Series of ERUDITE Working Papers

N° 13-2021

Title

Exogenous vs. endogenous obstacles to funding female entrepreneurs

in MENA countries

Authors

Philippe Adair, Imène Berguiga

Exogenous vs. Endogenous Obstacles to Funding Female Entrepreneurs in MENA Countries

Imène Berguiga[1] et Philippe Adair[2]

Abstract Do female entrepreneurs in MENA countries face obstacles in funding their business, either exogenous (discrimination) or endogenous (self-selection)? Literature review provides 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 *Micro*, *Small* and *Medium* sized Enterprises from the 2019 World Bank Enterprise Survey (WBES) including three North African countries (Egypt, Morocco and Tunisia) and three Middle East countries (Jordan, Lebanon and Palestine) documents the financial behaviour of both owners and managers according to gender. Two logistic regression models address loan supply and loan demand with respect to discrimination vs self-selection. There is neither discrimination nor self-selection for female owners, while female managers are prone to self-selection, as compared with their male counterparts. Self-selection behaviour from the demand side is not issued from discrimination on the supply side. A breakdown of the sample by geographic area (Middle East vs. North Africa) provides a robustness test and points out a "sub-region" effect on financing discrepancies by gender. 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. Hence, public authorities should support pooling loan guarantees in favour of female entrepreneurs, i.e. a positive discrimination.

Keywords: Bank credit; Discrimination; Entrepreneurs; Gender; Logistic regressions; Microfinance; Middle East and North Africa; Self-selection.

JEL Classification: D1; D8; D22; G2; G4.

Introduction.

The case of Middle East and North Africa (MENA) region is especially interesting, because the pervasive patriarchal pattern hinders the ability of women to own and manage their own businesses (IMAGES, 2017). Noteworthy is that gender gap for access to finance in 2017 is 18 per cent 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 confronting women entrepreneurs in MENA countries (AFEM, 2015; ILO, 2016; OIT, 2016). We tackle the finance issue for female entrepreneurs in six MENA countries, a set of resource-poor/labour abundant economies (Gatti et al, 2014), namely three North African countries (Egypt, Morocco and Tunisia) and three Middle East 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, almost one out of eight among 6,253-businesses owned by males and females in 2019. There is little empirical investigation on the topic of female entrepreneurship and, to our best knowledge, almost no paper so far has addressed this

[1] University of Sousse (IHEC), Tunisia. Email : imne068@yahoo.fr
[2] University Paris-Est Créteil, ERUDITE. Email: adair@u-pec.fr

funding issue as of 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 proves controversial. Section 2 points out the advantages and setbacks of the 2019 WBES data source as for the six MENA countries, including selection biases with respect to the underweight of micro and small sized businesses and the overweight of the manufacturing industry. It presents descriptive statistics upon the finance issue according to gender ownership and gender management, females accounting respectively for 13.05 per cent and 5.42 per cent of the sample. Section 3 displays logistic models and estimations as regards loan demand and loan supply, according to which there is neither self-selection nor discrimination as for 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 microenterprises in the six MENA countries. In so doing, 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 a prejudice towards 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.

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

On the one hand, no discrimination affects female business owners/managers according to an experiment upon micro-enterprises female owners 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.

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

On the other hand, discrimination occurs for female business owners/managers

There is discrimination in a small sample of Canadian firms (Riding & Swift, 1990), as in the US Surveys of Small Business Finances that was investigated over a period of sixteen years (Cole & Mehran, 2009). Women-owned firms in the US pay higher interest rates than male counterparts do and are more likely to put up collateral (Coleman, 2000). Muravyev et al (2009) contend that discrimination on the credit market takes place across both Western and Eastern European firms, wherein female entrepreneurs face higher interest rate 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.

Gender stereotypes are pervasive in a 2016 survey upon 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 home, and that educating boys it more important than educating girls (IMAGES, 2017).

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

A non-representative sample of 583 female entrepreneurs was collected by women 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 enjoy 10 years of experience in their family-based businesses that operates in the services, trade and craft, rather than in the manufacturing industries. The share of non-registered businesses is over one third in Egypt, whereas it is only four to 10 per cent 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%) and Tunisia (25.70%), *versus* highest in Morocco (49.50%) and Palestine (36.40%).

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

Female entrepreneurs are supposedly more prone to risk aversion than men are (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 besides game experiments on young students (Borghans et al, 2009) and professional traders (Charness & Gneezy, 2012) pointing out strong or mild female risk aversion, which depends on context. Real-life situations remain little investigated, with the exception of Parrotta & Smith (2013) who find a negative association between female CEO and risk attitudes upon a panel sample of Danish medium sized companies.

Among MENA countries, only the North Africa sub-region is analysed by Morsy et al. (2019) upon 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.

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 overweighed, despite the fact that these categories account for less than 10 per cent of all MENA enterprises (Ayadi and Sessa, 2017). Second, although it is minor share in the distribution of industries, the manufacturing industry is overweighed.

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 over 20 workers remain informal (unregistered) during almost four years since 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 international standards from the International Labour Office and the UN System of National Accounts. *Micro*-enterprises include 1-4 employees, whereas the standard definition is 1-9 employees. Small businesses comprise 5-19 employees, although the standard definition is 10-49 employees. Medium-sized enterprises encapsulate 20-99 employees, whereas it should be over 50 employees.

Nevertheless, WBES has two main advantages. On the one hand, there is consistent coverage in all countries, including the manufacturing industry and the services (trade, transportation and construction sectors) and excluding agriculture, public utilities, government services, health care and financial services industries. On the other hand, the harmonised questionnaire collects a large amount of data through face-to-face interviews with firm managers and owners. The finance topics is thoroughly investigated with 26 questions and overall information on loan application by 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 business, age and registration.

