female}} = 6.34$; $t = 2.79$, $p < 0.01$) subcategories. In contrast, they used significantly fewer *big words* ($M_{\text{Female-Female}} = 27.18$, $M_{\text{Male-Female}} = 30.39$; $t = -1.81$, $p < 0.08$), as well as words that fall into the *money* subcategory ($M_{\text{Female-Female}} = 6.13$, $M_{\text{Male-Female}} = 7.86$; $t = -1.80$, $p < 0.08$) compared with their male counterparts. (Section 5 of the online appendix shows how the other two treatment groups scored on these four additional LIWC subcategories.)

Although speculative, these findings suggest that, compared with male mentors, female mentors may have had more positive engagement with the female entrepreneurs, focusing less on the bottom line and more on being supportive and encouraging. At the same time, and again compared with male mentors, the female mentors may have felt more confident in the advice they

Table 2. Insights from Linguistic Analysis (Topic Modeling)

	(1) Topic 1: <i>Customer Profitability</i>	(2) Topic 2: <i>Online Presence</i>	(3) Topic 3: <i>Company Strategy</i>	(4) Topic 4: <i>Retailing-related</i>	(5) Topic 5: <i>Mentor and Mentee Engagement</i>
FREX words	client profit margin increas level identifi templat term option	student page cloth creat salon organ websit locat produc	key object strategi target develop talk review ensur social	per school shoe supermarket sign suppli million food bank	call email photo write account schedul record min phone
Text devoted to topic by focal treatment group (female entrepreneur)					
Treatment 1 (<i>Female Mentor</i>)	20.86%	10.42%	28.95%	16.19%	23.64%**
Treatment 2 (<i>Male Mentor</i>)	32.26%**	10.96%	30.18%	12.69%	13.94%

Notes. The table shows that female mentors devoted significantly more (less) text to topic 5 (1) than male mentors when paired with a female entrepreneur. Treatment 1, *Female Mentor* \times *Female Entrepreneur*; treatment 2, *Male Mentor* \times *Female Entrepreneur*. FREX words are the words that are both frequent and exclusive, identifying words that distinguish topics. FREX words identifying a particular topic are in bold.

**5% significance level.

provided to the female mentors (given the clout measure results). Together, these differences may have resulted in higher-quality mentoring interactions that increased the female entrepreneurs' beliefs in their capacity to execute behaviors necessary to grow their business (i.e., self-efficacy), ultimately leading to the observed gains in firm performance.

5.2. Behaviors Necessary To Grow the Business

Although there are many different ways (i.e., behaviors) to grow a business, developing and improving customer relationships is consistently highlighted as one of the most obvious ways to do so, not just by academics (e.g., Gupta and Zeithaml 2006) but also practitioners (e.g., Wong 2019). To that end, we collected several measures that can proxy for a firm's enhanced relationships with customers: (1) Customer Closeness (i.e., a firm's practices related to building rapport and closer relationships, contacting a customer postpurchase, and understanding customer needs), (2) Customer Transactions (i.e., the total number of unique purchase instances completed by a firm per month), and (3) Customer Bundling (i.e., whether a firm's customers bought more than one item during a purchase instance). Section 6 of the online appendix describes these measures in detail. In addition, to address noisy measurement issues and limit multiple hypothesis testing, we also constructed an overall Customer Relationship index by averaging the standardized values of the three individual customer relationship

measures.⁷ We then reestimated the intention-to-treat effects of a female entrepreneur being randomly assigned to either a female mentor (treatment 1) or a male mentor (treatment 2) but used the customer relationship measures as the dependent variable. Table 3 presents the results.

Compared with the control group, female entrepreneurs who were matched with female mentors seemed to have significantly improved their relationships with customers. None of the other treatment conditions are positive and significant. These findings indicate female entrepreneurs started to develop better relationships with their customers after they were matched with a female mentor.

