

[DOI: 10.20472/EFC.2020.013.002](https://doi.org/10.20472/EFC.2020.013.002)

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## **IS BANK LOAN FUNDING TO SMES IN NORTH AFRICA A MATTER OF SIZE?**

### **Abstract:**

The paper tackles the bank loan issue according to the size of 3,896 businesses, a sample from the World Bank Enterprises Survey conducted as of 2013 in Egypt, Morocco and Tunisia. First, the sample is adjusted with respect to international standards. Second, businesses that did not apply vs. those that did apply for a loan are investigated as regards corporate finance theory. Third, a logistic model addresses the demand and the supply of 1,020 businesses that applied for a loan. Characteristics of businesses -Size, Age, Registration and Financial inclusion influence loan demand, whereas Financial inclusion and Collateral influence loan supply.

### **Keywords:**

Bank loans; Corporate finance; Logistic regressions; North Africa; SMEs

**JEL Classification:** G21, G32

## Introduction

According to Stein et al (2013), over two-thirds of all *Micro, Small and Medium-sized* enterprises (henceforth MSMEs) in emerging markets lack access to credit. They rely on internal funds or informal loans (cash from family and friends), to launch and initially run their businesses. This is consistent with the finding that small firms use less external finance, especially bank credit (Beck et al, 2008).

There has been little investigation on the funding behaviour in North Africa over a wide range of SMEs with respect to size levels, Achy (2009) being an exception. Most papers focus on the high end of large businesses, i.e. listed companies, which are not representative (Latridis and Zaghmour, 2013; Belkhir et al, 2016; Nouira and Bellouma, 2019) and/or investigate one country, concentrating on the manufacturing industry (Achy, 2009; Ghazouani, 2013). Unfortunately, the aforementioned papers overlook the fact that at least 95 per cent of all businesses gather less than 10 employees. Companies are therefore Micro, Small and Medium sized Enterprises (henceforth MSMEs), whereupon a very thin layer of large companies can be added.

We extend research on cross-country differences in corporate capital structure, addressing three comparable non-oil exporting economies in North Africa, namely Egypt, Tunisia and Morocco. We take advantage of the World Bank Enterprise Survey (henceforth WBES), which provides the first update since the global recession, including a large section of the questionnaire that is devoted to financing issues.

We focus on size, a major variable of the corporate capital structure theory, which proves controversial with respect to its positive vs. negative impact upon bank credit. First, we contend that size is a key explanatory factor to the funding strategy of businesses in North Africa. Second, we challenge the claim of the World Bank (2013a, 2013a, 2014) that there is little mismatch between loan demand and supply in the three North African countries. We demonstrate that MSMEs are denied credit and that the alleged little mismatch is due to the inclusion of large businesses in the WBES sample; hence, size is once again a major criterion. To our best knowledge, no paper has so far disputed the assertion of the World Bank.

Section 1 first presents the literature review on corporate financing strategies according to the size of businesses in North Africa; it examines the methodology of the WBES sample, which is adjusted according to international standards, although two main selection biases remain. Section 2 tackles demand for credit with respect to 2,876 businesses that did not apply vs. 1,020 businesses that did apply for a loan. In Section 3, we focus upon the subsample of 1,020 businesses that applied for a loan on the demand side, including those that were denied a loan by financial institutions on the supply side. In Section 4, binary logistic models address both the demand and the supply side. A first salient finding is that *Size* and related factors -*Financial inclusion* and *Collateral* exert a major influence upon loan demand. In addition, over one out of six businesses in the full sample is denied credit, quite large a share that does not fit the alleged absence of mismatch according to the World Bank. Last, a sub sample of MSMEs (excluding large businesses) stands for a robustness check and highlights again the role of *Size*.

## 1. Literature review and sampling methodology

### 1.1. Literature review: the funding issue and the size factor in North Africa

Hereafter, we present the body of evidence on the funding issue and the size factor in North Africa from the demand side and the supply side.

Trade-Off Theory (hereafter TOT) holds that firms target an optimal debt ratio, comparing the tax benefits of debt with the bankruptcy costs thereof (Scott, 1977). It predicts a positive effect of the size of the firm on debt. Pecking Order Theory (hereafter POT) is based on minimising the costs associated with asymmetric information between internal stakeholders (owners and managers)

and external providers of the firm. It contends that firms avoid external financing if internal financing is available and comply with the following sequence: self-financing, non-risky debt issuance, risky debt issuance and equity issuance in last resort (Myers and Majluf, 1984).

Nouira and Bellouma (2019) apply panel data analysis on a sample of 216 unquoted and quoted firms from the MENA region over 2006-2015. In contrast with TOT suggesting that large firms easily accessing capital markets become more indebted, the size of the company is significant and exerts a negative effect upon the debt level.

Belkhir et al (2016) provide a comparative analysis 2003-2011 of 444 listed firms from ten MENA countries, among which Egypt, Morocco and Tunisia. Non-oil exporters, which make 46 per cent of the sample are not disentangled from oil exporters. There is a strong positive impact of size on leverage, in line with TOT.

Latridis and Zaghmour (2013) investigate 83 Moroccan and 135 Turkish listed companies over 2002-2011. Panel data analysis shows that size, an important factor for financial decision-making, is positively associated with leverage, in accordance with TOT.

Ghazouani (2013) applies an OLS estimation upon a very small sample of 20 Tunisian companies listed on the Stock Exchange from 2004 to 2010. Although it proves not significant, size is positively related to the debt ratio, in line with TOT.

Achy (2009), using a panel dataset covering 550 non-listed manufacturing firms in Morocco over 1998–2003, investigates both long-term and short-term measures of leverage. Three classes of firms are distinguished according to the size of staff, i.e. small (up to 50), medium-sized (between 51 and 200) and large firms (over 200). Small firms are relatively more indebted compared to larger ones. In contrast with TOT, the relationship between size and leverage is both significant and negative,

Reille and Bender (2014) use a sample of 1,412 registered MSMEs (below 200 employees) in Tunisia as of 2011. Most firms have a bank account, whereas 29 per cent have none. Although 80 per cent of MSMEs requesting a loan were successful, MSMEs are financing working capital with treasury funds (75%), savings of the owner (40%), and trade credit (34%). Financial institutions are reluctant to lend due to the absence of book accounts (40 %) and excessive reliance on cash (78 %) for supplier payments.

On the supply side, credit rationing encapsulates several meanings. Basic credit rationing happens whenever the borrower cannot provide sufficient collateral to cover up default risk. Credit rationing à la Jaffee and Modigliani (1969) occurs as a demand and supply mismatch at the prevailing loan interest rate, and market clearing should take place with interest rate adjustment. Credit rationing à la Stiglitz and Weiss (1981) is an equilibrium framework wherein borrowers are denied credit even if they are willing to pay higher interest rates, and there is no price adjustment. Ayadi and de Groen (2018) provide an overview of the banking performance in North Africa. Morocco enjoys the highest levels of financial depth and access combined with the lowest efficiency-levels. Banking assets represent about 120 per cent of GDP, of which about two-thirds is controlled by just three banks. Tunisia experiences low levels of financial depth, access and efficiency, with bank assets equal to 120 per cent of GDP. Non-performing loans (NPLs) to total loans amount to 16.5 per cent (2013). In Egypt, the bank-based system with assets that amount to 91 per cent of GDP (2013) is funding the government instead of the private sector, especially SMEs. However, private sector borrowers are defaulting on their loans. The poor quality of loan portfolio and credit administration programme is the main factor explaining why NPLs account for 26.5 per cent of total loans (2014).

