WORKING PAPER

Exogenous vs. Endogenous Obstacles to Funding Female Entrepreneurs in MENA Countries (2013-2019)

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Abstract

Do female entrepreneurs in MENA countries face obstacles to funding their businesses, either through self-selection or discrimination? A literature review reveals controversial evidence thereof but, to date, no paper has tackled this funding issue for female entrepreneurs in MENA countries from a dynamic perspective. Three pooled samples, from the 2013 and 2019 World Bank Enterprise Survey (WBES), and a cohort over 2013-2020, include three North African countries (Egypt, Morocco and Tunisia) and three Middle East countries (Jordan, Lebanon and Palestine); they document the financial behaviour of both owners and managers, according to gender. Probit regressions address loan demand (including Heckman probit) and loan supply, with respect to self-selection versus discrimination. In 2013, there is neither self-selection nor discrimination for female entrepreneurs, whereas female entrepreneurs are prone to self-selection in 2019, compared to their male counterparts. Self-selection behaviour from the demand side does not result from discrimination on the supply side. Sampling biases in the WBES, together with the characteristics of female clients of microfinance institutions, suggest that micro-entrepreneurs would have experienced self-selection and, possibly discrimination, regarding credit.

1   INTRODUCTION.

The case of the 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 the gender gap for access to finance is 18 per cent in North Africa as of 2017, registering 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 construct our research questions as follows: Do female entrepreneurs resist borrowing from banks because of their risk aversion? Are female entrepreneurs credit constrained due to discrimination from providers? To what extent are self-selection and discrimination independent and do they change over time?

In this respect, we investigate three pooled samples, including the six MENA countries, which are issued from the World Bank Enterprise Survey (WBES), two panels as of 2013 and 2019/2020 respectively, as well as a cohort from the 2013 panel that is encapsulated in the 2019/2020 panel.

There is little empirical investigation into the topic of female entrepreneurship and, to date, no paper has addressed the funding issue in respect of these six MENA countries from a dynamic perspective, to the best of our knowledge. Hence, our paper provides some new insights.

Section 1 reviews the literature devoted to self-selection and discrimination; there is little evidence regarding female entrepreneurs and outcomes from the loan funding gender issue proving controversial. Section 2 points out the advantages and setbacks regarding the WBES samples for the six MENA countries; it presents the variables and descriptive statistics. Section 3 is devoted to model design and estimations from models applied to self-selection (probit and Heckman probit), as regards loan demand and models applied to discrimination (probit) with respect to loan supply. Section 4 overcomes WBES selection biases with the inclusion of the microfinance industry, which provides a small amount of loans to female microenterprises in the six MENA countries.

2   LITERATURE REVIEW

The literature review on female entrepreneurs in the MENA region is sparse (Bastian et al., 2018) especially regarding comparative analyses based on quantitative data. The Global Entrepreneurship Monitor provides a qualitative comparison for MENA countries from household surveys, but the focus is upon female entrepreneurship, rather than on female-owned or managed actual enterprises (Dudokh & Aqel, 2017).

2.1 Self-selection from the borrowing 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 besides mock-up experiments, with real-life situations remaining little investigated.

Among MENA countries, the North Africa sub-region is analysed by Morsy et al. (2019), covering a sample of 6,097 registered firms with at least five employees, from several distorted WBES datasets (Egypt, Mauritania, Morocco and Tunisia) in 2013 and earlier. 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 & Adair (2021) draw a pooled sample of 3,896 businesses in Egypt, Morocco and Tunisia from the 2013 World Bank Enterprise Survey (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 non-owner managers, a distinction that Morsy et al. (2019) do not document. The main results of two logistic regressions upon loan demand and loan granting, with respect to self-selection vs. discrimination, show there is neither self-selection nor discrimination for female owners, whereas self-selection affects female managers.

2.2 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 certain 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 collateral, exactly as they apply to similar lending conditions for 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, no discrimination affects female business owners/managers, according to an experiment amongst micro-enterprises female owners in Sri Lanka (De Mel et al., 2009).

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

Bardasi et al. (2011) analyse 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 endogeneity bias, but not for other selection biases affecting these surveys. A multinomial logit model addresses the following situations: a) businesses do not need a loan, b) need a loan but do not apply for it, c) 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.

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

Muravyev et al. (2009) contend that discrimination within the credit market takes place across both Western and Eastern European firms, where 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 the presence of a gender gap, regarding access to finance in three Caribbean countries. The outcomes show that female entrepreneurs are less likely than other comparable firms to be discouraged borrowers, but they are more likely to be credit rationed.

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 (World Bank, 2021). Barriers to the Women Entrepreneurship Index displays varied scores (See Table A in the Appendix).

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 home and that educating boys is more important than educating girls (IMAGES, 2017).

Amara et al. (2018), applying logistic regression and propensity score matching of 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'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 enjoy 10 years of experience in their family-based businesses that operate in service industries, trade and craft, rather than in the manufacturing sector. The share of non-registered businesses is over one third in Egypt, whereas it is only between four and 10 per cent in Morocco and Tunisia. The gap to accessing finance for females, compared to their male counterparts, is lowest in Egypt and Tunisia, being highest in Morocco and Palestine.

3   PITFALLS AND ADVANTAGES OF THE WBES DATA SOURCE, VARIABLES AND DESCRIPTIVE STATISTICS

3.1 Pitfalls and advantages of the WBES data source

The WBES samples include three biases which question their representation: the sample size by country, the very small share of unregistered enterprises and the overrepresentation of medium and large enterprises, as well as of the manufacturing industry. Concerning the weight of countries, Egypt is overrepresented (53.02%) and Morocco (7.45%) is very underrepresented in the 2013 panel, whereas the 2019/2020 panel is larger and more balanced with respect to population size; North Africa accounting for about three-quarters (76.16%) of enterprises and the Middle East about a quarter (23.83%). North Africa (56.11% of enterprises) and, particularly, Morocco (10.27%) are under-represented in the 2013-2020 cohort. The almost complete absence of unregistered enterprises (plus or minus 1%) is unrealistic. Lastly, medium and large enterprises amount to around 30%, though these categories account for far less than 10 per cent of all MENA enterprises (Ayadi and Sessa, 2017), whereas the manufacturing industry includes a disproportionately large share (over half the firms).

However, the WBES has two main advantages. On the one hand, the coverage of the private sector is consistent, excluding agriculture, public utilities, government

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services, health care and financial services industries. On the other hand, the harmonised questionnaire collects a large spectrum of data through face-to-face interviews with firm managers and owners. A large set of 26 questions thoroughly investigates the financial topics, whilst overall information on business loan applications during the survey period, is available.

