

Funding Female Entrepreneurs in MENA Countries (2019): Self-Selection and Discrimination

Imène Berguiga and Philippe Adair

**FUNDING FEMALE ENTREPRENEURS
IN MENA COUNTRIES (2019):
SELF-SELECTION AND DISCRIMINATION**

Imène Berguiga¹ and Philippe Adair²

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Send correspondence to:

Imène Berguiga
University of Sousse
imne068@yahoo.fr

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¹ IHEC, University of Sousse, Tunisia.

² ERUDITE, University Paris-Est Créteil, France. Email: adair@u-pec.fr

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Abstract

Do female entrepreneurs in MENA countries face obstacles, either exogenous (discrimination) or endogenous (self-selection), in funding their businesses? Literature reviews provide controversial evidence thereof and, so far, very few papers tackled this funding issue for female entrepreneurs in MENA countries. A pooled sample of 6,253 enterprises from the 2019/2020 World Bank Enterprise Surveys (WBES) including six MENA countries (Egypt, Morocco, Tunisia, Jordan, Lebanon, and Palestine) documents the financial behavior of both owners and managers according to gender. Two probit regression models address loan supply and loan demand with respect to discrimination versus self-selection. There is self-selection and discrimination against female owners but not discrimination against female managers. We provide a robustness test by estimating the models on a sub-sample of micro, small, and medium-sized enterprises. Sampling biases in the WBES, together with the characteristics of female clients of microfinance institutions, suggest that micro-entrepreneurs would have faced bank discrimination and self-selection obstacles. Hence, public authorities should support pooling loan guarantees in favor of female entrepreneurs (i.e., positive discrimination).

JEL Classifications: D1, D8, D22, G2, G4.

Keywords: Bank credit, discrimination, entrepreneurs, gender, Probit regressions, microfinance, Middle East and North Africa, self-selection.

ملخص

هل تواجه رائدات الأعمال في دول الشرق الأوسط وشمال أفريقيا عقبات في تمويل أعمالهن، سواء كانت خارجية (تمييز) أو داخلية (الاختيار الذاتي)؟ وتقدم مراجعة الأدبيات أدلة مثيرة للجدل على ذلك، وحتى الآن، تناول عدد قليل جداً من الأوراق البحثية قضية التمويل هذه لرائدات الأعمال في بلدان الشرق الأوسط وشمال أفريقيا. توثق عينة مجمعة من 6,253 شركة من استقصاءات البنك الدولي للمشاريع 2020/2019 (WBES) بما في ذلك ستة بلدان في منطقة الشرق الأوسط وشمال أفريقيا (مصر- والمغرب وتونس والأردن ولبنان وفلسطين) السلوك المالي لكل من المالكين والمديرين وفقاً للجنس. ويتناول نموذجان للانحدار الاحتمالي العرض والطلب على القروض فيما يتعلق بالتمييز مقابل الاختيار الذاتي. هناك اختيار ذاتي وتمييز للمالكات الإناث ولكن ليس هناك تمييز للمديرات. يوفر تقدير النماذج على عينة فرعية من المؤسسات المتناهية الصغر والصغيرة والمتوسطة الحجم اختباراً للمتناهية. وتشير تحيزات أخذ العينات في WBES إلى جانب خصائص العمليات من مؤسسات التمويل البالغ الصغر إلى أن أصحاب المشاريع الصغيرة كانوا سيواجهون التمييز المصرفي والاختيار الذاتي. ومن ثم، ينبغي للسلطات العامة أن تدعم تجميع ضمانات القروض لصالح صاحبات المشاريع، أي التمييز الإيجابي.

Introduction

The case of the Middle East and North Africa (MENA) region is especially interesting in the context of female entrepreneurs because the pervasive patriarchal pattern hinders women's ability to own and manage their own businesses (IMAGES, 2017). The gender gap in access to finance in 2017 was 18 percent in North Africa, standing as the highest gap worldwide (Demirguc-Kunt et al, 2018). The lack of access to funding from formal financial institutions is one of the major problems facing female entrepreneurs in MENA countries (AFEM, 2015; ILO, 2016; OIT, 2016). We tackle the finance issue for female entrepreneurs in a set of six resource-poor and labor-abundant MENA economies (Gatti et al, 2014); namely three North African countries (Egypt, Morocco, and Tunisia) and three Middle Eastern countries (Jordan, Lebanon, and Palestine).

We use a pooled sample from the 2019 World Bank Enterprise Survey (WBES), which includes a subsample of 767 female-owned businesses, where almost one out of eight among 6,253 businesses are owned by males and females in 2019. There is little empirical investigation on the topic of female entrepreneurship and, to the best of our knowledge, almost no paper so far has addressed this funding issue in these six MENA countries from this WBES data source. Hence, our paper provides some new insights.

Section 1 reviews the literature devoted to discrimination and self-selection; there is little evidence regarding female entrepreneurs, and outcomes from the loan funding gender issue prove controversial. Section 2 points out the advantages and setbacks of the 2019 WBES data source for the six MENA countries, including selection biases with respect to the underrepresentation of micro and small-sized businesses and the overrepresentation of the manufacturing industry. It presents descriptive statistics on the finance issue according to gender ownership and gender management, with females accounting, respectively, for 13.05 percent and 5.42 percent of the sample. Section 3 displays probit models and estimations in regard to loan demand and loan supply, according to which there is neither self-selection nor discrimination against female owners, whereas female managers face self-selection. Section 4 overcomes WBES selection biases with the inclusion of the microfinance industry, which provides small amount loans to female micro-enterprises in the six MENA countries. In doing so, microfinance fills the gap for working capital but not for fixed assets.

1. Literature review

The literature review on female entrepreneurs in the MENA region is quite sparse (Bastian et al., 2018) and only a few qualitative studies (Hattab, 2012; Weeks, 2009) are devoted to comparative analyses.