Rocha, et al (2011) estimate a regression model over a sample of 330 banks from 16 MENA countries, six oil-exporters and 10 non-oil-exporters including Egypt, Morocco and Tunisia. The share of SME lending in total lending amounts from five per cent in Egypt, 15 percent in Tunisia,

up to 24 per cent in Morocco. Less than half of banks among non-oil-exporters developed internal scoring models to assess the risk of their clients. State banks are willing to take higher risks and expose to larger losses, relative to private banks. Large banks are less committed to SME lending.

### **1.2. The WBES classification: rationale, adjustment and remaining biases**

According to the World Bank Survey Methodology, the strata for Enterprise Surveys are firm size, industry, and geographic region within a country. Coverage is consistent with a focus upon the private sector, i.e. the manufacturing industry and the services (trade, transportation and construction), excluding agriculture, public utilities, government services, health care, and financial services. A harmonised questionnaire collects a large amount of data through face-to-face interviews with firm managers and owners. Among the topics addressed, the finance issue is thoroughly investigated with 26 questions. WBES is based upon a threefold classification: 5-19 (*Small*), 20-99 (*Medium*), and 100+ employees (*Large-sized firms*).

The WBES data source for Egypt, Morocco and Tunisia includes three drawbacks. The first drawback is the absence of representativeness due to two selection biases. One bias is magnifying the number of medium and large businesses in the sample, although Ayadi and Sessa (2017) report that *Microenterprises* account approximately for 91 per cent of all firms, *Small* and *Medium* ones around 8 per cent and *Large* firms less than one per cent. The other bias is the overweighed manufacturing industry, which is really a minor share in the distribution of industries, despite the fact that WBES uses stratified random sampling. In addition, the size of the country sample is unrelated to the size of the population in the country surveyed: the sample is smaller for Morocco than for Tunisia, three times smaller a country, whereas the sample for Egypt is almost seven times larger than for Morocco, three times smaller a country.

A second drawback is the underestimation of the informal sector (ILO, 2013), which is populated by *Micro*-enterprises (less than 10 employees) that are not registered in order to escape taxes and/or social security contributions. Gatti et al (2014) report that a quarter of firms employing over 20 workers start out as informal and operate for about four years without registration.

The last drawback is the sampling design as regards the various thresholds used to build the categories of businesses, which do not comply neither with standards used in most countries (Egypt and Tunisia, Morocco being an exception) nor with international standards from the International Labour Office and the UN System of National Accounts. *Micro*-enterprises are defined within the range of 1-4 employees, whereas the standard definition is 1-9 employees. *Small* businesses comprise 5-19 employees, although the usual definition is 10-49 employees. *Medium-sized* enterprises encapsulate 20-99 employees, whereas it should comprise 50 to 249 employees. Fortunately, the number of employees is available within the dataset, allowing overcoming this last drawback and redesigning the sample according to standards.

The definition of Small and Medium-sized Enterprises (SME) varies across countries and organizations. The most commonly used denominator for a definition of an SME is the number of employees (UNECE).

Lower income economies more frequently use 50 or 100 employees as a threshold for defining an SME. In Morocco, the upper threshold is 200 employees, 100 in Tunisia and 50 in Egypt. Middle income and high-income economies, Eurostat, the OECD and the IMF, define a SME as an enterprise employing up to 249 persons. They further divide the category into micro (1-9 employees), small (10-49 employees) and medium (50-249 employees) enterprises, namely MSMEs.

The WBES database for Egypt, Morocco and Tunisia accounts for 3,896 establishments in the three countries as of year 2013. We designed a pooled sample including *Micro* (1-9 employees), *Small* (10-49 employees), *Medium-sized* (50-249 employees) and *Large* (250 employees and over).

**Table 1. Distribution by size of the pooled sample**

Country Category	Egypt		Morocco		Tunisia		Total	
	Number	%	Number	%	Number	%	Number	%
<i>Micro (1-9 employees)</i>	675	23.29	69	16.95	110	18.58	854	21.91
<i>Small (10-49 employees)</i>	1,355	46.77	177	43.48	247	4.17	1,779	45.66
<i>Medium-sized (50-249 employees)</i>	637	21.99	122	29.97	187	31.58	946	24.28
<i>Large (250 + employees)</i>	230	7.94	39	9.58	48	8.11	317	8.13
<b>Total</b>	<b>2,897</b>		<b>407</b>		<b>592</b>		<b>3,896</b>	

Source: Authors' design from WBES.

Table 1 reports the distribution of the sample. Egypt accounts for three quarters of the sample. *Small* firms account for over two out of five businesses (45.66%) both in the pooled sample as well as in every country; a strong bias indeed. Hence, the distribution by size and industry is not representative and selection biases remain. *Micro* and *Small* businesses, which make over 95% of all enterprises (Ayadi, and Sessa, 2017) account only for two thirds of the sample, whereas *Medium-sized* and *Large* businesses account for the remaining one third of the sample

## 2. Loan application from businesses

In order to analyse loan demand from businesses, we have broken the pooled sample of 3,896 businesses into two subsamples: 2,876 businesses that did not apply for a loan from financial institutions (banks and Non-Banking Financial Institutions –NBFIs) and 1,020 businesses that applied for a loan in 2013 to fulfil their need for working capital and / or fixed assets. This subsample accounts for slightly over one quarter of the pooled sample (See Table 2).

### 2.1. Business that did not apply for a loan and the size factor

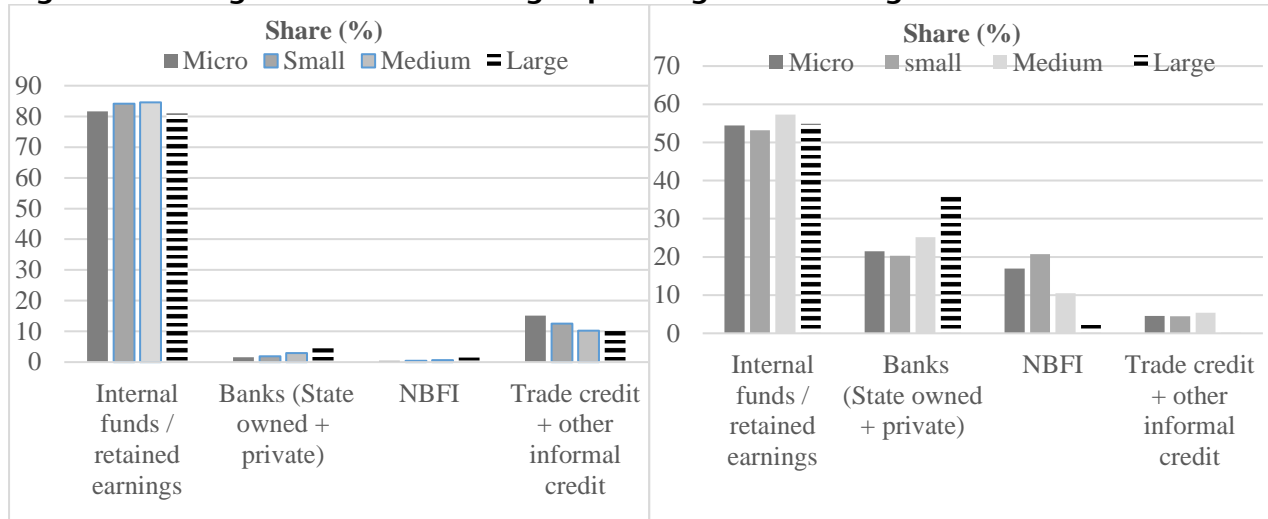
Business that did not apply for a loan may encapsulate those that did not need it or perhaps used another funding source and those that did not apply for a loan due to a lack of creditworthiness (e.g. absence of sufficient collateral and/or deficient financial inclusion). In the former situation, the leveraging strategy of businesses is demand driven and depends on preferences for safer or cheaper funds, according to POT vs TOT. In the latter situation, businesses face potential credit rationing from financial institutions (Stiglitz and Weiss, 1981).

