Discrimination and Access to Capital: Experimental Evidence from Ethiopia [*]

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Capital is a key accelerator for business growth, yet woman-owned businesses have less access to capital than their male-owned counterparts. One explanation may be gender discrimination by credit providers. We study whether financial providers in Ethiopia discriminate against female applicants in a business plan competition. Using an audit study design, financial providers were recruited to evaluate businesses in which applicants' gender was randomly assigned. In a sample of over 3,600 evaluations, we find no evidence that financial providers considered the gender of the business owner when evaluating businesses for capital or predicting future business performance. Our tight confidence intervals exclude any meaningful gender differences in evaluations or beliefs of business performance. Measuring the businesses' survival and profit after 18 months, we find that gender was indeed not predictive of business success among applicants to the competition, suggesting that the lack of discrimination was consistent with financial providers' accurate beliefs and targeting capital towards high performing businesses. We discuss how standard policies that increase female access to capital, through prioritizing female businesses and quotas, affects equity and targeting of capital allocation decisions.

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1 Introduction

Capital is a key accelerator for entrepreneurship, business growth, and productivity (Blattman, Fiala and Martinez, 2014). Yet, female entrepreneurs in developing countries are less likely to obtain formal financing and earn lower profits (The World Bank Group, 2019; Hardy and Kagy, 2020). One explanation may be gender discrimination by credit providers. Observable differences between men and women entrepreneurs explain only a small portion of the earnings differential, suggesting gender discrimination may be an important, yet understudied, factor inhibiting the success of female entrepreneurship (Buvinić, 2018). If loan officers and other funding sources discriminate in their evaluation of female-owned businesses, this may reduce female entrepreneurs' ability to obtain capital, which would in turn reduce the performance of female-owned businesses.

In addition to equity considerations, the use of gender in capital allocation decisions may have implications for profit maximization. If financial providers believe that business performance differs by gender, they may use gender as a proxy for identifying high-performing businesses. This highlights that the consequence of discrimination on potential misallocation of capital depends on the relationship between gender discrimination and whether gender is an accurate predictor for business success.

Our study asks whether financial providers discriminate, if this is aligned with providers' beliefs about differences in business performance by gender (i.e., statistical discrimination), and whether those beliefs are accurate (i.e., inaccurate versus accurate statistical discrimination). We find that there is no evidence for discrimination, that this is consistent with financial providers' beliefs, and that those beliefs were indeed accurate.

We use an audit study design to causally identify whether financial providers discriminate against female entrepreneurs. We recruited 84 financial providers, spanning ten different financial institutions, to serve as judges to evaluate 916 real businesses that applied to a business plan competition in Ethiopia. On the application forms given to the financial provider to evaluate, the gender of the business owner was randomly assigned to be shown

as either male or female. Each business was evaluated multiple times, and each financial provider evaluated multiple businesses.

We find no evidence that financial providers discriminated against businesses that were randomly shown as female-owned. Financial providers' evaluation scores, which determined the awarding of capital in the competition, did not differ by the randomly assigned gender of the business-owner. Similarly, when given the opportunity to forward the application for consideration at their own financial institution, financial providers were equally likely to recommend female-owned businesses. Our sample size of over 3,600 evaluations allows us to obtain tight standard errors and rule out any meaningful differences in these capital allocation decisions by gender.

Consistent with the lack of gender discrimination in these capital allocation decisions, we find that financial providers expected similar future business performance (e.g., future profits) for both genders in an incentivized belief elicitation. This highlights that the lack of gender discrimination is consistent with their beliefs of similar business performance of the male and female business owners in our sample.

We also do not find evidence that the gender of the business owner is predictive of business performance in our sample. In a follow-up survey of competition applicants, we find that business survival and profits did not statistically differ by the true gender of the business owner. Thus, the beliefs of financial providers on gender gaps in future business performance were accurate. Our results suggest that financial providers' lack of discrimination is an efficient response for targeting capital towards high performing businesses and is consistent with accurate belief-based behavior.

Our audit study design has several key features that bolster its internal and external validity. First, by using real businesses, we accurately capture the distribution of characteristics of businesses that apply for capital. Second, the competition is judged by experts that are regularly involved in determining capital allocation decisions through loans in the financial industry. Third, we incentivize the capital allocation decisions and belief elicita-

tion of future business performance predictions by these financial provider experts. Fourth, each business application is evaluated multiple times and each financial provider evaluates multiple businesses. This allows us to identify the effect of discrimination using fixed effects for each business and each individual financial provider, ensuring that the type of business or financial provider does not drive our results. Finally, we connect the results of the audit study with a follow-up survey of the businesses. This allows us to connect financial providers' behaviors and beliefs with respect to gender with actual gender differences in business performance.

Our study builds on a significant literature exploring gender gaps in capital access. For example, in Ethiopia, male managers are more likely to take out loans, and tend to borrow significantly more than female managers (The World Bank Group, 2019). Though gender gaps in financial access have been documented in many contexts, understanding what drives such gender gaps is difficult to disentangle. In particular, it is difficult to distinguish discrimination from differences in demand or supply decisions based on correlates of gender (e.g., less collateral, lower profits).