1.1. Discrimination from the lender's supply side

Two theories address discrimination. According to Becker (1957), taste-based discrimination is due to prejudice toward one group of applicants based on gender and other personal characteristics. Phelps (1972) grounds statistical discrimination upon information asymmetry.

Applying these theories to the credit market, lenders reject some loan applicants based on some observed characteristics such as gender, which are supposed to predict their creditworthiness.

The evidence proves controversial. Hereafter, we contend that there is no gender discrimination if banks require women to have a bank account and provide collateral exactly as they require these lending conditions from men. Discrimination occurs if female entrepreneurs with the same characteristics as their male counterparts are denied a loan when they apply for it.

On the one hand, there is no discrimination against female business owners/managers according to an experiment on female owners of micro-enterprises in Sri Lanka (De Mel et al., 2009). According to Bellucci et al (2010), female owners/entrepreneurs experience tight access to credit in Italy but do not pay higher interest rates.

For SMEs in India, female entrepreneurs are slightly less likely to be credit-constrained (Wellalage and Locke, 2017). Firm data from 16 sub-Saharan African countries show that female manufacturing entrepreneurs enjoy favoritism (positive discrimination) for micro and small firms compared to their male counterparts, whereas the advantage is reversed for medium-sized firms (Hansen and Rand, 2014).

On the other hand, discrimination occurs against female business owners/managers. There is discrimination in a small sample of Canadian firms (Riding and Swift, 1990), as shown in the US Surveys of Small Business Finances that was investigated over a period of 16 years (Cole and Mehran, 2009). Female-owned firms in the US pay higher interest rates than their male counterparts and are more likely to put up collateral (Coleman, 2000). Muravyev et al. (2009) contend that discrimination in the credit market takes place across both Western and Eastern European firms, wherein female entrepreneurs face higher interest rates or higher requested collateral compared to their male counterparts.

Presbitero et al. (2014) use a Fairlie nonlinear decomposition model to test for the presence of a gender gap in access to finance in three Caribbean countries. The outcomes are that female entrepreneurs are less likely than other comparable firms to be discouraged borrowers, but they are more likely to be credit rationed.

Bardasi et al. (2011) analyze a sample of more than 20,000 firms from 61 developing countries (Central and Eastern Europe, Latin America, and Sub-Saharan Africa), based on World Bank surveys from 2005 to 2007. The sample is corrected for an endogeneity bias, but not for other selection biases affecting these surveys (Berguiga and Adair, 2019). A multinomial logit model addresses the following situations: a) businesses do not need a loan, b) businesses need a loan but do not apply for it, c) businesses need a loan and apply for it (in the latter case, either the loan application is approved, or it is dismissed). There is no gender discrimination in access to formal funding.

From an institutional perspective, the question arises as to whether legislation prohibits gender discrimination in access to credit (Hyland et al., 2020). There is no prohibition in six MENA countries, with the exception of Morocco (World Bank, 2021). The Barriers to Women Entrepreneurship Index displays varied scores (Hyland et al., 2020).

Gender stereotypes are pervasive in a 2016 survey of nearly 10,000 people aged 18-59 from Egypt, Lebanon, Morocco, and Palestine. Most men believe that women are not fit to manage, should not work outside their homes, and that educating boys is more important than educating girls (IMAGES, 2017).

Amara et al. (2018) apply a logistic regression and propensity score matching upon a cross-section sample of 9,382 individuals and find that female entrepreneurs experience significant gender discrimination in Tunisia.

A non-representative sample of 583 female entrepreneurs was collected by women's associations in six MENA countries: Egypt, Jordan, Lebanon, Morocco, Palestine, and Tunisia (Carco et al., 2017). Female entrepreneurs, aged 40 on average, are mostly university graduates and have 10 years of experience in their family-based businesses that operate in services as well as trade and craft rather than manufacturing industries. The share of non-registered businesses is over one-third in Egypt, whereas it is only four to 10 percent in Morocco and Tunisia. As for access to financing, the difficulty of being a female entrepreneur compared to being a male entrepreneur is lowest in Egypt (19.80 percent) and Tunisia (25.70 percent) and highest in Morocco (49.50 percent) and Palestine (36.40 percent).

1.2. Risk aversion and self-selection on the borrower's demand-side

Female entrepreneurs are supposedly more prone to risk aversion than men (Watson, 2012), an inhibition resulting from fear of failure (Poggesi et al., 2016). However, the female risk aversion hypothesis proves controversial.

There is scant literature on the subject, aside from game experiments on young students (Borghans et al., 2009) and professional traders (Charness and Gneezy, 2012) pointing out strong or mild female risk aversion, depending on the context. Real-life situations remain little investigated, with the exception of Parrotta and Smith (2013), who find a negative association between female CEOs and risk attitudes in a panel sample of medium-sized Danish companies.

Among MENA countries, only the North Africa sub-region is analyzed by Morsy et al. (2019) in a sample of 6,097 registered firms employing at least five employees from several distorted WBES datasets (Egypt, Mauritania, Morocco, and Tunisia). A multinomial logistic regression rules out self-selection in response to discriminatory lending and finds no evidence of gender discrimination. However, an instrumented probit model highlights self-selection, combining low perceived creditworthiness and female risk aversion.

Berguiga and Adair (2021) draw a pooled sample of 3,896 businesses in Egypt, Morocco, and Tunisia from the 2013 WBES, pointing out sample biases and including microenterprises that Morsy et al. (2019) overlooked. Four out of five managers are owners, whereas a relevant distinction between these two sub-categories applies to the remaining share of managers who are non-owners, a distinction that Morsy et al. (2019) do not document. The main results of two multinomial logistic regressions investigate loan demand and loan granting with respect to self-selection versus discrimination. Results show that there is neither self-selection nor discrimination against female owners, whereas self-selection affects female managers.