Extant literature suggests that better relationships between a firm and its customers should increase firm sales and profitability (e.g., Gupta and Zeithaml 2006, Kumar et al. 2008). Thus, in a next step, we examined the empirical link between the Customer Relationship index and firm performance. The general pattern of results indicates a positive and significant correlation between the Customer Relationship index and firm performance (see Table 4).

We also tested whether the Customer Relationship index mediates treatment 1's effect (*Female Mentors matched with Female Entrepreneurs*) on firm performance using Hayes' (2018) PROCESS model 4. The results further support this mechanism explanation. For example, the indirect effect of treatment 1 on the Monthly Sales and

Table 3. Impact of Mentorship Gender-Matching on Entrepreneurs' Customer Relationships

	(1) Customer Closeness	(2) Customer Transactions	(3) Customer Bundling	(4) Customer Relationship Index
Treatment 1: <i>Female Mentor</i> × <i>Female Entrepreneur</i> (yes = 1)	0.295* (0.160)	13.484** (6.233)	0.085* (0.048)	0.305*** (0.092)
Treatment 2: <i>Male Mentor</i> × <i>Female Entrepreneur</i> (yes = 1)	−0.114 (0.123)	7.832 (5.613)	0.039 (0.050)	0.072 (0.098)
Treatment 3: <i>Male Mentor</i> × <i>Male Entrepreneur</i> (yes = 1)	−0.147 (0.106)	−5.942 (4.661)	−0.057 (0.041)	−0.185** (0.076)
Treatment 4: <i>Female Mentor</i> × <i>Male Entrepreneur</i> (yes = 1)	0.056 (0.115)	5.155 (5.113)	−0.104** (0.048)	−0.061 (0.083)
<i>p</i> -Value from test of equality between treatment 1 and 2	0.015	0.386	0.349	0.028
<i>p</i> -Value from test of equality between treatment 3 and 4	0.120	0.040	0.386	0.190
<i>p</i> -Value from test of equality between treatment 1 and 3	0.023	0.013	0.026	0.000
<i>p</i> -Value from test of equality between treatment 1 and 4	0.226	0.293	0.005	0.003
<i>p</i> -Value from test of equality between treatment 2 and 3	0.840	0.058	0.141	0.039
Mentor gender unknown condition control included	Yes	Yes	Yes	Yes
15 Business controls included	Yes	Yes	Yes	Yes
10 Entrepreneur controls included	Yes	Yes	Yes	Yes
10 Industry fixed effects included	Yes	Yes	Yes	Yes
Sample size	641	605	605	605
<i>R</i> ²	0.064	0.201	0.153	0.172
Control group mean	1.122	56.667	0.867	−0.008

Notes. The table summarizes analysis for the main effects (vs. the control group) of mentorship gender matching on the customer relationships of female- and male-led firms. Robust standard errors are in parentheses.

Statistically significant *p*-values are highlighted by *(10% significance level), **(5% significance level), and ***(1% significance level).

Table 4. Correlation between Entrepreneurs' Customer Relationships and Firm Performance

	(1)	(2)	(3)	(4)	(5)	(6)
	Monthly sales		Monthly profits		Monthly sales and profits	
	(Levels: UGX)	(Logs: IHS)	(Levels: UGX)	(Logs: IHS)	(Index 1)	(Index 2)
Customer Relationship Index	1,003.229** (452.812)	0.254*** (0.068)	205.088** (84.216)	0.326** (0.139)	0.150*** (0.046)	0.159*** (0.048)
Treatment 1: <i>Female Mentor</i> × <i>Female Entrepreneur</i> (yes = 1)	1206.16 (919.864)	0.144 (0.154)	203.837* (121.032)	0.692** (0.319)	0.163* (0.089)	0.186* (0.095)
Treatment 2: <i>Male Mentor</i> × <i>Female Entrepreneur</i> (yes = 1)	247.643 (608.584)	0.123 (0.134)	−6.294 (109.723)	0.146 (0.352)	0.042 (0.078)	0.046 (0.085)
Treatment 3: <i>Male Mentor</i> × <i>Male Entrepreneur</i> (yes = 1)	2,405.492** (1,046.475)	0.314** (0.121)	229.836 (186.330)	0.191 (0.212)	0.190** (0.094)	0.197** (0.099)
Treatment 4: <i>Female Mentor</i> × <i>Male Entrepreneur</i> (yes = 1)	1,310.872 (1,030.171)	0.168 (0.123)	75.383 (171.501)	−0.028 (0.245)	0.082 (0.093)	0.089 (0.099)
Baseline value of dependent variable included	Yes	Yes	Yes	Yes	Yes	Yes
Mentor gender unknown condition control included	Yes	Yes	Yes	Yes	Yes	Yes
15 Business controls included	Yes	Yes	Yes	Yes	Yes	Yes
10 Entrepreneur controls included	Yes	Yes	Yes	Yes	Yes	Yes
10 Industry fixed effects included	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	605	605	605	605	605	605
R ²	0.372	0.470	0.304	0.151	0.383	0.373
Control group mean	4,662.5	8.292	848.98	6.279	0	0