According to Figures 1a and 1b<sup>1</sup>, internal funds and retained earnings are the first source of working capital, a share of 80-85 per cent that rises with size from *Micro* and *Small*, to *Medium-sized* but declines for *Large* businesses. External financing, a share of 15-20 per cent, comes from three sources. Trade credit and informal funds rank first, then bank credit and last NBFIs. The share of trade credit and informal funds declines whereas that of bank credit increases with the size of firms. As for fixed assets, the share of internal funds and retained earnings drops to 50-55 per cent. Bank credit ranks first, then NBFIs and last trade credit and informal funds. The share of bank credit rises from 20 to 35 per cent with the size of firms. Hence, the size of firms is crucial to both the distribution and the trend of funding sources.

On the one hand, the prominent although declining share of internal funds over external funds is consistent with preferences according to POT or credit rationing. On the other hand, the larger the firm, the more its (external) funding is provided by financial institutions (banks and NBFIs). In line with TOT, this rising distribution pattern according to size suggests that larger businesses can afford to diversify their funding sources.

<sup>1</sup> Table is available upon request to the authors.

**Fig. 1a. Funding source for working capital Fig. 1b. Funding source for fixed assets**



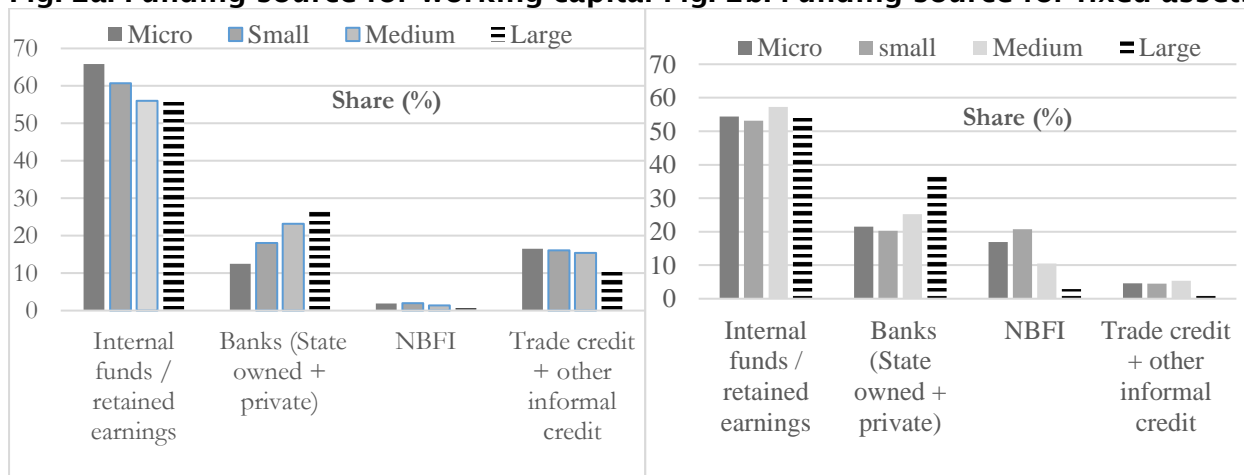
Note: N= 2,876 businesses that did not apply for a loan.  
Source: Authors.

**2.2. Businesses that did apply for a loan and the size factor**

Hereafter, we focus upon businesses that did apply for a loan (existing demand) with respect to corporate finance theory. Our comments are very similar to those regarding the subsample of business that did not apply for a loan. Indeed, the share of internal funding for both working capital and fixed assets is prominent over external sources, which is consistent with POT. However, the recourse to internal funds is decreasing with size, whereas bank credit application increases with size, which suggests a diversification strategy in line with TOT.

According to Figures 2a and 2b<sup>2</sup> internal funds and retained earnings are the first source of financing needs (working capital or fixed assets) of firms. As for working capital, internal funding is a share of 55-65 per cent that drops with size from *Micro* and *Small*, to *Medium*-sized and *Large* businesses. External financing comes from three sources: bank credit ranks first, then trade credit and informal funds and last NBFIs that provide a negligible share. The share of trade credit and informal funds declines, whereas that of bank credit increases with the size of firms. Hence, trade credit is a not a complement (TOT) but rather a substitute (POT) for bank loans.

**Fig. 2a. Funding source for working capital Fig. 2b. Funding source for fixed assets**



Note: N= 1,020 businesses that did apply for a loan.  
Source: Authors.

<sup>2</sup> Table is available upon request to the authors.

Size does not display an unambiguous pattern. However, bank credit ranks first and its share increases with the rising size of firms, whereas the share of trade credit and informal funds declines. Once again, the size of firms is crucial to both the distribution and the trend of funding sources.

### 3. Loan demand and loan supply: the size effect

We focus upon the subsample of 1,020 businesses that applied for a loan on the demand side, which includes those that were granted a loan (fulfilled demand or effective supply) and those that were rejected (unfulfilled demand). Among the 1,020 businesses that applied for a loan, over four out of five (853) did get credit, while over one out of six (167, over 16%) did not. See Table 2. Hence, the claim whereby loan application rejections would remain within a range of one to four per cent in Morocco, Egypt and Tunisia (de Lima et al, 2016) is a fairy tale.

**Table 2. Loan demand to financial institutions from all businesses by size**

Demand Category	No application to financial institutions	Loan application to financial institutions			Total <sup>b</sup>
		Successful	Unsuccessful <sup>a</sup>	Total	
<i>Micro</i>	662	109 (70%)	47 (30%)	156 (19.07%)	818
<i>Small</i>	1,262	335 (80%)	88 (20%)	423 (25.1%)	1,685
<i>Medium</i>	581	284(91.61%)	26 (8.38%)	310 (34.79%)	891
<i>Large</i>	159	125(95.41%)	6(4.58%)	131 (45.17%)	290
<b>Total</b>	2,664	853 (83.62%)	167 (16.37%)	1,020	3,684

Note: <sup>a</sup> 76 business are excluded because loan application is still pending. <sup>b</sup> N/A = 136.

Source: Authors' design from WBES

#### 3.1. Fulfilled loan demand

Both loan demand and getting credit increase alongside the size of firms. One out of five *Micro*-enterprises, whereas one out of four *Small* one out three *Medium*-sized businesses and over two out of five *Large* businesses did apply for a loan

Among applicants, application proved successful (*loan granted*) respectively for 70 per cent (*Micro*-enterprises), 80 per cent (*Small* businesses), over 90% per cent (*Medium*-sized businesses) and 95 per cent (*Large* businesses). Table 2 records the figures.

As for *Age*, Table 3 reports that mature businesses prove more successful in getting credit (85.6%) as compared to younger companies (75.8%) The older the firm, the larger its information record. TOT assumes a positive relationship between age and bank loans. According to POT, mature firms have less recourse to leverage than younger ones, assuming that the cash flow increases with age. Outcomes seem to sustain the predictions of POT.