3.2 Samples, variables and descriptive statistics

First of all, we compare the three pooled samples, respectively the 2013 panel (5,464 companies) and the 2019/2020 panel (6,284 companies), as well as the 2013-2019/2020 cohort (1,353 companies). Thus, we can track variables that change from one panel to another or remain constant over time (See Table A2 in the Appendix2).

It is noteworthy that a few variables are constant by construction in the 2013-2020 cohort. This is the case with the weight of enterprises by country, as well as the education of the manager. Conversely, the Manager experience, together with the Age of enterprises, increase in the cohort.

In contrast, some characteristics of companies vary in the same direction, both in the panels as well as in the cohort. Such is the case for Ownership, with an increase of Sole proprietorship, whereas the weight of the Manufacturing industry, together with the share of Micro and Small enterprises, are rising in the panels and decline in the cohort.

In both the panels and the cohort, most funding patterns are consistent: Self-selection rises, whereas Loan application (demand) and Loan purpose (working capital and fixed assets) drop, together with Loan granted (supply) and requested Collateral increases; Loan duration is rising in the panels and drops in the cohort.

As for the Owner gender and Manager gender, the directions are different: the share of female owners declines in both the panels and the cohort, whereas the share of female managers is rising in the panels and declines in the cohort.

As regards the 2013 full sample, self-selection is negatively correlated with Size, Age, Ownership, Financial inclusion and Loan purpose, whereas it is positively correlated with Personal loan which is an alternative to bank credit. Discrimination is negatively correlated with Size, Age, Financial inclusion and Sales Turnover, all variables that prove consistent, whilst it is positively correlated with Sub-region.

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[2] For the sake of parsimony, correlation matrices are omitted, but remain available on request.

With respect to the 2019 full sample, self-selection is negatively correlated with Size, Gender management, Management experience, Financial inclusion, Sales Turnover, Inflation and GDP per capita, where variables are consistent, whereas it is positively correlated with Loan purpose, Personal loan and Sub-region.

Discrimination is negatively correlated with Size, Sales Turnover, Collateral and Inflation.

As regards the 2013 cohort sample, self-selection is negatively correlated with Size, Age, Ownership and Financial inclusion and it is positively correlated with Personal loan and Inflation. Discrimination is negatively correlated with Loan purpose.

With respect to the 2019 cohort sample, self-selection is negatively correlated with Gender ownership and it is positively correlated with Personal loan. Discrimination is negatively correlated with Financial inclusion.

4   PROBIT   REGRESSIONS: SELF-SELECTION   AND DISCRIMINATION

4.1   Model design

Our model is a sequential choice model, which can be best designed with a decision tree, to include three binary options: (A) no funding need vs. funding need prior to (B) no loan application (self-selection) vs. loan application and (C) loan denied (potential discrimination) vs. loan granted (See Box 1 and Figure A1 in the appendix). It is noteworthy that the final choice in the last option does not belong to the companies on the demand side, but to the banks on the supply side. Hence, a nested logistic regression is not an appropriate method. Instead, we use a probit and a Heckman probit for sample selection correction (See Box 1 below and Figure A1 in the Appendix).

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Box 1. Probit model

Both models apply to the pooled sample, including 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 binary and self-selection comes from the absence of application (=0) as follows:

$Self-selection_{ik}$

$$= \begin{bmatrix} \textbf{0 } \textit{\textbf{if credit was needed and not applied for in 2013 and 2019}}/\textbf{2020} \\ \\ \textbf{1 } \textit{if credit was not needed and not applied for in } 2013 \textit{ and } 2019/2020 \end{bmatrix}$$

The model for funding supply is binary and discrimination comes from the denial of application (=0) as follows:

$Discrimination_{ik}$

$$= \begin{bmatrix} \textbf{0 } \textit{\textbf{if credit was applied for and was denied} } * \textit{\textbf{ in 2013 and 2019}}/\textbf{2020} \\ \\ 1 \textit{ if credit was applied for and was granted in } 2013 \textit{ and } 2019/2020 \end{bmatrix}$$

* Discrimination is conditional to the comparison between female and male entrepreneurs.

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

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

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

4.2 Self-selection

Our self-selection model is determined by the following explanatory variables: Characteristics of the business (*Size; Industry; Age; Ownership* and *Gender*) and financial characteristics (*Personal loans; Sales Turnover* and *Financial inclusion*), plus a control variable (*Sub region*).

We use two estimation methods: a probit and a Heckman probit. Heckman probit takes care of selection issues in our samples and checks the robustness of the results obtained with the probit. Such selection issues are as follows: our samples are non-random, a specific type of endogeneity; there are attrition biases due to missing (and truncated) data in the questionnaire; the explanatory variable may be endogenous rather than exogenous; unobservable variables could have an impact on the explanatory variable (Gender) and the explained variable (Self-selection), amongst which there is risk aversion.

Heckman probit is a two-step model. In the first equation, the company decides whether it has not (=0) or has a financing need (=1); in the second equation, provided there is a prior need for funding, it decides whether to self-select (=0) or apply for

credit (=1). The explanatory variables of two equations are the same, only the *loan purpose* variable is added in the second equation.

Both probit and Heckman probit apply to every sample and for each gender variable: *Gender ownership* and *Gender manager*. According to the estimation results as of the year 2013, female owners are less self-selecting than males (Table 1), whereas there is no relationship between gender and self-selecting behaviour in 2019 (Table 2).

To monitor the robustness of our results, we tackle the evolution of this behaviour over time, estimating the same sample of companies observed in both 2013 and 2019. Results for 2013 confirm that female-owned businesses are less self-selecting in 2013. However, their behaviour changed in 2019, when these companies are now self-selecting. The question arises: Is this change due to discrimination that occurred in 2013? Could self-selection behaviour in 2019 be explained by the decision of financial institutions to deny credit in 2013 and does rejection vary according to gender?

On the demand side, the issue is to discern whether the probability of companies self-selecting in 2019 depends on credit denial they may have faced on the supply side in 2013; hence, this last variable was included in the self-selection model. However, Table 3 reports that the Wald test of both probits displays a probability beyond 10 per cent and variables prove non-significant. This allows us to conclude that self-selection in 2019 is independent from discrimination in 2013, leaving sufficient room for other (unobservable) factors that would explain this change in behaviour, including attrition issues.

Actually, this result was expected; cross-sorting variables of self-selection in 2019 with discrimination in 2013 shows that, out of 145 companies, only three companies that were discriminated against in 2013 did self-select in 2019.