2. The WBES data source: Pitfalls, advantages, and descriptive statistics

2.1. The WBES sample: Pitfalls and advantages

The WBES data source encapsulates three pitfalls. One is the lack of representativeness, which is twofold. First, the share of medium and large businesses in the sample is overrepresented, despite the fact that these categories account for less than 10 percent of all MENA enterprises (Ayadi and Sessa, 2017). Second, although it is a minor share in the distribution of industries, the manufacturing industry is overrepresented.

Another pitfall is the underestimation of the informal sector (ILO, 2013), mostly made of micro-enterprises (less than 10 employees) that are not registered in order to avoid taxes and/or social security contributions. A quarter of the enterprises employing more than 20 workers remain informal (unregistered) for almost four years after their start (Gatti et al., 2014).

The last pitfall is that the various thresholds used to design the categories of enterprises do not comply with the international standards of the ILO and the UN System of National Accounts. Micro-enterprises include one to four employees, whereas the standard definition is one to nine employees. Small businesses comprise five to 19 employees, although the standard definition is 10 to 49 employees. Medium-sized enterprises encapsulate 20 to 99 employees, whereas it should be more than 50 employees.

Nevertheless, the WBES has two main advantages. On the one hand, there is consistent coverage in all countries, including the manufacturing industry and the services sector (trade, transportation, and construction) and excluding agriculture, public utilities, government services, healthcare, and financial services industries. On the other hand, the harmonized questionnaire collects a large amount of data through face-to-face interviews with firm managers and owners. The finance topic is thoroughly investigated with 26 questions, and overall information on loan applications by the businesses during the survey period is available.

2.2. Descriptive statistics

There are discrepancies between male and female entrepreneurs regarding industry, ownership, the size of the business, age, and registration.

In Table 1, females – both as owners and managers – are less represented than males, below one out of seven (13.33 percent) and slightly above one out of 20 (5.31 percent), respectively. Female entrepreneurs are more concentrated in Tunisia. It is noteworthy that the overall category of female entrepreneurs deserves to be disentangled into the two subcategories of female owners and female managers that we present hereafter. We also compare their profiles to those of their male counterparts.

Female-owned businesses are slightly more involved in the manufacturing industry, whereas female-managed enterprises are more involved in services; both male owners and managers are more involved in the manufacturing industry. Female-owned businesses operate in shareholding and partnership companies, recording almost four out of five cases, whereas three out of five female managers operate in shareholding and partnership companies; the share for both male owners and managers is just slightly over half. Nearly nine out of 10 female owned-companies are mature, a slightly larger share than eight out of 10 for female-managed companies. Similarly, the share is close to nine out of 10 for both male-owned and managed companies. Almost two-thirds of female-owned businesses are micro or small, and the share is up to three out of four female-managed businesses, which is also the share of both male-owned and managed businesses.

Female owners are slightly less registered (98.8 percent), whereas female managers are slightly more registered (99.4 percent) than their male counterparts. In this respect, figures should be considered irrelevant. Registration is obviously overestimated due to the underestimation of micro-enterprises, the workforce of which is most likely informal (i.e., lacking social protection).

Table 1 reports the distribution of loan applications by gender.

Nine out of 10 businesses do not apply for credit, while only one out of 10 do. The proportion of female owners (16.97 percent) applying for a loan is twice as high as that of male owners (8.58 percent), but women enjoy a slightly lower acceptance rate (76.56 percent) than men (77.8 percent). Conversely, the share of loan applications granted to businesses run by females is almost identical to that of their male counterparts, suggesting that female managers are not discriminated against.

Table 1. Loan demand by gender

Demand		No loan demand N (%)	Loan demand to financial institutions*			Total
			Granted N (%)	Rejected N (%)	Total	
<i>Gender of the owner</i>	<i>Female</i>	626 (83.02)	98 (76.56)**	30 (23.43)	128	754
	<i>Male</i>	4,655 (91.41)	340 (77.8)	97 (22.19)	437	5,092
	Total	5 281 ^a	438	127	565 ^c	5,846
<i>Gender of the manager</i>	<i>Female</i>	283 (88.71)	28 (77.77)	8 (22.22)	36	319
	<i>Male</i>	5,023 (90.30)	420 (77.92)	119 (22.07)	539	5,562
	Total	5.306 ^b	448	127	575 ^d	5,881

Note: * banks and non-banking financial institutions. ** % of loan demand. ^a n.a=32, ^bn.a=14 ^c n.a= 38, ^d n.a= 73.
Source: Authors from the WBES.

The absence of demand for credit from businesses owned or/and managed by women is explained either by the lack of need for credit, or by self-selection due to various costs and constraints, such as the complexity of application procedures, unfavorable interest rates, excessive collateral requirements, concern that the application will be rejected, and other reasons.

Table 2 records that both female owners (50.55 percent) and managers (42.6 percent) are more prone to self-selection than their male counterparts.

Table 2. Absence of loan demand and self-selection by gender

	<i>Gender of the owner</i>			<i>Gender of the manager</i>		
	Female N (%)	Male N (%)	Total N (%)	Female N (%)	Male N (%)	Total N (%)
Need for a loan (self-selection)	319 (50.55)	1,862 (39.89)	2,181 (41.16)	118 (42.60)	2,072 (41.04)	2,190 (41.12)
No need for a loan	312 (49.44)	2,805 (60.10)	3,117 (58.83)	159 (57.4)	2,976 (58.95)	3,135 (58.87)
Total	631 (100.00)	4,667 (100.00)	5,298 (100.00)	277 (100.00)	5,048 (100.00)	5,325 (100.00)
Personal loan	113 (15.18)	347 (6.90)	460 (7.97)	46 (14.42)	418 (7.81)	5,349 (92.01)
No personal loan	631 (84.81)	4,685 (93.10)	5,316 (92.03)	273 (85.57)	5,072 (94.82)	464 (7.99)
Total	744 (100.00)	5,032 (100.00)	5,776 (100.00)	319 (100.00)	5,349 (100.00)	5,813 (100.00)

Note: Percentages read on the vertical axis.
Source: Authors from WBES.