**Table 3. Age, ownership and financial inclusion for loan application in the subsamples**

Businesses/	Unsuccessful loan application			Successful application ( <i>loan granted</i> )			Applications
	Financial exclusion	Financial inclusion	Total	Financial exclusion	Financial Inclusion	Total	Total
<i>Start-up+young</i>	19	24	43	12	104	116	153
<i>Mature</i>	58	66	124 (74.25%)	43	694	737 (85.6%)	861
<b>Total Age</b>	77 (41.91%)	90 (53.89%)	167 (100%)	55 (6.5%)	798(94.32%)	846 (100%)	1,014 <sup>a</sup>
<i>Share.+ Partner.</i>	54	37	91	43	635	678 (85.17%)	796
<i>Sole proprietor</i>	20	32	52	13	148	161 (75.58%)	213
<b>Total Ownership</b>	74 (51.75%)	69 (48.25%)	143 (100%)	56 (6.77%)	783 (93.32%)	839 (100%)	1,009 <sup>b</sup>

Note: <sup>a</sup> N/A = 6. <sup>b</sup> N/A = 11. Percentage read on the horizontal axis.

Source: Authors' calculations from WBES

Table 3 reports on *Ownership*: Shareholding and partnership companies prove more successful in getting credit (85.17%) as compared to sole proprietorship businesses (75.58%). This suggests that backed-capital is favourable to accessing a loan. Sole proprietorship businesses should have more recourse (TOT) vs. less recourse (POT) to bank loans. Outcomes seem to confirm POT.

As for the sub-sample of 846 businesses, Table 3 shows that *Financial inclusion* is a strong albeit not sufficient condition to enjoy a successful loan application. Over nine out of ten businesses that were granted a loan enjoy financial inclusion, albeit over half of unsuccessful applicants, especially MSMEs, also enjoy financial inclusion.

According to Table 4a, over nine out of ten businesses that were granted a loan also use other funding sources (including internal funds and informal loans). *Micro* and *Small* enterprises are those that apply respectively the least and the most for loans. Only one out of fifteen businesses are financed exclusively by financial institutions (banks or/and NBFIs).

**Table 4a. Characteristics of the loan: businesses that enjoyed a successful application**

	Funding sources			Loan duration <sup>a</sup>				Requested collateral <sup>b</sup>				
	Bank	NBFI <sup>c</sup>	Others <sup>c</sup>	Total	VeryST	ST	MLT	Total	None	One	Two or more	Total
<b>Micro</b>	58 (53.21%)	18	104	109	20	31	49	100	21	31	54	106
<b>Small</b>	202 (60.29%)	61	316	335	65	97	141	303	28	111	183	322
<b>Medium</b>	179 (63.02%)	41	268	284	43	82	125	250	40	80	151	271
<b>Large</b>	89 (71.2%)	10	112	125	22	30	47	99	24	26	69	119
<b>Total</b>	528	130	800	853	150	240	362	752	113	248	457	818

Note: <sup>a</sup> N/A = 101. <sup>b</sup> N/A = 35. <sup>c</sup> including microfinance. ST: short term; MLT: mid-long term. <sup>d</sup> moneylenders, friends, relatives, etc. Percentage read on the horizontal axis.

Source: Authors' calculations from WBES.

Loan duration is below two years (very short and short term) rather than over a longer term, suggesting that funding may be devoted to working capital in the first place. At least one collateral (property, plant, equipment, inventory or/and personal ownership) is requested from almost six out of seven businesses, without any clear pattern according to size. *Collateral* is positively related to bank loans, in accordance with TOT.

The ratio of bank loans upon total funding sources rises with Size.

**Table 4b. Sales and purchase on credit and outcome for loan application in the subsample**

Businesses	Unsuccessful loan application					Successful application ( <i>loan granted</i> )					Applications		
	Sales on Total credit		Purchase on credit		Total	Sales on Total credit		Purchase on credit		Total	Total		
	Yes	No	Yes	No		Yes	No	Yes	No				
<b>Micro</b>	20	27	47	24	23	47	79	29	108	76	33	109	156
<b>Small</b>	55	32	87	46	39	85	278	50	328	236	91	335	423
<b>Medium</b>	21	4	25	15	9	24	236	47	283	203	76	284	310
<b>Large</b>	6		6	3	2	5	102	20	122	88	29	125	131
<b>Total</b>	102	63	165	88	73	161	692	146	838	603	229	853	1,020

Source: Authors' calculations from WBES.

In Table 4b, successful companies that were granted a loan provide more sales on credit than they purchase on credit, *Micro* (73.14% vs. 69.72%), *Small* (84.76% vs. 70.44%), *Medium* (83.39% vs. 71.47%) and *Large* businesses (83.6% vs. 70.44%). There is no unambiguous pattern regarding Size.



### 3.2. Unfulfilled loan demand

Table 5 reports the reasons for unsuccessful loan application. It is worth observing that almost all unsuccessful businesses had recourse to other sources of funding. Once again, the ratio of bank loans upon total funding sources rises according to *Size*, from *Micro*, *Small*, *Medium* to *Large* businesses, but remains low.

**Table 5. Main reasons for unsuccessful loan application of businesses**

	Bank	Funding sources		Financial inclusion			Lack of collateral <sup>a</sup>			
		NBFI <sup>b</sup>	Other sources <sup>c</sup>	Total	Excluded	Included	Total	Yes	No	Total
<b>Micro</b>	1	4	47	47	29	18	47	34	7	42
<b>Small</b>	9	2	86	88	36	52	88	45	21	66
<b>Medium</b>	3	2	24	26	11	15	26	8	7	15
<b>Large</b>	2	0	6	6	1	5	6	2	2	4
<b>Total</b>	15	8	163	<b>167</b>	77	90	<b>167</b>	89	37	<b>127</b>

Note: <sup>a</sup> N/A = 40. <sup>b</sup> including microfinance. <sup>c</sup> moneylenders, friends, relatives, etc.

Source: Authors' calculations from WBES.

The main reason why the application was rejected is the lack of collateral affecting over two out of three businesses, which declines according to *Size*. The other reason is the absence of a bank or savings account; surprisingly, the share of businesses facing financial exclusion is below that of those enjoying financial inclusion, and there is no clear pattern according to *Size*.

The interest rate applied by financial institutions differs according to countries and to the category of enterprise: mean is twice as high in Egypt (11.27%) as compared with Tunisia (6.14%). There is no unique pattern as for North Africa: the rate increases with the size of Egyptian businesses, whereas it declines both in Morocco and in Tunisia with the exception of microenterprises (See Table A1, Appendix).

### 4. Binary logistic models: loan demand vs. loan granted and size

Hereafter, we focus upon the two explained variables, namely *loan demand* and *loan granted* (supply). Our explanatory variables are included in five broad categories: (i) the characteristics of the firm; (ii) the characteristics of the manager; (iii) the financing need of the firm; (iv) the characteristics of the loan; and (v) Macroeconomic indicators that are used as control variables (See Table A2, Appendix).

According to the correlation matrix (Table A3, Appendix), the probability of getting credit from financial institutions (*loan granted*) on the supply side is very significantly and positively correlated with *Financial inclusion* and *Loan purpose*, whereas it is negatively correlated with the *Interest rate* and *Inflation*. There is no meaningful linear relationship between *Loan granted* and the *Gender of the Owner*, *Educational attainment* of the manager and *Collateral*.