Table 1. Estimation of the self-selection model, 2013 and 2019

Variables	2013 (1) Probit Self-select.	2013 (2) Probit sample selection Self-select.	2013 (2) Need	2013 (1) Probit Self-selection	2013 (2) Probit sample selection Self-select.	2013 (2) Need	2019 (1) Probit Self-selection	2019 (2) Probit sample selection Self-select.	2019 (2) Need	2019 (1) Probit Self-select.	2019 (2) Probit ample selection Self-select.	2019 (2) Need
Gender owner: *female*	-0.2851*** (-2.6950)	0.0902 (1.0439)	0.4003*** (5.5860)				-0.0842 (-1.0023)	0.2302*** (3.6705)	0.3264*** (5.8519)			
Gender manager: *femal*				-0.1238 (-0.8607)	0.0849 (0.8204)	0.2140** (2.4153)				0.1536 (1.1606)	0.1968** (2.1167)	0.0861 (1.0803)
Personal loans	-0.2634** (-2.1638)	0.2153** (2.2040)	0.6461*** (7.5212)	-0.2849*** (-2.6980)	0.2191*** (2.5760)	0.6556*** (8.6038)	-0.7956*** (-9.0975)	0.2091** (2.4103)	0.9529*** (13.1116)	-0.8048*** (-9.1875)	0.2280*** (2.5881)	0.9850*** (13.5790)
Financial inclusion	-0.9239*** (-8.2971)	-0.5169*** (-5.4926)	-0.1045* (-1.8806)	-0.9555*** (-9.2545)	-0.5017*** (-5.8564)	-0.0725 (-1.3929)	-0.5940*** (-5.7601)	-0.2391*** (-3.2390)	-0.0232 (-0.4712)	-0.6184*** (-5.9656)	-0.2292*** (-3.0378)	-0.0023 (-0.0464)
Turnover	-0.0519*** (-3.6747)	-0.0229** (-2.2875)	0.0117 (1.4342)	-0.0436*** (-3.5124)	-0.0175** (-2.0542)	0.0128* (1.7538)	-0.0310*** (-2.7012)	-0.0151* (-1.7676)	0.0132* (1.8678)	-0.0278** (-2.4337)	-0.0167** (-1.9946)	0.0100 (1.4254)
Industry	-0.2209*** (-2.7521)	-0.1457** (-2.4979)	-0.0388 (-0.8498)	-0.2032*** (-2.8725)	-0.1161** (-2.2566)	-0.0138 (-0.3348)	-0.0510 (-0.7809)	0.1360*** (3.0205)	0.1896*** (5.0862)	-0.0429 (-0.6582)	0.1426*** (3.1864)	0.1950*** (5.2567)
Size: Micro	0.4467*** (3.4134)	0.2548*** (2.6514)	0.0819 (1.0582)	0.4993*** (4.3790)	0.2852*** (3.4175)	0.0677 (0.9921)	0.6791*** (6.1397)	0.4307*** (5.4712)	0.1910*** (2.9208)	0.7277*** (6.6455)	0.4313*** (5.4993)	0.1696*** (2.6193)
Size: Medium	0.2793*** (2.5789)	0.1156 (1.4026)	-0.0207 (-0.3127)	0.3464*** (3.6133)	0.1557** (2.1547)	-0.0473 (-0.8117)	0.5862*** (6.1615)	0.3915*** (5.5282)	0.1574*** (2.7274)	0.6277*** (6.6574)	0.3916*** (5.5528)	0.1392** (2.4396)
Size: Large	0.3458** (2.3868)	0.1253 (1.1215)	-0.0938 (-1.0607)	0.4038*** (3.1992)	0.1825* (1.8951)	-0.0739 (-0.9490)	0.2138* (1.7741)	0.2429*** (2.8362)	0.2142*** (2.8592)	0.2587** (2.1498)	0.2489*** (2.9323)	0.2044*** (2.7535)
Age: Mature	-0.3303*** (-3.4302)	-0.2670*** (-3.9414)	-0.0992* (-1.8665)	-0.2853*** (-3.3520)	-0.2352*** (-3.9437)	-0.0889* (-1.8310)	-0.0011 (-0.0104)	0.0327 (0.4766)	0.0609 (1.0533)	-0.0016 (-0.0151)	0.0283 (0.4126)	0.0604 (1.0445)
Ownership: *sole proprietorship*	0.5247*** (4.9457)	0.2157*** (2.6525)	-0.1285** (-2.0680)	0.5191*** (5.5674)	0.1554** (2.2339)	-0.1818*** (-3.3426)	0.3701*** (4.3294)	0.2104*** (3.3800)	0.0550 (1.0746)	0.3752*** (4.4836)	0.1738*** (2.8230)	0.0097 (0.1946)
Ownership: *partnership*	0.5440*** (5.3412)	0.2453*** (3.1581)	-0.0988 (-1.6406)	0.4965*** (5.7244)	0.2099*** (3.2714)	-0.0921* (-1.7824)	0.2900*** (3.4770)	0.1338** (2.2178)	-0.0065 (-0.1266)	0.2940*** (3.5652)	0.1150* (1.9153)	-0.0307 (-0.6039)
Loan purpose			0.2618*** (5.9677)			0.2750*** (7.1414)			0.2683*** (4.9534)			0.2764*** (5.0639)
Sub-region: North Afric	0.1251 (1.3370)		-0.0810* (-1.7525)	0.1568* (1.8337)		-0.0786* (-1.8929)	0.5571*** (7.1874)		-0.1360*** (-3.9314)	0.5557*** (7.1655)		-0.1358*** (-3.9340)
Constant	1.6886*** (5.5050)	0.0957 (0.4034)	-0.5965*** (-3.2801)	1.4110*** (5.0517)	-0.0795 (-0.4026)	-0.6285*** (-3.8534)	0.7224** (2.5110)	-0.8365*** (-3.8146)	-1.3022*** (-7.4024)	0.6138** (2.1606)	-0.7858*** (-3.7061)	-1.2059*** (-6.9072)
Observations	1,297	3,439	3,439	1,596	4,176	4,176	2,036	5,128	5,128	2,047	5,151	5,151

Log likelihood	-714,139	-2886,318	-909,2091	-3567,859	-1005,9414	-4195.95	-1012.857	-4232.828
LR statistic	278.64	75.21	297,44	87.45	273.16	131.15	277.45	120.89
Mc Fadden R2	0.1927		0.1708		0.1436		0.1447	
Predicted cases	70.70%		68.8%		75.98%		76.01%	
LR test [a] (rho = 0)		0.0000		0.0000		0.0000		0.0000