Female owners are more self-selecting than male owners, especially in North Africa, which is not in line with the result of Morsy et al. (2019) for North Africa. Female managers are more self-selecting than their male counterparts, both in the overall sample and in North Africa. This result is consistent with that of Berguiga and Adair (2021) for North Africa.

Very few businesses have used personal loans to finance their activities and this use proves higher for businesses owned and managed by females than for their male counterparts.

Almost all businesses owned or managed by females enjoy financial inclusion (bank accounts), which is not the case for their male counterparts, while female owners seem to face less favorable financing conditions than their male counterparts. Three out of four female owners must pledge two assets and repay their credit within a (very) short period of time, whereas three out of four male owners must pledge two assets, but less than three out of five do repay their

credit within a (very) short period of time. Conversely, there is mixed evidence regarding female managers. On the one hand, they enjoy better funding conditions than their male counterparts with respect to collateral; less than three out of five female managers did get credit with at least two guarantees compared to three out of four male managers. On the other hand, three out of four female managers face (very) short loan repayment durations, compared to less than three out of five male managers. This suggests that both female-owned and female-managed businesses are more prone to finance working capital than fixed assets, but it does not necessarily imply that discrimination occurs. Interest rates that could shed some light are unfortunately unavailable in the 2019 WBES.

3. Probit regressions: Self-selection and discrimination

3.1. Model design

We split the full set into two subsets. The first subset addressing the demand side includes 5,320 businesses that did not apply for a loan in 2018 (Middle East) or 2019 (North Africa), whereas the second subset comprising 648 businesses that did apply for a loan tackles the supply side. We design two models, which we estimate with probit regressions (See Box 1), according to a decision tree (See Figure 1).

Box 1. Models

Both models apply to every business i located in country $k = [1 \text{ (Egypt)}, 2 \text{ (Jordan)}, 3 \text{ (Lebanon)}, 4 \text{ (Morocco)}, 5 \text{ (Palestine)}, \text{ and } 6 \text{ (Tunisia)}]$.

The model for loan demand depends on the first and second options (A and B) of the decision tree as follows:

$$Self - selection_{ik} = \begin{cases} 0 & \text{if credit was needed but not applied for in 2018/19} \\ 1 & \text{if credit was not needed and not applied in 2018/19} \end{cases}$$

The model for funding supply depends on the second and third options (B and C) of the decision tree as follows:

$$Discrimination_{ik} = \begin{cases} 0 & \text{if the business applying for a loan did not get credit in 2019/20} \\ 1 & \text{if the business applying for a loan did get credit in 2019/20} \end{cases}$$

* Discrimination is potential and depends on the comparison between female and male entrepreneurs.

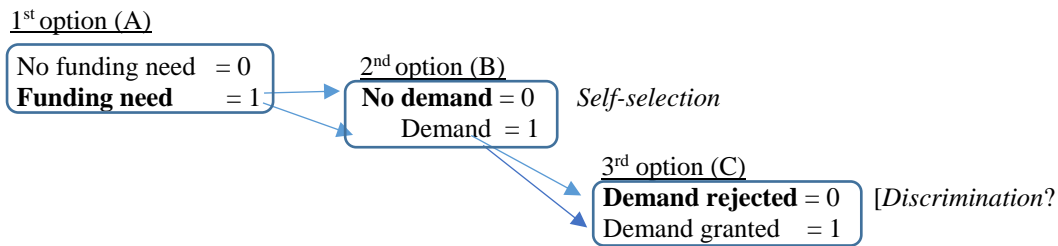
Both models are estimated according to the general equation for the explained variable Y :

$$E(Y = 1/X_{ikj}) = P_{ikj} = \sum_j \alpha_j X_{ikj} + \sum_j \beta_j W_{ikj} + \sum_j \varphi_j Z_{ikj} + \gamma_j S_{jk} + \varepsilon_j$$

Wherein explanatory variables are the following: X_j = business characteristics W_j = financing need; Z_j = characteristics of the loan; S_{jk} = macroeconomic indicators (control variables), and ε_j is the error term.

Source: Authors.

Figure 1. Decision tree: Sequential model for the 2019 sample



Source: Authors.

3.2. Self-selection

In the self-selection model based on the subsample of businesses that did not apply for a loan, the explained variable is the dummy of *no need for a loan and no demand versus the need for a loan and no demand*. The gap is attributed to self-selection. Explanatory variables are *access to personal loans, business characteristics, managers' characteristics, and the macroeconomic environment*. Gender variables (*Gender ownership and Gender of managers*) are used as explanatory variables in models 1 and 2, then we build sub-samples of females and males in models 3 and 4.

Table 3 displays the estimation for self-selection. According to models 1 and 2, significant variables include the following: *Personal loan, Size (micro, small and medium), Industry, Ownership (Shareholding), Gender ownership, Sales Turnover, Inflation, GDP per capita, and North African sub-region*.

The sign of the *Gender ownership* variable is positive: being a female owner increases the probability of self-selection by more than five percentage points compared to that of male owners. The self-selection of women owners is then stronger than that of men. However, there is no significant relationship between female leaders and self-selection.

Examining the determinants of self-selection for both sub-samples of owners and managers by gender (models 3 and 4) allows us to test the robustness of models 1 and 2, but only for male entrepreneurs. The probability of self-selection of male entrepreneurs (owners and managers) vis-à-vis financial institutions increases when the company is a micro, small, or medium-sized enterprise (MSMEs) requesting personal loans and investing in the non-industrial sector. Conversely, being an owner in a company with shareholding status reduces the probability of self-selection of women owners by 14 percent compared to that in sole proprietorships.

The macroeconomic environment, in particular the *Zone* in which the business is located, has an important impact on the self-selection behavior of men and women (owners only). It seems that the financing conditions for companies in North Africa are more favorable because these companies self-select less than those in the Middle East.