We design two cross-section analyses upon the sub-sample of 1,020 businesses that applied for a loan. The first logistic regression analyses the demand for credit of businesses according to supply from the financial institutions (banks and NBFIs). The explained variable, *Loan demand*, is measured by two binary outcomes (Box 1).

The model estimates the probability of access to various funding sources in 2013 (based on 2012 sources), according to the determinants of access for these businesses. Noteworthy is that loan provisioning on the supply side is an endogenous subset of loan demand, in as much as overall loan demand minus unfulfilled demand equals *Loan granted* or fulfilled demand.

**Box 1. Models**

Both models apply to every business  $i$  located in country  $k = [1 \text{ (Egypt), } 2 \text{ (Morocco) or } 3 \text{ (Tunisia)}]$ .  
The model for loan demand is the following:

$$\text{Loan demand}_{ik} = \begin{cases} 1 & \text{if credit was applied for and granted in 2013} \\ 0 & \text{if credit applied for was not granted in 2013} \end{cases}$$

The model for funding supply is the following:

$$\text{Loang granted}_{ik} = \begin{cases} 1 & \text{if the company enjoyed getting credit} \\ 0 & \text{if the company enjoyed access to other funding sources} \end{cases}$$

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

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

Wherein explanatory variables are the following (See Table A2 in the Appendix):

$X_j$  = 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);

$\varepsilon_j$  = error term.

**4.1. Results from the model for loan demand**

We estimated model (1) for loan demand according to characteristics of the business, the manager and the loan, the funding purpose and the macroeconomic environment. *Size* was also used as an interaction variable respectively with *Financial inclusion* (model 2), *Collateral* (model 3), and both *Financial inclusion* and *Collateral* (model 4). The interaction of *Size* (*Micro*, *Medium* and *Large* enterprises) with these variables enables us to observe their impact on the demand for credit, *Small-sized* enterprises standing as the category of reference.

Table 6 displays the estimation for loan demand. Pseudo R-square standing around 50 per cent proves acceptable, whereas the quality of prediction standing above 90 per cent is very good.

**Table 6. Estimations for loan demand**

Model	(1)	(2)	(3)	(4)
Variables	<i>Demand</i>	<i>Financial inclusion</i>	<i>Collateral</i>	<i>Financial inclusion + Collateral</i>
<b>Size:</b>	-0.1814	0.4697	1.6760*	2.5889**
<i>Micro</i>	(-0.2828)	(0.5252)	(1.7498)	(2.3122)
<b>Size:</b>	1.0371***	0.1422	1.3356*	0.0007
<i>Medium</i>	(2.8573)	(0.2027)	(1.7847)	(0.0006)
<b>Size:</b>	2.3949***	16.9250***	3.1211***	17.9667***
<i>Large</i>	(2.9476)	(17.7114)	(2.5950)	(17.1715)
<b>Industry:</b>	0.5440	0.6407*	0.6637*	0.7836**
<i>Manufacturing</i>	(1.6017)	(1.7997)	(1.9456)	(2.1621)
<b>Age:</b>	0.6185*	0.7183*	0.6948*	0.8443**
<i>Mature</i>	(1.7650)	(1.9567)	(1.8559)	(2.1081)
<b>Ownership</b>	-0.0383	0.0031	-0.0414	0.0123
<i>Shareholding + Partnership</i>	(-0.1210)	(0.0095)	(-0.1307)	(0.0385)
<b>Registration:</b>	-1.0630*	-0.9786*	-1.1628**	-1.0176*
<i>Registered</i>	(-1.9363)	(-1.7716)	(-2.1783)	(-1.8750)
<b>Financial inclusion</b>	1.5885***	1.7881***	1.6792***	1.9962***
	(4.6230)	(3.9048)	(4.8154)	(4.0212)
<i>Financial inclusion*Micro</i>		-0.7972		-1.0284
		(-0.9630)		(-1.3155)

<i>Financial inclusion*Medium</i>		1.2807 (1.4857)		1.5896 (1.5527)
<i>Financial inclusion*Large</i>		-15.1225*** (-13.5260)		-15.9734*** (-12.9984)
<b>Gender ownership:</b>	-0.8087	-0.9104	-0.7476	-0.8396
<i>Male</i>	(-1.5109)	(-1.6297)	(-1.4328)	(-1.5778)
<b>Productivity</b>	0.0000	0.0000	0.0000	0.0000
	(1.1386)	(1.0858)	(1.0841)	(1.0079)
<b>Manager experience:</b>	-0.0707	-0.1994	0.1045	-0.0474
<i>Young</i>	(-0.1004)	(-0.2672)	(0.1550)	(-0.0662)
<b>Manager experience:</b>	-0.7461	-0.7179	-0.7862	-0.7839
<i>Mature</i>	(-1.0427)	(-0.9366)	(-1.0215)	(-0.9264)
<b>Manager gender:</b>	-0.3644	-0.4292	-0.5067	-0.6238
<i>Male</i>	(-0.8150)	(-0.8929)	(-1.1134)	(-1.2900)
<b>Manager education:</b>	0.1033	0.2811	-0.1929	0.0235
<i>Tertiary</i>	(0.1183)	(0.3269)	(-0.2133)	(0.0263)
<b>Manager education:</b>	-0.1813	0.0656	-0.4665	-0.1411
<i>Secondary</i>	(-0.2069)	(0.0761)	(-0.5060)	(-0.1549)
<b>Purchase on credit</b>	-0.0761	-0.1613	-0.1817	-0.2698
	(-0.2569)	(-0.5320)	(-0.5963)	(-0.8754)
<b>Loan purpose:</b>	-1.2508***	-1.1605**	-1.1582***	-1.0492**
<i>Working capital or fixed assets</i>	(-2.7765)	(-2.5157)	(-2.6955)	(-2.4292)
<b>Interest rate</b>	-7.2009	3.1846	-26.6976	-18.0805
	(-0.2534)	(0.1091)	(-0.9875)	(-0.6523)
<b>Collateral</b>	1.7454***	1.8699***	2.6552***	2.8049***
<i>Requested</i>	(4.6310)	(4.6783)	(4.8491)	(4.8914)
<i>Collateral*Micro</i>			-2.8125*** (-2.9542)	-3.0001*** (-3.2545)
<i>Collateral*Medium</i>			-0.2179 (-0.2477)	0.1981 (0.1833)
<i>Collateral*Large</i>			-1.0215 (-0.6417)	-0.1485 (-0.1088)
<b>Inflation</b>	-29.6152*	-36.9156**	-23.6502*	-30.8915**
	(-1.9556)	(-2.3083)	(-1.8806)	(-2.4295)
<b>GNI per capita</b>	0.0028**	0.0032**	0.0022*	0.0025*
	(2.1684)	(2.4874)	(1.6815)	(1.9207)
Constant	-4.8309	-6.9906	-2.0696	-4.0195
	(-0.8086)	(-1.1746)	(-0.3418)	(-0.6583)
Observations	827	827	827	827
Log Likelihood	-166.1205	-161.66734	-160.35013	-154.40453
LR statistic	159.07	594.35	157.37	560.94
Mc Fadden R2	0.4785	0.4925	0.4967	0.5153
Predicted cases	91.05%	91.17%	90.69%	90.93%

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

Source: Authors

With respect to model 1, *Size*, *Age*, *Registration*, *Financial inclusion*, *Loan purpose* (mostly working capital), *Collateral* and macroeconomic indicators (*Inflation* and *GNI per capita*) influence demand for credit. Conversely, *Industry*, *Ownership*, *Gender ownership*, *Purchase on credit* and *interest rate*, as well as none of the characteristics of managers (*Gender*, *Experience* or *Education*) prove significant and exert any influence upon the decision to apply for funding.