In Table 1, females both as owners and managers are less represented than males are, respectively below one out of seven (13.30 %) and slightly above one out of twenty (5.31 %). Female entrepreneurs are more concentrated in Tunisia. Noteworthy is that the overall category of female entrepreneurs deserves to be disentangled into the two subcategories of female owners and female managers we present hereafter. We also compare their profiles with those of their male counterparts.

Table 1. Distribution of the pooled sample by gender: owners and managers

		Gender of the owner			***Gender of the manager***		
		Female	***Male***	**Total**	***Female***	***Male***	**Total**
		N (%)	N (%)	N	N (%)	N (%)	N
Country	*Egypt*	220 (7.19)	2 839 (92.8)	3 059	140 (4.56)	2 929	3069
	Morocco	170 (15.76)	908 (84.23)	1 078	76 (7.05)	1 001	1077
	Tunisia	212 (36.11)	375 (63.88)	587	58 (9.44)	556	614
	Lebanon	61 (11.46)	471 (88.53)	532	25 (4.69)	507	532
	Jordan	126 (21.35)	464 (78.64)	590	28 (4.66)	572	600
	Palestine	39 (10.74)	324 (89.25)	363	5 (1.38)	356	361
	Total	828 (13,33)	5 381 (86.66)	6222	332 (5.3)	5 921	6253
Sub-region	*North Africa*	602 (12.74)	4 122 (87.25)	4724	274 (5.75)	4 486	4760
	Middle East	226 (15.21)	1 259 (84.89)	1 485	58 (3.88)	1 435	1493
	Total	828 (13.33)	5 381 (86.66)	6 209	332 (5.3)	5 921	6253
Gender owner / manager	*Female*	190 (23.05)	139	329	190 (22.90)	634	824
	Male	634 (10.83)	5219	5853	139 (25.94)	5219	5358
	Total	824	5358	6182	329	5853	6182
Ownership	*Sole proprietorship*	174 (6.27)	2599	2773	131 (4.71)	2646	2777
	Partnership.	338 (16.96)	1654	1992	120 (5.97)	1889	2009
	Shareholding	310 (22.03)	1097	1407	80 (5.6)	1347	1427
	Total	822	5660	6482	331 (5.32)	5882	6213
Experience of the manager	*Beginner: <2 years*	12	49	61	7	50	57
	Young: 2-7 years	70	523	593	43	551	594
	Mature: > 8 years	712	4663	5375	270	5146	5416
	Total	794	5235	6029	320	5747	6067
Industry	*Manufacturing.*	447 (12.87)	3024	3472	158 (4.52)	3337	3495
	Retail & services	381 (13.91)	2367	2738	174 (6.3)	2584	2758
	Total	828	5381	6209	332 (5.4)	5921	6253
Size	*Micro*	168 (9,72)	1559	1727	95 (5.4)	1 641	1736
	Small	367 (12,80)	2 499	2866	153 (5.32)	2 718	2871
	Medium-sized	116 (18,86)	499	615	37 (5.98)	581	618
	Large	174(17,82)	802	976	45 (4.48)	958	1003
	Total	825	5359	6184	330 (5.29)	5 898	6228
Registration	*Not registered*	11 (26.82)	30 (73.31)	41	2 (4.76)	40 (9.52)	42

	Registered	811(13,23)	5316	6127	327 (5.29)	5 850 (94.70)	6177
	Total	822	5376	6127	329 (5.29)	5 890	6219
Age	*Young*	95(15,57)	652	747	54 (7.21)	694 (92.78)	748
	Mature	706(15,27)	4623	5329	265 (4.93)	5 109 (95.06)	5374
	Total	801(15,03)	5275	6076	319 (0.53)	5 803	6122
Total		828(13,33)	5381 (86,66)	6209[a]	332 (5.3)	5 921 (94.69)	6253

Note: percentages read on the horizontal axis. [a] n.a. = 75, [b] n.a. = 31
Source: Authors from WBES 2019.

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 are operating in shareholding and partnership companies, almost four out of five cases, whereas three out of five female managers are operating in shareholding and partnership companies; the share for both male owners and managers is just slightly over a half. Nearly nine out of ten female owned-companies are mature, a slightly larger share than over eight out of ten for female-managed companies; similarly, the share is close to nine out of ten 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 business. Female owners are slightly less registered (98.8%), whereas female managers are slightly more registered (99.4%) than their male counterparts are; figures in this respect should be considered as irrelevant. Registration is obviously overestimated, due to the underestimation of micro enterprises, whose workforce is most likely to be informal (i.e. lacking social protection).

Table 2 reports the distribution of loan application by gender.

Table 2. Loan demand by gender

Demand		**No loan demand**	**Loan demand to financial institutions***			**Total**
			Granted	**Rejected**	**Total**	
		N (%)	N (%)	N (%)		
Gender of the owner	*Female*	626 (83.02)	98 (76.56)**	30 (23.43)	128	754
	Male	4,655 (91.41)	340 (77.8)	97 (22.19)	437	5,092
	Total	5 281[a]	438	127	565[c]	5,846
Gender of the manager	*Female*	283 (88.71)	28 (77.77)	8 (22.22)	36	319
	Male	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, [b]n.a=14 [c] n.a= 38,[d] n.a= 73.*
Source: Authors from WBES.

Nine out of ten businesses do not apply for credit, while only one out of ten does. The proportion of female owners (16.97%) applying for a loan is twice as high as that of male owners (8.58%), but women enjoy a slightly lower acceptance rate (76.56%) than that of men (77.8%). This discrimination occurs present in North Africa but not in the Middle East. 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.

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 complexity of application procedures, unfavourable interest rates, excessive collateral requirement, concern that application will be rejected and other reasons.

Table 3 records that both female owners (51.95%) and managers (42.6%) are more prone to self-selection than their male counterparts are.

