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July 2019

The High 5

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Improve the Quality of Life for the People of Africa

Working Paper Series
n° 317
July 2019
African Development Bank Group

AFRICAN DEVELOPMENT BANK GROUP

Working Paper N° 317

Abstract

Women are disproportionately disadvantaged in access to finance in Africa. While supply-side detriments, such as high interest rates and collateral requirements, are well documented in the literature, little is understood about how demand-side factors contribute to the observed gender gap in access to finance. This paper provides the first empirical evidence on how women managers' perception about their creditworthiness contributes to the large gender gap in Africa, particularly in the Northern region. One of the innovations of the paper is introducing a theoretical model using the credit market framework with imperfect and asymmetric information to explain what may drive loan applicants to self-select. We use firm-level data for 47 African countries from the World Bank Enterprise Survey. We find that women entrepreneurs in Africa, in general, and in North Africa, in particular, are more likely to self-select themselves out of the credit market due to low perceived creditworthiness compared to their men counterparts. The results also suggest that the observed self-selection behavior is not a response mechanism to current discriminatory lending practices by the banks. The results are robust to different empirical specifications. The findings will inform policies towards greater financial inclusion of women in the region.

This paper is the product of the Vice-Presidency for Economic Governance and Knowledge Management. It is part of a larger effort by the African Development Bank to promote knowledge and learning, share ideas, provide open access to its research, and make a contribution to development policy. The papers featured in the Working Paper Series (WPS) are those considered to have a bearing on the mission of AfDB, its strategic objectives of Inclusive and Green Growth, and its High-5 priority areas—to Power Africa, Feed Africa, Industrialize Africa, Integrate Africa and Improve Living Conditions of Africans. The authors may be contacted at workingpaper@afdb.org.

Correct citation: Morsy H., A. El-Shal and A. Woldemichael (2019), Women Self-Selection out of the Credit Market in Africa, Working Paper Series N° 317, African Development Bank, Abidjan, Côte d'Ivoire.

Women Self-Selection out of the Credit Market in Africa

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JEL classification: D01; D22; D8; G4; G2.

Keywords: Gender Inequality; Access to Finance; Perception of Creditworthiness; Discrimination; Imperfect Information; Africa; North Africa.

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1. Introduction

Access to finance helps start-ups grow into large enterprises and incumbent firms innovate and become competitive, creating job opportunities and contributing to economic growth. In most part of the developing world, however, low access to external finance has been a key constraint for entrepreneurs. Women entrepreneurs are particularly disadvantaged. For instance, according to the World Bank 2017 *Global Findex Report*, 56 percent of the adult population in the developing world which is still "unbankable"—without access to a bank account—are women, with a 9-percentage points gender gap. In Sub-Saharan Africa, 37 percent of women have a bank account compared to 48 percent of men, a gap that has widened over the past several years. The figures are even more drastic in the region of North Africa, where about two-third of the adult population remains "unbankable." At 18 percentage points, the North Africa region, to which this paper gives an emphasis, has the largest gender gap in the world (Demirguc-Kunt et al., 2018). Women are, therefore, disproportionately shunned from effectively participating in the market economy and, at a macro level, limiting countries from realizing their full growth and employment creation potentials (Aterido et al., 2013).

Several studies have shown that supply-side factors play a major role in the exclusion of women from the formal credit market. When they do have access to finance, they face stringent loan configurations—higher interest rate or higher collateral—compared to men (Muravyev et al., 2009). There is also evidence that credit rationing through high interest rates disproportionately discourages women entrepreneurs from applying for a loan, while lack of a collateral reduces their access to loans than men (Aterido et al, 2013). Moreover, women are more likely to be excluded from the formal financial sector in countries where there are gender discriminatory laws and norms, lower participation of women in the labor market, and high level of state-ownership in the banking sector (Morsy and Youssef, 2017). This is particularly the case in most North Africa countries, where the gender gap, driven by socio-economic and cultural factors, is pervasive.

While the impacts of supply-side factors are important in limiting women's access to finance, women's decision-making behavior also plays an important role in the observed gender gap. Aterido et al. (2013), for instance, found that the observed gender gap in South and East Africa could be attributed to lower levels of income and education of women compared to men. Similarly, an earlier study by Buvinic and Berger (1990) found that female entrepreneurs in Peru decide to not apply for loans due to complicated application procedures.

In addition, the literature establishes that women entrepreneurs could decide to not apply for loans—self-select themselves out of the credit market—due to factors such as low financial literacy, risk aversion, fear of failure, and so forth, even in the absence of discrimination by the banks.

However, there is little evidence on how financial behavior of women in Africa contributes to the observed gender gap in access to finance. Do women entrepreneurs in Africa systematically self-select themselves out of the credit market compared to their men counterparts, and why? Understanding how women entrepreneurs make financial decisions in an environment where credit is highly rationed is important to design right policies and interventions.

This paper fills the knowledge gap in the literature by examining whether women-managed formal enterprises self-select themselves out of the formal credit market in Africa based on their perceived creditworthiness. We give emphasis to the North Africa region, where the gender gap is the highest in the world. In a parsimonious theoretical framework of credit market with imperfect information regime, we show that some applicants could self-exclude themselves out of the credit market based on their perceived creditworthiness. We use data from the World Bank Enterprise Survey (ES) project, taking advantage of the detailed survey information on why firms exclude themselves from the credit market and perceived creditworthiness. The survey covers 47 countries in Africa, out of which four—namely, Egypt, Mauritania, Morocco, and Tunisia—are in North Africa. We use an Instrumental Variable (IV) method to address potential endogeneity, and control for various confounding factors that are potentially correlated with women manager and self-selection based on perceived creditworthiness.

Our paper disentangles self-selection based on low perceived creditworthiness from self-selection due to actual or perceived discriminatory lending practice by banks. The literature, drawing mainly from developed countries, distinguishes between two types of discrimination in the credit market: statistical and taste-based discrimination (Phelps, 1972; Becker, 1971). On the one hand, statistical discrimination occurs when there is information asymmetry and lenders reject certain types of applicants based on some observed characteristics. This is because, lenders use a set of loan applicants' characteristics, for instance, age, gender and race/ethnic group, to predict their creditworthiness and make decisions to accept or reject certain group of applicants. Taste-based discrimination, on the

other hand, emanates from an animus or a prejudice towards one group of applicants based on race, gender, religion and other personal characteristics (Becker, 1971). This type of discrimination carries a higher cost to the decision-maker.

Regardless of the type of discrimination, women loan applicants form their beliefs and respond in different ways. In the context of developed countries, for instance, Wellner (2008) found that minority applicants in the U.S. are disproportionately discouraged from applying for credit. These applicants face higher denial rates, higher mortgage interest rates, and higher payment-to-debt ratios. Similarly, in the U.S. mortgage-market context, Longhofer and Peters (2005) shows the existence of a self-selection behavior among minorities in response to taste-based discrimination by banks.

In a developing-country context, Agier and Szafarz (2013) found evidence of a glass-ceiling effect against women among large project applicants in a large Brazilian microfinance institution, although they did not detect a discriminatory lending practice. Women can also resort to informal finance as a response mechanism to discrimination. Based on a survey of small-size enterprises in three African countries—Ethiopia, Tanzania and Zambia, Richardson et al. (2004) found that women entrepreneurs were more likely to rely on their own or informal financing mechanisms to finance their businesses than men do. While these studies are informative about women entrepreneurs' financial behavior, there is a huge gap in our understanding of women self-selective behavior in the context of Africa.

Our paper provides fresh evidence on how perception about creditworthiness, even in the absence of discriminatory lending practices, contributes to the large gender gap in Africa, particularly in the Northern region. The findings of our paper inform policies towards greater financial inclusion of women in the region.

The rest of the paper is organized as follows. Section 2 describes the data used in our analysis and presents some descriptive statistics; section 3 introduces our conceptual framework of self-selection in the credit market; section 4 discusses the empirical strategies employed; section 5 presents the key findings of the paper; and section 6 concludes by discussing the findings' implications for policy and directions for future research.

2. Data and Descriptive Analysis

This study is based on data from the standardized ES, a firm-level survey jointly conducted by the World Bank, the European Bank for Reconstruction and Development and the European Investment Bank. We use the harmonized dataset that covers more than 135,000 firms in 189 countries in the geographic regions of the world, conducted over a ten-year period between 2006 and 2016. The survey covers more than 37,000 firms in 47 countries African countries, with more than 6,000 firms in four North African countries (Egypt, Mauritania, Morocco and Tunisia).[1]

The survey covers firms in manufacturing and services sectors that correspond to ISIC codes of 15-37, 45, 50-52, 55, 60-64, and 72 (ISIC Rev.3.1). The distribution between sectors is determined according to the sectors' relative contribution to GDP in each country. Formal (registered) firms with more than five employees are included in the survey. Services sector activities include construction, retail, wholesale, hotels, restaurants, transport, storage, communications and information technology. Firms with 100 percent government ownership are not eligible for the survey. The sampling methodology is stratified random sampling.