As for *Size*, both *Medium* and *Large* enterprises are positive and significant, which is consistent with TOT contending that credit constraint declines with the size of the firms.

As for *Age*, being mature has a weak but positive influence on the decision to apply for a loan. This is not consistent with POT, contending that self-financing capacity increases with maturity and the need for external funding declines. Both *Collateral* and *Financial inclusion* prove positive and very

significant, whereas the *Registration* of the business is negative and weakly significant. This is in line with Reille and Bender (2014).

*Interest rate* bears an expected negative sign although it proves insignificant and has no impact on the probability of loan application.

*Loan purpose* is negative and significant as regards the demand to fulfil one purpose, usually for working capital, which businesses finance with internal funding and trade credit rather than with bank loans. This may prove consistent with Reille and Bender (2014) as well as with POT.

Economic environment has a significant influence upon the demand for credit and bears expected signs. *Inflation* is negative, deterring loan demand, whereas *GNI per capita* is positive and may signal business opportunities.

The results of models 2 to 4 with the interaction variables remain the same as for the explanatory variables of demand and their significance in model 1 (Table 6).

*Large enterprises* proves very significant and positive as for *Age*, *Registration*, *Loan purpose*, *Collateral*, *Financial inclusion* and microeconomic indicators.

*Micro-enterprises and Industry* become positive but weakly significant: being a micro-enterprise or operating in the manufacturing sector may increase the probability of loan application

The interaction of *Size* with *Financial inclusion* and *Collateral* is significant, respectively for *Large* and *Micro-enterprises* but their sign becomes negative. The impact of *Financial inclusion* on demand vary according to *Size*: the more *Large* businesses enjoy financial inclusion, the less they apply for credit compared to *Small-sized* enterprises. The impact of *Collateral* also depends on *Size*, but it is only significant and negative for *Micro-enterprises*.

#### 4.2. Results from the model for loan supply (loan granted)

We estimated *Loan granted*, adding gradually the variables of loan characteristics: *Collateral* and *Loan duration* (model 1 to 2). Next, it was re-estimated according to *Size* with *Financial inclusion* (model 3), *Collateral* (model 4), and both *Financial inclusion* and *Collateral* (model 5). The interaction of *Size* with these variables compares their effect upon *Micro*, *Medium* and *Large* enterprises as for the probability of access to financial institutions, *Small* enterprises standing as the category of reference. Table 7 reports estimations for loan supply (*Loan granted*).

**Table 7. Estimations for loan supply (*Loan granted*)**

Model Variables	(1) <i>Collateral</i>	(2) <i>Loan duration</i>	(3) <i>Financial inclusion</i>	(4) <i>Collateral</i>	(5) <i>Financial inclusion + Collateral</i>
<b>Size: Micro</b>	0.0988 (0.3606)	-0.0985 (-0.3311)	-0.4721 (-0.5313)	-0.3038 (-0.4791)	-0.6682 (-0.6191)
<b>Size: Medium</b>	0.2071 (0.9878)	-0.0421 (-0.1770)	13.4421*** (17.1771)	0.2557 (0.4342)	13.8330*** (13.7774)
<b>Size: Large</b>	0.7111** (2.1684)	0.1410 (0.3704)	0.9967 (0.6995)	0.3228 (0.4328)	1.0881 (0.7155)
<b>Industry: Manufacturing</b>	0.4325** (2.0670)	0.4258* (1.7236)	0.4495* (1.7992)	0.4330* (1.7549)	0.4571* (1.8264)
<b>Age: Mature</b>	-0.0257 (-0.1139)	-0.1904 (-0.6934)	-0.1980 (-0.7147)	-0.2070 (-0.7450)	-0.2185 (-0.7816)
<b>Ownership</b> <i>Shareholding + Partnership</i>	0.0963 (0.4660)	-0.0669 (-0.2728)	-0.0763 (-0.3101)	-0.0742 (-0.2982)	-0.0811 (-0.3251)
<b>Registration: Registered</b>	-0.1163 (-0.3220)	0.0128 (0.0334)	0.0121 (0.0315)	0.0100 (0.0263)	0.0099 (0.0259)
<b>Financial inclusion</b>	0.7523*** (2.6664)	-0.2250 (-0.5380)	0.0385 (0.0620)	-0.2250 (-0.5324)	0.0363 (0.0581)
<i>Financial inclusion*Micro</i>			0.3748 (0.4163)		0.3757 (0.4143)

<i>Financial inclusion*Medium</i>			-13.5920***		-13.6394***
			(-16.6462)		(-16.5811)
<i>Financial inclusion*Large</i>			-1.0522		-1.0462
			(-0.7295)		(-0.7207)
<b>Productivity</b>	0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.1954)	(-0.4708)	(-0.4137)	(-0.5453)	(-0.4949)
<b>Manager experience:</b>	-0.5638	-0.5605	-0.5071	-0.5113	-0.4559
<i>Young</i>	(-1.1371)	(-0.8791)	(-0.7934)	(-0.7910)	(-0.7059)
<b>Manager experience:</b>	-0.1250	-0.1690	-0.1416	-0.1423	-0.1101
<i>Mature</i>	(-0.3222)	(-0.3355)	(-0.2787)	(-0.2800)	(-0.2166)
<b>Manager gender:</b>	-0.0797	-0.1418	-0.1714	-0.1452	-0.1805
<i>Male</i>	(-0.2380)	(-0.4039)	(-0.4802)	(-0.4083)	(-0.4094)
<b>Manager education:</b>	0.6161	0.4830	0.4526	0.4896	0.4575
<i>Tertiary</i>	(0.9670)	(0.7497)	(0.7094)	(0.7618)	(0.7185)
<b>Manager education:</b>	0.4205	0.3405	0.3121	0.3399	0.3097
<i>Secondary</i>	(0.6486)	(0.5145)	(0.4753)	(0.5151)	(0.4731)
<b>Sales on credit:</b>	0.5636***	0.6147**	0.5872**	0.6150**	0.5880**
	(2.7106)	(2.4739)	(2.3562)	(2.4831)	(2.3636)
<b>Loan purpose: Working capital or fixed assets</b>	-0.9540***	-0.9331***	-0.9277***	-0.9380***	-0.9354***
	(-5.4650)	(-4.7708)	(-4.7407)	(-4.7780)	(-4.7619)
<b>Loan duration:</b>		-0.3249	-0.3470	-0.3388	-0.3598
<i>Very short-term</i>		(-1.2641)	(-1.3268)	(-1.3043)	(-1.3628)
<b>Loan duration:</b>		0.3619*	0.3783*	0.3531	0.3707*
<i>Short-term</i>		(1.6702)	(1.7481)	(1.6316)	(1.7148)
<b>Interest rate</b>	19.6639	8.9988	-1.0781	10.4388	0.3577
	(1.3648)	(0.5493)	(-0.0611)	(0.6349)	(0.0202)
<b>Collateral</b>	0.7229***	0.5688**	0.5839**	0.6642	0.6788
<i>Requested</i>	(3.4352)	(2.2415)	(2.2976)	(1.4669)	(1.4948)
<i>Collateral*Micro</i>				0.2792	0.2664
				(0.3991)	(0.3756)
<i>Collateral*Medium</i>				-0.3349	-0.3898
				(-0.5282)	(-0.6137)
<i>Collateral*Large</i>				-0.1942	-0.0875
				(-0.2547)	(-0.1156)
<b>Inflation</b>	-24.0259***	-15.7332	-10.2896	-16.7256*	-11.2683
	(-2.7978)	(-1.5761)	(-0.9669)	(-1.6677)	(-1.0545)
<b>GNI per capita</b>	0.0015***	0.0009	0.0005	0.0009	0.0006
	(2.6590)	(1.3426)	(0.7307)	(1.4139)	(0.7977)
Constant	-6.4366**	-2.3306	-0.7279	-2.6505	-1.0403
	(-2.3890)	(-0.7675)	(-0.2149)	(-0.8669)	(-0.3054)
Observations	842	673	673	673	673
Log Likelihood	-468.85111	370.13751	-367.60941	-369.78556	-367.21913
LR statistic	136.70	68.44	651.99	69.62	653.07
Mc Fadden R2	0.1664	0.0942	0.1004	0.0950	0.1013
Predicted cases	72.68%	73.11%	72.51%	73.40%	73.11%