Table 3. Absence of loan demand and self-selection by gender

	Gender of the owner			*Gender of the manager*		
	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)	5,34 9 (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) as 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) as for North Africa.

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

Table 4 records the characteristics of successful application (loan granted) according to gender.

Table 4. Characteristics of successful loan application by gender of the owner/manager

		Financial inclusion			**Requested collat**			**Number of collateral**				**Loan duration**			
		Yes	**No**	**Total**	**Yes**	**No**	**Total**	**None**	**One**	**Two+**	**Total**	**Very ST**	**ST**	**MLT**	**Total**
Gender of the owner	*Female*	97	1	98	69	6	75	2	15	46	61	23	14	12	49
	Male	318	21	339	212	23	235		53	148	201	23	70	84	177
	Total	415	22	437	281	29	310	2	83	194	277	46	14	12	49
Gender of the manager	*Female*	28	-	28	15	3	18	1	4	7	12	3	5	3	11
	Male	397	22	419	272	26	298	1	64	190	255	43	79	95	217
	Total	425	22	447	287	29	316	2	68	197	267	46	84	98	228

Note: ST= short term; MLT= mid-long term.
Source: Authors' calculations from WBES.

Almost all businesses owned or managed by women enjoy financial inclusion (bank account), which is not the case for their male counterparts, whilst female owners seem to face less favourable financing conditions than their male counterparts do benefit. 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 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 do 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 duration, compared with less than three out of five male managers. This suggest that both female owned and managed businesses are more prone to finance working capital than fixed assets, but it does not necessarily imply that discrimination occurs. In contrast with 2013 WBES, interest rates that could shed some light prove unfortunately unavailable in 2019 WBES.

3. Logistic regressions: Self-selection and discrimination

3.1. Model design

We split the full set into two sub-sets. 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 logistic regressions (See Box 1).

Box 1. Models

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

The model for loan demand is the following:

$$Loan\ demand_{ik} = \begin{cases} 1\ if\ credit\ was\ applied\ for\ and\ granted\ in\ 2019/20 \\ 0\ if\ credit\ applied\ for\ was\ not\ granted\ in\ 2019/20 \end{cases}$$

The model for funding supply is the following:

$$Loang\ granted_{ik} = \begin{cases} 1\ if\ the\ business\ enjoyed\ getting\ credit\ in\ 2019/20 \\ 0\ if\ the\ business\ enjoyed\ access\ to\ other\ funding\ sources\ in\ 2019/20 \end{cases}$$

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

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

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

3.2. Self-selection

We estimated the self-selection model based on the subsample of 5,306 businesses that did not apply for a loan. The explained variable is the dummy: *No need for a loan and no demand vs. 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*, disentangling the subsample between females and males.

Table 6 displays the estimation for self-selection. Pseudo R^2 is very weak and the ratio of predicted cases is very good. Non-significant variables include: *Age of the firm* and *experience of the manager, ownership, financial inclusion, gender of the owner,* and *sales*. Significant variables inclue: *Personal loan* (female owner and female manager)*, size –micro* and *smal*l (only female manager)*, industry* (only female manager)*, inflation* and *GNI per capita (*female owner and female manager) and *North Africa sub-region (*female owner and female manager).

Size (*micro* and *small*) has a positive impact upon self-selection for female and for male owners. There is statistical evidence of self-selection affecting female managers in the selected MENA countries, which is mainly driven by *Size* (*micro* and *small*). This finding contradicts that of Morsy et al (2019) contending that *Size* is not a key factor in the female self-selection on the credit market in North Africa. Conversely, it is consistent with the finding of Berguiga & Adair (2021).

3.3. Discrimination

Another logistic regression with interaction was estimated on a subsample of 648 firms that applied for a loan in 2018 and 2019 in order to capture discrimination, noteworthy is that the size of the sample of females vs. males is quite small. Pseudo R^2 is weak and the ratio of predicted cases is very good. *Gender of the owner* and *gender of the manager* are used as explanatory variables, and as variables interacting with variables from the banking supply-side (*collateral* and *financial inclusion*).

According to Table 7, non-significant variables include: *financial inclusion, industry, age of the firm* and *experience of the manager*, and interacting variables (*collateral*gender* and *financial inclusion*gender*).

Significant variables include *collateral*, (female owner), *gender* (female manager), *loan purpose* (female owner and female manager only for North Africa), *size –micro* and *smal*l (female owner and female manager)*, ownership (*female owner and female manager)*, Sales (*female owner and female manager)*, inflation* and *GDP per capita (*female owner and female manager)*, North Africa sub-region (*female owner and female manager).

There is no statistical evidence of discrimination on the credit market against female owners and female managers vs. their male counterparts in the selected MENA countries. This outcome corroborates that of Morsy et al (2019) and Berguiga & Adair, who find no statistical evidence of discrimination against female managers on the credit market in North Africa.