Estimating these different models on a sub-sample of MSMEs constitutes a test of robustness and again confirms the results found previously.

The *Gender ownership* variable (model 1) remains significant. It has self-selection for female owners but not for female managers. This result contradicts that of Morsy et al. (2019) and Berguiga and Adair (2021) showing that female managers in North Africa self-select more than their male counterparts whose businesses have the same characteristics but over a different period (2012-13).

Size (micro and small) has a positive impact on self-selection only for male entrepreneurs and this impact is more pronounced for micro-enterprises compared to other businesses (*small, medium, and large*).

3.3. Discrimination

Another Probit regression was estimated on a subsample of 648 firms that applied for a loan. In order to capture discrimination, Gender variables (*Gender ownership and Gender of manager*) are used as explanatory variables separately (Models 1 and 2), then simultaneously (Model 3). These models are also estimated on a subsample of MSMEs in order to check robustness.

According to Table 4, significant variables include *Gender Ownership, Ownership (partnership), Sales Turnover, and Zone*.

Being a female owner increases the likelihood of credit rejection compared to their male counterparts. Although it is interesting to identify the means used by financial institutions to exercise this discrimination, the size of the sample of females versus males is quite small in order to run an estimation on subsamples.

However, there is no statistical evidence of discrimination in the credit market against female managers versus their male counterparts in the six MENA countries. This outcome is consistent with the models of discrimination in North Africa and corroborates that of Morsy et al. (2019) and Berguiga and Adair (2021), who find no statistical evidence of discrimination against female manager entrepreneurs in the credit market in North Africa.

The *Ownership* variable (*Partnership*) has a negative impact on the probability of rejection of a loan application from a company insofar as the company that establishes partnership relations will be considered more solvent.

Companies operating in North Africa have a higher likelihood of credit rejection than those operating in the Middle East, but the *Zone* variable is weakly significant.

There is a positive relationship between the likelihood of rejection and *Sales Turnover*, which is a relevant (although indirect) indicator of business profitability and solvency. However, this relationship is weakly significant.

Table 3. Estimation of probit regressions: The self-selection model (marginal effects)

Variables	Model	(1)	(2)	(3)		(4)		(1)	(2)	(3)		(4)	
		Full sample MENA	Full sample MENA	Gender ownership		Gender manager		Sub-sample MSMEs	Sub-sample MSMEs	Gender ownership		Gender manager	
			Females	Males	Female	Males			Females	Males	Female	Males	
Personal loan (ref.: <i>no personal loan</i>)		0.1703***	0.1751***	0.0334	0.2068***	0.2426**	0.1670***	0.1764***	0.1811***	0.0325	0.2157***	0.2510**	0.1753***
Size: Micro (ref.: <i>-Large/ Medium</i>)		0.1878***	0.1922***	0.0551	0.2199***	0.1221	0.1981***	0.1312***	0.1356***	0.0669	0.1440***	0.1761	0.1345***
Size: Small (ref.: <i>Large Medium</i>)		0.1559***	0.1582***	0.0319	0.1862***	0.0749	0.1658***	0.1011***	0.1036***	0.0434	0.1128***	0.1280	0.1043***
Size: Medium (ref.: <i>Large</i>)		0.1282***	0.1269***	-0.0269	0.1713***	-0.1033	0.1440***						
Industry: Manuf. (ref.: <i>Retail and services</i>)		-0.0644***	-0.0648***	-0.0720	-0.0618***	0.1505	-0.0759***	-0.0668***	-0.0670***	-0.0708	-0.0644***	0.1554	-0.0783***
Age: Mature (ref.: <i>Start-up + young</i>)		0.0179	0.0172	0.0199	0.0222	-0.1481	0.0337	0.0162	0.0155	0.0195	0.0186	-0.1557	0.0308
Ownership: Sharehold. (ref.: <i>Sole prop.</i>)		-0.0491*	-0.0426*	-0.1423**	-0.0344	-0.0598	-0.0422	-0.0509**	-0.0446*	-0.1428**	-0.0379	-0.0620	-0.0448*
Ownership: Partner. (ref.: <i>Sole prop.</i>)		-0.0460	-0.0346	-0.0982	-0.0418	0.0609	-0.0378	-0.0521*	-0.0410	-0.0969	-0.0494	0.0723	-0.0446
Financial inclusion (ref.: <i>Excluded</i>)		0.0163	0.0178	-0.1034	0.0273	0.0648	0.0162	0.0148	0.0168	-0.1038	0.0249	0.0670	0.0150
Gender ownership: Female (ref.: <i>Male</i>)		0.0562**						0.0575**					
Gender of manager: Female (ref.: <i>Male</i>)			0.0567						0.0588				
Sales turnover		0.0027	0.0021	-0.0147	0.0053	0.0139	0.0017	0.0026	0.0020	-0.0146	0.0054	0.0131	0.0016
Inflation		-0.0244***	-0.0237***	-0.0354*	-0.0232***	0.0046	-0.0249***	-0.0239***	-0.0232***	-0.0352*	-0.0223***	0.0023	-0.0245***
GDP per capita		0.0000**	0.0000**	0.0000*	0.0000*	-0.0000	0.0000**	0.0000**	0.0000**	0.0000*	0.0000*	-0.0000	0.0000***
Zone: North Africa (ref.: <i>Middle East</i>)		-0.2924***	-0.2931***	-0.3493***	-0.2887***	-0.2102	-0.2940***	-0.2894***	-0.2901***	-0.3489***	-0.2841***	-0.2217	-0.2912***
Observations		2,130	2,140	366	1,764	127	2,013	2,130	2,140	366	1,764	127	2,013
Log Likelihood		-1334.663	-1342.226	-235.64	-1090.321	-79.931	-1255.928	-1339.5716	-1347.1009	-235.6882	-1097.2894	-80.1092	-1261.8487
LR statistic		208.71	208.17	32.74	187.05	17.49	198.37	199.64	199.47	32.25	171.86	16.43	188.13
Mc Fadden R2		0.0767	0.0757	0.0691	0.0833	0.091	0.0774	0.0733	0.0724	0.069	0.0774	0.0890	0.0731
Predicted cases		64.69	65.23	60.38	65.76	66.14	65.33	64.27	64.53	59.84	65.42	65.35	65.33

Note: Robust z-statistics are omitted for the sake of parsimony. *** p<0.01, ** p<0.05, * p<0.1. Source: Authors.