We use direct survey information to construct our key dependent variable, which is self-selection out of the credit market. The ES directly asks respondents on whether they applied for a new loan or a line of credit in the last fiscal year. If the response is "No", then respondents are asked to provide the major reason for why they did not apply. The reasons are: 1) "*Don't know*" 2) "*No need for a loan*"; 3) "*Complex application procedures*"; 4) "*Interest rates were not favorable*"; 5) "*Collateral requirements are too high*"; 6) "*Insufficient size of loan and maturity*"; 7) "*Did not think it would be approved*"; and 8) "*Other reasons.*" We considered a respondent to self-select herself/himself out of the credit market, if her/his main reason for not applying is "*Did not think it would be approved."* We construct an additional dependent variable to reflect whether women entrepreneurs face higher rejection rate on their applications for loans or lines of credit based on respondents' answers to a question about the outcome of the most recent application for loan/line of credit (accepted or rejected).

[1] A comprehensive description of the data and survey methodology is provided online at: www.enterprisesurveys.org.

Our explanatory variable of interest is the gender of the entrepreneur, i.e., firm's top manager.[2] Table 1 shows the reasons for "not applying" for new loans or new lines of credit by gender and region. For firms in need of a loan, the top two reasons for not applying reported by female managers in Africa are "*interest rates were not favorable*" and "*application procedures were complex.*" The top two reasons for female-managed firms in the North Africa region are "*application procedures were complex*" and they "*did not think it would be approved,*" revealing important differences.

Table 1: Reasons for not Applying for New Loans/Lines of Credit in the Last Fiscal Year (by Gender of Top Manager)

Reason	Africa			North Africa		
	Male	Female	Pooled	Male	Female	Pooled
No need for a loan*	67.6%	55.3%	62.8%	75.9%	66.6%	75.3%
Application procedures were complex	9.2%	10.9%	10.4%	8.6%	11.0%	8.8%
Interest rates were not favorable	8.6%	11.5%	10.9%	6.4%	6.2%	6.4%
Collateral requirements were too high	5.2%	8.3%	5.8%	2.0%	3.2%	2.1%
Size of loan and maturity were insufficient	1.1%	1.1%	1.2%	0.7%	0.4%	0.7%
Did not think it would be approved (Low Perceived Creditworthiness)	**3.5%**	**6.5%**	**4.1%**	**3.2%**	**9.3%**	**3.6%**
Other reasons	4.7%	6.4%	4.7%	3.1%	3.2%	3.1%
Observations			37,699			6,097

* Establishment had sufficient capital. Survey weighted data are used (Stata's svy prefix).

While 6.5 percent of female-managed firms in Africa reported that they did not apply for new loans or credit line because they perceived that their application would not be approved, only 3.5 percent of male-managed firms reported that as a main reason. The difference is much larger for respondents in North Africa, with 9.3 percent of female-managed firms reporting that they did not apply because they "*did not think their application would be approved,*" only 3.2 percent of male-managed firms reported that as the main reason for not applying. This yields a gender gap of over 6 percent in North Africa vis-à-vis 3 percent for the entire continent.

The observed gender gap in self-selection out of the credit market could be explained by two main reasons: either female-managed firms have a lower probability of getting their

[2] The descriptive statistics and estimations' results by the gender of the firm's *owner* are provided in Appendix A.

application approved because they have lower creditworthiness, and/or they perceive themselves of lower creditworthiness than they are.[3]

Our formal econometric analysis controls for sales per worker that reflects the productivity of the firm or the firm's profitability in the broad sense[4], sector of operation, firm size, locality size, whether the firm is located in the official capital city, legal status of the firm, share of foreign ownership, firm age, number of employees, top manager's years of experience, whether the firm holds an internationally-recognized quality certification, share of direct exports in total sales, and whether the firm's financial statements were checked and certified by an external auditor. Our set of control variables also includes year and country dummies. Moreover, we use the proportion of full-time female employees in the total workforce as an instrument for "female manager". We discuss more about the instrument in the empirical methods' section.

The differences in firms' characteristics by gender of top manager are reported in Table 2. On average, both in Africa and North Africa, female-managed firms are more concentrated in the services' sector, are of smaller size, are more likely to be located in the official capital city, have lower foreign ownership's share, are younger, have fewer number of employees, have lower top manager's experience years, and are less likely to hold an internationally-recognized quality certification, compared to male-managed firms. Such differences can have serious implications for access to finance. For instance, younger and smaller firms are typically less favored by bankers (Robb, 2013). Also, being in the main capital city can be associated with a negative effect as firms face fiercer competition and thus, need to meet higher requirements in order to be successful in their application for credit. On the contrary, being a big exporter and having a manager with more years of experience can make the firm more confident to apply for credit.

We also observe that the variation by gender in some of the key firms' characteristics, such as firm's size and age, is lower in the North Africa region compared to the whole continent, suggesting that systematic reasons for self-selection are less significant in the region. If this is the case, and the estimation results provided later exhibit a stronger evidence of self-

[3] If the latter is the case, and female managers are, on average, less overconfident and more risk averse than male managers (Nekby et al., 2007), then the pool of female applicants is likely to consist of women managers whose businesses have superior characteristics of performance and creditworthiness (and thus, more likely to get their application approved). This will, in turn, result in a higher share of female successful applicants.
[4] This is a key indicator used by financial institutions or banks to assess the creditworthiness of a firm.

selection in North Africa, we may conclude that women entrepreneurs' self-selection behavior in this region is more sensitive to their perceptions. In this regard, it is imperative to note that no differences are observed in firm true creditworthiness (proxied by sales per worker) between female- and male-managed firms in both Africa and North Africa.

Table 2: Differences in Baseline Firm Characteristics

(by Gender of Top Manager)

Characteristic	Africa			North Africa		
	Male	Female	Pooled	Male	Female	Pooled
Sector						
Manufacturing	48.6%	39.3%	47.5%	64.4%	60.5%	64.2%
Services	51.4%	60.7%	52.5%	35.6%	39.5%	35.8%
Firm Size						
Small	53.0%	68.9%	54.9%	40.6%	46.3%	40.9%
Medium	31.2%	23.3%	30.2%	34.8%	34.3%	34.8%
Large	15.8%	7.8%	14.8%	24.6%	19.4%	24.3%
Locality Size						
Main Business City*	19.0%	16.2%	18.7%	34.0%	40.1%	34.3%
Over 1 million	40.7%	43.2%	41.0%	17.3%	14.5%	17.1%
250,000 - 1 million	25.7%	27.6%	25.9%	20.6%	18.5%	20.5%
50,000 - 250,000	10.4%	10.2%	10.4%	15.8%	15.4%	15.8%
Less than 50,000	4.2%	2.8%	4.1%	12.3%	11.4%	12.2%
Official Capital City Y:1	41.5%	45.0%	41.9%	26.2%	29.3%	26.3%
Firm Legal Status						
Shareholding Company with Shares Traded in the Stock Market	6.5%	4.1%	6.2%	7.9%	7.8%	7.9%
Shareholding Company with Non-Traded/Privately-Traded Shares	17.4%	12.9%	16.9%	29.0%	26.7%	28.9%
Sole Proprietorship	49.6%	57.2%	50.5%	32.3%	32.0%	32.2%
Partnership	12.1%	10.1%	11.8%	19.3%	18.3%	19.3%
Limited partnership	12.2%	13.7%	12.4%	10.3%	13.0%	10.5%
Other	2.3%	2.0%	2.3%	1.3%	2.2%	1.3%
Share Foreign Ownership	11.774	9.017	11.594	6.470	5.900	6.492
Firm Age	17.747	15.281	15.875	21.098	20.718	20.645
Number of Employees	82.262	39.027	65.506	138.991	102.991	132.212
Top Manager Experience Years	16.994	13.677	15.197	22.001	18.707	21.425
Quality Certification Y:1	17.5%	12.3%	16.9%	24.1%	19.5%	23.9%
Log Sales Per Worker	10.369	10.212	10.490	10.900	10.835	10.887
Direct Exports Share of Sales	5.873	4.612	4.823	9.204	9.658	8.999
External Audit Y:1	56.9%	49.7%	56.0%	77.5%	77.8%	77.5%
Observations			37,699			6,097

For continuous variables (share foreign ownership, firm age, number of employees, top manager experience years, ln sales per worker and direct exports share of sales), we report means instead of proportions.
*Main business cities are defined as cities with "major economic activity".

3. Conceptual Framework

Imperfect and asymmetric information in the credit market gives rise to incentive problems in the form of adverse selection and moral hazard. Stiglitz and Weiss (1981) shows that banks reject some borrowers due to information asymmetry, leading to credit rationing even in a perfectly competitive credit market. This is because, at higher levels of interest rate and collateral requirements, only the risky firms apply giving rise to negative adverse selection. In parallel, a higher interest rate incentivizes borrowers to choose riskier projects with higher returns, increasing the risk of bankruptcy and moral hazard. Even with risk-neutral borrowers, as shown in Wette (1983), a higher collateral requirement can push safe projects out of the

market, decreasing banks' profits. Bester (1985), however, shows that if banks compete on collateral requirements and use the interest rate to screen borrowers' riskiness, then no credit rationing will occur in equilibrium as using different contracts acts as a self-selection mechanism. High-creditworthy borrowers tend to accept loan contract configurations that have higher collateral requirements for a certain reduction in the interest rate than low-creditworthy borrowers. Building on Bester (1985), Han et al. (2009) further shows that high-creditworthy borrowers can offer collateral as a signal to lenders to obtain lower interest rate than low-creditworthy investors with riskier and low-return projects.[5]

Within the standard credit market model, we introduce loan applicants' perception toward their creditworthiness. Following the literature (such as Bester, 1985; Han et al., 2009; Longhofer and Peters, 1999), our key simplifying assumptions are: (1) both banks and borrowers are risk neutral, and risk-free interest rate is normalized to zero; (2) banks' loan offers depend on the observed signals that the loan applicants send; (3) banks can objectively predict applicants' creditworthiness based on the signals banks receive; and (4) borrowers have imperfect information about their true creditworthiness.