Table 6. Estimation of logistic regressions: the self-selection model

Model	**(1)**	**(2)**		**(3)**		**(1)**	**(2)**		**(3)**	
	Full sample	**Gender ownership**		**Gender manager**		**Sub-sample**	**Gender ownership**		**Gender manager**	
Variables	**MENA**	**Females**	**Males**	**Female**	**Males**	**North Africa**	**Females**	**Males**	**Female**	**Males**
Personal loan	0.6481***	0.4593	0.7086***	0.7985	0.6441***	0.5920***	0.4481	0.6302***	0.8518	0.5779***
(ref.: *no personal loan)*	(3.8000)	(1.3109)	(3.6353)	(1.3855)	(3.6192)	(3.6121)	(1.3164)	(3.3715)	(1.5325)	(3.3641)
Size:*Micro*	0.3480**	-0.4115	0.5161***	0.4916	0.3417**	0.2897**	-0.4135	0.4403***	0.4900	0.2795*
*(*ref.: *Large*)	(2.4520)	(-1.1250)	(3.3094)	(0.7260)	(2.3465)	(2.0663)	(-1.1407)	(2.8476)	(0.7218)	(1.9464)
Size: *Small*	0.3039**	-0.3021	0.4573***	0.1136	0.3231**	0.2573*	-0.3447	0.4065**	0.1335	0.2700*
*(*ref.: *Large*)	(1.9992)	(-0.8260)	(2.7352)	(0.1595)	(2.0845)	(1.6751)	(-0.9516)	(2.3835)	(0.1887)	(1.7234)
Size: *Medium*	0.4114***	-0.1646	0.5471***	0.5297	0.4051***	0.3819***	-0.2001	0.5157***	0.5400	0.3729***
*(*ref.: *Large*)	(3.4360)	(-0.5316)	(4.1416)	(0.9227)	(3.3006)	(3.1486)	(-0.6459)	(3.8381)	(0.9310)	(3.0049)
Industry: *Manufacturing*	0.0825	0.1538	0.0632	0.7952**	0.0558	0.0867	0.1341	0.0784	0.8185**	0.0569
(ref.: *Retail and services)*	(1.1655)	(0.7487)	(0.8341)	(2.2772)	(0.7714)	(1.2449)	(0.6581)	(1.0552)	(2.4177)	(0.7995)
Age:*Mature*	0.0480	0.0451	0.0567	-0.5917	0.0823	-0.0061	0.0385	-0.0107	-0.6099	0.0245
(ref.: *Start-up + young)*	(0.4286)	(0.1443)	(0.4681)	(-1.3544)	(0.7083)	(-0.0558)	(0.1248)	(-0.0907)	(-1.4004)	(0.2167)
Ownership: *Shareholding*	-0.1443	0.2270	-0.2559**	0.4006	-0.1549	0.0091	0.2670	-0.0523	0.4166	0.0043
(ref.: *Sole proprietorship)*	(-1.4707)	(1.0142)	(-2.3030)	(1.0060)	(-1.5307)	(0.0966)	(1.2008)	(-0.5021)	(1.0573)	(0.0445)
Ownership: *Partnership*	-0.0545	0.1225	-0.0706	-0.1231	-0.0733	-0.0827	0.1750	-0.1137	-0.1433	-0.0968
*(*ref.: *Sole proprietorship)*	(-0.6733)	(0.4499)	(-0.8282)	(-0.3421)	(-0.8930)	(-1.0225)	(0.6577)	(-1.3336)	(-0.3944)	(-1.1764)
Financial inclusion	0.0204	0.0767	-0.0081	0.6317	0.0145	0.1545*	0.2015	0.1361	0.6547	0.1491*
(ref.: *Excluded)*	(0.2340)	(0.2376)	(-0.0883)	(1.3948)	(0.1629)	(1.7822)	(0.6278)	(1.5007)	(1.4387)	(1.6896)
Manager experience: *Young*	0.0826	0.2322	0.0348	-1.0215	0.1449	0.0483	0.2032	0.0235	-1.1266	0.1357
(ref.: Beginner)	(0.1538)	(0.2186)	(0.0564)	(-1.1598)	(0.2400)	(0.0969)	(0.1930)	(0.0416)	(-1.2790)	(0.2430)
Manager experience: *Mature*	0.1897	-0.0961	0.2031	-0.2174	0.2133	0.2314	-0.0851	0.2802	-0.2977	0.2830
(ref.: Beginner)	(0.3583)	(-0.0932)	(0.3338)	(-0.2598)	(0.3583)	(0.4727)	(-0.0833)	(0.5041)	(-0.3559)	(0.5149)
Gender ownership: *Female*	0.2153*					0.1781				
(ref.: *Male)*	(1.7940)					(1.5362)				
Gender top manager: *Female*	0.0443					0.1434				
(ref.: *Male)*	(0.2810)					(0.8998)				
Turnover	-0.1557***	-0.2493***	-0.1309***	-0.2278**	-0.1574***	-0.2288***	-0.2824***	-0.2158***	-0.2617***	-0.2316***
	(-6.5283)	(-4.3287)	(-5.0111)	(-2.0388)	(-6.4511)	(-10.5322)	(-5.2878)	(-9.1074)	(-2.8197)	(-10.4086)
Inflation	-0.1409***	-0.1047***	-0.1426***	-0.2214***	-0.1400***	-0.2168***	-0.1520***	-0.2265***	-0.2516***	-0.2176***
	(-11.6175)	(-2.7519)	(-11.0701)	(-3.4878)	(-11.3662)	(-22.2855)	(-5.2866)	(-21.6942)	(-4.9860)	(-21.9889)
GNI per capita	-0.0003***	-0.0001	-0.0004***	-0.0002	-0.0003***	0.0001***	0.0001	0.0001**	0.0001	0.0001***
	(-5.1879)	(-0.7398)	(-5.7453)	(-0.4751)	(-5.1266)	(2.6408)	(1.1148)	(2.1493)	(0.3353)	(2.6960)
Zone: *North Africa*	-1.6752***	-0.9064**	-1.8969***	-1.0141	-1.6949***					
(ref.: *Middle East*)	(-9.0874)	(-1.9643)	(-9.2506)	(-0.7392)	(-9.1370)					