Note: Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1. [a] Independent equations (rho = 0)
Source: Authors

Table 2. Estimation of the self-selection model, 2013-2019 cohort

	2013						2019					
	(1) Probit	(2) Probit sample selection		(1) Probit	(2) Probit sample selection		(1) Probit	(2) Probit sample selection		(1) Probit	(2) Probit sample selection	
Variables	Self-selection	S-selection	Need	S-selection	S-selection	Need	S-selection	Self-selection	Need	Self-selection	Self-selection	Need
Gender ownership: *female*	-0.0988	-0.1791	0.1833*				-0.3436*	0.0268	0.3754***			
	(-0.6399)	(-1.4574)	(1.7229)				(-1.7127)	(0.1642)	(2.7461)			
Gender manager: *female*				-0.0215	0.0276	-0.0914				0.0191	0.0843	0.2093
				(-0.0735)	(0.1161)	(-0.4706)	-0.2681	0.3780**	0.9101***	(0.0653)	(0.4642)	(1.2301)
Personal loans	-0.7088***	-0.9427***	0.8746***	-0.7135***	-0.9575***	0.8962***	(-1.2250)	(2.2071)	(5.3738)	-0.1941	0.3468**	0.7893***
	(-4.3098)	(-6.9962)	(6.4683)	(-4.3571)	(-7.1191)	(6.6210)	-0.9316***	-0.3506***	0.0754	(-1.0034)	(2.2204)	(5.2651)
Financial inclusion	-0.2553	-0.4024**	0.4034***	-0.2723	-0.4177**	0.4184***	(-4.3094)	(-2.6621)	(0.6454)	-0.8702***	-0.3145**	0.0958
	(-1.0750)	(-2.2738)	(3.2360)	(-1.1558)	(-2.3637)	(3.3565)	-0.0571**	-0.0103	0.0259*	(-4.2804)	(-2.5645)	(0.8668)
Turnover	-0.0414*	-0.0399***	0.0188	-0.0371*	-0.0368***	0.0176	(-2.3947)	(-0.6997)	(1.9039)	-0.0495**	-0.0148	0.0194
	(-1.8972)	(-2.8011)	(1.4606)	(-1.7039)	(-2.6008)	(1.3744)	-0.1878	-0.0368	-0.0668	(-2.3434)	(-1.0746)	(1.5798)
Industry	-0.1002	-0.0987	0.0368	-0.0691	-0.0885	0.0456	(-1.2406)	(-0.3492)	(-0.7482)	-0.1309	0.0069	-0.0196
	(-0.7834)	(-1.0126)	(0.4564)	(-0.5421)	(-0.9085)	(0.5662)	0.6616***	0.3036*	0.1074	(-0.9676)	(0.0722)	(-0.2426)
Size: Micro	0.6129***	0.2227	0.3579**	0.6739***	0.2279	0.3731***	(2.6041)	(1.6809)	(0.7026)	0.7427***	0.3780**	0.1773
	(2.7434)	(1.3415)	(2.5624)	(3.0470)	(1.3845)	(2.6891)	0.5281**	0.3021*	0.0445	(3.2995)	(2.3177)	(1.2995)
Size: Medium	0.2398	0.0243	0.2416**	0.3045*	0.0386	0.2440**	(2.5125)	(1.8873)	(0.3409)	0.5560***	0.3543**	0.0797
	(1.3295)	(0.1777)	(1.9971)	(1.7102)	(0.2854)	(2.0318)	0.7511**	0.2213	-0.3256*	(3.0162)	(2.4361)	(0.6923)
Size: Large	0.0857	-0.0820	0.2225	0.1437	-0.0759	0.2229	(2.5535)	(1.0072)	(-1.8095)	0.4347*	0.2164	-0.1653
	(0.3577)	(-0.4485)	(1.3603)	(0.6035)	(-0.4191)	(1.3731)	-0.3540*	-0.3029**	-0.1643	(1.7217)	(1.0766)	(-1.0332)
Age: Mature	-0.1933	-0.5183	0.8209	-0.2117	-0.5386	0.8232	(-1.8580)	(-2.3784)	(-1.4880)	-0.2872*	-0.2407**	-0.0980
	(-0.2359)	(-0.7709)	(1.5096)	(-0.2590)	(-0.7905)	(1.4940)	0.6000***	0.2568*	-0.0746	(-1.6662)	(-2.0952)	(-0.9620)
Ownership: *sole proprietor*	0.1600	0.1937	-0.1298	0.1732	0.2206*	-0.1572	(3.0251)	(1.8082)	(-0.5952)	0.5846***	0.2185*	-0.1532
	(0.9694)	(1.4974)	(-1.2336)	(1.0689)	(1.7242)	(-1.5177)	0.3225*	0.0030	-0.2679**	(3.3114)	(1.7652)	(-1.3914)
Ownership: *partnership*	0.1002	0.1819	-0.1914*	0.0708	0.1893	-0.2125**	(1.6932)	(0.0228)	(-2.3198)	0.2973*	0.0366	-0.2315**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	(0.6262)	(1.5056)	(-1.8576)	(0.4579)	(1.5962)	(-2.0851)			0.2235***	(1.8479)	(0.3155)	(-2.3227)
Loan purpose	0.2289		0.1302			0.1481			(2.6728)			0.2794***
	(1.5385)		(1.1405)			(1.3146)			0.0956			(3.8580)
Sub-region: North Africa			0.2666***	0.2198		0.2754***	0.0259		(1.2647)	0.0509		0.0779
			(3.2904)	(1.4782)		(3.4085)	1.5486*** (0.1561)	-0.4895	-0.8561***	(0.3405)		(1.1693)
Constant	1.1933	2.6719***	-2.3007**	1.0425	2.5874***	-2.2896***	(2.9350)	(-1.5055)	(-2.6801)	1.1178**	-0.6191**	-0.9510***
	(1.2114)	(3.5278)	(-3.6265)	(1.0614)	(3.3812)	(-3.5796)				(2.2847)	(-2.0254)	(-3.2829)
Observations	452	1,065	1,065	456	1,067	1,067	370	894	894	454	1,094	1,094
Log likelihood	-276.138	-945,7475		-278.85294	-949.2022		-205.1086	-263.054	-964,7626	87.47	44,65	
LR statistic	43.98	79.51		44.46	78.08		98.74			87.47		
Mc Fadden	0.083			0.0844			0.20	-769,544		0.1611		
Predicted cases	67.04%			67.32%			70.81%	37.77		67.62%		
LR test [a] (rho=0)		0.0067			0.0939				0.0001		0.0001	