Indeed, among low and middle income countries, we are aware of only two previous papers that aim to identify the role of discrimination in explaining gender gaps in credit markets, both in Turkey.[1] Using lab-in-the-field experiments, they find evidence of discrimination on the intensive margin of capital (Alibhai et al., 2019) and on stricter conditions when providing credit (Brock and De Haas, 2019). The former does not test for discrimination on the extensive margin, and the latter does not find evidence of discrimination affecting the extensive margin; both suggest a form of implicit discrimination as the underlying mechanism. Consistent with Brock and De Haas (2019), we find no discrimination on the extensive margin of capital allocation decisions.

We build on these two studies by rigorously testing for discrimination in a high-stakes

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[1] A related literature explores credit decisions when clients and loan officers share traits, which suggests that discrimination may be an underlying phenomenon (Fisman, Paravisini and Vig, 2017; Beck, Behr and Madestam, 2017).

context: a business plan competition with large prizes from Ethiopia's flagship agency for entrepreneurship promotion. We observe real capital allocation decisions and compare them to financial providers' underlying beliefs, measured using an incentive compatible elicitation. Finally, we provide a novel contribution by studying the efficiency implications of these decisions, based on actual business performance 18 months after the competition.

We also contribute to a growing, but limited, literature on gender discrimination in low-income countries. There is a significant literature documenting gender gaps in a wide variety of outcomes in low-income countries (see Duflo (2012) and Jayachandran (2015) for a review). However, gender discrimination has been studied in particular contexts such as early childhood investments (Jayachandran and Kuziemko, 2011; Bharadwaj and Ladakhawala, 2013) and political leadership (Beaman and Topalova, 2009), but evidence is more limited in labor market and employment settings. And while there is a large literature on labor market discrimination in high-income countries (Bertrand and Duflo, 2017), in previous work in Ethiopia, we show that the patterns of gender discrimination in low-income country labor markets may be quite different from high-income countries (Ayalew and Sheth, 2021). We further contribute to this larger discrimination literature by showing that capital allocation decisions are consistent with beliefs of expectations of business performance by gender. Relatively few papers on discrimination distinguish between taste-based and belief-based (i.e., statistical) discrimination, particularly in developing countries (Guryan and Charles, 2013; Ayalew and Sheth, 2021).

The rest of the paper proceeds as follows. Section 2 provides details of the context in which we implement our study. In Section 3 we review the methodology used for analysis, and 4 presents our findings. Section 5 discusses implications for policies that promote increased female access to capital and concludes.

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2   Context

Ethiopia generally performs poorly on global indicators of gender equality. For example, in the World Economic Forum's 2016 Global Gender Gap Report, Ethiopia ranked 109 of 144. This low rank was driven by their rank on sub-indices related to education and labor market outcomes: they ranked 106 on economic participation and opportunity and 132 on educational attainment. The majority of women in the labor force are entrepreneurs, highlighting the importance of concerns in gender gaps in capital and business performance. There is an increasing policy response and acknowledgement of these gender gaps – for example, Ethiopia has a financial inclusion policy that specifically targets gender gaps and many lending institutions are encouraged to lend to female clients.

The Entrepreneurship Development Center (EDC) is the key agency tasked by the government of Ethiopia to increase entrepreneurship and economic growth, with specific attention to the needs of women entrepreneurs. A key element of EDC's mission is to improve access to finance.

We partnered with EDC to launch a business plan competition, EthioSpur, to provide capital and other awards to promising businesses and study gender discrimination by financial providers. Business plan competitions are an increasingly common method to stimulate entrepreneurial growth in developing countries. During the time of our own competition, we were aware of two other business plan competitions in Ethiopia itself.

EthioSpur targeted existing entrepreneurs to help support firm growth. The eligibility criteria were: (i) applicant was the majority owner of an existing business in Ethiopia; (ii) the business was operational for at least four months prior to the competition; and (iii) an idea to expand or scale the business.[2] The competition's prizes were 300,000 ETB, 220,000 ETB, and 140,000 ETB for the top three businesses. In addition, the top 20 businesses were awarded with media and marketing coverage, and the top 100 were awarded with a "fast

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[2]Businesses were not required to have a license at the time of the application, but were informed that they would be required to get a business licence to receive any prizes.

track to credit."

2.1 Application

The application was designed to reflect the criteria used by financial providers when making capital lending decisions. The application was developed after interviewing different financial providers from nine different financial institutions on the criteria they used when evaluating businesses, and based on loan application forms, including the World Bank's WEDP loan application form. To ensure the application was widely accessible, the competition was promoted on a national level via social media, SMS, and targeted outreach by EDC staff. The application was designed to be simple and available in multiple languages. EDC also provided assistance in completing the application to a subset of entrepreneurs that had previously used their services. To ensure that applicants were truthful, they were informed that all information would be audited and verified for winning businesses. If a business was found to be false or misleading, they would not only be disqualified from the competition, but also from all future EDC initiatives.

2.2 Evaluation

The competition was judged by financial providers recruited from lending institutions (i.e., banks and MFIs). Institutions were asked to provide five experts that met the following criteria: (i) involved in reviewing applications seeking capital from the institution, with specific attention to urban clients, capital for business purposes, and individual applicants or enterprises (i.e., not applicants that are socially collaterlized); (ii) employed as a loan officer or a member of the loan approval committee; and (iii) employed for at least one year at the institution. The recruited judges underwent an orientation and received a packet of applications to evaluate that was expected to be completed in approximately two weeks. The orientation and evaluation were generally done over the phone or internet due to the COVID-19 pandemic. Judges were compensated 2,500 ETB for their time upon completion

of their evaluations. All applications were digitized to create the packets of applications that were given to the judges.The applications were presented to the judges in English, with the exception of the detailed business plan narrative, which was presented in either English or Amharic, the most prevalant local language in Ethiopia.