Now, consider a project that succeeds with probability p and fails with probability $1-p$. The probability of success depends on the borrowers' quality (or type), which is also equal to its creditworthiness θ. When the project succeeds, the borrower/entrepreneur earns a return of $R = (1+\tilde{r})I$, otherwise zero, where $\tilde{r}$ is the rate of return on the project and I is the investment amount. Given the borrower's risk type θ, the expected return from the investment is given by $R = \theta(1+\tilde{r})I$. If the project succeeds, the expected benefit from the loan is the sum of initial wealth (denoted by W) that is presented as a collateral and the return of the project. If the project fails, the borrower must transfer the collateral to the bank. Then, for a borrower of risk type θ, the expected net benefit of undertaking the project using a loan offered under contract γ_θ is given by

$$E\Pi(\gamma_\theta) = \theta[W + (1+\tilde{r})I - (1+r)I] + (1-\theta)[W - C]$$

$$= W + (\tilde{r} - r)\theta I + (1-\theta)C \qquad (1)$$

[5] This sorting behavior is referred to as 'sorting-by-private-information' in which collateral is used by applicants as a signal to banks.

where r is the interest rate charged by the bank. Based on the signals it receives from the loan applicant and the applicants' pool, the bank forms its posterior belief distribution about the types of loan applicants. For the sake of simplicity, we assume that the bank receives applications from two groups of loan applicants: high-creditworthy applicants H with probability α and low-creditworthy type L with probability $1-\alpha$. Then, the bank offers contracts $\gamma_H = \{r_H, C_H\}$ to high-creditworthy applicants and $\gamma_L = \{r_L, C_L\}$ to low-creditworthy applicants. This set of loan contracts should maximize the bank's expected profit and serve as a self-selection mechanism, satisfying the individual rationality (IR) and incentive compatibility (IC) conditions. The IR condition stipulates that the entrepreneur applies for the loan if and only if the expected benefit of undertaking the project through bank financing is greater than the initial wealth:

$$E\Pi(\gamma_i) = W + (\tilde{r}_i - r_i)\theta_i\, I + (1-\theta_i)C > W, \quad i = \{L, H\} \tag{2}$$

The IC condition implies that a borrower of type i accepts only a loan contract designed for her/him, i.e.,

$E\Pi_H(\gamma_H) > E\Pi_H(\gamma_L)$, and $E\Pi_L(\gamma_L) > E\Pi_L(\gamma_H)$.

Under imperfect information, the borrower does not have full information about her/his true risk type θ_i and about the set of information that the bank has on the pool of applicants. Instead, the applicant uses her/his self-assessed (perceived) creditworthiness $\tilde{\theta}$ to make the decision on whether to apply for a loan or not. We denote the borrower's perceived creditworthiness by $\tilde{\theta}_i = \theta_i + \zeta_i$, where $\zeta_i \sim iid(0, \sigma_\zeta^2)$ is the perception bias towards her/his creditworthiness. Then, the potential borrower applies for a loan if and only if:

$$E\Pi(\tilde{\gamma}_i) = W + (\tilde{r}_i - r_i)\tilde{\theta}_i\, I + \left(1-\tilde{\theta}_i\right)C > W \Rightarrow (\tilde{r}_i - r_i)\tilde{\theta}_i\, I + \left(1-\tilde{\theta}_i\right)C > 0 \tag{3}$$

Therefore, we can write the probability of loan application as

$$Pr(Apply_i = 1|\,.) = P\,r\left[\frac{(\tilde{r}_i - r_i)\theta_i\, I + (1-\theta_i)C}{C - (\tilde{r}_i - r_i)\, I} > \zeta_i\right] \tag{4.a}$$

$$= Pr\left[\frac{1}{1-(\tilde{r}_i - r_i)\frac{I}{C}} + \theta_i > \zeta_i\right] \tag{4.b}$$

The first part of equation (4.b), i.e., $\frac{1}{1-(\tilde{r}_i-r_i)\frac{I}{C}}$, is the profitability of the project. The second part (i.e., θ_i) is the objective creditworthiness, which is assumed to correspond with the bank's unbiased predicted creditworthiness based on the applicants' profiles and received signals.

The implications are straightforward with three empirically testable predictions: 1) If $\zeta_i = 0$, the bank's unbiased prediction and the applicant's perceived creditworthiness coincide. In this case, the model is similar to the standard credit market model in the literature in that the borrower's decision to apply for the loan is based on the objective prediction of her/his creditworthiness and expected profit. 2) If the applicant's perceived creditworthiness is lower than her/his true creditworthiness ($\zeta_i < 0$), she/he decides to not apply even if her/his predicted creditworthiness is higher and the loan application has higher likelihood of being accepted by the bank. 3) If the applicant's perceived creditworthiness is higher than her/his predicted creditworthiness ($\zeta_i > 0$), then the entrepreneur applies for a loan even if her/his predicted creditworthiness is lower and the loan application has lower likelihood of being accepted by the bank.

4. Empirical Methods

4.1. Baseline Specification

We use a multinomial logistic regression to model the various reasons for "not applying" to new bank loans or lines of credit. In the specification, our primary interest is to examine whether women entrepreneurs tend to self-select out of the credit market because they did not think their applications for loans/lines of credit would be approved. The multinomial specification allows us to jointly estimate all the reasons for "*not applying*" while accounting for potential correlation between the different reasons. As described in the data section above, we consider an entrepreneur to self-select out of the credit market on the bases of low perceived creditworthiness, if she/he did not apply for a loan or a line of credit because she/he "*did not think it would be approved*." Accordingly, we write the multinomial model as:

$$Pr(ReasonNotApplied_i = j | Applied_i = 0) = \Lambda\left(\alpha_j + \varphi_j Female_i + \beta_j Z_i\right), \qquad (5)$$

where $\Lambda(\cdot)$ is a multinomial log function. $ReasonNotApplied_i$ is a categorical variable taking values $j = 1$, if the reason was "*there was no need for loan*"; $j = 2$, if the reason was "*the application procedures were complex*"; $j = 3$, if the reason was "*the loan/credit terms were unfavorable (interest rates were not favorable, collateral requirements were too high, or size*

of loan and maturity were insufficient)"; $j = 4$, if the reason was "*did not think its application would be approved*" (our proxy of self-selection); and $j = 5$, if the response was "*other reasons*". $Female_i$ is our explanatory variable of interest and is a dummy variable taking a value of 1, if the firm is female-managed, and 0, otherwise. Z_i is a vector of control variables including proxies for firm's creditworthiness, a set of firm characteristics, and country and year dummies, α_j, φ_j and β_j are vectors of coefficients to be estimated.

If φ_j is statistically significant, we infer that there is gender-based self-selection conditional on all other factors. We run the model in equation (5) separately for Africa and for the subsample of the North Africa region.

One of the challenges is, we do not have enough information on whether respondents self-select in response to discriminatory lending practices by banks and/or because they perceive themselves as low creditworthy. To rule out the possibility that women entrepreneurs self-select out of the credit market in response to discriminatory lending practices, we need to empirically establish that there is no gender-based differences in loan rejection rates. Therefore, we estimate the probability of rejection on a recent loan using a logit model as

$$Pr(AppReject_i = 1 | Applied_i = 1) = \Lambda(\alpha + \gamma Female_i + \sigma W_i), \qquad (6)$$

where $AppReject_i$ indicates if the application for a new loan or a line of credit was rejected, W_i is a vector of control variables, and γ is our coefficient of interest, capturing gender differential in the probability of loan application rejection. All other variables are as defined before.

If we find no statistically significant evidence of discrimination by banks, it is plausible to infer that self-selection by women entrepreneurs is not driven by discriminatory lending practices by banks, but rather by their perceived creditworthiness.

4.2. Instrumental Variable Approach

A potential challenge for our model specification is endogeneity, as φ could be biased due to omitted variable/s problem. We suspect that other observed and unobserved factors could systematically affect women entrepreneurship and self-selection behavior in the credit market. For instance, in addition to perception towards their creditworthiness, women and men could have systematic differences, say on the levels of risk aversion, which could be correlated with

women entrepreneurship and self-selection out of the credit market. As a result, the estimated coefficient could be biased picking up the effects of other observed and unobserved factors that differ by gender. Depending on the direction of correlation, the bias could be positive or negative.