Constant	4.7198***	5.3666***	4.8066***	5.4062***	4.8400***	2.9933***	4.3931***	3.0665***	4.2325***	37.638***
	(6.7295)	(4.0782)	(6.5877)	(2.7639)	(6.9231)	(4.6429)	(3.5650)	(4.7404)	(2.9615)	(7.356)
Observations	4739	538	4206	243	4519	4739	538	4206	243	3,554
Log Likelihood	-2649.625	-321.512	-2315.124	-134.897	-2520.670	-2699.29	-323.726	-2367.75	-135.336	-2101.684
LR statistic	701.5	84.53	611.11	44.89	676.66	680.25	75.62	601.3	44.86	397.03
Mc Fadden R2	0.1601	0.1368	0.1655	0.1747	0.1614	0.1444	0.1309	0.1465	0.1721	0.101
Predicted cases	72.59%	67.66 %	73.61 %	72.43 %	73.03 %	72.17 %	68.96 %	72.87 %	72.84 %	72.15 %

Note: Robust z-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: Authors

Table 7. Estimation of logistic regressions: the discrimination model

	Gender ownership		Gender manager		Genre owner (NA)		Gender manager (NA)	
Full sample	**(1)**	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
MENA	**Females**	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**	**Males**
Variables								
Collateral*:* *Requested*	-1.2223**		-1.1730**		-1.2215**		-1.1740**	
(ref.: *non requested*)	(-2.1001)		(-2.0532)		(-2.0998)		(-2.0543)	
Gender: *Female*	0.4447		0.9445		0.4386		0.9243	
(ref.: *Male)*	(0.8923)		(1.3994)		(0.8856)		(1.3970)	
Financial inclusion	-0.4527		-0.5150		-0.4383		-0.4966	-0.4527
(ref.: *Excluded)*	(-0.4751)		(-0.5375)		(-0.4610)		(-0.5189)	(-0.4751)
Loan purpose: *Working*	-0.5191	-0.5156	-0.5932	-0.6083	-0.5314	-0.5286	-0.6090	-0.6217
capital or fixed assets	(-1.1449)	(-1.1309)	(-1.3403)	(-1.3645)	(-1.1876)	(-1.1754)	(-1.3894)	(-1.4079)
Size: *Micro*	1.1322	1.1477	1.1138	1.1964	1.1509	1.1674	1.1387	1.2205
*(*ref.: *Large*)	(1.4426)	(1.4282)	(1.4322)	(1.4391)	(1.4836)	(1.4689)	(1.4769)	(1.4921)
Size: *Small*	0.7753	0.8037	0.8489	0.9238	0.7875	0.8164	0.8648	0.9395
*(*ref.: *Large*)	(1.1933)	(1.1728)	(1.3618)	(1.3849)	(1.2236)	(1.2018)	(1.3966)	(1.4256)
Size: *Medium*	0.2719	0.3222	0.2788	0.4109	0.2921	0.3424	0.3058	0.4369
*(*ref.: *Large*)	(0.3994)	(0.4507)	(0.4034)	(0.5422)	(0.4431)	(0.4938)	(0.4548)	(0.5963)
Industry: *Manufacturing*	0.8257	0.8359	0.8148	0.8161	0.8187	0.8287	0.8043	0.8078
(ref.: *Retail & services)*	(1.4860)	(1.5141)	(1.4861)	(1.5019)	(1.4777)	(1.5042)	(1.4709)	(1.4862)
Age: *Mature*	-0.5421	-0.5386	-0.4279	-0.4539	-0.5447	-0.5412	-0.4286	-0.4559
(ref.: *Start-up + young)*	(-0.7563)	(-0.7531)	(-0.5711)	(-0.6087)	(-0.7669)	(-0.7640)	(-0.5751)	(-0.6153)
Ownership: *Shareholding.*	-1.0302*	-1.0226*	-0.9443*	-0.9342*	-1.0044**	-0.9957**	-0.9086*	-0.9038*
(ref.*: Sole proprietor)*	(-1.9027)	(-1.8851)	(-1.7990)	(-1.7508)	(-2.0260)	(-1.9944)	(-1.9116)	(-1.8744)
Ownership: *Partnership*	-1.8466**	-1.8416**	-1.9104**	-1.8966**	-1.8346**	-1.8295**	-1.8947**	-1.8827**
*(*ref.: *Sole proprietor)*	(-2.3306)	(-2.3563)	(-2.4784)	(-2.4969)	(-2.3362)	(-2.3600)	(-2.4766)	(-2.5000)
Manager experience: *Young +Beginner*(ref : *Mature)*	1.1738*	1.1787*	1.2246*	1.2200*	1.1860*	1.1912*	1.2420*	1.2345*
	(1.7209)	(1.7308)	(1.8278)	(1.8055)	(1.7439)	(1.7553)	(1.8572)	(1.8320)
Sales Turnover	**-0.1424**	**-0.1458**	**-0.1417**	**-0.1455**	**-0.1434**	**-0.1469**	**-0.1432**	**-0.1467**
	(-1.0777)	(-1.1113)	(-1.0596)	(-1.0820)	(-1.0743)	(-1.1081)	(-1.0582)	(-1.0808)
Inflation	-0.1637	-0.1641	-0.1643*	-0.1719*	-0.1725**	-0.1733**	-0.1764**	-0.1824**
	(-1.6278)	(-1.6387)	(-1.7022)	(-1.6882)	(-2.1530)	(-2.1683)	(-2.3188)	(-2.2861)
GNI per capita	-0.0001	-0.0001	-0.0002	-0.0002	-0.0001	-0.0001	-0.0001	-0.0001
	(-0.4998)	(-0.4994)	(-0.6022)	(-0.5591)	(-0.4436)	(-0.4371)	(-0.5186)	(-0.5003)
Zone: *North Africa*	-0.1319	-0.1387	-0.1867	-0.1565				
(ref.: *Middle East*)	(-0.1778)	(-0.1877)	(-0.2503)	(-0.2085)				
Collateral* *Gender*								
Collateral Female*		-1.5866		-2.1105		-1.5819		-2.1286