The evaluation form was divided into four sections (see Figure 1). Section A asks the judge to confirm basic demographics of the applicant: ID, age, gender, total years of experience, and whether the applicant was also employed outside of the proposed business. Judges were informed that this section was used to verify that the correct application was being reviewed. We used this section to ensure that the judge was aware of the randomly assigned gender of the business-owner, and as a check that the judge was paying attention to the information in the application.

Section B asked the judge to provide a prediction of the business' performance in January 2021, exactly one year after the submission of applications. They were asked to provide these predictions if the business did or did not win the competition prize. The judges predicted the likelihood of survival, monthly profit, capital stock, and number of paid employees. They were also asked about the likelihood of repayment for a 3-year loan for 100,000 ETB, and to better understand the impact of the COVID-19 pandemic, the whether operational hours increased or decreased relative to January 2020. This section was incentivized for accuracy. The judges were informed that the person with the most accurate evaluations for Section B would receive 15,000 ETB.[3] They were also informed that their responses in this section would have no bearing on the awarding of the capital from the competition.

Section C collected addition information about the judge's beliefs about the business owner. They were asked to evaluate the business owner's managerial skills, sources and amount of capital for the business, market demand for the business, and whether the business was the primary source of income for the household. This section was not incentivized, and was designed to shed light on potential beliefs that did not affect business performance, but

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[3]The recruited judges were not informed of the exact way that accuracy would be determined. They were simply told "the judge who provides the most accurate evaluations" will receive the bonus.

Confidential Evaluation of Applicant
Date of evaluation (DD/MM): _____   Judge ID: _____

Section A: Application Verification (*For verification purposes only*)

Application ID:
Applicant's age: ☐ 18-25   ☐ 26-35   ☐ 36-45   ☐ 46-55   ☐ above 55   ☐ Information is missing
Applicant's gender: ☐ Male   ☐ Female   ☐ Information is missing
Applicant's total years of experience: ☐ 0-4   ☐ 5-9   ☐ 10-19   ☐ 20 or more   ☐ Information is missing
Applicant employed outside of the proposed business: ☐ Yes   ☐ No   ☐ Information is missing

Section B: Understanding Business Growth (*For determining judge bonus only*)
*Suppose that the applicant receives **no capital** from the competition:*

What is the probability that this business will be operational in January 2021: ☐ 0-10% ☐ 11–20% ☐ 21–30% ☐ 31–40% ☐ 41-50% ☐ 51-60% ☐ 61-70% ☐ 71–80% ☐ 81-90% ☐ 91-100%
Assuming that the business is operational in January 2021, provide your best estimate of:
The number of operational hours in January 2021 will be: ☐ Less than in January 2020   ☐ Similar to January 2020   ☐ Greater than January 2020
The value of the business' capital stock in January 2021:   Birr
The monthly profits or losses of the business in January 2021 (*Only one should be filled*).   *Monthly Profit:* _____ Birr *Monthly Loss:* _____ Birr
The number of paid employees (excluding the owner) in January 2021:

*Suppose the applicant receives **300,000 ETB** from the competition:*

What is the probability that this business will be operational in January 2021: ☐ 0-10% ☐ 11–20% ☐ 21–30% ☐ 31–40% ☐ 41-50% ☐ 51-60% ☐ 61-70% ☐ 71–80% ☐ 81-90% ☐ 91-100%
Assuming that the business is operational in January 2021, provide your best estimate of:
The number of operational hours in January 2021 will be: ☐ Less than in January 2020   ☐ Similar to January 2020   ☐ Greater than January 2020
The value of the business' capital stock in January 2021:   Birr
The monthly profits or losses of the business in January 2021 (*Only one should be filled*).   *Monthly Profit:* _____ Birr *Monthly Loss:* _____ Birr
The number of paid employees (excluding the owner) in January 2021:

*If the applicant was instead given a **3-year 100,000 ETB loan**, which of the following do you believe is most likely?*
☐ Applicant will repay the loan: Applicant will have enough financial resources and will repay.
☐ Applicant will strategically default: Applicant will have enough financial resources, but will still not repay.
☐ Applicant must default: Applicant will not have enough financial resources to repay the loan.

Section C: Reviewing the Applicant

Rate applicant's managerial skills: ☐ very poor   ☐ poor   ☐ acceptable   ☐ good   ☐ excellent
Which do you expect that the applicant can access to cover shortfalls in demand? *Check all that apply.* ☐   Personal savings/assets   Gifts/Loans from family or friends   ☐   Business loans from microfinance B   Busness loans from bank   Government assistance
Estimate the total amount of additional capital the applicant can secure (from all sources):   Birr
Applicant's business is most likely the primary source of income for the applicant's household?   ☐ Yes   ☐ No
Rate market demand of applicant's business: ☐ very low   ☐ low   ☐ medium   ☐ high   ☐ very high

Section D: Determination of winner Overall impression will be half the final score, and value proposition and entrepreneurial credibility will be the other half of the final score. ***This final score is the only measure that determines the competition winners.***
Final Score = Overall Impression + ½ *Value Proposition + ½ *Entrepreneurial Credibility.