To correct for such bias, we estimate our model using an IV method. We use the proportion of full-time female employees in the firm as an instrument for "female manager." The instrument is both plausible with a strong underlying economic rationale and passes important statistical tests. In terms of economic rationale, organizational theory establishes that there is a positive gender spillover between bosses and lower-rank employees. As described in Kinze and Mileler (2017), there are two channels for the positive correlation between women managers and the proportion of female workers in the firm. First, higher-ranking women serve as mentors, role models, and advocates for their lower-ranking coworkers. Second, the decisions to promote or hire are often based on taste-based or statistical discrimination of current leaders.

Moreover, female-management is correlated with higher proportion of women employees in the firm by weakening the associations of formal employment with masculinity. Although the spillover could be negative, there is an overwhelming evidence that the relationship between female management and the proportion of female employment is positive (Maida and Webber, 2019). The proportion of female employees, however, is normally orthogonal and exogenous to self-selection out of the credit market. Hence, the proportion of female workers in the firm is a plausible IV for "female manager."

In addition, our checks show that the instrument meets the criteria of strong relevance and exogeneity.[6] The proportion of female employees is significantly and positively correlated with the "female manager" variable. The first-stage F-statistic for the significance of the instrument further supports its strong relevance from a statistical standpoint. Besides, the overidentifying restrictions' tests provide evidence of the instrument's exogeneity. Thus, we estimate an IV probit model focusing on our dependent variable of interest: "self-selection."

[6] For an IV approach to be a reasonable identification strategy, any instrumental variable Z is required to be correlated with the likelihood of becoming a manager being a woman (assumption 1), while it should not be correlated with neither the dependent variable "self-selection" nor the error term "unobservables" (assumption 2). If either of these two identification assumptions is violated, employing Z as an instrument is not a viable approach.

5. Results and Discussion

5.1. Baseline Estimates of Self-Selection

The estimated results of our baseline specification are reported in Tables 3 and 4 for the whole sample of Africa and the North Africa region, respectively. As shown in Table 3, compared to men, women managers in Africa are significantly more likely to not apply for new loans or new lines of credit because they "*did not think it would be approved.*" Specifically, having a female rather than a male manager is significantly associated with a 1.202 increase in the relative log odds of reporting self-selection as the reason for not applying versus the "no need for a loan" reason. By exponentiating the coefficient, we find that the relative probability of reporting self-selection as the reason for not applying rather than "no need for a loan" for female managers is more than triple the corresponding relative probability for male managers with the same firm characteristics.[7]

The difference between male and female managers' self-selection behavior is stronger for firms in North Africa. Table 3 shows that female managers have 1.583 higher relative log odds of selecting themselves out of the credit market. In other words, the relative probability of reporting self-selection as the reason for not applying rather than the "*no need for a loan*" reason for female managers in North Africa is more than four times the corresponding relative probability for male managers with the same firm characteristics. Interestingly, self-selection is the only reason for which we find significant gender differences between female- and male-managed firms both in Africa and North Africa. We find no statistically significant differences between female- and male-managed firms for all the other reported reasons: "*complexity of application procedures,*" "*unfavorable loan/credit terms,*" and "*other reasons.*"

There is also a significant negative relationship between log sales per worker, which is a good proxy for profitability and true creditworthiness of firms, and self-selection out of the credit market. A one-unit increase in log sales per worker, denoting an increase in the true creditworthiness of the firm, is associated with an 0.128 decrease in the relative log odds of

[7] The coefficients obtained from the logistic regression are the raw regression coefficients. The coefficient of the variable "Female Top Manager" is the log of odds ratio between the female-managers group and the male-managers group. So, we obtain the odds ratio, i.e., the odds for female managers versus male managers for a specific outcome (reason for not applying), by exponentiating the reported regression coefficient of the variable "Female Top Manager."

reporting self-selection as the reason for not applying versus the "*no need for a loan*" reason (Table 3). This result affirms that low perception of creditworthiness is also determined by firm's performance.

Similarly, women managers in North Africa are more likely to self-select due to their lower perception of the creditworthiness of their firms, and not by their true creditworthiness (Table 4). We should expect high-productivity firms to have high perceived creditworthiness and low self-selection. To our surprise, however, we find no statistically significant relationship between productivity and perceived creditworthiness as a reason for firms in North Africa to self-select. This implies that managers' perceived creditworthiness in the North Africa region can, in fact, be vastly different from the true creditworthiness.

Table 3: Multinomial Logit Estimates of Reasons for Self-Selection
(by Gender of Manager in *Africa)*

Outcome Variable: What is the Main Reason for not Applying for New Loans / New Lines of Credit?	Reason			
	(1) Complex Application	(2) Unfavorable Terms	(3) Low Perception	(4) Other Reasons
Female Top Manager Y:1 N:0	0.424	0.348	1.202***	0.000
	(0.313)	(0.233)	(0.432)	(0.305)
Sector (Ref: Manufacturing)				
Services	-0.261	-0.300*	-0.064	-0.160
	(0.202)	(0.154)	(0.307)	(0.263)
Firm Size (Ref: Small)				
Medium	-0.412*	-0.451**	0.067	-0.178
	(0.227)	(0.186)	(0.331)	(0.323)
Large	-0.421	-1.215***	-0.625*	-0.245
	(0.350)	(0.253)	(0.354)	(0.407)
Locality Size (Ref: Main Business City)				
Over 1 million	-0.393	0.391	0.917**	1.171**
	(0.333)	(0.273)	(0.439)	(0.505)
250,000 - 1 million	-0.001	0.682**	0.894**	1.154**
	(0.391)	(0.315)	(0.428)	(0.480)
50,000 - 250,000	0.066	0.932***	2.126***	1.267**
	(0.424)	(0.323)	(0.531)	(0.516)
Less than 50,000	0.087	0.995***	0.448	0.190
	(0.474)	(0.354)	(0.482)	(0.644)
Official Capital City Y:1 N:0	-0.401	0.211	0.088	-0.169
	(0.298)	(0.191)	(0.289)	(0.297)
Firm Legal Status (Ref: Shareholding Company with Shares Traded in the Stock Market)				
Shareholding Company with Non-Traded/Privately-Traded Shares	-0.750	0.047	-0.113	-1.359**
	(0.463)	(0.395)	(0.946)	(0.549)
Sole Proprietorship	-0.211	0.098	-0.026	-0.091
	(0.427)	(0.337)	(0.861)	(0.475)
Partnership	-0.030	0.518	-0.279	-0.853*
	(0.443)	(0.367)	(0.948)	(0.514)
Limited partnership	0.212	0.322	0.847	-0.677
	(0.465)	(0.366)	(0.936)	(0.574)
Other	-1.214	-1.509**	1.627	-1.343*
	(0.777)	(0.673)	(1.347)	(0.791)
Share Foreign Ownership	-0.007*	0.004	0.001	-0.011***
	(0.004)	(0.003)	(0.005)	(0.003)
Firm Age	-0.002	-0.001	-0.062***	-0.040***
	(0.006)	(0.006)	(0.016)	(0.013)
Number of Employees	0.000	0.000	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Top Manager Experience Years	-0.009	0.005	0.006	0.019*
	(0.011)	(0.008)	(0.013)	(0.011)

Quality Certification Y:1 N:0	-0.070	-0.106	-1.300***	-0.474
	(0.341)	(0.213)	(0.382)	(0.355)
Sales Per Worker	-0.035	-0.080	-0.128*	0.079
	(0.057)	(0.049)	(0.072)	(0.091)
Direct Exports Share of Sales	-0.005	-0.010*	-0.013**	-0.017***
	(0.005)	(0.006)	(0.006)	(0.005)
External Audit Y:1 N:0	-0.435**	-0.158	0.743**	0.643**
	(0.205)	(0.152)	(0.319)	(0.252)
Constant	-1.264	0.288	-4.176***	-2.129*
	(0.915)	(0.798)	(1.570)	(1.284)
Observations	11,603	11,603	11,603	11,603

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Country dummies are included in all estimations. Reference category: No need for a loan.

Table 4: Multinomial Logit Estimates of Reasons for Self-Selection (by Gender of Manager in *North Africa)*

