

***The middle-class of Enterprises in Middle East and North Africa (MENA) during the pandemic:  
Do Covid-19 adaptive strategies improve access to credit?***

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**ABSTRACT**

Our paper investigates whether COVID-19 adaptive strategies by the middle class of enterprises had an impact on access to finance, in particular government programs support, during the COVID-19 pandemic. These firms are identified by their turnover: 2278 small businesses in four MENA countries (Egypt, Morocco, Tunisia and Jordan) are selected from firm-level data in the Economic Research Forum (ERF) from February 2020 to June 2021. A univariate probit for the demand model and a seemingly unrelated bivariate probit model for the supply model in order to eliminate the endogeneity bias are used. Our findings imply that trade credits and business model adjustments by Digital marketing and E-commerce have disadvantaged firms to apply for government programs (demand side). However, the use of digital platforms, social media and specialized applications to maintain their commercial activity without having a direct contact with the customer (E-commerce) is apperceived as an advantage for firms to have access to Government support (supply side). Trade credits were perceived as a sufficient substitute for bank loans, and Governments encourage digitalization of activity during the pandemic crisis by approving financing demand.

**Keywords:** Access to credit, business-model adjustments, COVID-19, Government programs, seemingly unrelated bivariate probit, Small businesses, MENA countries, Middle class.

**JEL Classification :** D1; D8; D22; G2; G30 ; M14

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## 1. INTRODUCTION

During the COVID-19 pandemic, healthcare spending has surged, people have lost their jobs and income, business economic activities have been severely disrupted, and uneven impacts on the already fragile social fabric of the MENA region have been observed. Poverty increased substantially between 5 and 35 percentage points in 2020 (Hoogeveen and Lopez-Acevedo, 2021). A group of "new poor" who were not poor in the first quarter of 2020 and who have become so, has emerged and accentuated the decline of the middle class, including entrepreneurs.

The latter was faced to a situation where lenders were granted less and less credit. This is due to some factors, including their capital structure, debt levels, and lack of supply diversification. As a result, the middle-class entrepreneurs have to operate a "crisis management" mode by adopting strategies of business-model adjustments and searching for alternative sources of financing to maintain their financial viability and to combat Covid-19 pandemic.

Among the most apparent control strategies is the digitalization of the business (digital marketing and online sales), which aims at adapting to the changing consumer behavior face to mobility restrictions (Davoud et al., 2022). Also, the recourse to informal loans and trade credits has been mentioned as an additional source of financing for firms that have less access to bank credits (Dornel et al., 2020).

Recent studies have highlighted that public granted financing is an alternative source of financing to bank loans during COVID-19 crisis (Falagiarda et al., 2022; Roper et al, 2021). In fact, some governments have launched support programs to provide funds for firms suffering from COVID-19 crisis. These support programs include government-guaranteed loans, operating subsidies, wage subsidies, tax deferrals, etc. These support measures differ from one economy to another, with different strategies for targeting priority businesses. However, for the MENA region as a whole, the share of companies that received or expected to receive support was 25%, lower than Europe and Central Asia, at 46% and 28% respectively. Business Pulse Surveys suggest that aid only reaches a minority of companies, mainly in the form of wage subsidies (Hoogeveen and Lopez-Acevedo, 2021)

In this context, do the COVID-19 adaptive strategies by the middle-class of Enterprises in MENA countries improve access to government support programs? In other words, on the demand side, have those strategies encouraged firms to apply for? or increased the firm's chances of benefiting from government programs on the supply side?

Our study investigates the impact of different strategies adopted to adjust the firm's business model in response to the COVID-19 pandemic crisis, on the access to government funding from both sides: demand and supply. There is little empirical investigation into the topic of middle-class entrepreneurship and, to the best of our knowledge, no paper has addressed the relationship between the funding issue of these entrepreneurs and Covid-19 adaptive strategies in MENA countries. Hence, our paper provides some new insights.

The paper is structured as follows.

Section 2 tackles the literature review and stylised facts upon the middle-class enterprises, their responses to the Covid-19 epidemic crisis as well as their funding behaviour during this crisis.