Table 4. Estimation of probit regressions: The discrimination model (Marginal effects)

Variables	Model	(1) Gender ownership	(2) Gender manager	(3) Gender Ownership + Gender manager	(1) Gender ownership	(2) Gender manager	(3) Gender Ownership + Gender manager
Collateral: <i>Requested</i> (ref.: <i>non request.</i>)		0.0296	0.0231	0.0301	0.0304	0.0241	0.0306
Gender: <i>Female</i> (ref.: <i>Male</i>)		0.0961***		0.0931***	0.0935***		0.0925***
Gender of manager: <i>Female</i> (ref.: <i>Male</i>)			0.0667	0.0096		0.0592	0.0031
Financial inclusion (ref.: <i>Excluded</i>)		-0.0843	-0.0915	-0.0853	-0.0858	-0.0938	-0.0862
Loan purpose: <i>Working capital or fixed assets</i>		0.0647	0.0490	0.0642	0.0662	0.0502	0.0661
Size: <i>Micro</i> (ref.: <i>Large /Medium</i>)		0.0720	0.0540	0.0725	0.0444	0.0243	0.0442
Size: <i>Small</i> (ref.: <i>Large /Medium</i>)		0.0681	0.0650	0.0702	0.0404	0.0341	0.0407
Size: <i>Medium</i> (ref.: <i>Large</i>)		0.0430	0.0480	0.0448			
Industry: <i>Manufacturing</i> (ref.: <i>Retail and services</i>)		0.0492	0.0272	0.0488	0.0504	0.0276	0.0503
Age: <i>Mature</i> (ref.: <i>Start-up + young</i>)		-0.0700	-0.0452	-0.0686	-0.0697	-0.0464	-0.0692
Ownership: <i>Shareholding.</i> (ref.: <i>Sole proprietor</i>)		0.0318	0.0265	0.0316	0.0342	0.0309	0.0342
Ownership: <i>Partnership</i> (ref.: <i>Sole proprietor</i>)		-0.0957**	-0.0624	-0.0939**	-0.0936**	-0.0624	-0.0930**
Sales turnover		-0.0095	-0.0110*	-0.0096	-0.0100	-0.0112*	-0.0100*
Inflation		0.0109	0.0091	0.0107	0.0105	0.0087	0.0104
GDP per capita		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Zone: <i>North Africa</i> (ref.: <i>Middle East</i>)		0.0750*	0.0720*	0.0752*	0.0753*	0.0693*	0.0754*
Observations		249	253	249	249	253	249
Log Likelihood		-44.993	-47.774	-44.977	-45.273	-48.131	-45.271
LR statistic		43.57	46.37	44.24	45.93	46.41	46.16
Mc Fadden R2		0.2424	0.1992	0.2427	0.2377	0.1932	0.2377
Predicted cases		94.38	93.68	94.38	94.38	93.68	94.38

Note: Robust z-statistics are omitted for the sake of parsimony. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors.

4. Enlarging the picture: The informal sector and funding from the microfinance industry

The aforementioned results from the WBES suggesting the absence of discrimination and some self-selection for female managers prove inconsistent with several more qualitative surveys, though based upon smaller samples. Over a quarter of the businesses among 400 female entrepreneurs in Morocco (AFEM, 2015) faced difficult access to finance. Less than one out of six among 200 female micro-entrepreneurs in Egypt (ILO, 2016) applied for a loan but less than half were granted a loan, with female business owners claiming that lending conditions were too restrictive and interest rates were too high. Access to finance was the major obstacle for seven out of 10 businesses in a sample of 201 female entrepreneurs in Tunisia (OIT, 2016).

Banks loans do bear an interest rate and require collateral, and the share of loans increases with the size of businesses (Rocha et al, 2011), whereas loans from microfinance institutions (MFIs) charge an interest rate but do not usually require collateral and fund, especially micro-enterprises.

Micro-enterprises are underrepresented in the WBES and this is a serious bias for several reasons. First, because these businesses are the most widespread and more prone to be informal, the self-employed and micro-enterprises account for more than 50 percent of employment in the manufacturing industry, and informal employment accounts for more than 60 percent of overall employment (ILO, 2019). Second, they are facing the most difficult access to finance (Kushnir et al., 2010) and they include a significant share of female entrepreneurs (ILO, 2018). The WBES overlooks the role of microfinance that is included in non-banking financial institutions, a puzzling result in as much as the *raison d'être* of the microfinance industry is to provide funding to micro and small enterprises, most of which are informal, not registered with a national government authority, and without bookkeeping (ILO, 2013). For instance, almost one out of six informal micro-enterprises in Morocco enjoyed micro-credit, whereas one out of 20 was granted a bank loan (HCP, 2016).

Hence, funding from the microfinance industry displays a better picture than that of the WBES. Table A3 (in the Appendix) reports the key figures of the microfinance industry, namely 20 MENA microfinance institutions (MFIs) with the most complete client data that we selected from the MIX database. Among active borrowers (NAB), three out of five are females and more than nine out of 10 are MSMEs. In the first place, MFIs grant micro-credit to micro-enterprises, a share above eight out of 10, whereas for SMEs it is only one out of 10. More than two out of five businesses are granted loans according to the joint liability mechanism, suggesting they lack collateral. The average loan balance per borrower in MENA is weak, with the exception of Palestine standing above average. In contrast, the average lending rate is high, within a range of 25-36 percent, although borrowers pay back. In this respect, MSMEs can afford to fund working capital rather than fixed assets.