		(-1.3396)		(-1.5671)		(-1.3348)		(-1.5902)
Collateral Male*		-1.0848*		-1.0364*		-1.0854*		-1.0344*
		-1.5866		(-1.6496)		-1.5819		(-1.6478)
Fin. inclusion* Gender								
Fin.inclusion Female*		0.3930		1.2435		0.3974		1.2582
Collateral* *Gender*		(0.2801)		(0.9962)		(0.2840)		(1.0087)
Collateral Female*		-0.4626		-0.4950		-0.4474		-0.4783
		(-0.4926)		(-0.5216)		(-0.4773)		(-0.5049)
Constant	3.7448	3.6646	3.8573	3.7135	3.5852	3.4988	3.6297	3.5180
	(1.4417)	(1.4149)	(1.4635)	(1.4246)	(1.5241)	(1.4902)	(1.5180)	(1.5010)
Observations	299	299	302	302	299	299	302	302
Log Likelihood	-93.589	-93487	- 93.13	-92.870	-93.6	-93.50	-93.16	-92.895
LR statistic	26.14	25.74	31.88	33.57	25.99	25.6	31.64	33.32
Mc Fadden R2	0.1781	0.1790	0.1850	0.1873	0.1779	0.1788	0.1788	0.1871
Predicted cases	88.29 %	89.14 %	89.37 %	89.37 %	87.96 %	88.29 %	88.74 %	88.41 %

Note: Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1. NA: North Africa

Source: Authors

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

Aforementioned results from 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 was granted, female business owners claiming that lending conditions were too restrictive and interest rates too high. Access to finance was the major obstacle as for seven out of ten businesses in a sample of 201 female entrepreneurs in Tunisia (OIT, 2016).

Banks loans do bear an interest rate and require a 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 a collateral and fund especially micro-enterprises.

Microenterprises prove 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 per cent of employment in the manufacturing industry, and informal employment accounts for more than 60 per cent 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, being 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 a microcredit, 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 WBES.

Table 8 reports the key figures of the microfinance industry, namely 20 MENA MicroFinance Institutions (henceforth 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 over nine out of ten are MSMEs. In the first place, MFIs grant micro-credit to *Micro*-enterprises, a share above eight out of ten, whereas SMEs is only one out of ten. Over two out of five businesses are granted loans according to the joint liability mechanism, suggesting they lack collateral.

Table 8. 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			
Egypt	5	911,7	0.0469	515,5 (56.54)	67	399,571 (43.82)	907,276	813,843	93,433	34.6	0.6	408.1
Jordan	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
Lebanon	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
Morocco	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
Palestine	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
Tunisia	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. ** Portfolio At Risk >30 days.
Source: MIX (2017), WGI (2017).

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 payback. In this respect, MSMEs can afford funding working capital rather than fixed assets.

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 endogenous self-selection behaviour of female entrepreneurs due to risk aversion from the borrower. On the supply side, discrimination against females from financial institutions would be grounded upon risk aversion from the lender.

A logistic regression model was estimated on a subsample of 5,320 businesses that did not apply for a loan and did test self-selection behaviour with respect to gender. The results show that the factors driving loan applicants to self-selection are the *Size* of businesses (*Micro*), *Gender*, the use of *Personal loans* and the macroeconomic environment. It suggests that female managers are more prone to self-selection than their male counterparts.

A logistic regression model was estimated on a subsample of 648 businesses that applied for a loan in 2018 or 2019 and did address discrimination from financial institutions. The results show that discrimination is mainly driven by specific characteristics of businesses as *Size (Micro* and *Small), Ownership, Sales Turnover,* and *Loan purpose*., which affects female managers rather than owners. However, the interaction of bank lending practices related to requested *Collateral* and *Financial inclusion* with gender variables shows the absence of discrimination against female owners and managers.

Self-selection behaviour on the demand side does not come from discrimination on the supply side: this result confirms that of Morsy et al (2019) and Berguiga and Adair (2021). The estimation of these two logistic regression models upon a subsample of businesses operating in the North Africa area brings in a robustness check, which confirms the lack of self-selection for both sexes, whereas female managers face discrimination in this area.

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 micro finance industry, which is pro-female borrower-oriented helps overcome both self-selection and discrimination.

Admittedly, there are shortcomings in our study, which leave room enough for extended research. In so far we used a cross-section analysis, 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 a better sampling including both Microenterprises 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. At last, the issue of informality should be addressed, in as much as many Micro and Small enterprises are informal business entities without registration or/and 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 (e.g., loan guarantees scheme, social protection basic coverage). Governments can help develop these new products by strengthening the microfinance industry with a favourable regulatory and institutional framework.

References

AFEM (2015). Evaluation du vivier entrepreneurial au Maroc. Rapport. Association des femmes chefs d'entreprise au Maroc, Casablanca, Maroc.

Amara, M., Khallouli, W., & Zidi, F. (2018). Gender Discrimination in the Tunisian Labor Market: the Youth crisis *ERF Working Paper* No. 1263, Economic Research Forum, Cairo, December.

Ayadi, R., & Sessa, E. (Eds) (2017). *Micro, Small and Medium-Sized Enterprises Development in Egypt, Jordan, Morocco & Tunisia- Structure, Obstacles and Policies*. EMNES, EU project "Support to economic research, studies and dialogue of the Euro-Mediterranean Partnership", ENPI/2014/354-488.

Bastian, B.L., Sidani, Y.M., & El Amine Y. (2018). Women entrepreneurship in the Middle East and North Africa: A review of knowledge areas and research gaps, *Gender in Management,* 33(1): 14-29.

Becker, G. S. (1957). *The economics of discrimination*. Second ed., 1971, University of Chicago press.

Bellucci, A., Borisov, A. & Zazzaro, A. (2010). Does gender matter in bank–firm relationships? Evidence from small business lending. *Journal of Banking & Finance* 34(12): 2968–2984.