Section 3 examines the characteristics of the middle-class Enterprises selected in four MENA countries: Tunisia, Morocco, Egypt and Jordan. From the surveys conducted by the Economic Research Forum (ERF) in 2021 (OAMDI, 2021) upon a stratified sample of enterprises, we select 2278 small businesses belonging to the middle class, during the three waves COVID-19 crisis, i.e., from February 2020 to June 2021.

Section 4 analyses the estimation results of two econometric models that depend on strategies adopted to combat the economic restrictions caused by the COVID-19 pandemic such as trade

credits, digitalization of marketing activity, and implementation of online business tools through digital tools such as websites, digital platforms and specialized applications. The first model estimated by a univariate probit, expresses the self-selection of the middle-class entrepreneurs (Demand side) while the second model has as the binary dependent variable the funding decision made by the government support programs (Supply side). Bivariate analysis was used to estimate this model, in order to resolve the endogeneity problem of the strategy variables. Section 5 concludes.

## 1. LITERATURE REVIEW

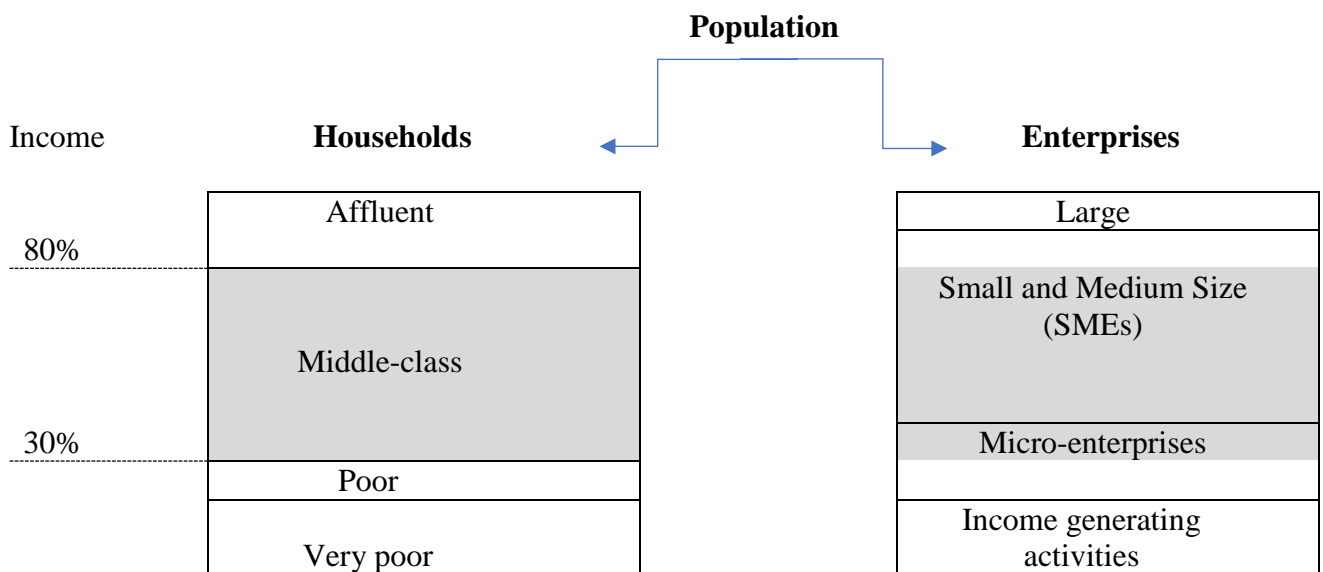
### 1.1. The middle-class of Enterprises

Social stratification covers various representations and there is no consensus on any definition of social class (Clément et al, 2022).

The most common definition of the middle class is generally based on two criteria. The income criterion places the middle class in a central space, between the wealthiest 20% and the poorest 30% or, in terms of another method, between 75% and 125% of the median income (i.e., the income level that splits the population in half, one part earning more and the other less) (Jacquemot, 2012). According to the OECD (2019), the middle class is represented by people with an income between 75% and 200% of the median income, while for the PEW (2015), it is characterized by people with an income between 66% and 200% of median income. Thus, the size of the middle class is defined as the residual of the total population after deducting the size of the poor, vulnerable and well-off groups (Fig. 1)

The profession criterion positions the middle class in an intermediate level between the poorest (workers and employees) and the richest (company managers and executives). However, heterogeneous categories of entrepreneurs should be observed in this middle class: the category of executives which covers middle managers, the category of entrepreneurs which includes craftsmen with employees, owners of micro-enterprises or small businesses and CEOs of medium companies. In this context, only large enterprises, the upper part of small and medium-sized enterprises (SMEs) and the lower part of micro-enterprises are excluded from Middle class of enterprises (Fig. 1).