Notes. The table summarizes analysis pertaining to the correlation between the customer relationship index and performance of female- and male-led firms. Values listed in levels represent Ugandan shillings (in thousands). Robust standard errors are in parentheses.

Statistically significant *p*-values are highlighted by * (10% significance level), ** (5% significance level), and *** (1% significance level).

Profits Index 2—through the Customer Relationship index—is positive and significant (i.e., $a \times b = 0.048$; 95% confidence interval based on 10,000 bootstrap samples = 0.012, 0.094).⁸ Of note is that the direct effect of treatment 1 on firm performance remains marginally significant ($p < 0.1$) when controlling for the Customer Relationship index. This suggests that, besides the improved customer relationships, the entrepreneurs improved their businesses in other ways as well. Indeed, if the mentoring enhanced the entrepreneurs' self-efficacy, one would expect there to be additional mechanisms at play.⁹

6. Heterogeneous Effects: Does Aspiration Matter?

Mentorship arrangements are believed to be more effective when the mentee aspires to reach the position or status of the mentor (e.g., Athey and Palikot 2022), suggesting the effects demonstrated earlier may vary based on an entrepreneur's level of aspiration. Consistent with this notion, Carrell et al. (2010) report that higher-achieving female students (i.e., those with top SAT math scores in high school) benefitted the most from having a female (as opposed to a male) college professor in quantitative courses. Thus, it may be that female entrepreneurs with higher (versus lower) aspirations also benefit significantly more from having a female mentor. We consider this aspect next.

As part of the baseline survey, the field auditors assessed all entrepreneurs in terms of their (1) aspiration

to achieve a high level of success, (2) understanding of business, and (3) seriousness to succeed in business (see Section 7 of the online appendix). We first created an aspiration composite for each entrepreneur by averaging their scores on these three individual measures. We then examined the interaction effect between aspiration levels and mentorship gender matching on firm performance. Table 5 reports these results.

As can be seen in Table 5, there is a consistently positive interaction effect between treatment 1 (female mentors matched with female entrepreneurs) and the aspiration composite. Most importantly, the interaction effect is positive and significant in models (5) and (6), that is, when examining impacts on the two sales and profits indices. Using the latter of these two indices (i.e., Monthly Sales and Profits Index 2), Figure 1 illustrates the interaction effect for female entrepreneurs at different levels of aspiration.

As Figure 1 shows, female entrepreneurs with (ex ante) higher aspiration levels benefitted significantly more from female mentors in terms of increasing their firms' performance. Overall, this pattern of results suggests that aspirational female entrepreneurs may be better targets for training programs aimed at stimulating business growth when such programs are led by female mentors. We note that our research design does not allow us to provide a process explanation for the observed interaction effect. Nonetheless, we speculate that female entrepreneurs with higher aspirations are