OVERALL IMPRESSION:	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10
VALUE PROPOSITION:	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10
ENTREPRENEURIAL CREDIBILITY:	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10

<u>*Internal*</u>: Should applicant's information be sent to your institution for loan consideration?   ☐ Yes   ☐ No

Figure 1: Evaluation Form

could be influenced by gender and affect an evaluation of a business.

Section D was the judge's overall score for the business and was used to determine the competition's prizes. The judges were asked to score the business on overall impression, value proposition, and entrepreneurial credibility with a range of 1 to 10 each. This was then calculated as a final score using the following formula: $FinalScore = OverallImpression + .5 * (ValueProposition + EntrepreneurialCredibility)$. Importantly, the financial providers were informed that this was the *only* measure that would determine the competition's winners.

The financial providers were also asked whether they wanted the applicant's information to be sent to their institution for consideration for a loan. It may be the case that judges make different decisions about capital that is not sourced from their own employer or lending institution. Therefore, we included this question as a proxy for capital allocation decisions from the provider's own lending institution.

Our main outcomes of interest for capital decisions are the judge's final score from Section D, and whether they requested the application's information be sent to the institution for consideration for a loan.

3   Methodology

3.1   Identifying Discrimination

We use an audit study design to identify the causal effect of gender discrimination on capital allocation decisions. The competition judges, who were financial providers in Ethiopia, were given packets of applications in which the gender of the applicant was randomly assigned.

The randomization was done as follows. We created four sets of application forms from the 916 applicants (i.e., we created copies of each applicant to generate four application forms corresponding to each applicant). Each applicant was depicted as male in two of the sets and female in the remaining sets. The set in which the applicant was depicted as male

was randomly determined. We then randomly ordered the application forms in each given set, such that we had a list of 3,664 application forms in random order. We then assigned 48 application forms to each judge in order (i.e. Judge 1 was given 1 to 48, Judge 2 was given 49-97, etc.). We refer to the application forms assigned to a judge as their "application packet." The random ordering of applicants within each set of application forms ensured that the same applicant was unlikely to be assigned more than once to the same judge. However, if it was the case that an applicant was assigned to the same judge twice, we simply dropped one of the application forms before providing the packet to the judge. Thus, each judge was given 48 application forms to review and each applicant was reviewed four times.[4]

Because of this random ordering of application forms, our causal identification is valid even if assignment is incomplete (i.e., not all packets are given to a judge) or there is attrition (i.e., judges do not complete the application forms assigned to them). This flexibility also allowed us to rerandomize based on ongoing financial provider recruitment. Specifically, our initial randomization (as described above) was based on a sample of 75 judges. To accommodate judges who were recruited after the first 75, we randomly selected 490 applicants and repeated the random assignment process using sets of two application forms for each applicant (rather than four), and judge packets containing 49 applications (rather than 48).

Not all judges completed the review of all applicants. If a judge did not complete an entire packet, we generally reassigned it to another judge. In some instances, a packet was reassigned, but the original judge did eventually complete their evaluations. This would only affect our causal interpretation if non-completion was a function of the gender shown on the application form. Since we reassigned an entire application packet (not individual applications), this is unlikely. We confirm that non-completion was uncorrelated with the gender shown on the application form.

In practice, each judge's application packet was divided into four different segments, where the application forms in each segment were randomly assigned. This was meant to

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[4]We also make use of a pilot round in which applicants were reviewed up to 6 times, and judges were given 55 application forms to review; and a re-randomization to accommodate recruitment of additional judges.

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make the review more manageable and to signal to judges to not rush through all of them at one time. We had expected that subsequent segments would be provided only after initial segments were completed. However, due to COVID-related contact restrictions, this became unsustainable, and towards the end of the evaluation period, all application forms were provided to the judge at one time. However, they were still provided in four different segments. In general, some judges did not complete all of the segments assigned to them. .

Due to COVID-19, there was a delay between the submission deadline to the competition and the evaluation process, and the evaluation process itself took longer than planned. The competition closed on January 20, 2020, and evaluations were conducted from September 2020 to December 2020 [5]. Thus, judges were aware of COVID when they scored the applications and predicted business success. Judges benefited from the delay because they had more contextual information to predict business performance in January 2021, given information on past business performance in January 2020.

We limit our primary analysis sample to evaluations in which judges completed all our pre-specified primary and secondary outcomes.[6] Our primary analysis sample consists of 3,696 completed evaluations of 915 businesses by 84 financial providers. In this sample, 910 businesses were evaluated by multiple (2 to 8) financial providers, and 83 financial providers reviewed multiple applicants (2 to 79). 82 of these financial providers had variation in the gender of the applications they reviewed.

We estimate whether capital allocation decisions differ when the business owner was randomly assigned as male using the following estimating equation:

$$Y_{ij} = \alpha_0 + \beta_1 * RandomlyAssignedMale_{ij} + \alpha_i + \alpha_j + \epsilon_{ij} \qquad (1)$$

where $RandomlyAssignedMale$ indicates that applicant i assigned to judge j was shown

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as a male. The specification includes applicant and judge fixed effects and uses robust standard errors. We study two primary outcomes that reflect capital allocation decisions. The first outcome is the overall final score given to the application that determined the winners of the business plan competition. The second outcome is an indicator for whether the judge selected the business application to be forwarded to their institution for consideration of a loan. We also estimate Eq 1 on a pre-specified set of judge predictions of business performance: survival, profits, assets, and employment, one year after the competition, with and without receiving additional capital.