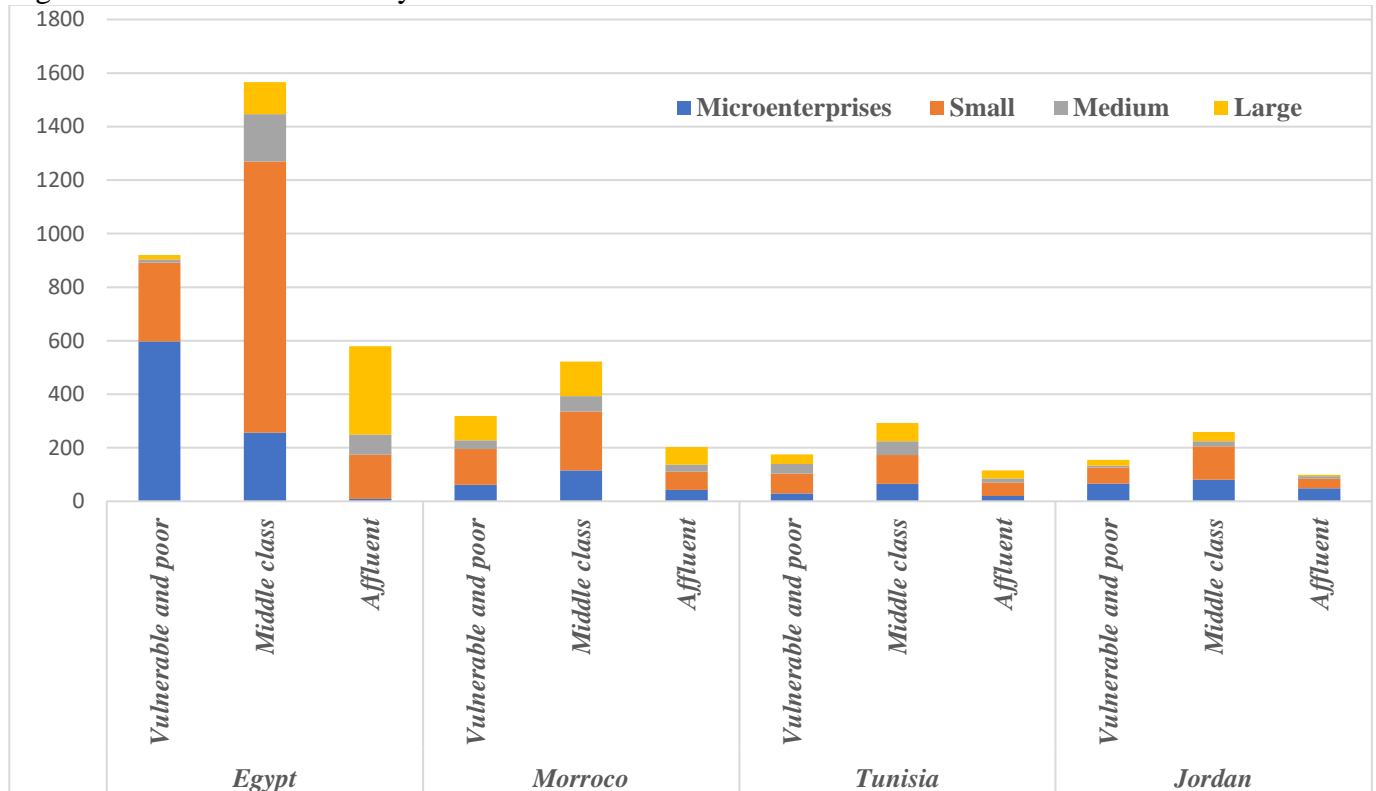
Fig. 1: Presentation of the middle-class: Households *versus* Enterprises