Berguiga, I., & Adair, P. (2019). Funding female entrepreneurs in North Africa: self -selection vs. discrimination? MSMEs, the informal sector and the microfinance industry. *International Journal of Gender and Entrepreneurship*,. ahead-of-print.

Berguiga, I. , & Adair, P. (2019). Funding Micro-Small and Medium Size Enterprises in North Africa: is there a Mismatch between Demand and Supply? *ERF Working paper series*, N°1350, Economic Research Forum.

Blanco-Oliver, A., Reguera-Alvarado, N., & Veronesi, G (2021). Credit risk in the microfinance industry: The role of gender affinity. *Journal of Small Business Management*, https://doi.org/10.1080/00472778.2020.1844487

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, National Bureau of Economic Research, Cambridge.

Carco, M., Fayolle, A., & Amara N. (2017). Empowerment for Inclusive and Sustainable Industrial Development in the Middle East and MENA region. A study on women entrepreneurship development in Egypt, Jordan, Lebanon, Morocco, Palestine and Tunisia United Nations Industrial Development Organization (UNIDO).

Charmes, J. (2019). *Dimensions of Resilience in Developing Countries: Informality, Solidarities and Carework*. Springer

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

Cole, R. A., & Mehran, H. (2009). Gender and the availability of credit to privately held firms: evidence from the surveys of small business finances, *Staff Reports 383*, Federal Reserve Bank of New York.

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

Gatti, R., Bodor, A., Angel-Urdinola D. F., & Silva J. (2014). *Striving for Better Jobs: The Challenge of Informality in the Middle East and North Africa*. Washington DC: The World Bank.

Hansen, H., & Rand, J. (2014). The myth of female credit discrimination in African manufacturing. *Journal of Development Studies*, 50(1): 81–96.

Hattab, H. (2012). Towards understanding female entrepreneurship in Middle Eastern and MENA countries: a cross-country comparison of female entrepreneurship, *Education, Business and Society: Contemporary Middle Eastern Issues*, 5(3): 171-186.

HCP (2016). *Enquête nationale sur le secteur informel 2013/2014* [National Survey on the Informal Sector 2013/2014], Haut-Commissariat au Plan, Rabat, Maroc.

ILO (2019). Small matters. Global evidence on the contribution to employment by the self-employed, micro-enterprises and SMEs. Geneva: International Labour Office.

ILO (2018). *Women and men in the informal economy: A statistical picture*. Third edition. Geneva: International Labour Office.

ILO (2016) Women's Entrepreneurship Development Assessment –Egypt. Cairo, Egypt: International Labour Office.

ILO (2015).Women in business and management gaining momentum. Global report, Geneva: International Labour Office.

ILO (2013). *Measuring informality: A statistical manual on the informal sector and informal employment*. Geneva: International Labour Office.

IMAGES (2017). Understanding masculinities, results from the International Men and Gender Equality Study in the Middle East and North Africa, UN Women and Promundo.

Kushnir, K., Mirmulstein, M. L., & Ramalho, R. (2010). Micro, Small, and Medium Enterprises Around the World: How Many Are There, and What Affects the Count? World Bank/IFC

MIX (2015).Global Outreach & Financial Performance Benchmark Report - 2014, https://www.themix.org/sites/default/files/publications/mix_global

MIX (2017). Global Outreach & Financial Performance Benchmark Report - 2017-2018, https://www.themix.org

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

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

OAMDI (2016). *Study on the Constraints Facing the Development of Micro and Small Enterprises",* http://erf.org.eg/data-portal/. Version 1.0 of Licensed Data Files; Egypt CDMSE 2014. Egypt: Economic Research Forum.

OIT (2016). Évaluation nationale du développement de l'entrepreneuriat féminin : Tunisie. Organisation internationale du Travail, Le Caire, Egypte

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. *American Economic Review*, 62(4): 659-661.

Poggesi, S., Mari, M., & De Vita, L. (2016). What's new in female entrepreneurship research? Answers from the literature, *International Entrepreneurship and Management Journal*, 12(3): 735–764.

Presbitero, A. F., Rabellotti, R. & Piras C. (2014). Barking up the Wrong Tree? Measuring Gender Gaps in Firm Access to Finance, *Journal of Development Studies*, 50(10): 1430-1444.

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.

Rocha, R., Farazi, S. Khouri, R., & Pearce, D. (2011).The status of bank lending to SMEs in the Middle East and MENA region : the results of a joint survey of the Union of Arab Bank and the World Bank, *Policy Research Working Paper* 5607, The World Bank, Washington, DC.

Watson, J. (2012). Networking: gender differences and the association with firm performance, *International Small Business Journal*, 30(5): 536–558.

WBES (2019a). World Bank Enterprise Survey – Egypt data set. Washington DC: The World Bank.

WBES (2019b). World Bank Enterprise Survey – Morocco data set. Washington DC: The World Bank.

WBES (2019c). World Bank Enterprise Survey – Tunisia data set. Washington DC: The World Bank.

WBES (2019d). World Bank Enterprise Survey – Lebanon data set. Washington DC: The World Bank.

WBES (2019e). World Bank Enterprise Survey – Jordan data set. Washington DC: The World Bank.

WBES (2019f). World Bank Enterprise Survey – Palestine data set. Washington DC: The World Bank.

Wellage, N. & Locke, S. (2017). Access to credit by SMEs in South Asia: do women entrepreneurs face discrimination. *Research in International Business and Finance*, 41: 336–346.

Weeks, J.R. (2009). Women business owners in the Middle East and North Africa: a five-country research study, *International Journal of Gender and Entrepreneurship*, 1(1): 77-85.