Note: Robust z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1. [a] Independent equations.
Note: Authors

Table 3. Estimation of self-selection in 2019 according to credit denial in 2013

	(1)	(2)		(3)	(4)	
	Probit	**Probit with sample selection**		**Probit**	**Probit with sample selection**	
Variables	Self-ction	Self-ection	**Need**	Self-ction	Self-ection	**Need**
Prob(rejected) in 2013	-0.0487	0.0755		0.0108	0.0874	
	(-0.0579)	(0.2102)		(0.0130)	(0.1384)	
Gender ownership: *female*	-0.2770	-0.4086**	0.3196**			
	(-0.9725)	2.2919)	(2.1630)			
Gender manager: *female*				0.6118	0.4041	0.2095
				(1.3374)	(0.6654)	(0.7912)
Personal loans	-0.3520	-0.8074***	0.8995***	-0.3744	-0.8023**	0.9197***
	(-1.0817)	(-3.8564)	(4.7343)	(-1.1347)	(-2.1702)	(4.8550)
Financial inclusion	-0.5969	-0.5388*	0.2779	-0.6405	-0.6648	0.2926
	(-1.2025)	(-1.6570)	(1.3018)	(-1.2831)	(-1.4342)	(1.3683)
Turnover	-0.0287	-0.0691***	0.0746***	-0.0262	-0.0657**	0.0745***
	(-0.6527)	(-3.2492)	(4.0616)	(-0.5960)	(-2.1609)	(3.8195)
Industry: Manufacturing	0.2002	0.2660*	-0.1446	0.1542	0.1948	-0.1604
	(-0.7880)	(-1.7259)	(1.1926)	(-0.6071)	(-0.8823)	(1.3343)
Size: Micro	0.7333	0.4658*	-0.0025	0.6466	0.4763	0.0273
	(1.5392)	(1.7906)	(-0.0123)	(1.3582)	(1.2434)	(0.1290)
Size: Medium	0.3076	0.0901	0.1538	0.2485	0.1286	0.1931
	(0.9579)	(0.4719)	(0.9219)	(0.7707)	(0.4223)	(1.1343)
Size: Large	-0.0583	-0.1702	0.2468	-0.1351	-0.2422	0.2774
	(-0.1410)	(-0.7133)	(1.1486)	(-0.3187)	(-0.6955)	(1.2938)
Ownership: *sole* hip	0.1793	0.3925*	-'0***	0.3425	0.4942	-0.5117***
	(0.4816)	(1.8725)	(-2.8002)	(0.9586)	(1.6005)	(-3.1870)
Ownership: *partnership*	0.3638	0.4715**	-0.5163***	0.5054	0.5575*	-32***
	(1.1663)	(2.5131)	(-3.3795)	(1.6025)	(1.8680)	(-3.6205)
Loan purpose: *WC or FA*			-0.1393			-0.2722
			(0.9519)			(1.3502)
Sub-region: *North Africa*	0.5164*		0.3059***	0.4441		0.3363**
	(1.7016)		(2.9564)	(1.4620)		(2.4124)
Constant	0.7242	3.2493***	-'8***	0.5641	2.6401**	-3.1550***
	(0.6837)	(5.8701)	(-6.4022)	(0.5423)	(2.0806)	(-5.5672)
Observations	126	748	748	126	749	749
Log likelihood	-79.9191	-363,7843		-79.6720	-365,8878	
Wald	14.91	48.69		14.44	23,48	
Prob>chi2	0.2670	0.0000		0.2737	0.0151	
Mc Fadden R2	0.0834			0.0863		
Predicted cases	61.11%			65.08%		
LR test [a] (rho = 0)		0.0752			0,4908	

Note: Robust z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1. [a] Independent equations (rho = 0). *Age* (Mature) was omitted in 2019.
Source: Authors

4.3 Discrimination

On the supply side, the decision to deny (=0) or to grant a loan (=1) is no longer in the hands of the companies but belongs to the financial institutions. In as much as the decision is exogenous, a Heckman probit proves useless. We design a probit model measuring the probability of rejecting or accepting credit applications from companies, including the following explanatory variables: characteristics of the business (*Size*, *Industry*, *Age* and *Ownership*), the requirements of financial institutions (*Collateral* and *Financial inclusion*, *Loan purpose* and *Turnover*) and Control variables (*GNI per capita* and *Inflation*).

In order to infer whether there is gender discrimination from financial institutions regarding the credit granting decision, we include *Gender ownership* and *Gender manager* in the interaction with *Collateral* and *Financial inclusion*.

This model is estimated in 2013 and again in 2019. Table 4 records estimation results, showing that interacting variables are significant and signs remain constant over time for females and for male owners or managers. Gender discrimination on the part of financial institutions does not occur in loan granting decisions, for both 2013 and 2019. It is noteworthy that, only the financial inclusion variable that interacts with the gender of managers is significant for both males and females in 2019; hence, financial inclusion runs opposite to rejection probabilities.