Outcome Variable: What is the Main Reason for not Applying for New Loans / New Lines of Credit?	Reason			
	(1) Complex Application	(2) Unfavorable Terms	(3) Low Perception	(4) Other Reasons
Female Top Manager Y:1 N:0	0.619	0.659	1.583***	-0.761
	(0.414)	(0.433)	(0.550)	(0.883)
Sector (Ref: Manufacturing)				
Services	-0.190	-0.356	-0.009	-0.092
	(0.247)	(0.228)	(0.375)	(0.403)
Firm Size (Ref: Small)				
Medium	-0.511*	-0.284	0.073	-0.394
	(0.277)	(0.258)	(0.411)	(0.510)
Large	-0.676	-1.297***	-0.336	0.248
	(0.413)	(0.430)	(0.505)	(0.723)
Locality Size (Ref: Main Business City)				
Over 1 million	-0.685*	0.482	1.146*	2.185**
	(0.411)	(0.459)	(0.689)	(1.015)
250,000 - 1 million	-0.107	0.879**	0.975	2.072**
	(0.415)	(0.441)	(0.671)	(0.988)
50,000 - 250,000	0.036	1.220***	2.578***	2.380**
	(0.457)	(0.441)	(0.690)	(1.017)
Less than 50,000	-0.013	1.192**	0.799	1.150
	(0.495)	(0.464)	(0.686)	(1.108)
Official Capital City Y:1 N:0	-0.630*	0.382	0.561	1.203
	(0.380)	(0.407)	(0.624)	(1.034)
Firm Legal Status (Ref: Shareholding Company with Shares Traded in the Stock Market)				
Shareholding Company with Non-Traded/Privately-Traded Shares	-0.869	0.173	-0.470	-2.577***
	(0.540)	(0.561)	(1.358)	(0.848)
Sole Proprietorship	-0.174	0.059	-0.322	-0.601
	(0.490)	(0.504)	(1.255)	(0.618)
Partnership	-0.010	0.632	-0.568	-1.759**
	(0.500)	(0.506)	(1.353)	(0.685)
Limited partnership	0.141	0.274	0.515	-1.428*
	(0.545)	(0.551)	(1.321)	(0.787)
Other	-2.759**	-0.348	-14.981***	-2.114*
	(1.355)	(0.933)	(1.378)	(1.131)
Share Foreign Ownership	-0.009	0.007	0.004	-0.017**
	(0.005)	(0.005)	(0.006)	(0.008)
Firm Age	-0.002	0.003	-0.094***	-0.076***
	(0.007)	(0.008)	(0.027)	(0.028)
Number of Employees	0.000	0.000	0.001***	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Top Manager Experience Years	-0.007	0.008	0.011	0.031*
	(0.013)	(0.011)	(0.018)	(0.017)
Quality Certification Y:1 N:0	0.057	-0.311	-1.567***	-0.573
	(0.429)	(0.349)	(0.521)	(0.710)
Sales Per Worker	-0.015	0.020	-0.105	0.074
	(0.081)	(0.095)	(0.112)	(0.206)
Direct Exports Share of Sales	-0.007	-0.006	-0.017**	-0.019**
	(0.007)	(0.006)	(0.008)	(0.010)
External Audit Y:1 N:0	-0.409*	-0.225	1.097**	1.048**

	(0.241)	(0.229)	(0.500)	(0.436)
Country (Ref: Egypt)				
Mauritania	0.357	1.786***	0.541	0.859
	(0.813)	(0.634)	(1.234)	(1.196)
Morocco	-1.096**	-0.480	-0.693	-0.388
	(0.500)	(0.398)	(0.908)	(0.525)
Tunisia	0.819**	0.670*	1.702***	0.944
	(0.386)	(0.367)	(0.565)	(0.708)
Constant	-0.670	-3.023***	-2.828	-4.796**
	(1.091)	(1.173)	(2.036)	(2.282)
Observations	3,946	3,946	3,946	3,946

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Reference category: No need for a loan.

Similarly, the results show that managers of older firms, firms holding an internationally-recognized quality certification, and firms with higher exports share of sales, are more confident and significantly less likely to engage in a self-selection behavior in general, both in Africa and North Africa. Also, managers of firms located in larger cities are less confident as they face fiercer competition in the credit market, and thus are significantly more likely to engage in a self-selection behavior. Unexpectedly, we observe that firms whose financial statements are checked and certified by an external auditor, supposedly reducing information asymmetries (between firms and banks) that increase risk to lenders and constrain the supply of finance, tend to adopt a self-selection behavior in both Africa and North Africa (Tables 3 and 4).

5.2. Instrumental Variable Estimates

Although the results from our baseline specification show strong self-selection of female-managers out of the credit market, the estimates are suspected to be biased due to endogeneity. We use an IV probit specification to correct for the potential endogeneity. Tables 5 and 6 depict the results for the whole Africa sample and the North Africa region subsample, respectively. We report the results for all firms and the subsamples of micro firms (less than 5 employees) and small-size firms (5-19 employees)[8]. From the first-stage F-statistic for the instrument's significance and statistically significant coefficient of the proportion of female employees, we confirm the statistical plausibility of our instrument[9] (see Tables 5 and 6; columns 2, 4, and 6). The J-test of overidentifying restrictions further supports the validity of our instrument, as the

[8] We could not report the results of medium- (20-99 employees) and large-size (100+ employees) firms due to small sample sizes.

[9] As a rule of thumb, the F-statistic for (joint) significance of the instrument(s) in the first stage should exceed 10.

statistically insignificant J-test statistic implies that we do not reject the null hypothesis of instrument exogeneity (see Tables 5 and 6; columns 1, 3, and 5).

As shown in Table 5 (column 1), after correcting for potential endogeneity, the coefficient on female top manager for the whole sample of firms in Africa becomes insignificant. However, when we restrict our sample to micro and small-size firms (see columns 3 and 5, respectively), we find evidence that women managers significantly self-select out of the credit market because of their low perception of their creditworthiness, compared to men. This finding can be explained by the fact that, in light of asymmetric and imperfect information in the credit market, smaller firms tend to have less information about their true creditworthiness, as they usually lack the expertise to assess their creditworthiness through reliable financial reports and, importantly, to obtain information on the creditworthiness of the pool of applicants in the credit market, leading to a perception bias. This combined with the fact that women are more risk averse than men in financial decision-making[10], probably lead women managers of smaller firms to generate even lower perception of their creditworthiness. Besides the gender of top manager, self-selection out of the credit market in Africa is significantly determined by factors such as the age of the firm, holding an internationally-recognized quality certification, and firm's export orientation.

Table 5: IV Estimates of Self-Selection due to Low Perceived Creditworthiness
(by Gender of Top Manager in *Africa* and Firm Size)

Variables	All Firms		Small Firms		Micro Firms	
	(1) Low Perception	(2) First-Stage	(3) Low Perception	(4) First-Stage	(5) Low Perception	(6) First-Stage
Female Top Manager Y:1 N:0	1.449		1.750**		1.547*	
	(1.052)		(0.840)		(0.916)	
Sales Per Worker	-0.051*		-0.037		-0.040	
	(0.032)		(0.035)		(0.052)	
Proportion of Female Employees		0.236***		0.333***		0.363***
		(0.056)		(0.064)		(0.082)
Proportion of Female Employees		-0.019		-0.025		-0.001
(Missing)		(0.019)		(0.028)		(0.039)
Constant	-2.818***	0.310***	-3.406***	0.384***	-1.290	0.241*
	(0.703)	(0.105)	(0.735)	(0.136)	(0.856)	(0.130)
F-Stat (IVs Joint Significance)		18.22		27.15		20.53
J-Stat (Overidentification)	1.01		1.32		0.79	
Observations	11,603	11,603	6,457	6,457	3,641	3,641
With Controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Country dummies are included in all estimations.

[10] There is a lot of evidence that women are more risk averse than men in financial decision-making (see e.g., Parrotta and Smith, 2013; Charness and Gneezy, 2012; Borghans et al., 2009).

Women self-selection due to low perceived creditworthiness is far stronger for firms in North Africa regardless of the sample size and firm true creditworthiness (Table 6). One possible explanation is the lower marketing and financial literacy of women entrepreneurs in the region compared to men, making it harder for women to assess their true creditworthiness. According to S&P Global FinLit Survey, the gender gap in financial literacy ranges from 5 percent in Egypt to 9 percent in Mauritania, 10 percent in Algeria, and 13 percent in Tunisia. Another explanation is the difficulties faced by women entrepreneurs in the region in presenting their investment projects to bankers or investors. Moreover, women may lack the confidence in dealing with authorities and financial institutions and, therefore, find it difficult to convincingly convey their business proposals (OECD, 2011). Besides, the gender of top manager, we find significant evidence that self-selection out of the credit market in North Africa is determined by factors such as the size of locality and the age of the firm (Table 6).

Table 6: IV Estimates of Self-Selection due to Low Perceived Creditworthiness
(by Gender of Top Manager in *North Africa* and Firm Size)

	All Firms		Small Firms		Micro Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
	Low Perception	First-Stage	Low Perception	First-Stage	Low Perception	First-Stage
Female Top Manager Y:1 N:0	2.844***		3.006***		2.832**	
	(0.994)		(0.965)		(1.151)	
Sales Per Worker	-0.045		-0.038		-0.072	
	(0.045)		(0.052)		(0.080)	
Proportion of Female Employees		0.179**		0.258***		0.356**
		(0.074)		(0.096)		(0.141)
Proportion of Female Employees (Missing)		-0.023		-0.034		-0.018
		(0.022)		(0.034)		(0.050)
Constant	-1.851**	0.212**	-1.353*	0.090	-0.243	0.083
	(0.773)	(0.092)	(0.695)	(0.087)	(1.004)	(0.137)
J-Stat (Overidentification)	0.51		0.13		0.31	
Observations	3,916	3,916	1,628	1,628	843	843
With Controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Country dummies are included in all estimations.

Our results provide evidence that the size of the firm is not a key driver of women's self-selection out of the credit market, both in Africa and North Africa.

5.3. Discrimination in the Credit Market

In addition to perception about creditworthiness, self-selection out of the credit market could be driven by present discriminatory lending practices against women by the banks. In order to rule out discrimination by banks as a possible driver for women's self-selection behavior, we

estimate whether firms with female manager face higher rejection rate on their applications for new loans or new lines of credit, compared to their male counterparts.