3.2 Measuring Business Performance and Implications for Discrimination

We implement an endline survey on the businesses' performance from June to August, 2021, 18 months after the close of the competition and 6 months after the completion of the evaluations. We conducted three rounds of the survey to capture monthly profits and survival (i.e., whether the business was operational at the time of the survey). In the initial survey, we also asked additional questions that reflect business performance (e.g., number of employees, capital assets), perceptions of gender discrimination, experience with theorized gender-specific constraints, and response to shocks, including experience and response to COVID-19.

We use the survey to test how well financial providers targeted the best performing businesses, and whether a business owner's gender is a predictive factor in the performance of a business.

We first estimate whether there are gender differences in business performance:

$$\bar{Y}_i = \beta_0 + \beta_1 * TrueMale_i + \epsilon_i \tag{2}$$

where $\bar{Y}_i$ is the average response from the three surveys on whether the business is oper-

ational or the inverse hyperbolic sine of the businesses' profits. This provides an estimate of whether being a male-business owner is predictive of successful business performance.

We then explore if any such gender difference remains even after we control for the factors that were observed by the financial providers during their evaluations by comparing estimations from the following two equations.

$$\bar{Y}_i = \beta_0 + \delta * \mathbf{X}_i + \epsilon_i \tag{3}$$

$$\bar{Y}_i = \beta_0 + \beta_1 * TrueMale_i + \delta * \mathbf{X}_i + \epsilon_i \tag{4}$$

where X is either the mean final score provided by the evaluating financial providers, or a vector of quantifiable characteristics shown to the financial providers when they evaluated the business. This comparison informs whether being a male-business owner predicts business performance above and beyond the assessment of the financial providers or the baseline business information given to the judges. In other words, once we account for business characteristics, do businesses run by male owners have a different expected survival rate and profits?

If we observe that a business owner's gender continues to predict business performance beyond baseline characteristics, then this suggests that gender information may increase the efficiency of targeting capital towards high performing businesses, though at a cost to equity. However, if gender is not predictive, then financial providers would not benefit from incorporating gender into their capital allocation decisions, and gender is not a proxy for improving capital allocation. Financial providers' assessments and decisions would be based on business success with the provided capital. As the businesses in our sample did not actually receive capital, we assume that strong business performance without additional capital is a proxy for businesses' performance with capital. We confirm this assumption by showing that the predictions for business success without capital are a valid proxy for

Table 1: Causal Effect of Gender on Capital Allocation Decisions

	(1) Score	(2) Loan
Assigned Male	-0.105	0.000893
	(0.116)	(0.0140)
Observations	3696	3696
Assigned Female Mean	12.06	0.495

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Specifications include judge and application fixed effects. Robust standard errors in parentheses.

predictions for business success with capital.

4 Results

4.1 Audit Study: Identifying Discrimination

We find no evidence that financial providers discriminate against female applicants when deciding how to allocate capital. Table 1, Column 1 finds that the final score, which was used to determine who would be awarded the capital, is not statistically different whether the applicant was shown as male or female. In fact, when applicants were shown as male, they received slightly lower scores. The point estimate for the difference in scores is 0.105 points (on a scale from 0 to 20), which amounts to a difference of less than .03 standard deviations. The 95 percent confidence interval for the differences in scores is similarly very small (-.337 to .127), a range of merely -.07 to .03 standard deviations. Figure 2 displays the cumulative distribution functions of scores for applicants shown as male versus female. The figure highlights that throughout the distribution (i.e., the quality of businesses), randomly assigned gender had no meaningful effect on the evaluation of the businesses for the competition. These results suggest that financial providers did not discriminate by applicant gender in the allocation of capital in the business plan competition.

We also find that financial providers did not discriminate when making decisions about
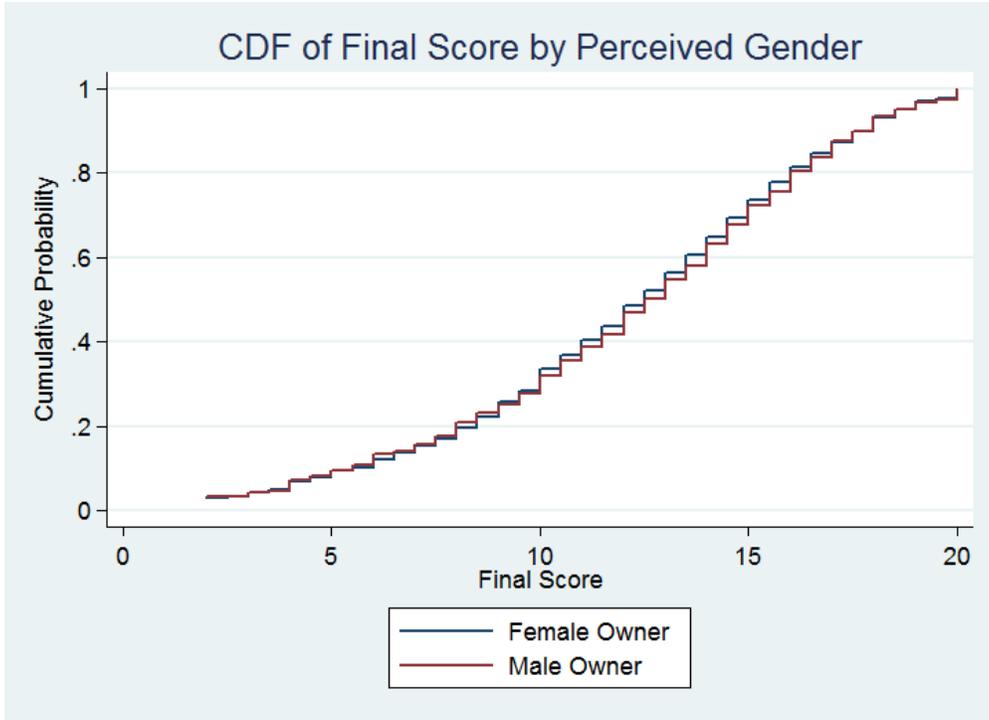
Figure 2: CDF of Final Score by Perceived Gender