Table 4. Probit estimation of loan rejection in 2013 and 2019

Variables	2013		2019	
	Probit Gender ownership	Probit Gender manager	Probit Gender ownership	Probit Gender manager
Industry	-0.3557 (-0.9089)	0.0044 (0.0165)	0.3727 (1.1429)	0.1741 (0.5150)
Size: *Micro*	3.7060*** (6.2897)	-0.1230 (-0.1957)	0.8463 (1.4380)	0.5854 (1.1152)
Size: *Small*	3.8338*** (9.6901)	0.1402 (0.3829)	0.6720 (1.4224)	0.6290 (1.5459)
Size: *Medium*	4.5949*** (13.5874)	0.5421 (1.2807)	0.4232 (0.8280)	0.3922 (0.8835)
Age: *Mature*	-0.0545 (-0.1274)	-0.2838 (-0.7316)	-0.6463 (-1.3190)	-0.3922 (-0.7926)
Ownership: *sole proprietorship*	1.0033** (2.2496)	0.3262 (0.8439)	0.8018* (1.7116)	0.5596(1.4869)
Ownership: *partnership*	0.2512 (0.4583)	0.2201 (0.7654)	1.2666*** (2.8860)	0.8599** (2.1667)
Turnover	-0.2048** (-2.5505)	-0.1533** (-2.4876)	-0.1011 (-1.6150)	-0.1042* (-1.7199)
Loan purpose: WC or FA	-0.0402 (-0.1266)	0.1381 (0.5227)	0.5253 (1.4080)	0.3883 (1.0963)
Collateral*female	4.3118*** (8.9925)	-0.9077 (-1.4686)	-0.0738 (-0.0786)	4.0425*** (6.3204)
Collateral*male	4.2173*** (6.3867)	4.2729*** (11.1191)	0.5588 (1.0796)	0.1092(0.1821)
Financial inclusion*female	5.0462*** (4.8157)	10.2825*** (11.9993)	0.2450 (0.2483)	-4.1974*** (-5.1524)
Financial_inclusion*male	4.7540*** (7.9617)	4.0235*** (8.5934)	-1.1792** (-2.1105)	-0.9326* (-1.7371)
Inflation	0.2368 (1.5802)	0.2111(1.2719)	0.0119 (0.1310)	-0.0118 (-0.1385)
GNI per capita	-0.0001 (-0.5437)	-0.0003** (-1.9719)	0.0001 (1.3138)	0.0001 (1.3834)
Constant	-12.5085*** (-8.8590)	-6.1475***(-4.7471)	-2.1376** (-2.2534)	-1.3048 (-1.5732)
Observations	375	501	249	253
Log likelihood	-21,4749	-44,922	-46,6401	-51,063
LR statistic	18.58	30,76	25.50	19.45
Prob>chi2	0.2336	0.0095	0.0436	0.1483
Mc Fadden R2	0.3019	0.2550	0.2147	0.16
Predicted cases	98.4%	97.6%	93.98%	94.10%

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

On the one hand, the estimation of this model on the cohort observed in 2013 and 2019 does not confirm the absence of discrimination, whilst on the other hand, it points out a change in credit granting decisions by financial institutions. Indeed, the probabilities of Wald test stand at over 10 per cent and some variables are omitted, which is due to the very low number of companies that have been denied credit.

5   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 other qualitative surveys, though these are based upon smaller samples. Over a quarter of the businesses, amongst 400 female entrepreneurs in Morocco (AFEM, 2015), faced difficult access to finance. Less than one out of six amongst 200 female micro-entrepreneurs in Egypt (ILO, 2016) applied for a loan but less than half was granted, with female business owners claiming that lending conditions were too restrictive and interest rates too high. Access to finance was the major obstacle for seven out of ten businesses in a sample of 201 female entrepreneurs in Tunisia (OIT, 2016).

Banks loans do carry an interest rate and require collateral, whilst 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 especially fund 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, with informal employment accounting 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 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 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 the WBES.

Table 5 reports the key figures of the microfinance industry, namely 20 MENA Micro-Finance Institutions (henceforth MFIs) with the most complete client data, as of the year 2017 from the MIX database (year 2018 is not completed yet). Amongst active borrowers (NAB), three out of five are females and over nine out of ten are MSMEs. In first place, MFIs grant micro-credit to Micro-enterprises, a share above eight out of ten, whereas the SME share 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. Average loan balance per borrower in MENA is weak, with the

exception of Palestine, which stands above average. In contrast, the average lending rate is high, within a range of 25-36 percent, although borrowers do payback. In this respect, MSMEs can afford to fund working capital rather than fixed assets.

Agier & 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 microcredit 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 by formal finance vs. they prefer microfinance. Such assumptions are worth a test that goes beyond the scope of this paper.

Table 5. 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 MSMEs	Micro	SMEs	Lending rate (%)	PAR> 30 ***	Risk coverage (%)
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. ** A close proxy to GDP per capita. *** Portfolio At Risk >30 days.
Source: Authors from MIX (2017).

6   DISCUSSION AND CONCLUSIONS

Self-selection and discrimination affecting female entrepreneurs in the MENA region are controversial issues, upon which our paper brings forth new insights. In particular, it proves inconsistent with Morsy et al. (2019) as regards self-selection and discrimination, as well as with Berguiga & Adair (2021) in respect of discrimination, with both papers investigating prior WBES devoted to MENA countries.

We designed a sequential choice model with a decision tree, whereby two main binary options are relevant: provided that companies need funding, their option on the demand side is no loan application (self-selection) vs. loan application. The final option does not belong to the companies on the demand side, but to the banks on the supply side; it is loan denied (potential discrimination) vs. loan granted.

On the demand side, we use both a probit and a Heckman probit for sample selection correction, whereas a probit is appropriate to tackle the supply side.

According to estimation results as of the year 2013, female owners are less self-selecting than males, whereas there is no link between self-selecting behaviour and gender in 2019.

We address the self-selection behaviour over time, upon the 2013-2019 cohort. Estimation results confirm that female-owned businesses are less self-selecting in 2013. However, their behaviour changed in 2019, these companies are now self-selecting. Including discrimination for 2013 in the self-selection model applied to 2019, it shows that self-selection in 2019 is independent from discrimination in 2013.

Gender discrimination on the part of financial institutions does not occur in loan granting decisions, for both 2013 and 2019.

However, all studies on the MENA region that use WBES encapsulate several biases, particularly regarding the size of businesses, which make funding look like a fairy tale. The fact that the microfinance industry provides credit to female microentrepreneurs suggests another story about self-selection and perhaps discrimination, which do occur for these businesses.

Amongst some limitations of the paper that pave the way for future research on self-selection and discrimination in MENA countries, two are worth mentioning: Investigating the reasons why a shift in behaviour took place over 2013-2019 and exploring the characteristics of (female) entrepreneurs who are granted a loan from the microfinance industry.

7   REFERENCES

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

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

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

4. 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.

5. Bardasi E., Sabarwal, S., and Terrell, K. (2011), How do Female Entrepreneurs Perform? Evidence from Three Developing Regions, <u>*Small Business Economics*</u>, 37(4), 417-441

6. 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.

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

8. Berguiga, I., & Adair, P. (2021). Funding female entrepreneurs in North Africa: self-selection vs. discrimination. MSMEs, the informal sector and the microfinance industry. *International Journal of Gender and Entrepreneurship*, 13(4): 394-419.

9. 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. 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 Organisation (UNIDO).

10. De Mel, S., McKenzie, D., Woodruff, C. (2009), Are women more credit constrained? Experimental evidence on gender and microenterprise returns. *American Economic Journal: Applied Economics*, 1(3), 1–32.

11. 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.

12. Dudokh, D., & Aqel, A. (2017) Women entrepreneurship in Jordan. Jordan Enterprise Development Corporation –JEDCO. Amman.

13. 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.