Table 7 presents the results for the whole sample of Africa and firms in North Africa. After controlling for confounding factors, the results show no statistically significant evidence that female-managed firms in Africa and North Africa have a higher probability of rejection than men-managed firms. That is, we find no statistical evidence of credit market discrimination against female entrepreneurs both in Africa and North Africa. This strengthens our argument that female entrepreneurs self-select out of the credit market due to their low perceived creditworthiness.

Table 7: Logit Estimates of Loan / Credit Line Application Outcomes (by Gender of Top Manager)

Outcome Variable: What Was the Outcome of the Most Recent Application for Loan / Credit Line? Rejected:1 Approved:0	Logistic regression	
	(1) Africa	(2) North Africa
Female Top Manager Y:1 N:0	-0.948	-0.986
	(0.631)	(1.111)
Sector (Ref: Manufacturing)		
Services	0.091	0.218
	(0.382)	(0.593)
Firm Size (Ref: Small)		
Medium	0.175	0.774
	(0.398)	(0.676)
Large	-1.082**	-0.653
	(0.480)	(0.710)
Locality Size (Ref: Main Business City)		
Over 1 million	0.741	2.119*
	(0.684)	(1.238)
250,000 - 1 million	-0.124	0.838
	(0.651)	(1.195)
50,000 - 250,000	1.661*	3.759***
	(0.862)	(1.346)
Less than 50,000	1.488*	3.053**
	(0.811)	(1.279)
Official Capital City Y:1 N:0	1.079**	2.797**
	(0.477)	(1.115)
Firm Legal Status (Ref: Shareholding Company with Shares Traded in the Stock Market)		
Shareholding Company with Non-Traded/Privately-Traded Shares	0.099	-0.138
	(0.567)	(0.754)
Sole Proprietorship	-0.582	-0.626
	(0.525)	(0.765)
Partnership	-1.098	-0.869
	(0.822)	(1.177)
Limited partnership	-0.033	0.030
	(0.610)	(0.881)
Other	-0.191	0.685
	(0.891)	(1.447)
Share Foreign Ownership	0.009*	0.010
	(0.004)	(0.007)
Firm Age	-0.041***	-0.077***
	(0.015)	(0.023)
Number of Employees	-0.000	0.000
	(0.000)	(0.000)
Top Manager Experience Years	0.010	0.025
	(0.016)	(0.025)
Quality Certification Y:1 N:0	-0.135	-0.100
	(0.514)	(0.789)
Sales Per Worker	-0.576***	-0.530***

	(0.126)	(0.192)
Direct Exports Share of Sales	0.004	0.002
	(0.006)	(0.008)
External Audit Y:1 N:0	-1.149***	-0.954*
	(0.368)	(0.521)
Constant	6.542***	4.363
	(1.918)	(2.832)
Observations	2,253	577

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Country dummies are included in all estimations.

Overall, application rejection rates are significantly driven by systematic characteristics such as firm size, locality size, whether the firm is in a capital city, firm age, and whether the firm's financial statements are checked and certified by an external auditor. Also, as expected, we observe a significant negative association between productivity and the probability of a firm's application being rejected. This result suggests that firm's productivity is an important indicator used by banks to assess the creditworthiness of firms, supporting our simplifying assumption in the conceptual framework that banks' prediction of creditworthiness is unbiased and coalesce towards the objective creditworthiness of applicants.

6. Conclusion

Access to finance is a key constraint for entrepreneurs in Africa, and empirical evidence shows that women entrepreneurs are particularly disadvantaged. Although supply-side factors that limit women's access to finance have been extensively addressed in the literature, little is documented about demand-side factors, in particular, self-selectivity behavior. Within a parsimonious theoretical model of credit market with an imperfect information regime, we provide fresh evidence that compared to men, women entrepreneurs are more likely to self-select themselves out of the formal credit market based on their perceived creditworthiness. Women managers of micro- and small-size firms in Africa are found to be more likely to self-select out of the credit market compared to men. Regardless of firm size, we also find stronger self-selectivity behavior in the region of North Africa.

Moreover, we show that there is no systematic bias in loan rejection rates against women entrepreneurs and establish that the observed self-exclusion behavior from the part of women loan applicants is mainly due to their low perceived creditworthiness. This holds even if the results show that banks assess them favorably. Thus, the observed self-selection behavior is not a response mechanism to current discriminatory lending practices by financial institutions, but could be driven by, for instance, lower levels of risk tolerance by women than

men. If this is the case, then low overall financial literacy among women together with poor communication between financial institutions and women entrepreneurs can induce uninformed decisions about accessing finance.

The findings of this paper have substantial policy implications to address the gender gap in access to finance. Besides supply-side factors, there is need to address demand-side factors, such as the financial literacy of women entrepreneurs. Financially-literate entrepreneurs are found to make more informed financial decisions and assess their creditworthiness more objectively. This is especially important as the complexity of credit markets increases. Thus, enabling women entrepreneurs with the appropriate financial knowledge and skills will ensure their effective engagement in the credit market.

Equally important is to realize that, besides financial knowledge, gender differences extend to financial behavior. Women, for instance, are more likely than men to save informally. Thus, one way to foster women's demand for financial services is to introduce financial products aimed at meeting the needs of borrowers who traditionally use informal systems of finance. An example of such products is loans for which smaller and more mobile assets—and traditional wealth-storage mediums such as livestock or gold—are accepted as collateral. Governments can also assist in the development of new products—for example, by putting in place the necessary legal and fiscal framework.

Our study raises several opportunities for future research, especially regarding the causal pathways that underlie the observed gender differential in perceived creditworthiness, which drives women's self-selection behavior. As we control for differences between men and women entrepreneurs in terms of talents, and their respective firms in terms of characteristics; and as we rule out that the observed self-selection behavior is driven by discrimination on the supply side of the credit market, or generally institutional barriers; we are left with an interesting causal pathway that requires further investigation: men and women tend to behave differently. These behavioral differences can be based, for instance, on differences in risk, social and competitive preferences, which deserves further investigation.

References

Agier, I., & Szafarz, A. (2013). Microfinance and gender: Is there a glass ceiling on loan size? World Development, 42, 165-181.

Aterido, R., Beck, T., & Iacovone, L. (2011). Gender and finance in Sub-Saharan Africa: Are women disadvantaged? The World Bank.

Aterido, R., Beck, T., & Iacovone, L. (2013). Access to finance in Sub-Saharan Africa: Is there a gender gap? World Development, 47, 102-120.

Becker, G. S. (1971). The economics of discrimination. University of Chicago press.

Bester, H. (1985). Screening vs. rationing in credit markets with imperfect information. The American Economic Review, 75(4), 850-855.

Blanchάower, D. G., P. Levine, & D. Zimmerman (2003). Discrimination in the small business credit market. The Review of Economics and Statistics, 85(4), 930-943.

Borghans, L., Golsteyn, B. H. H., Heckman, J. J., & Meijers, H. (2009). Gender differences in risk aversion and ambiguity aversion. NBER Working Paper No. 14713.

Brush, C. G. (1992). Research on women business owners: Past trends, a new perspective and future directions. Entrepreneurship Theory and Practice, 16(4), 5-30.

Buvinic, M., & Berger, M. (1990). Sex differences in access to a small enterprise development fund in Peru. World Development, 18(5), 695-705.

Chaganti, R. (1986). Management in women-owned enterprises. Journal of Small Business Management, 24, 18.

Charness, G., & Gneezy, U. (2012). Strong evidence for gender differences in risk taking. Journal of Economic Behavior & Organization, 83(1), 50-58.

Demirguc-Kunt, A., Klapper, L., & Randall, D. (2013). Islamic finance and financial inclusion: Measuring use of and demand for formal financial services among Muslim adults. The World Bank.

Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution. The World Bank.

Han, L., Fraser, S., & Storey, D. J. (2009). The role of collateral in entrepreneurial finance. Journal of Business Finance & Accounting, 36(3-4), 424-455.

Han, S. (2004). Discrimination in lending: Theory and evidence. The Journal of Real Estate Finance and Economics, 29(1), 5-46.

Honohan, P. & Beck, T. (2007). Making finance work for Africa. Washington, DC: World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/6626 License: CC BY 3.0 IGO.

Kunze, A. and Miller. R. A. (2017). Women helping women? Evidence from private sector data on workplace hierarchies. The Review of Economics and Statistics, December 2017, 99(5): 769–775.

Longhofer, S. D., & Peters, S. R. (2005). Self-selection and discrimination in credit markets. Real Estate Economics, 33(2), 237-268.

Lusardi, A., & Tufano, P. (2015). Debt literacy, financial experiences, and overindebtedness. Journal of Pension Economics & Finance, 14(4), 332-368.

Maida, A. and Weber, A. (2019). Female Leadership and Gender Gap within Firms: Evidence from an Italian Board Reform. IZA DP No. 12099.

Martin, R. & Hill, R. (2000). "Loan performance and race?" Economic Inquiry 38, No. 1, 136-150.

Morsy, H. and Youssef, H, 2017. Access to Finance – Mind the Gender Gap. EBRD Working Paper No. 202. Available at SSRN: https://ssrn.com/abstract=3119113 or http://dx.doi.org/10.2139/ssrn.3119113

Muravyev, A., Talavera, O., & Schäfer, D. (2009). Entrepreneurs' gender and financial constraints: Evidence from international data. Journal of Comparative Economics, 37(2), 270-286.