their own institution's capital. Randomly assigned gender did not affect loan officers' decision to consider the applicant for a loan at their own institution (see Table 1, Column 2). That is, loan officers were equally likely to recommend businesses in which the owner was randomly assigned as female as those that were randomly assigned as male. The point estimate on the difference in recommendation is .09 percentage points. The 95 percent confidence interval allows us to rule out a difference of more than 3 percentage points.

Consistent with the lack of a difference in capital allocation decisions, financial providers also predict similar business performance for applicants shown as male or female. As described in Section 2.2, financial providers were asked to predict business performance one year after the application submission. There were no significant differences by the randomly assigned gender in predictions of business success under the conditions of the business being provided capital. Table 2 finds no difference in profit (Column 1), survival likelihood (Column 2), assets (Column 3), or the number of employees (Column 4). This lack of difference in expected business performance remains true even for predictions without additional capi-

Table 2: Effect of Gender on Business Performance Expectations (with additional capital)

	(1) Profit	(2) Survival	(3) Assets	(4) Jobs
Assigned Male	-962.1	-0.0339	-962.8	162.0
	(911.4)	(0.666)	(865.1)	(205.3)
Observations	3696	3696	3696	3696
Assigned Female Mean	709.2	60.08	2187.5	878.0

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Profit and Assets are reported in thousands of Birr. Jobs are windsorized at the 99th percentile. Specifications include judge and application fixed effects. Robust standard errors in parentheses.

Table 3: Effect of Gender on Business Performance Expectations (with no additional capital)

	(1) Profit	(2) Survival	(3) Assets	(4) Jobs
Assigned Male	-24.26	-0.0944	-380.1	87.85**
	(74.49)	(0.636)	(497.4)	(43.00)
Observations	3696	3696	3696	3696
Assigned Female Mean	43.26	50.47	1261.1	219.2

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Profit and Assets are reported in thousands of Birr. Jobs are windsorized at the 99th percentile. Specifications include judge and application fixed effects. Robust standard errors in parentheses.

tal (see Table 3). This suggests that financial providers did not expect gender differences in a business' growth potential after receiving a capital infusion.

These findings highlight that the lack of discrimination found in the allocation of capital is consistent with judge predictions for business performance. Indeed, Tables ?? and ?? confirm that predicted business performance is significantly correlated with the final score and loan consideration, in the expected direction. All but one of the aspects (assets with capital) are statistically significant in predicting the final score and consideration for a loan. Whether with or without additional capital, judges predicted that business performance would not be different based on the gender of the business owner.

We provide several pieces of evidence that the financial providers were attentive and

Table 4: Baseline Business Characteristics Predictive of Capital Allocation Decisions

	(1) Score	(2) Loan
Profits (IHS)	0.136***	0.0103***
	(0.0201)	(0.00173)
Employees	0.000141	0.0000564**
	(0.000359)	(0.0000268)
Assets (IHS)	0.254***	0.0188***
	(0.0258)	(0.00255)
Liabilities (IHS)	-0.0107	-0.000354
	(0.0116)	(0.00134)
Initial Yr	0.0197*	0.00116
	(0.0114)	(0.00102)
Projected Employees	0.00313**	-0.0000300
	(0.00143)	(0.000105)
Projected Revenue (IHS)	0.224***	0.0137***
	(0.0290)	(0.00299)
Industry Exp.	0.0136	0.00248
	(0.0155)	(0.00187)
Observations	3696	3696
F	40.61	28.36
pvalue	4.28e-57	6.71e-35
Adjusted R-squared	.41	.34

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each independent variable is interacted with an indicator for the variable being missing, which is not shown. All independent variables are information reported by the applicant and viewed by the judge. Specifications include judge fixed effects, and standard errors are clustered by application.

thorough when evaluating businesses. First, though randomly assigned gender did not affect evaluations, we find that financial providers did consider other aspects of the business when evaluating the applicant. Table 4, shows that businesses with higher profits, greater assets, and business plans that projected greater employees and revenue were more likely to receive higher scores and be recommended for loan consideration. Evaluation outcomes are strongly predicted by baseline business information indicating that judges reviewed the businesses with effort and attention.