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

Source: Authors

Pseudo R-square stands within a weak 10-16 per cent interval, whereas the quality of prediction stands within a good 72-73 per cent interval.

According to estimates models 1 and 2, *Age*, *Registration*, *Ownership*, *Productivity* and *Interest rate* prove insignificant as well as all human capital characteristics of the manager. In contrast, *Size*, *Industry*, *Financial inclusion*, *Sales on credit*, *Loan purpose*, *Collateral*, *Loan duration* and macroeconomic indicators (*Inflation* and *GNI per capita*) have a significant influence upon the decision to grant a loan.

As for *Size*, only the coefficient for *Large* enterprises is positive and weakly significant (model 1) alongside *Industry*.

*Financial inclusion* exerts a positive and significant impact on the probability of getting credit. This is consistent with the reluctance to grant credit to businesses lacking book accounts and making an excessive use of cash (Reille and Bender, 2014).

*Collateral* is positive and significant. It is indeed a mandatory condition for most loans, which is consistent with the assumption of risk aversion from financial institutions according to TOT (Brealey et al, 2017). Noteworthy is that the ratio of collateral upon loan amount stands above 250 per cent in Egypt and Tunisia and above 150 per cent in Morocco (de Lima et al, 2016).

Access to credit is all the more favourable for businesses using *Sales on credit*, which proves positive and very significant. This may signal a good customer relationship and a promising sales turnover.

*Loan purpose* is negative and very significant. A single financing requirement, mainly for working capital, reduces the probability of granting credit.

*Loan duration* is negative as for the very short term and positive as for the short term but it is weakly significant in the second case.

*Interest rate* is positive as for *Collateral* and *Financial inclusion*, although not significant, being neither a determinant nor an obstacle to grant credit

Macroeconomic indicators have a significant impact on the lending decision. *Inflation* is negative, potentially affecting the real interest rate, hence the returns of financial institutions. Conversely, *GNI per capita* is weakly positive.

As for interaction variables, models 3 to 5 display the same results as for *Industry*, *Sales on credit*, *loan purpose*, and *loan duration*. *Size* becomes significant for *Medium* enterprises alongside *Financial inclusion* in interaction with *Medium* enterprises: the impact of financial inclusion on the loan supply depends on *Size* contrary to *Collateral*, whereas *Inflation* and *GNI per capita* become insignificant.

### 4.3. Robustness check

In order to check the robustness of our results, we estimated loan demand and loan supply on a new subsample of 889 *Micro*, *Small* and *Medium*-sized enterprises that applied for a loan from financial institutions. The exclusion of *Large* companies tests whether the role of size remains relevant. The estimation results are indeed similar to those of the subsample of 1,020 businesses as regards both sign and significance<sup>3</sup>.

**Table 8. Loan application (demand) to financial institutions from businesses by size**

Demand Category	No application to financial institutions	Loan application to financial institutions			Total <sup>a</sup>
		Successful	Unsuccessful	Total	
<i>Micro</i>	662	109 (70%)	47 (30%)	156 (19.07%)	818
<i>Small</i>	1,262	335 (80%)	88 (20%)	423 (25.1%)	1,685
<i>Medium</i>	581	284 (91.61%)	26 (8.38%)	310 (34.79%)	891
<b>Total</b>	<b>2,505</b>	<b>728 (81.88%)</b>	<b>161 (18.11%)</b>	<b>889 (100%)</b>	<b>3,465</b>

Note: <sup>a</sup> including 71 business with loan application still pending. Read percentage on the horizontal axis.

Source: Authors' design from WBES

In Table 8, the share of successful businesses increases once again with *Size*, from 70 per cent for *Micro* and up to over 90 per cent for *Medium*-sized enterprises. Noteworthy is the significant share of unsuccessful businesses that were denied a loan.

## Conclusion

Our research question has addressed the role of size as a good predictor of loan funding for 3,896 *Micro*, *Small*, *Medium*-sized and *Large* businesses from the WBES upon Egypt, Morocco and

<sup>3</sup> Table is available upon request to the authors.

Tunisia. Indeed, our main findings do show that size exerts a positive effect upon bank credit, which proves consistent with TOT.

In the first place, size matters with respect to sample design. WBES include *Large* businesses according to an inconsistent classification. However, whether *Large* businesses are included or not, loan funding remains positively related to size. Of course, successful applications increase when *Large* businesses are included, although such inclusion is inconsistent with the focus upon MSMEs claimed by the World Bank. Conversely, over one out of six loan applications (over 16%) proved unsuccessful, even when *Large* businesses are included. Hence, we challenge the fairy tale from World Bank country reports (World Bank, 2013a, 2013b and 2014), whereby loan applications are scarcely rejected.

We focused upon a subsample of 1,020 businesses that applied for a loan (loan demand), disentangling those that were granted a loan (loan supply) from those that were rejected (unfulfilled demand). We used a binary logit model to address both the demand side and the supply side. Our salient findings are the following: *Size*, *Age*, *Registration*, *Financial inclusion* and *Collateral* are the main driving variables upon loan application, whereas *Financial inclusion* and *Collateral* exert a major impact on the supply side. A robustness check confirms these results.

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. Fortunately, recent panel data from WBES for Egypt and Tunisia are becoming available in 2020. Adjustment of the supply and demand for funding calls for a better sampling. On the demand side, self-selection from businesses that refrain from applying for bank credit calls for an in-depth analysis. 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, which are crowded out from bank credit.

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### **Acknowledgements**

We are grateful to two anonymous reviewers for their assessment, which helped improving this paper.



## Appendix

Table A1. Average nominal interest rate for loan application from businesses

	Egypt	Morocco	Tunisia	Mean
<b>Micro</b>	9.375%	8.85%	6.07%	7.68%
<b>Small</b>	11.719%	8.35%	6.49%	8.48%
<b>Medium</b>	11.796%	7.073%	6.084%	7.905%
<b>Large</b>	10.97%	6%	4.964%	8.151%
<b>Mean</b>	11.272%	7.661%	6.143%	8.143%

Note: As for 2013, the prime lending rate of commercial banks reached 12% Egypt (World Bank), 6.3% in Morocco (Bank Al Maghrib) and 7.31% in Tunisia (Banque Centrale de Tunisie).