Agier and Szafarz (2013) do not detect discrimination in female access to credit from a Brazilian MFI. However, they observe that the largest female projects face the highest penalty, thereby confirming that micro-credit is not the best vehicle for funding capital investment. These results are consistent with observations from MENA MFIs, as well as from micro-enterprises in

Morocco (HCP, 2016). We assume that female active borrowers from MENA MFIs were either self-selecting and/or discriminated against by formal finance or that they simply prefer microfinance. Such assumptions are worth a test that goes beyond the scope of this paper.

Discussion and conclusions

There is a gap according to gender between loan demand from businesses and loan supply from financial institutions in the six selected MENA countries. On the demand side, such a gap could be driven by the endogenous self-selection behavior of female entrepreneurs due to risk aversion from the borrower. On the supply side, discrimination against females from financial institutions would be based upon risk aversion from the lender.

A probit regression model was estimated on a subsample of 5,320 businesses that did not apply for a loan, and it tested self-selection behavior with respect to gender. The results show that the factors driving loan applicants to self-selection are the business characteristics (*Size of businesses, Gender ownership, Sector, Ownership*), the use of *Personal loans*, and the macroeconomic environment. It suggests that female owners are more prone to self-selection than their male counterparts. This self-selection is influenced by the ownership of shareholding and the macroeconomic environment.

A probit regression model was estimated on a subsample of 648 businesses that applied for a loan, and it addressed discrimination from financial institutions. The results show the presence of discrimination against female owners but not managers.

It is noteworthy that the self-selection behavior of female entrepreneurs on the demand side may come from some previous discrimination by financial institutions on the supply side. However, we have no clue in this respect.

The estimation of these two probit regression models (upon a subsample of MSMEs) checks the robustness of results. Companies in North Africa self-select less than those in the Middle East, although they are more rejected by the credit market.

There is also credit market segmentation as suggested by the obvious mismatch between demand from MSMEs addressing NBFIs (including microfinance), which proves quite small in the WBES sample and the large loan supply provided by MFIs to micro-enterprises according to the MIX. One may think that the microfinance industry, which is pro-female and borrower-oriented, helps overcome both self-selection and discrimination.

Admittedly, there are shortcomings in our study, which leaves room for extended research. So far, we used a cross-sectional analysis and we could not discern a trend that would require panel data. In this respect, investigating recent surveys (WBES, 2020 and 2021; OAMDI COVID-19 Monitor) in the MENA region would enlarge the overall sample and measure the evolution of the gender gap over time. Adjustment of the supply and demand for funding calls for better sampling, including both micro-enterprises and microfinance institutions. On the demand side, self-selection from MSMEs that refrain from applying for bank credit calls for an in-depth

analysis of the role of the microfinance industry. Finally, the issue of informality should be addressed, in as much as many micro and small enterprises are informal business entities without registration and/or social protection.

Our findings have important policy implications for closing the gender gap in accessing finance. One way to increase women's demand for financial services is to introduce financial products to meet their needs (ex. loan guarantee schemes and basic social protection coverage). Governments can help develop these new products by strengthening the microfinance industry with a favorable regulatory and institutional framework.

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Appendix

Table A1. Distribution of the pooled sample by gender: Owners and managers

		<i>Gender of the owner</i>			<i>Gender of the manager</i>		
		<i>Female</i> N (%)	<i>Male</i> N (%)	<i>Total</i> N	<i>Female</i> N (%)	<i>Male</i> N (%)	<i>Total</i> N
Country	<i>Egypt</i>	220 (7.19)	2 839 (92.8)	3,059	140 (4.56)	2,929	3,069
	<i>Morocco</i>	170 (15.76)	908 (84.23)	1,078	76 (7.05)	1,001	1,077
	<i>Tunisia</i>	212 (36.11)	375 (63.88)	587	58 (9.44)	556	614
	<i>Lebanon</i>	61 (11.46)	471 (88.53)	532	25 (4.69)	507	532
	<i>Jordan</i>	126 (21.35)	464 (78.64)	590	28 (4.66)	572	600
	<i>Palestine</i>	39 (10.74)	324 (89.25)	363	5 (1.38)	356	361
	Total	828 (13.33)	5,381 (86.66)	6,222	332 (5.3)	5,921	6,253
Sub-region	<i>North Africa</i>	602 (12.74)	4,122 (87.25)	4,724	274 (5.75)	4,486	4,760
	<i>Middle East</i>	226 (15.21)	1,259 (84.89)	1,485	58 (3.88)	1,435	1,493
	Total	828 (13.33)	5,381 (86.66)	6,209	332 (5.3)	5,921	6,253
Gender owner / manager	<i>Female</i>	190 (23.05)	139	329	190 (22.90)	634	824
	<i>Male</i>	634 (10.83)	5,219	5,853	139 (25.94)	5,219	5,358
	Total	824	5,358	6,182	329	5,853	6,182
Ownership	<i>Sole proprietorship</i>	174 (6.27)	2,599	2,773	131 (4.71)	2,646	2,777
	<i>Partnership</i>	338 (16.96)	1,654	1,992	120 (5.97)	1,889	2,009
	<i>Shareholding</i>	310 (22.03)	1,097	1,407	80 (5.6)	1,347	1,427
	Total	822	5,660	6,482	331 (5.32)	5,882	6,213
Industry	<i>Manufacturing.</i>	447 (12.87)	3,024	3,472	158 (4.52)	3,337	3,495
	<i>Retail and services</i>	381 (13.91)	2,367	2,738	174 (6.3)	2,584	2,758
	Total	828	5,381	6,209	332 (5.4)	5,921	6,253
Size	<i>Micro</i>	168 (9.72)	1,559	1,727	95 (5.4)	1 641	1,736
	<i>Small</i>	367 (12.80)	2,499	2,866	153 (5.32)	2,718	2,871
	<i>Medium-sized</i>	116 (18.86)	499	615	37 (5.98)	581	618
	<i>Large</i>	174 (17.82)	802	976	45 (4.48)	958	1,003
	Total	825	5,359	6,184	330 (5.29)	5,898	6,228
Registration	<i>Not registered</i>	11 (26.82)	30 (73.31)	41	2 (4.76)	40 (9.52)	42
	<i>Registered</i>	811 (13.23)	5,316	6,127	327 (5.29)	5,850 (94.70)	6,177
	Total	822	5,376	6,127	329 (5.29)	5,890	6,219
Age	<i>Young</i>	95 (15.57)	652	747	54 (7.21)	694 (92.78)	748
	<i>Mature</i>	706 (15.27)	4,623	5,329	265 (4.93)	5,109 (95.06)	5,374
	Total	801 (15.03)	5,275	6,076	319 (0.53)	5 803	6,122
Total	828 (13.33)	5,381 (86.66)	6,209 ^a	332 (5.3)	5,921 (94.69)	6,253	