Source: Author

World Bank Enterprise Surveys (WBES) collect data on managers' education, gender and experience but no information on their income. However, the annual turnover of enterprises can be used as a proxy for their income which constitutes only a minimal part of this amount (after the deduction of reserves, self-financing of the enterprise...) (Appendix 1). Breaking down this turnover by percentile makes it possible to identify middle-class companies with an income between the poorest 30% and the richest 20%<sup>2</sup>. According to the distribution of different categories of firms by social class in the four MENA countries: Egypt, Morocco, Tunisia and Jordan, the middle-class of enterprises regroups micro-enterprises, medium-sized enterprises but mostly small businesses (10-49 employees), including 68.8% in Egypt, 51.89% in Morocco, 46.55% in Tunisia and 56.62% in Jordan (Fig. 2 and Appendix 2). These businesses are mostly owned (87%) or managed (94%) by men. Three out of four managers have a university education and mature experience (Appendix 3).

Fig. 2: Distribution of Firms by social class in MENA countries



Source: Author and WBES (2019)

## 1.2. Business's responses to the Covid-19 epidemic crisis

Crises are characterized by instability that affects the managerial decisions of the firm and consequently, its marketing activity. Their occurrences can give rise to new challenges for the company: new business models, opportunities and technologies. However, previous research studies have not identified suitable strategies and actions taken by managers in times of crisis, as well as their effectiveness considering the capabilities of the firm (Bundy et al., 2017), especially for small and medium-sized firms (SMEs).

The COVID-19 pandemic crisis has revealed new challenges for small and medium-sized enterprises. Although the business model does not guarantee the effectiveness of its performance (Porter, 2001), it can be the source of discovering the firm's potential (Chesbrough and Rosenbloom,

<sup>2</sup> This chosen approach may maximize the number of middle-class entrepreneurs.

2002). Sun et al. (2022) tried to conduct a survey regarding changes in business models of firms and noticed that their response to the pandemic crisis depends on firm size, ownership, firm age, and location. These strategies may be adopted in order to send positive signals to the capital market regarding the financial stability of the firm (Milde and Riley, 1988).

Due to the prolonged periods of confinement causing the paralysis of the whole world and the physical and social estrangement, consumers' behavior has changed. People have found themselves in a situation where they can only consume through the goods and services offered online to satisfy their daily needs (Cowling et al., 2020). Therefore, in order to adapt and respond to the demands of the new environment (new consumer behavior), the digitalization of the business has become a necessity for its survival. In fact, Digital transformation has been used as a means of product differentiation and allows SMEs to develop new business models and new strategies. SMEs that have adopted digital platforms to offer their news and products have also generated high returns (Ato Sarsah et al., 2020). Furthermore, the use of technology to address the occurrence of the COVID-19 pandemic crisis has two purposes. First, to ensure that the services offered by the company remain operational and continuous, even during a crisis and mobility restrictions. Second, to send a signal to investors that the company's market value is profitable.

On the other hand, the plight of SMEs is an issue of central importance for policymakers. Governments around the world have launched various support funds to provide credit to non-financial businesses to mitigate the negative effects of COVID-19 (Hanson et al., 2020). MENA countries have taken advantage of government support to create new opportunities, including investment in research into new consumption patterns and enabling SMEs to cope with the crisis. Morocco lowered its key interest rate to 1.5% and suspended the payment of loans to SMEs. A special fund of about 3% of GDP is financed by the government on behalf of SMEs and individuals (OECD, 2020). To support these businesses, the central bank in Jordan injected US\$705 million to reduce banks' bond reserves by deferring loan repayments and expanding the coverage of guarantees on loans to SMEs. For Egypt, a recovery plan representing 1.2% of GDP has been put in place including emergency funds for the most vulnerable businesses in particular in the tourism sector. In Tunisia, government support programs have dedicated US\$103 million to SMEs as well as a liquidity easing package to limit layoffs.

MENA governments have joined the global approach to support programs by other decisions taken such as tax deferral, Deferral of loan payments by banks, new loans for companies in relevant sectors, Other measures, including reduction of utility bills (Egypt, Saudi Arabia), direct assistance with salary payments (Saudi Arabia 60% for three months), and compensation for companies that lose business (Algeria). They have designed sustainable stimulus packages to support SMEs severely affected by the crisis, not only to support their cash flow but also to enable them to access innovation and growth capital (OECD, 2020).