Second, evaluations were internally consistent in several ways. Judges predicted busi-

Table 5: Final Score Correlates with Business Performance Expectation

	(1) Profit	(2) Survival	(3) Assets	(4) Jobs
Score	22.73**	2.529***	116.5	-6.816
	(9.233)	(0.344)	(71.29)	(11.23)
Constant	-220.0**	20.38***	-6.312	343.8
	(106.7)	(4.714)	(767.9)	(277.0)
Observations	3696	3696	3696	3696

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Profit and Assets are reported in thousands of Birr. Jobs are windsorized at the 99th percentile. Judge clustered standard errors in parentheses.

nesses would have better performance with capital than without in the vast majority of evaluations. In 92 percent of evaluations, judges predicted that the business would be as or more likely to be operational in a year with capital than without capital. We observe similarly high percentages of internally consistent evaluations with and without capital for projected number of employees (93 percent), capital stock (93 percent), and profits (84 percent).

Third, businesses with stronger predicted performance were more likely to be awarded capital (i.e., received higher scores and be considered for a loan). Table 5 finds that judges provided higher scores to businesses that they expected to have higher profits and a greater likelihood of survival. Similarly, Table 6 finds the same relationship between loan consideration and expected profits and survival. Column 3 also shows that a judge was more likely to consider a business for a loan when they expected that business to have greater assets, an important consideration for collateral and loan contracts.

Finally, our results are not driven by a handful of judges with small differences in evaluations. Judges had significant variation within their own evaluations. The average range of scores used by a judge in their evaluations is 13.8, and the average standard deviation for final scores within a given judge is 3. Judges recommended 50 percent of their businesses for loan consideration, on average, and all judges except five recommended at least one business for the loan consideration. None of the judges recommended all of the businesses they

Table 6: Loan Consideration Correlates with Business Performance Expectation

	(1) Profit	(2) Survival	(3) Assets	(4) Jobs
Loan	164.7**	14.58***	897.0*	368.1
	(64.39)	(2.283)	(507.8)	(249.0)
Constant	-28.07	43.63***	950.0***	74.97*
	(32.23)	(2.460)	(182.6)	(38.21)
Observations	3696	3696	3696	3696

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Profit and Assets are reported in thousands of Birr. Jobs are windsorized at the 99th percentile. Judge clustered standard errors in parentheses.

reviewed for loan consideration. Results are also robust to excluding judge fixed effects.

These results are consistent with the fact that the context of the study provided significant incentives for judges to complete the evaluations carefully. Judges were responsible for the allocation of a significant amount of capital by a prominent national agency in a well-publicized business plan competition. They were typically referred by their manager to serve as judges. Thus, there would be reputational costs to negligent work on the evaluations. Together, these features underscore that loan officers took the evaluation process seriously.

We conducted a battery of robustness tests to confirm the finding of a lack of discrimination: weighting evaluations so that each judge has equal weight; controlling for the order in which evaluations were assigned; expanding the sample to include evaluations with some missing predictions; winsorizing and transforming relevant evaluation measures to account for outliers; limiting the sample to judges who passed various attention and internal consistency checks; excluding judges with fewer than 30 evaluations; and limiting the sample to the first five applications given to judges. The main finding that there is no discrimination in the evaluation of businesses is remarkably robust.

Table 7: Predicted Firm Survival and Profits as a Function of Gender and Final Score

	(1)	(2)	(3)	(4)	(5)	(6)
	Firm Survival			Firm Profits (IHS)		
Male	0.0281		0.0275	0.478		0.451
	(0.0245)		(0.0245)	(0.455)		(0.450)
Mean Final Score		0.0101**	0.0100**		0.356***	0.354***
		(0.00442)	(0.00441)		(0.0899)	(0.0896)
Constant	0.838***	0.853***	0.838***	6.087***	6.325***	6.082***
	(0.0187)	(0.0122)	(0.0186)	(0.329)	(0.226)	(0.324)
Observations	847	847	847	846	846	846

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

4.2 Endline Survey: Targeting high performing businesses

Tables 7 and 8 find that business performance did not differ by gender. Though the final scores in the competition and loan consideration are predictive of firm survival and profits, we do not find evidence that the true gender of the business owner predicts business outcomes. The same pattern emerges when controlling for baseline business characteristics shown to the judges (Table 9). These results suggest that the underlying beliefs of financial providers were consistent with the actual (lack of a) gender gap observed in our sample. Thus, this suggests that the lack of discrimination observed in the previous section is consistent with accurate beliefs of financial providers.

5 Conclusion

Our results do not find support for gender discrimination as an explanation for gender gaps in capital and entrepreneurial success. We find that the response to gender by financial providers is consistent with their underlying beliefs about business performance by gender, and that those beliefs were accurate in our sample of businesses. These results are based on experts in the financial sector, when given significant baseline information on a business and conditional on a sample of businesses that are interested in applying for capital. These

Table 8: Predicted Firm Survival and Profits as a Function of Gender and Loan Consideration

	(1)	(2)	(3)	(4)	(5)	(6)
	Firm Survival			Firm Profits (IHS)		
Male	0.0281		0.0278	0.478		0.463
	(0.0245)		(0.0245)	(0.455)		(0.452)
Mean Loan Consideration		0.0974**	0.0971**		3.353***	3.344***
		(0.0477)	(0.0477)		(0.961)	(0.959)
Constant	0.838***	0.853***	0.838***	6.087***	6.337***	6.088***
	(0.0187)	(0.0121)	(0.0186)	(0.329)	(0.226)	(0.328)
Observations	847	847	847	846	846	846