Source: Authors' calculations from WBES.

Table A2. Dictionary of variables

	Name	Type	Definition	Units	Source
<b>Characteristics of the firm</b>	<i>Industry</i>	Discrete	<i>Manufacturing</i> = 1 <i>Retail and services</i> = 2	Binary (1, 2)	WBES Calculated
	<i>Size</i>	Discrete	Full-time permanent staff <i>Micro</i> : 1-9 employees = 1 <i>Small</i> : 10-49 employees = 2 <i>Medium</i> : 50-99 employees = 3 <i>Large</i> : 100 + employees = 4	Ordinal (1, 2, 3 and 4)	WBES Calculated
	<i>Age</i>	Discrete	Number of years <i>Start-up + young</i> < 8 years = 1 <i>Mature</i> ≥ 8 years = 2	Binary (1, 2)	WBES Calculated
	<i>Ownership</i>	Discrete	<i>Shareholding + Partnership</i> = 1 <i>Sole proprietorship</i> = 2	Binary (1, 2)	WBES Calculated
	<i>Registration</i>	Discrete	<i>Non registered (informal)</i> = 0 <i>Registered (formal)</i> = 1	Dummy (0,1)	WBES
	<i>Financial inclusion</i>	Discrete	<i>Excluded</i> (no bank account) = 0 <i>Included</i> (bank account) = 1	Dummy (0,1)	WBES
	<i>Productivity</i>	Continuous	<i>Sales turnover</i> as of 2012/ Number of employees		WBES Calculated
<b>Characteristics of the manager</b>	<i>Gender ownership</i>	Discrete	<i>Female</i> = 0 <i>Male</i> = 1	Dummy (0, 1)	WBES Calculated
	<i>Top manager experience</i>	Discrete	<i>Beginner</i> : < 2 years = 1 <i>Young</i> : 2-7 years = 2 <i>mature</i> : ≥ 8 years = 3	Ordinal (1, 2, 3)	WBES Calculated
	<i>Top manager gender</i>	Discrete	<i>Male</i> = 1 <i>Female</i> = 2	Binary (1, 2)	WBES
	<i>Top manager education</i>	Discrete	<i>Tertiary (university)</i> = 1 <i>Secondary school (at most)</i> = 2 <i>Primary school (at most)</i> = 3	Ordinal (1, 2, 3)	WBES Calculated
<b>Financing need of the firm</b>	<i>Sales on credit</i>	Discrete	<i>No sales on credit</i> = 0 <i>Sales on credit</i> = 1	Dummy (0, 1)	WBES
	<i>Purchase on credit</i>	Discrete	<i>No purchase on credit</i> = 0 <i>Purchase on credit</i> = 1	Dummy (0, 1)	WBES Calculated
	<i>Loan purpose</i>	Discrete	<i>Working capital or fixed assets</i> = 1 <i>Working capital + fixed assets</i> = 2	Binary (1,2)	WBES Calculated
<b>Characteristics of the loan</b>	<i>Collateral</i>	Discrete	<i>No collateral requested</i> = 0 <i>Collateral requested</i> = 1	Dummy (0, 1)	WBES
	<i>Loan duration</i>	Continuous	Duration of the loan in months <i>Very short term</i> : < 6 months = 1 <i>Short term</i> : 6 - 24 months = 2 <i>Mid-long term</i> : > 24 months = 3	Ordinal (1, 2, 3)	WBES Calculated
	<i>Interest rate</i>	Continuous	Average nominal interest rate / size of business for each country	Per cent	WBES
<b>Macroeconomic indicators</b>	<i>Inflation</i>	Continuous	Rate of inflation	Per cent	WDI
	<i>GNI per capita</i>	Continuous	GDP per capita	\$ billion	WDI

Source: Authors from WBES (2013) and World Development Indicators (WDI).

**Table A3. Correlation matrix**

	Loan demand	Loan granted	Size	Industry	Age	Ownership	Registered	Gender	Manager gender	Manager exper.	Manager educ.	Financial inclus.	Purchase/credit	Turnover	Sales/credit	Loan purpose	Collateral	Interest rate	Loan duration	Inflation	GNI per capita
Loan Demand	1																				
Loan granted	0.40*	1																			
Size	0.23*	0.16*	1	1																	
Industry	0.08	0.07	-0.13*	1																	
Age	0.12*	0.05	0.16*	0.11*	1																
Ownership	-0.11*	-0.12*	0.17*	-0.07	-0.04	1															
Registered	-0.02	0.002	0.03	0.09*	0.02	0.01	1														
Gender ownership	-0.09*	-0.03	-0.06	-0.09*	-0.03	0.05	-0.05	1													
Manager gender	0.001	0.032	-0.01	0.04	-0.06	0.001	0.003	-0.26*	1												
Manager experience	0.07	0.10*	0.04	0.12*	0.19*	0.008	-0.09	-0.01	-0.07	1											
Manager education	-0.13*	-0.08	-0.22*	0.01	-0.001	-0.02	-0.006	0.06	-0.08	0.06	1										
Financial inclusion	0.44*	0.26*	0.21*	0.18*	0.08*	-0.03	0.07	-0.15*	0.04	0.18*	-0.15*	1									
Purchase on credit	0.14*	0.22*	0.07	0.05	0.08*	-0.13*	0.09	-0.10*	-0.03	0.07	0.08*	0.14*	1								
Productivity	0.11*	0.04	-0.04	0.10*	-0.005	0.008	-0.04	-0.07	-0.04	0.03	0.001	0.08*	0.02	1							
Sales/credit	0.19*	0.22*	0.14*	0.01	0.02	0.13*	0.04	-0.05	0.003	0.05	0.02	0.26*	0.51*	0.02	1						
Loan purpose	0.23*	0.3*	0.21*	0.09*	0.02	-0.10	0.03	-0.05	0.037	0.08	-0.03	0.21*	0.2	0.05	0.15*	1					
Collateral	0.14*	0.11*	-0.03	0.02	-0.02	-0.08	-0.04	0.007	-0.01	0.005	0.06	0.002	0.02*	-0.001	0.008	0.08*	1				
Interest rate	-0.22*	-0.26*	-0.03	-0.46*	-0.09*	0.20*	-0.06	0.14*	-0.06	-0.21*	-0.06	-0.31*	-0.31*	-0.3	-0.27*	-0.27*	-0.03	1			
Loan duration <sup>a</sup>		0.13*	0.009	0.008	-0.03	0.009	-0.01	0.01	0.003	0.06	0.04*	0.003	0.13*	-0.16*	0.14*	0.12*	0.17*	-0.22*	1		
Inflation	-0.26*	-0.22*	-0.03	-0.48*	-0.08	0.07	-0.04	0.16*	-0.01	-0.19*	-0.05	-0.35*	-0.22*	-0.37*	0.18*	0.21*	0.03	0.66*	0.1*	1	
GNI pc	0.11*	0.21*	-0.04	0.25*	0.03	0.2*	0.05	-0.05	0.08	0.13*	0.03*	0.22*	-0.25*	-0.24*	0.29*	0.18*	0.1*	-0.72*	0.36*	-0.06*	1

Note: \* significant at 1% threshold.<sup>a</sup> No correlation between Loan duration and Loan demand, data being only available for businesses that successfully applied for a loan in 2013.

Source: Authors.