Table 5. Moderating Effect of Female Entrepreneurs' Aspiration

	(1)	(2)	(3)	(4)	(5)	(6)
	Monthly sales		Monthly profits		Monthly sales and profits	
	(Levels: UGX)	(Logs: IHS)	(Levels: UGX)	(Logs: IHS)	(Index 1)	(Index 2)
Treatment 1: <i>Female Mentor</i> × <i>Female Entrepreneur</i> (yes = 1)	1,688.717*	0.259*	291.322**	0.833**	0.232**	0.257***
	(956.918)	(0.147)	(122.003)	(0.327)	(0.090)	(0.096)
Treatment 2: <i>Male Mentor</i> × <i>Female Entrepreneur</i> (yes = 1)	344.758	0.146	15.143	0.177	0.056	0.061
	(604.676)	(0.137)	(110.422)	(0.355)	(0.079)	(0.086)
Treatment 3: <i>Male Mentor</i> × <i>Male Entrepreneur</i> (yes = 1)	2,228.74**	0.269**	198.109	0.141	0.165*	0.172*
	(1,039.497)	(0.124)	(181.918)	(0.216)	(0.094)	(0.100)
Treatment 4: <i>Female Mentor</i> × <i>Male Entrepreneur</i> (yes = 1)	1,278.074	0.158	68.578	−0.045	0.076	0.083
	(1,031.264)	(0.124)	(171.623)	(0.249)	(0.093)	(0.099)
Entrepreneur: Aspiration Composite	−248.006	−0.175	−152.930	−0.060	−0.062	−0.048
	(1,002.143)	(0.175)	(204.862)	(0.369)	(0.113)	(0.122)
Interaction: Treatment 1 × Aspiration Composite	2,957.611*	0.755**	441.773*	0.688	0.399**	0.387**
	(1,757.711)	(0.292)	(245.981)	(0.592)	(0.156)	(0.164)
Interaction: Treatment 2 × Aspiration Composite	−667.190	0.043	305.349	−0.289	0.008	−0.013
	(1,487.159)	(0.339)	(263.503)	(0.667)	(0.187)	(0.198)
Interaction: Treatment 3 × Aspiration Composite	1,009.114	0.114	473.873	0.562	0.198	0.200
	(2,031.941)	(0.278)	(337.240)	(0.416)	(0.185)	(0.197)
Interaction: Treatment 4 × Aspiration Composite	−3,569.603	−0.285	−242.235	−0.182	−0.228	−0.235
	(3,419.595)	(0.344)	(590.571)	(0.677)	(0.305)	(0.323)
Test of equality of treatments 1 and 2 (<i>p</i> -value)	0.181	0.431	0.030	0.049	0.054	0.044
Test of equality of treatments 3 and 4 (<i>p</i> -value)	0.429	0.432	0.526	0.481	0.407	0.436
Test of equality of interaction effects (treatments 1 and 2) (<i>p</i> -value)	0.038	0.072	0.521	0.217	0.041	0.046
Test of equality of interaction effects (treatments 3 and 4) (<i>p</i> -value)	0.235	0.308	0.266	0.270	0.204	0.220
Baseline value of dependent variable included	Yes	Yes	Yes	Yes	Yes	Yes
Gender unknown condition control included	Yes	Yes	Yes	Yes	Yes	Yes
15 Business controls included	Yes	Yes	Yes	Yes	Yes	Yes
10 Entrepreneur controls included	Yes	Yes	Yes	Yes	Yes	Yes
10 Industry fixed effects included	Yes	Yes	Yes	Yes	Yes	Yes
<i>R</i> ²	0.372	0.461	0.300	0.146	0.376	0.366
Sample size	605	605	605	605	605	605

Notes. The table summarizes the analysis for the main and interaction effects (based on the entrepreneur's aspiration) of mentorship gender matching on the performance of female- and male-led firms. Values listed in levels represent Ugandan shillings (in thousands). Robust standard errors are in parentheses.

Statistically significant *p*-values are highlighted by *(10% significance level), **(5% significance level), and ***(1% significance level).