Nekby, L., Thoursie, P. S., & Vahtrik, L. (2007). Gender and self-selection into a competitive environment: Are women more overconfident than men? IZA Discussion Paper No. 2794.

OECD (2011). Women's access to finance in the Middle East and North Africa (MENA) Region. OECD Publishing, Paris.

Parrotta, P., & Smith, N. (2013). Female-led firms: Performance and risk attitudes. IZA Discussion Paper No. 7613.

Phelps, E. S. (1972). The statistical theory of racism and sexism. The American Economic Review, 659-661.

Richardson, P., Howarth, R., & Finnegan, G. (2004). The challenges of growing small businesses: Insights from women entrepreneurs in Africa. Geneva: International Labour Office.

Riding, A. L., & Swift, C. S. (1990). Women business owners and terms of credit: Some empirical findings of the Canadian experience. Journal of Business Venturing, 5(5), 327-340.

Robb, A. M. (2013). Access to capital among young firms, minority-owned firms, women-owned firms, and high-tech firms. U.S. Small Business Administration Office of Advocacy Working Paper No. 403.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. The American Economic Review, 71(3), 393-410.

Weller, C. E. (2009). Credit access, the costs of credit and credit market discrimination. The Review of Black Political Economy, 36(1), 7-28.

Wette, H. C. (1983). Collateral in credit rationing in markets with imperfect information: Note. The American Economic Review, 73(3), 442-445.

Appendix A: Descriptive Statistics and Estimation Results by Gender of Firm's Owner

Table A.1: Reasons for not Applying for New Loans/Lines of Credit in the Last Fiscal Year (by Gender of Principal/Majority Owner*)

Reason	Africa			North Africa		
	Male	Female	Pooled	Male	Female	Pooled
No need for a loan**	67.2%	51.5%	62.8%	75.4%	75.6%	75.3%
Application procedures were complex	9.9%	10.2%	10.4%	9.0%	6.3%	8.8%
Interest rates were not favorable	8.2%	13.1%	10.9%	6.0%	11.0%	6.4%
Collateral requirements were too high	5.4%	9.6%	5.8%	2.1%	0.8%	2.1%
Size of loan and maturity were insufficient	1.0%	3.0%	1.2%	0.7%	0.0%	0.7%
Did not think it would be approved (Low Perceived Creditworthiness)	**3.7%**	**3.0%**	**4.1%**	**3.6%**	**2.8%**	**3.6%**
Other reasons	4.6%	9.7%	4.7%	3.1%	3.6%	3.1%
Observations			37,699			6,097

* Each firm is categorized as men-owned, majorly men-owned, majorly women-owned, women-owned, and equally owned. Equally men- and women-owned firms report 50-percent male ownership and 50-percent female ownership; these firms represent less than 5 percent of our sample and are excluded from all ownership calculations. Survey weighted data are used (Stata's svy prefix). ** Establishment had sufficient capital.

Table A.2: Differences in Firm Baseline Characteristics (by Gender of Principal/Majority Owner)

Characteristic	Africa			North Africa		
	Male	Female	Pooled	Male	Female	Pooled
Sector						
Manufacturing	48.2%	39.4%	47.3%	64.2%	65.2%	64.2%
Services	51.8%	60.6%	52.7%	35.8%	34.8%	35.8%
Firm Size						
Small	55.1%	72.8%	56.8%	41.3%	52.8%	41.6%
Medium	30.4%	21.7%	29.5%	35.2%	33.2%	35.2%
Large	14.6%	5.6%	13.7%	23.5%	14.0%	23.2%
Locality Size						
Main Business City	19.6%	12.4%	18.8%	34.5%	31.5%	34.4%
Over 1 million	39.5%	47.9%	40.3%	17.1%	12.9%	17.0%
250,000 – 1 million	25.9%	26.0%	25.9%	20.3%	22.5%	20.4%
50,000 – 250,000	10.7%	10.8%	10.7%	15.7%	20.8%	15.9%
Less than 50,000	4.5%	2.9%	4.3%	12.4%	12.4%	12.4%
Official Capital City Y:1	40.8%	45.0%	41.2%	26.5%	23.0%	26.3%
Firm Legal Status						
Shareholding Company with Shares Traded in the Stock Market	5.8%	1.7%	5.3%	7.0%	5.1%	7.0%
Shareholding Company with Non-Traded/Privately-Traded Shares	17.2%	6.9%	16.1%	28.5%	20.8%	28.3%
Sole Proprietorship	52.0%	77.5%	54.5%	33.4%	51.1%	34.0%
Partnership	12.1%	5.7%	11.4%	19.3%	15.2%	19.2%
Limited partnership	10.9%	6.9%	10.5%	10.5%	6.2%	10.3%
Other	2.2%	1.3%	2.1%	1.3%	1.7%	1.3%
Share Foreign Ownership	11.791	6.047	11.594	6.252	5.423	6.492
Firm Age	16.894	14.373	15.875	20.900	18.565	20.645
Number of Employees	72.796	57.763	65.506	128.771	71.723	132.212
Top Manager Experience Years	16.716	13.888	15.197	21.899	19.080	21.425
Quality Certification Y:1	16.1%	8.9%	15.4%	22.9%	14.4%	22.6%
Sales Per Worker	10.323	9.677	10.490	10.890	10.530	10.887
Direct Exports Share of Sales	5.784	4.739	4.823	8.911	12.126	8.999
External Audit Y:1	55.2%	41.9%	53.9%	77.2%	72.2%	77.0%
Observations			37,699			6,097

For continuous variables (share foreign ownership, firm age, number of employees, top manager experience years, ln sales per worker and direct exports share of sales), we report means instead of proportions.

Table A.3: Multinomial Logit Estimates of Self-Selection out of the Credit Market (by Gender of Principal/Majority Owner in *Africa)*

Outcome Variable: What is the Main Reason for not Applying for New Loans / New Lines of Credit?	Reason			
	(1) Complex Application	(2) Unfavorable Terms	(3) Low Perception	(4) Other Reasons
Female Principal/Majority Owner Y:1 N:0	-0.393	0.101	-0.200	-0.137
	(0.431)	(0.259)	(0.459)	(0.364)
Sector (Ref: Manufacturing)				
Services	-0.217	-0.260	-0.041	-0.145
	(0.208)	(0.161)	(0.320)	(0.273)
Firm Size (Ref: Small)				
Medium	-0.418*	-0.473**	0.001	-0.175
	(0.235)	(0.196)	(0.366)	(0.338)
Large	-0.330	-1.260***	-0.437	-0.085
	(0.364)	(0.298)	(0.382)	(0.435)
Locality Size (Ref: Main Business City)				
Over 1 million	-0.449	0.414	1.041**	1.172**
	(0.346)	(0.278)	(0.500)	(0.504)
250,000 - 1 million	-0.004	0.774**	0.993**	1.144**
	(0.396)	(0.316)	(0.453)	(0.485)
50,000 - 250,000	0.059	0.918***	2.141***	1.251**
	(0.431)	(0.321)	(0.547)	(0.523)
Less than 50,000	0.076	1.053***	0.474	0.164
	(0.479)	(0.361)	(0.504)	(0.648)
Official Capital City Y:1 N:0	-0.437	0.268	0.013	-0.154
	(0.310)	(0.192)	(0.322)	(0.308)
Firm Legal Status (Ref: Shareholding Company with Shares Traded in the Stock Market)				
Shareholding Company with Non-Traded/Privately-Traded Shares	-0.801	0.140	-0.192	-1.155*
	(0.495)	(0.402)	(1.051)	(0.610)
Sole Proprietorship	-0.254	0.246	0.005	0.268
	(0.448)	(0.340)	(0.956)	(0.536)
Partnership	-0.057	0.732**	-0.403	-0.493
	(0.465)	(0.371)	(1.039)	(0.575)
Limited partnership	0.116	0.414	0.819	-0.345
	(0.497)	(0.366)	(1.045)	(0.649)
Other	-1.960**	-1.468**	-2.797**	-1.254
	(0.802)	(0.694)	(1.187)	(0.848)
Share Foreign Ownership	-0.009**	0.003	0.000	-0.011***
	(0.004)	(0.004)	(0.005)	(0.003)
Firm Age	-0.004	-0.003	-0.082***	-0.044***
	(0.006)	(0.007)	(0.018)	(0.015)
Number of Employees	0.000	0.000	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Top Manager Experience Years	-0.008	0.008	0.008	0.021*
	(0.011)	(0.009)	(0.015)	(0.012)
Quality Certification Y:1 N:0	-0.094	-0.098	-1.319***	-0.451
	(0.363)	(0.229)	(0.409)	(0.381)
Sales Per Worker	-0.038	-0.079	-0.146**	0.039
	(0.058)	(0.050)	(0.066)	(0.084)
Direct Exports Share of Sales	-0.005	-0.010*	-0.014**	-0.017***
	(0.005)	(0.006)	(0.006)	(0.006)
External Audit Y:1 N:0	-0.434**	-0.162	0.658**	0.744***
	(0.208)	(0.158)	(0.322)	(0.257)
Constant	-0.937	0.159	-3.173**	-2.083
	(0.923)	(0.841)	(1.487)	(1.359)
Observations	10,603	10,603	10,603	10,603

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Country dummies are included in all estimations. Reference category: No need for a loan.