Note: percentages read on the horizontal axis. ^a n.a. = 75, ^b n.a. = 31

Source: Authors from the WBES 2019.

Table A2. Dictionary of variables

	Name	Type	Definition	Units	Source
Gender	<i>Gender ownership</i>	Discrete	<i>Female = 1</i> <i>Male = 2</i>	Binary (1, 2)	WBES <i>Calculated</i>
	<i>Gender Top manager</i>	Discrete	<i>Female = 1</i> <i>Male = 2</i>	Binary (1, 2)	WBES
Other characteristics of the firm	<i>Industry</i>	Discrete	<i>Manufacturing = 1</i> <i>Retail and services = 2</i>	Binary (1, 2)	WBES <i>Calculated</i>
	<i>Size</i>	Discrete	Full-time permanent staff <i>Micro: 1-9 employees = 1</i> <i>Small: 10-49 employees = 2</i> <i>Medium: 50-99 employees = 3</i> <i>Large: 100 + employees = 4</i>	Ordinal (1, 2, 3 and 4)	WBES <i>Calculated</i>
	<i>Age</i>	Discrete	Number of years <i>Start-up + young <8 years = 1</i> <i>Mature >=8 years = 2</i>	Binary (1, 2)	WBES <i>Calculated</i>
	<i>Ownership</i>	Discrete	<i>Sole proprietorship = 1</i> <i>Partnership = 2</i> <i>Shareholding = 3</i>	Ordinal (1, 2, and 3)	WBES <i>Calculated</i>
	<i>Financial inclusion</i>	Discrete	<i>Excluded (no bank account) = 0</i> <i>Included (bank account) = 1</i>	Dummy (0,1)	WBES
	<i>Sales Turnover</i>	Continuous	<i>Ln(Sales turnover) as of 2019</i>	Currency unit	WBES <i>Calculated</i>
	Financing need of the firm	<i>Personal loans</i>	Discrete	<i>No personal loans = 0</i> <i>Personal loans used to finance business activities = 1</i>	Dummy (0, 1)
	<i>Loan purpose</i>	Discrete	<i>Working capital or fixed assets = 1</i> <i>Working capital + fixed assets = 2</i>	Binary (1,2)	WBES <i>Calculated</i>
Characteristics of the loan	<i>Collateral</i>	Discrete	<i>No collateral requested = 0</i> <i>Collateral requested = 1</i>	Dummy (0, 1)	WBES
	<i>Loan duration</i>	Continuous	Duration of the loan in months <i>Very short term: < 6 months = 1</i> <i>Short term: 6 -24 months = 2</i> <i>Mid-long term: >24 months = 3</i>	Ordinal (1, 2, 3)	WBES <i>Calculated</i>
Zone	<i>North Africa</i> <i>Middle East</i>	Discrete		Dummy	WBES
Macroeconomic indicators	<i>Inflation</i>	Continuous	Rate of inflation	Percentage	WDI
	<i>GDP per capita</i>	Continuous	GDP per capita	\$ billion	WDI

Source: Authors from WBES (2019) and World Development Indicators (WDI).

Table A3. MFIs in the selected MENA countries (2017)

Country	MFIs	NAB * (1,000)	Average loan balance /GNI per capita **	Rural borrowers (%)	Female borrowers (%)	Solidarity groups (% of loans)	Number of loans outstanding			Lending rate (%)	PAR> 30 ***	Risk coverage (%)
							MSMEs	Micro	SMEs			
<i>Egypt</i>	5	911,7	0.0469	515,5 (56.54)	67	399,571 (43.82)	907,276 (99.5)	813,843	93,433	34.6	0.6	408.1
<i>Jordan</i>	4	246,6	0.1403	106,3 (43.10)	88	151,347 (61.37)	201,300 (81.63)	200,544	0,755	32.5	1.6	210.6
<i>Lebanon</i>	1	72,8	0.1003	32,0 (43.95)	57	15,594 (21.42)	72,802 (100)	72,468	0,334	30.3	6.7	398.8
<i>Morocco</i>	5	519,1	0.1817	227,0 (43.72)	46	98,831 (19.03)	386,288 (74.41)	386,288	0	26.2	6.1	61.9
<i>Palestine</i>	4	73,3	0.9228	34,7 (47.33)	33	0	31,084 (42.40)	29,756	1,328	14.3	5.1	78.0
<i>Tunisia</i>	1	329,5	0.1414	128 (38.88)	61	0	266,646 (80.92)	266,646	0	26.2	0.8	176.3
Total	20	1,823.5		1,043.5 (57.22)	1,063.294 (58.31)	665.343 (36.48)	1,865.402 (80.55)	1,769.545 (94.86)	97,178			

Note: * Number of Active Borrowers. ** A close proxy to GDP per capita. *** Portfolio At Risk >30 days. Figures in italics are above average.

Source: MIX (2017), WGI (2017).