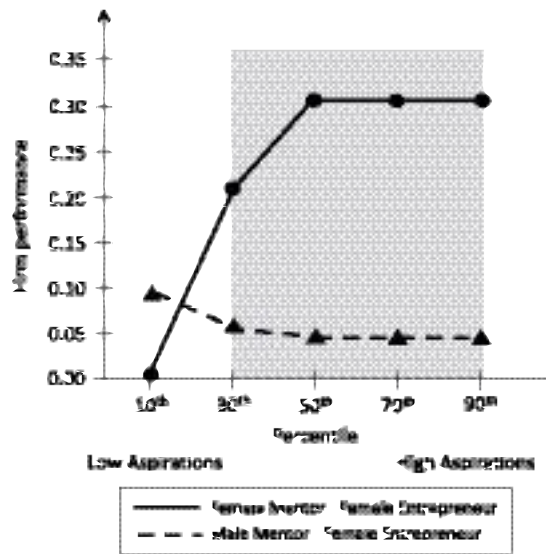
more attuned to female role models, which, in turn, helps them overcome the sticky stereotypes and gender-specific roles of entrepreneurs in developing countries (e.g., Card et al. 2022), thereby reinforcing their self-efficacy.

7. Conclusion

Governmental and nongovernmental organizations invest billions in business training programs to fight poverty in developing economies (e.g., Campos et al. 2017). Unfortunately, female entrepreneurs have been found to benefit less—or not at all—from these programs. Our study provides causal evidence in support of a potential new policy tool that can help overcome the pervasive barriers to business success and advancement faced by female entrepreneurs in developing economies. Indeed, *mentorship gender-matching* represents a solution

that can complement other corporate policies (e.g., board quotas (Bertrand et al. 2019)) in an effort to shatter glass ceilings across a range of contexts and countries. We hope designers of future training programs in developing economies consider our findings and, where possible, match female business professionals with female mentors. Doing so, we dare to predict, will result in more equitable and inclusive business growth.¹⁰ And where female mentors are not available, perhaps male mentors would be more effective as mentors of female entrepreneurs if they adopted a style characterized by more positive engagement (akin to the female mentors). Although our study design does not allow us to address this conjecture, we hope future research will explore this and related questions to improve the success and advancement of female business professionals in developing economies.

Figure 1. Aspirational Female Entrepreneurs Benefit More from Female Mentors



Notes. The figure shows the interaction effect between a female entrepreneurs' aspiration (ranging from low to high) and whether her mentor is female (solid line) or male (striped line). Considering firm performance (i.e., Monthly Sales and Profits Index 2; captured on the y axes), female entrepreneurs with higher aspiration levels (ex ante) benefitted significantly more from female (than male) mentors. The shaded area (30th percentile and above) indicates aspiration levels at which female entrepreneurs with female mentors performed significantly better than female entrepreneurs with male mentors. Results are very similar when considering the Monthly Sales and Profits Index 1 in the analysis.

Endnotes

¹ We construe the term glass ceiling broadly to represent all barriers faced by women in a business context, including during the process of building their businesses.

² We consulted the following World Bank website to determine the number of self-employed workers in developing countries: <https://data.worldbank.org/indicator/SL.EMP.SELF.ZS>.

³ Anderson et al. (2021) and Anderson et al. (2023) leverage data from the same project to study two other important, yet very different, research questions. Anderson et al. (2023) investigate the general effects of international coaching via virtual collaboration technology, whereas Anderson et al. (2021) examine the more specific effects of marketers in helping small firms grow. Critically, these studies *ignore the impact of gender* (both of the entrepreneur and the mentor) on business performance and entrepreneurial advancement. Moreover, neither of these studies investigates whether (and why) female entrepreneurs perform better when guided by a female (as opposed to a male) mentor, which is our key research question here.