Appendix

Table A1. Dictionary of variables

	Name	Type	Definition	Units	Source
Gender	*Gender ownership*	Discrete	*Female = 1* *Male = 2*	Binary (1, 2)	WBES *Calculated*
	Gender Top manager	Discrete	*Male = 1* *Female = 2*	Binary (1, 2)	WBES
Other characteristics of the firm	*Industry*	Discrete	*Manufacturing = 1* *Retail and services = 2*	Binary (1, 2)	WBES *Calculated*
	Size	Discrete	Full-time permanent staff *Micro: 1-9 employees = 1* *Small:10-49employees= 2* *Medium: 50-99 employees = 3* *Large: 100 + employees = 4*	Ordinal (1, 2, 3 and 4)	*WBES* *Calculated*
	Age	Discrete	Number of years *Start-up + young <8 years = 1* *Mature >=8 years = 2*	Binary (1, 2)	WBES *Calculated*
	Ownership	Discrete	*Shareholding + Partnership = 1* *Sole proprietorship = 2*	Binary (1, 2)	WBES *Calculated*
	Registration	Discrete	*Non registered (informal) = 0* *Registered (formal) = 1*	Dummy (0,1)	WBES
	Financial inclusion	Discrete	*Excluded* (no bank account) *= 0* *Included* (bank account) *= 1*	Dummy (0,1)	WBES
	Turnover	Continuous	*Ln(Sales turnover)* as of 2019	Currency unit	WBES *Calculated*
Characteristics of the manage	*Manager experience*	Discrete	*Beginner:<2 years = 1* *Young: 2-7 years = 2* *mature: >= 8 years = 3*	Ordinal (1, 2, 3)	WBES *Calculated*
Financing need of the firm	*Personal loans*	Discrete	*No personal loans =0* *Personal loans used to finance business activities =1*	Dummy (0, 1)	WBES
	Loan purpose	Discrete	*Working capital or fixed assets = 1* *Working capital + fixed assets = 2*	Binary (1,2)	WBES *Calculated*
Characteristics of the loan	*Collateral*	Discrete	*No collateral requested = 0* *Collateral requested = 1*	Dummy (0, 1)	WBES
	Loan duration	Continuous	Duration of the loan in months *Very short term:< 6 months = 1* *Short term:6 -24 months = 2* *Mid-long term: >24 months= 3*	Ordinal (1, 2, 3)	WBES *Calculated*
	Interest rate	Continuous	Average nominal interest rate (loan or credit) according to the size of business for each country	Percentage	WBES
Macroeconomic indicators	*Inflation*	Continuous	Rate of inflation	Percentage	WDI
	GNI per capita	Continuous	GDP per capita	$ billion	WDI

Source: Authors from World Bank Enterprises Surveys (WBES, 2013) and World Development Indicators (WDI).

Table A2. Correlation matrix

	Discri-mination	*Self-Selectio*	*Size*	*Industry*	*Age*	*Owner-ship.*	*Regis.*	*Gender Owner.*	*Gender Manag.*	*Exper. Manag.*	*Financ. Inclusion*	*Sales*	*Loan Purpose*	*Colla-teral*	*Loan Duratio*	*Inflation*	*GDP per capita*	*Zone*	*Personal Loan*
Discrimi-nation	1.00																		
Self-selection	.	1.00																	
Size	-0.15*	-0.11*	1.00																
Industry	0.09	0.08*	-0.2*	1.00															
Age	-0.05	-0.03	0.12*	-0.08*	1.00														
Ownership	0.09	0.04	-0.27*	-0.01	-0.09*	1.00													
Registrat.	-0.01	-0.02	-0.02	0.04*	0.001*	0.03	1.00												
Gender Ownership	-0.01	-0.07	-0.09	-0.01	-0.005	0.19	0.03	1.00											
Gender Manager	-0.001	-0.007*	0.01	-0.03	0.03*	0.02	0.001	0.31*	1.00										
Experience Manager	-0.1	-0.08*	0.07*	-0.11*	0.32*	-0.08	0.04*	-0.002	0.04*	1.00									
Financial Inclusion	-0.18	-0.08*	0.19*	0.04*	0.09*	-0.25*	0.03	-0.08*	-0.008	0.08*	1.00								
Sales	-0.17*	-0.19*	0.44*	-0.10*	0.14*	-0.29*	0.04*	0.02	0.04*	0.14*	0.28*	1.00							
Loan purpose	0.003	0.14*	0.04*	0.04*	0.006	-0.03*	0.04*	-0.11*	-0.01	-0.01	0.07*	0.02*	1.00						
Collateral	-0.16*	-0.002	-0.1*	-0.01	-0.04	-0.06	-0.02	-0.03	0.03	0.10*	0.07	-0.03	0.11*	1.00					
Loan duration	-0.06	-0.02	0.12*	-0.02	-0.03	0.22	0.03	0.19*	0.07	-0.12*	-0.03	0.18*	0.006*	0.02*	1.00				
Inflation	-0.16*	-0.39*	-0.03	-0.19*	-0.02	0.03*	0.1*	0.11*	0.01	0.16*	0.09*	-0.03	-0.19*	0.21*	-0.07*	1.00			
GDP per capita	-0.03	-0.002*	-0.08*	0.02*	0.05*	-0.06*	0.04*	0.02	0.02	0.07*	0.10*	0.57*	0.07*	0.03	0.33*	-0.18*	1.00		
Zone	0.03	0.30*	-0.11*	0.11*	-0.01	-0.05	0.01	-0.03	0.03*	-0.02	0.04*	0.25*	0.23*	0.06	0.34*	-0.55*	0.70*	1.00	
Personal loan	0.05	0.10*	-0.01	0.06*	-0.02	-0.01	-0.08*	0.10*	-0.06*	0.07*	0.02	-0.04	0.04*	0.05	-0.12*	-0.17*	-0.03	0.01	1.00

Note: * p<0.1. [a] No correlation between *Self-selection* with *Discrimination* because they don't belong to the same sample.
Source: Authors.