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

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

16. Hyland, M., Djankov, S. & Goldberg, P.K. (2020). Gendered Laws and Women in the Workforce. *American Economic Review: Insights*, 2(4): 475-–90.

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

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

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

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

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

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

23. 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

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

25. 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.

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

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

28. Phelps, E. S. (1972). The statistical theory of racism and sexism. *American Economic Review*, 62(4): 659-661.

29. 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.

30. 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.

31. 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.

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

33. WBES. World Bank Enterprise Survey catalogue. Washington DC: The World Bank.

34. 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.

35. WGI (2017) World Governance Indicators database. Washington DC: The World Bank.

36. *WBL (2021) Women, Business and the Law 2021, The World Bank, Washington, DC.*

8   ACKNOWLEDGEMENTS

9 APPENDIX

Table A1. Legislation prohibiting discrimination in access to credit by gender, women entrepreneurship index

Egypt	No	75
Jordan	No	100
Lebanon	No	75
Morocco	Yes	100
Palestine	No	100
Tunisia	No	75

Source: Hyland et al. (2020), World Bank (2021).

Table A2. Dictionary of variables and descriptive statistics

Variables	Samples	Year 2013 N	%	Year 2019/2020 N	%	2013-2020 Variation	2013-2020 cohort 2013	%	2019/2020	%	Variation
Country	*Egypt*	2,897	53.02	3,075	48.93	-	392	28.97	392	28.97	
North Africa	*Morocco*	407	7.45	*1,096*	*17.44*	+	139	10.27	139	10.27	
	Tunisia	592	10.83	615	9.79	-	228	16.85	228	16.85	
	Lebanon	561	10.27	532	8.47	-	219	16,18	219	16,18	
Middle East	*Jordan*	573	10.49	601	9.56	-	193	14.26	193	14.26	
	Palestine	434	7.94	365	5.81	-	182	13.45	182	13.45	
	Total	**5,464**	100.00	**6,284**	100.00		**1,353**	100.00	**1,353**	100.00	
Ownership	*Sole proprietorship*	1,859	34.25	*2,783*	*44.62*	+	394	30.00	*448*	*34.14*	+
	Partnership	1,851	34.11	2,022	32.42	-	442	33.66	422	32.16	-
	Shareholding	1,717	31.64	1,432	22.96	-	477	36.33	442	33.69	-
	Total	5,427	100.00	6,237	100.00		1,313		1,312		
Registration	*Not registered*	74	1.37	41	0.66	-	17	1.26	10	0.74	-
	Registered	5,312	98.63	*6,202*	*99.34*	+	1,324	98.73	*1,331*	*99.25*	+
	Total	5,386	100.00	6,243	100.00		1,341		1,341		
Industry	*Manufacturing*	3,192	58.42	*3,696*	*58.82*	+	740	54.69	713	52.69	-
	Trade & services	2,272	41.58	2,588	41.18	-	613	45.30	*640*	*47.30*	+
	Total	5,464	100.00	6,284	100.00		1,353		1,353		
Size	*Micro*	1,387	25.67	*1,744*	*27.85*	+	355	26.45	354	26.34	-
	Small	2,389	44.22	*2,814*	*44.94*	+	601	44.78	595	44.27	-
	Medium-size	572	10.59	625	9.98	-	130	9.68	*136*	*10.12*	+
	Large	1,055	19.53	1,078	17.22	-	256	19.07	*259*	*19.27*	+
	Total	5,403	100.00	6,261	100.00		1,342		1,344		
Financial inclusion	*Excluded*	1,219	22.48	1,263	20.38	-	247	18.37	197	14.78	-
	Included	4,204	77.52	*4,935*	*79.62*	+	1,079	81.62	*1,136*	*85.22*	+
	Total	5,423	100.00	6,198	100.00		1,344		1,333		
Owner gender	*Female*	978	18.03	828	13.33	-	269	19.98	88	6.75	-
	Male	4,447	81.97	*5,381*	*86.67*	+	1,077	80.01	*1,215*	*93.24*	+
	Total	5,425	100.00	6,209	100.00		1,346		1,303		
Manager gender	*Female*	272	4.98	*317*	*5.20*	+	66	4.88	59	4.38	-
	Male	5,189	95.02	5,777	94.80	-	1,286	95.12	*1,286*	*95.62*	+

Exogenous vs. Endogenous Obstacles to Funding Female Entrepreneurs in MENA Countries (2013-2019)

Category	Subcategory										
Manager experience	Total	5,461	100.00	6,094	100.00		1,352		1,345		
	Young <8 years	607	11.32	660	10.81	-	136	10.30	98	7.45	-
	Mature	4,756	88.68	5,447	89.19	+	1,184	89.69	1,217	92.54	+
	Total						1,320	100.00	1,315	100.00	
Manager education		5,363	100.00	6,107	100.00						
	Primary	161	2.96				42	3.11	42	3.11	
	Secondary	1,267	23.30				383	28.41	383	28.41	
	University	4,010	73.74				923	68.47	923	68.47	
	Total	5,438	100.00				1,348	100.00	1,348	100.00	
Owner/manager	Yes	4,311	79				1,080	80			
	No	1,134	21				270	20			
	Total	5,445	100				1,350				
Age (enterprise)	Young <8 years	1,233	22.77	744	12.04	-	260	18.21	11	0.81	-
	Mature >8 years	4,181	77.23	5,433	87.96	+	1,093	80.78	1,342	99.18	+
	Total	5,414	100.00	6,177	100.00		1,353	100.00	1,353	100.00	
Self-selection	Yes	1,118	25.76	1,660	32.00	+	253	25.12	313	30.50	+
	No	3,222	74.24	3,528	68.00	-	754	74.88	713	69.49	-
	Total	4,340	100.00	5,188	100.00		1,007	100.00	1,026	100.00	
Loan application	Yes	900	17.01	647	10.84	-	297	22.63	204	16.25	-
	No	4,392	82.99	5,321	89.16	+	1,015	77.36	1,051	83.74	+
	Total	5,292	100.00	5,968	100.00		1,312	100.00	1,255	100.00	
Personal loan	No personal loan	4,743	92.80	5,361	91.94	-	1,175	92.52	1,084	89.14	-
	Personal loan	368	7.20	470	8.06	+	95	7.48	132	10.85	+
	Total	5,111	100.00	5,831	100.00		1,270	100.00	1,216	100.00	
Loan purpose	Working capital or fixed assets	3,896	72.48	5,322	90.60	+	1,196	88.52	1,170	93.52	+
	Working capital and fixed assets	1,479	27.52	552	9.40	-	155	11.47	81	6.47	-