⁴ Notably, the mentoring intervention also had a positive impact on Monthly Sales and the two Monthly Sales and Profits Indices when male entrepreneurs were matched with male mentors (see treatment 3 in Table 1). However, the tests of equality between treatments that included male entrepreneurs in Table 1 (i.e., treatments 3 and 4) indicate that mentor gender (i.e., male versus female) did not have a significant impact on male entrepreneurs ($p > 0.40$). The results therefore do not provide conclusive evidence that mentorship gender matching is beneficial for male business professionals.

⁵ We only considered the written summaries of the two focal treatment groups (where entrepreneurs were female) in the STM

analysis because considering the text from all treatment groups (i.e., including those where entrepreneurs were male) would create a different topic space and hence not allow us to identify topics unique to the two focal treatment groups. This issue would be exacerbated further considering that the *Male Mentor-Male Entrepreneur* group was the largest ($n = 191$; see Figure S6 in the online appendix).

⁶ We considered the personal pronouns category as the use of personal pronouns in text has been shown to reflect attentional allocation (e.g., Tausczik and Pennebaker 2010). We considered the social referents category as people who use a high level of these words are more socially connected with the respective other (e.g., Penner et al. 2005). We considered the Big Words category as people who use a high rate of big words tend to be psychologically distant and detached (e.g., Tausczik and Pennebaker 2010). Finally, we considered the money category based on the topic modeling findings that male mentors focused more on money and profitability. Averages reported capture the percentage of total words included in the written summaries that fall into the respective subcategory.

⁷ We recognize that, *individually*, each of the three customer relationship measures could have positive, negative, or null effects on a firm's overall sales and profits. For example, increasing customer closeness could lead to worse performance if their experiences were not good, and thus, regularly contacting them for feedback may raise the salience of criticisms or negative feelings. Likewise, increasing customer transactions or bundling may not necessarily result in greater sales (e.g., offering smaller package sizes such as a single-use pouch of shampoo rather than a larger bottle) or greater profits (e.g., if bundled goods represent lower margin items; McKenzie 2020). This is especially true in a developing country context where customers' income streams tend to be low (and uncertain), which, in turn, can influence their purchasing patterns in unexpected ways (e.g., Banerjee and Duflo 2011, p. 20). That said, *in totality*, we expect these three customer relationship measures to have a positive relationship with firm performance. Once a firm has built up its closeness to customers (and enhanced their loyalty), then increasing the number of transactions or bundling by these customers is most likely to be additive in ways that benefit the firm. For instance, if customers feel a closer connection to the entrepreneur-owner, then they may patronize the store more regularly while also spending more money during each visit—essentially devoting more “share of wallet” to the focal firm (versus other businesses) and driving its overall sales and profits. The index should allow us to capture this combined effect.

⁸ The indirect effect is positive and significant for all six firm performance measures used in this study.

⁹ We conducted several additional analyses to test alternative mechanism explanations. In particular, there is some descriptive work in developing economy contexts that suggests that having a mentor can provide entrepreneurs with access to finance and/or new networks (World Bank 2022). We estimated similar regressions as outlined in the section here but replaced the Customer Relationship index with variables that served as proxies for the alternative mechanism explanations (e.g., changes in an entrepreneur's access to loans). None of the focal variables were significant in these models. This is not to say that access to finance or networks are not important channels for entrepreneurs in developing economies. However, for our intervention and context, these alternative mechanism explanations were not supported by the evidence.

¹⁰ Our findings also contribute to the broader mentoring literature. For example, we provide evidence for the efficacy of having female mentors outside of the context of traditional education (e.g., Dennehy and Dasgupta 2017) or academic jobs (e.g., Ginther et al. 2020). Also, as mentioned earlier, Dennehy and Dasgupta (2017) speculate that mentor gender is less important after college. However, our

findings suggest otherwise, at least when considering an emerging market context. Moreover, past research (e.g., Ragins 1997, Ragins and Cotton 1999) has argued that male protégés with male mentors receive the most benefits from a mentoring relationship than any other gender combination. Our findings suggest that female protégés benefit just as much—or even more—from female mentors as male protégés benefit from male mentors (see tests of equality reported in Table 1 between treatment 1 and treatment 3).

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