Table A.4: Multinomial Logit Estimates of Self-Selection (by Gender of Principal/Majority Owner in *North Africa)*

Outcome Variable: What is the Main Reason for not Applying for New Loans / New Lines of Credit?	Reason			
	(1) Complex Application	(2) Unfavorable Terms	(3) Low Perception	(4) Other Reasons
Female Principal/Majority Owner Y:1 N:0	-0.418	0.460	-0.018	-3.830***
	(0.791)	(0.628)	(0.868)	(0.755)
Sector (Ref: Manufacturing)				
Services	-0.157	-0.328	0.033	-0.040
	(0.249)	(0.233)	(0.387)	(0.408)
Firm Size (Ref: Small)				
Medium	-0.492*	-0.339	0.122	-0.399
	(0.277)	(0.269)	(0.436)	(0.502)
Large	-0.578	-1.259***	-0.062	0.384
	(0.422)	(0.454)	(0.533)	(0.731)
Locality Size (Ref: Main Business City)				
Over 1 million	-0.748*	0.682	1.128	2.074**
	(0.427)	(0.474)	(0.694)	(1.008)
250,000 - 1 million	-0.120	1.110**	0.860	2.016**
	(0.414)	(0.460)	(0.664)	(0.993)
50,000 - 250,000	-0.002	1.254***	2.370***	2.362**
	(0.459)	(0.468)	(0.662)	(1.017)
Less than 50,000	-0.042	1.364***	0.566	1.028
	(0.496)	(0.497)	(0.659)	(1.112)
Official Capital City Y:1 N:0	-0.680*	0.603	0.212	1.139
	(0.384)	(0.425)	(0.635)	(1.032)
Firm Legal Status (Ref: Shareholding Company with Shares Traded in the Stock Market)				
Shareholding Company with Non-Traded/Privately-Traded Shares	-0.964*	0.297	-0.957	-2.159**
	(0.581)	(0.573)	(1.213)	(0.938)
Sole Proprietorship	-0.256	0.297	-0.590	-0.205
	(0.513)	(0.529)	(1.098)	(0.753)
Partnership	-0.095	0.906*	-1.083	-1.351*
	(0.525)	(0.529)	(1.206)	(0.788)
Limited partnership	0.024	0.361	0.069	-1.078
	(0.567)	(0.570)	(1.173)	(0.886)
Other	-2.942**	-0.260	-14.752***	-1.811
	(1.386)	(0.971)	(1.269)	(1.223)
Share Foreign Ownership	-0.010*	0.006	0.003	-0.016**
	(0.006)	(0.005)	(0.007)	(0.008)
Firm Age	-0.003	0.001	-0.118***	-0.083***
	(0.007)	(0.008)	(0.026)	(0.030)
Number of Employees	0.000	0.000	0.001***	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Top Manager Experience Years	-0.006	0.010	0.012	0.037**
	(0.013)	(0.012)	(0.019)	(0.017)
Quality Certification Y:1 N:0	-0.002	-0.230	-1.579***	-0.464
	(0.452)	(0.351)	(0.530)	(0.735)
Sales Per Worker	-0.015	0.030	-0.179*	-0.071
	(0.084)	(0.101)	(0.102)	(0.164)
Direct Exports Share of Sales	-0.006	-0.005	-0.018**	-0.019*
	(0.007)	(0.007)	(0.008)	(0.010)
External Audit Y:1 N:0	-0.408*	-0.264	1.110**	1.190***
	(0.241)	(0.232)	(0.501)	(0.447)
Country (Ref: Egypt)				
Mauritania	0.365	1.669**	0.654	1.156
	(0.813)	(0.661)	(1.253)	(1.190)
Morocco	-1.025**	-0.536	-0.710	-0.496
	(0.496)	(0.414)	(0.916)	(0.624)
Tunisia	0.784**	0.706*	1.960***	1.043
	(0.396)	(0.382)	(0.584)	(0.705)
Constant	-0.495	-3.507***	-1.253	-3.723*
	(1.121)	(1.273)	(1.743)	(2.081)
Observations	3,775	3,775	3,775	3,775

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Reference category: No need for a loan.

Table A.5: IV Estimates of Self-Selection due to Low Perceived Creditworthiness (by Gender of Principal/Majority Owner in *Africa* and Firm Size)

Variables	All Firms		Small Firms		Micro Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
	Low Perception	First-Stage	Low Perception	First-Stage	Low Perception	First-Stage
Female Principal/Majority	2.485*		2.866***		2.444**	
Owner Y:1 N:0	(1.518)		(1.026)		(1.170)	
Sales Per Worker	-0.040		-0.043		-0.062	
	(0.030)		(0.028)		(0.041)	
Proportion of Female Employees		0.117***		0.167***		0.206***
		(0.036)		(0.046)		(0.056)
Proportion of Female Employees (Missing)		0.009		-0.006		-0.022
		(0.013)		(0.014)		(0.019)
Constant	-2.609***	0.287***	-2.880***	0.286**	-1.626**	0.277**
	(0.573)	(0.094)	(0.617)	(0.126)	(0.666)	(0.111)
F-Stat (IVs Joint Significance)		10.53		13.66		15.09
Observations	10,603	10,603	6,009	6,009	3,421	3,421
With Controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Country dummies are included in all estimations.

Table A.6: IV Estimates of Self-Selection due to Low Perceived Creditworthiness (by Gender of Principal/Majority Owner in *North Africa* and Firm Size)

Variables	All Firms		Small Firms		Micro Firms	
	(1)	(2)	(3)	(4)	(5)	(6)
	Low Perception	First-Stage	Low Perception	First-Stage	Low Perception	First-Stage
Female Principal/Majority	4.573***		4.200***		4.604***	
Owner Y:1 N:0	(1.773)		(1.554)		(1.364)	
Proportion of Female Employees		0.074		0.139*		0.161*
		(0.050)		(0.072)		(0.096)
Proportion of Female Employees (Missing)		0.004		-0.007		-0.029*
		(0.011)		(0.017)		(0.016)
Constant	-1.803***	0.118**	-1.398***	0.055	-0.328	0.057
	(0.500)	(0.048)	(0.485)	(0.037)	(0.462)	(0.052)
Observations	4,267	4,267	1,816	1,816	943	943
With Controls	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Country dummies are included in all estimations. The p-value associated with the "Proportion of Female Employees" in the "All Firms" estimation equals 0.141. The removal of "Sales Per Worker" corresponded to a significant increase in the validity of the instrumental variable "Proportion of Female Employees".

Table A.7: Logit Estimates of Loan / Credit Line Application Outcomes

(by Gender of Principal/Majority Owner)

Outcome Variable: What Was the Outcome of the Most Recent Application for Loan / Credit Line? Rejected:1 Approved:0	Logistic Regression	
	(1) Africa	(2) North Africa
Principal/Majority Owner Y:1 N:0	-0.986*	-1.889
	(0.527)	(1.375)
Sector (Ref: Manufacturing)		
Services	-0.064	-0.120
	(0.391)	(0.595)
Firm Size (Ref: Small)		
Medium	0.238	0.709
	(0.445)	(0.733)
Large	-0.844*	-0.405
	(0.471)	(0.706)
Locality Size (Ref: Main Business City)		
Over 1 million	1.312*	2.641**
	(0.720)	(1.168)
250,000 - 1 million	0.453	1.463
	(0.712)	(1.197)
50,000 - 250,000	2.860***	4.840***
	(0.935)	(1.421)
Less than 50,000	2.164**	3.654***
	(0.891)	(1.390)
Official Capital City Y:1 N:0	1.370**	2.750**
	(0.573)	(1.176)
Firm Legal Status (Ref: Shareholding Company with Shares Traded in the Stock Market)		
Shareholding Company with Non-Traded/Privately-Traded Shares	-0.282	-0.366
	(0.639)	(0.780)
Sole Proprietorship	-0.804	-1.189
	(0.576)	(0.854)
Partnership	-0.524	-0.360
	(0.746)	(1.050)
Limited partnership	-0.222	-0.291
	(0.642)	(0.848)
Other	-0.306	0.346
	(0.975)	(1.575)
Share Foreign Ownership	0.007	0.009
	(0.005)	(0.007)
Firm Age	-0.012	-0.032
	(0.015)	(0.020)
Number of Employees	-0.000	0.000
	(0.000)	(0.001)
Top Manager Experience Years	-0.007	-0.002
	(0.019)	(0.029)
Quality Certification Y:1 N:0	-0.665	-0.946
	(0.585)	(0.903)
Sales Per Worker	-0.511***	-0.420**
	(0.125)	(0.173)
Direct Exports Share of Sales	0.005	0.002
	(0.006)	(0.008)
External Audit Y:1 N:0	-1.084***	-0.824
	(0.409)	(0.561)
Constant	4.741**	3.182
	(2.100)	(2.782)
Observations	1,982	546

Standard errors are reported in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively. All coefficients are estimated using survey weighted data (Stata's svy prefix). Country dummies are included in all estimations.