	Total	5,375	100.00	5,874	100.00		1,351	100.00	1,251	100.00	
Loan duration	*(very) short & short term*	448	41.91	270	40.24	-	154	41.86	*100*	*45.25*	+
	Long term	621	58.09	*401*	*59.76*	+	219	58.71	121	54.75	-
	Total	1,069	100.00	671	100.00		373	100.00	221	100.00	
Collateral	*Requested*	1,048	82.72	*836*	*84.44*	+	338	80.47	*278*	*89.39*	+
	Not requested	219	17.28	154	15.56	-	82	19.52	33	10.61	-
	Total	1,267	100.00	990	100.00		420	100.00	311	100.00	
Loan application Outcome	*Granted*	794	92.54	554	88.50	-	283	96.58	174	88.32	-
	Rejected	64	7.46	*72*	*11.50*	+	10	3.41	*23*	*11.67*	+
	Total	858	100.00	626	100.00		293	100.00	197	100.00	
Total		5,464	100.00	6,284	100.00		1,353		1,353		

Source: Authors from WBES (2013, 2019 and 2020).

Figure A1. Decision tree: the sequential (data) models

2013 sample (N = 5,464)
1st option (A)

No funding need = 0
Funding need   = 1
[N (1,118 + 858) = 1,976]

2nd option (B)
No demand = 0 [N=1,118]: *Self-selection*
Demand   = 1 [N (794 + 64) = 858]

3rd option (C)
Demand rejected = 0 [N=64]: *Discrimination?* (7.46%)
Demand granted = 1 [N=794]

2019 sample (N = 6,284)
1st option (A)

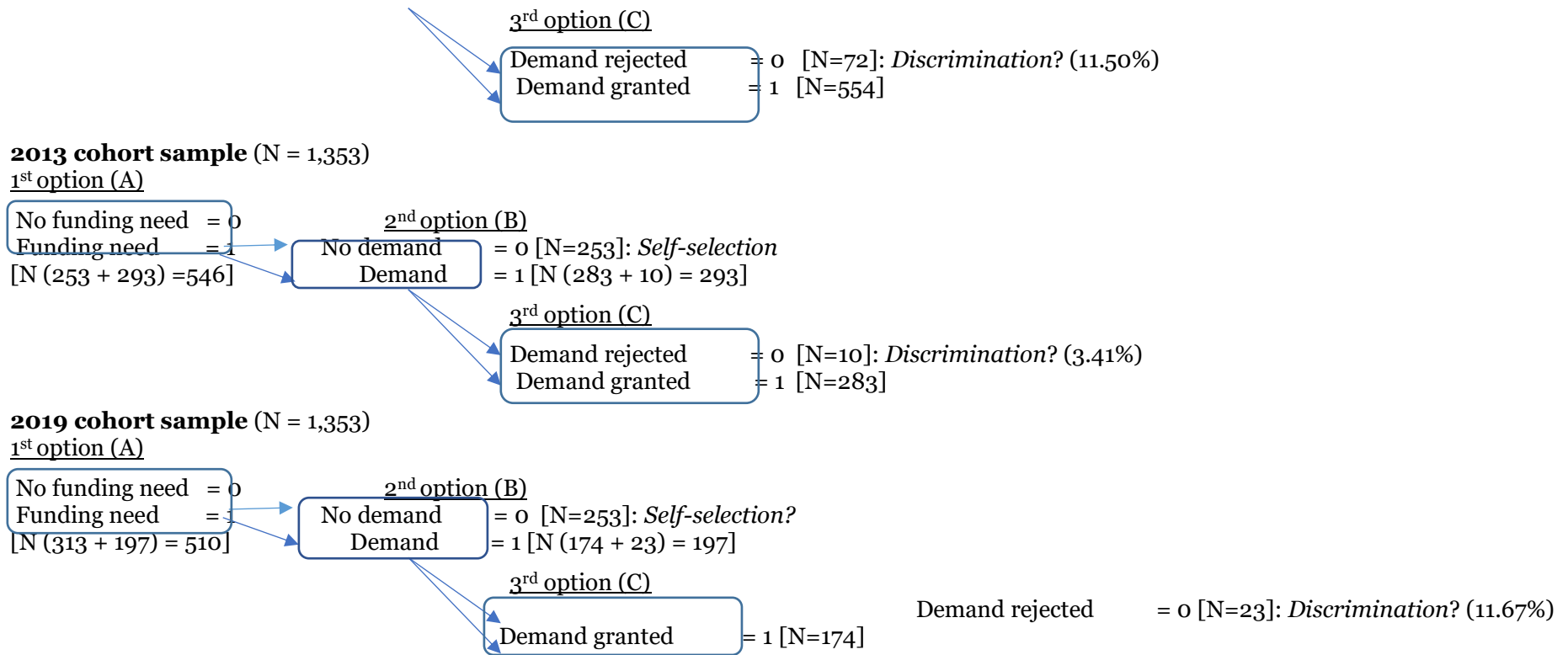No funding need = 0
Funding need   = 1
[N (1,660 + 626) =2,286]

2nd option (B)
No demand = 0 [N=1,660]: *Self-selection*
Demand   = 1 [N (554 + 72) = 626]

Exogenous vs. Endogenous Obstacles to Funding Female Entrepreneurs in MENA Countries (2013-2019)

3rd option (C)

Demand rejected = 0 [N=72]: *Discrimination?* (11.50%)
Demand granted = 1 [N=554]

2013 cohort sample (N = 1,353)
1st option (A)

No funding need = 0
Funding need = 1
[N (253 + 293) =546]

2nd option (B)
No demand = 0 [N=253]: *Self-selection*
Demand = 1 [N (283 + 10) = 293]

3rd option (C)

Demand rejected = 0 [N=10]: *Discrimination?* (3.41%)
Demand granted = 1 [N=283]

2019 cohort sample (N = 1,353)
1st option (A)

No funding need = 0
Funding need = 1
[N (313 + 197) = 510]

2nd option (B)
No demand = 0 [N=253]: *Self-selection?*
Demand = 1 [N (174 + 23) = 197]

3rd option (C)

Demand rejected = 0 [N=23]: *Discrimination?* (11.67%)
Demand granted = 1 [N=174]

Source: Authors from WBES (2013, 2019 and 2020).

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The Euro-Mediterranean and African Network for Economic Studies (EMANES) is a network of research institutions and think tanks working on socio-economics policy in Europe, the Mediterranean and Africa. EMANES is coordinated by the Euro-Mediterranean Economists Association (EMEA).

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