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table 9: Predicted Firm Survival and Profits as a Function of Gender and Baseline Performance

	(1)	(2)	(3)	(4)	(5)	(6)
	Firm Survival			Firm Profits (IHS)		
Male	0.0281		0.0285	0.478		0.413
	(0.0245)		(0.0235)	(0.455)		(0.440)
Profits (IHS)		0.00427	0.00408		0.309***	0.306***
		(0.00335)	(0.00333)		(0.0612)	(0.0610)
Employees		0.0000368***	0.0000379***		0.00111***	0.00113***
		(0.00000955)	(0.0000108)		(0.000136)	(0.000125)
Assets (IHS)		0.00689	0.00720		0.132	0.136
		(0.00557)	(0.00557)		(0.0916)	(0.0919)
Liabilities (IHS)		0.00449**	0.00436**		0.104***	0.102***
		(0.00213)	(0.00212)		(0.0381)	(0.0383)
Observations	847	847	847	846	846	846

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Estimation includes covariates include additional business performance characteristics on application form at baseline. Each covariate that is missing is coded as 0 and an additional indicator is included the covariate was missing. Robust standard errors in parentheses.

conditions are generally true when credit and financial providers are making decisions on capital allocation decisions.

We acknowledge that the borrowing process involves many more steps, during which discrimination may still be a factor. Loan processes generally include multiple visits and communications between a potential business and the lending institution, during which biases may occur, if information provided is not interpreted in a gender neutral format or gender becomes more salient. Note that additional information is generally thought to reduce discrimination, and so the occurrence of discrimination in later stages would likely only occur if the same information is interpreted differently for each gender or if financial providers alter their focus on what characteristic is most importance due to salience. It may also be the case that though we observe no discrimination in the extensive margin of capital allocation decisions, there may have been discrimination on the intensive margin or contractual features of loans (e.g., collateral requirements).

Our results suggest that policies that increase female access to capital, such as quotas or prioritization of women, may be at the expense of targeting higher performing businesses. It also suggests that the type of businesses applying for capital may differ from the broader distribution of firms. Future research on gender differences and constraints on applying and seeking for capital may be an informative channel to explaining gender gaps in business performance.

References

Alibhai, Salman, Aletheia Donald, Markus Goldstein, Alper Ahmet Oguz, Alexander Pankov, and Francesco Strobbe. 2019. "Gender Bias in SME Lending Experimental Evidence from Turkey." *Policy Research Working Paper*, , (9100).

Ayalew, Shibiru, Shanthi Manian, and Ketki Sheth. 2021. "Discrimination from Below: Experimental Evidence from Ethiopia." *Journal of Development Economics*, 151.

Beaman, Lori, Raghabendra Chattopadhyay Esther Duflo Rohini Pande, and Petia Topalova. 2009. "Powerful Women: Does Exposure Reduce Bias?" *Quarterly Journal of Economics*, 124(4): 1497–1540.

Beck, Thorsten, Patrick Behr, and Andreas Madestam. 2017. "Sex and Credit: Is There a Gender Bias in Lending?" *Journal of Banking and Finance*, 87.

Bertrand, M., and E. Duflo. 2017. "Field Experiments on Discrimination." *Handbook of Economic Field Experiments*.

Bharadwaj, Prashant, and Leah K. Ladakhawala. 2013. "Discrimination Begins in the Womb: Evidence of Sex-Selective Prenatal Investments." *Journal of Human Resources*, 48(1): 71–113.

Blattman, Chris, Nathan Fiala, and Sebastian Martinez. 2014. "Generating Skilled Self-Employment in Developing Countries: Experimental Evidence from Uganda." *The Quarterly Journal of Economics*, 129(2): 697–752.

Brock, Michelle J., and Ralph De Haas. 2019. "Gender discrimination in small business lending. Evidence from a lab-in-the-field experiment in Turkey." *Working Paper*, , (232).

Buvinić, Mayra. 2018. "The Clock Is Ticking on Financial Inclusion and a Focus on Women Can Help."

Duflo, Esther. 2012. "Women Empowerment and Economic Development." *Journal of Economic Literature*, 50(4): 1051–79.

Fisman, Raymond, Daniel Paravisini, and Vikrant Vig. 2017. "Cultural Proximity and Loan Outcomes." *The American Economic Review*, 107(2): 457–92.

Guryan, Jonathan, and Kerwin Kofi Charles. 2013. "Taste-Based or Statistical Discrimination: The Economics of Discrimination Returns to Its Roots." *Economic Journal*, 123(572): 417–32.

Hardy, Morgan, and Gisella Kagy. 2020. "ItâS Getting Crowded in Here: Experimental Evidence of Demand Constraints in the Gender Profit Gap." *The Economic Journal*, 130(631): 2272–2290.

Jayachandran, Seema. 2015. "The Roots of Gender Inequality in Developing Countries." *Annual Review of Economics*, 7(1): 63–88.

Jayachandran, Seema, and I. Kuziemko. 2011. "Why Do Mothers Breastfeed Girls Less than Boys? Evidence and Implications for Child Health in India." *The Quarterly Journal of Economics*, 126(3): 1485–1538.

The World Bank Group. 2019. "Ethiopia Gender Diagnostic Report: Priorities for Promoting Equity."