### **1.3. Funding behaviour of Business during the Covid-19 epidemic crisis**

#### ***1.3.1. Funding demand behaviour: self-selection***

Based on a sample of 1962 SMEs during the period 2019-2020, Zhang et al., (2021) used differences in differences method and show that Hubei's SMEs credit demand was reduced compared to that of non-Hubei SMEs. They concluded that adverse effects were more pronounced for the non-state-owned enterprises and SMEs without prior bank relationships.

Cowling et al. (2022) that are conducted a study on 5,002,010 SMEs in UK during 2020 by using Heckman's model, show that 72% of previously rejected borrowers are reluctant to request loans during COVID-19 crisis.

Using experimental variation, Bartik et al. (2020) assess take-up rates and business resilience effects for loans relative to grants-based programs during COVID-19 crisis on a sample of 5800 small businesses in the United States. They found that the majority of the sample planned to seek funding through a government program namely CARES (Coronavirus Aid, Relief, and Economic Security) and that they anticipated problems with accessing the aid such as bureaucratic hassles and difficulties establishing eligibility.

Gur et al. (2023) examine how SMEs in Istanbul managed their financial needs during the COVID-19 pandemic. The empirical findings suggest that, during the pandemic, micro and small firms tend to borrow more from their acquaintances, such as relatives and friends; they tend to apply for bank loans less than large firms, while medium-size firms are more likely to apply; and they are more inclined to report difficulty in accessing credit.

### ***1.3.2. Funding supply behavior***

Due to COVID-19 restrictions, the demand, supply and government share of SME lending increased (Calabrese et al, 2021).

Didier et al., (2021) conducted a study based on stock markets across industries in the United States in 2020 and concluded that government support during the health crisis in developing countries prioritized emergency needs in order to save some enterprises from bankruptcy. Thus, it is dedicated to firms with deteriorating revenues (Groenewegen et al., 2021). However, most SMEs had little to no available access to loans (Jing et al, 2022). Micro and small businesses had the highest demand for loans, and that better-performing firms were more likely to receive loans (Calabrese et al, 2021). According to Omar et al., (2020)'s study based on Malaysian SMEs on March 2020; digital marketing strategies were adopted as an alternative financial resource in order to deal with credit constraints.

Using the World Bank's COVID-19 impact survey data collected between 2020 and mid-2021 from 42 countries, Gull et al (2023) find that better strategies adopted by SMEs (such as adjusting the process and product, shifting business activity online, and remote working arrangements) increase their likelihood of getting new credit from government and commercial banks. The results remain robust to alternative test settings.

Bui and Do (2021) investigate whether the use of information technology capabilities reduces financial constraints on SMEs by using the instrumental variable technique with a Vietnamese panel dataset. They provide evidence that the utilization of technology facilitates loan applications and increases approval rates.

Mushtaq et al (2022) examine the association between Information and Communication Technology (ICT) adoption, innovation, and SMEs' access to finance by exploiting the WBES data of 171,000 SMEs from 149 countries between 2006 and 2020. By decomposing SMEs' access to finance into basic and advanced access to finance, they confirm that ICT adoption reduces information asymmetry between SMEs and banks; and SMEs with greater access to and use of new technologies are more likely to acquire financial resources from banks.

## **2. SAMPLE AND STATISTICS**

### **2.1. Sample: source and choice**

The objective of our study is to investigate the role of different strategies adopted by middle-class of entrepreneurs in response to the COVID-19 pandemic crisis, on their access to government

funding. A WBES COVID-19 Monitor (WBES 2021) taken place in Morocco and Jordan, is a data source but not used in this paper, due to too small a sample size.

The ERF conducted three waves upon a stratified sample of enterprises (OAMDI 2021) and it establishes 64 questions that explore in depth the characteristics of the firm and its financing activity during the COVID-19 pandemic crisis. Unfortunately, the lacking variable on the Turnover of business as a proxy of the income of their managers or owners prevents us from identifying middle-class enterprises. Hence, we have selected only small businesses (10-49 employees) as middle class. This choice was made for two reasons. First, only the upper stratum of micro-enterprises (5-10 employees) and the lower stratum of medium enterprises (50-60 employees) may belong to the middle class.

Secondly, the characteristics of these "small businesses" sub-sample, although limited, were compared with their middle-class counterparts in the WBES database (WBES, 2019).

The two sub-samples of small businesses ERF and WBES had the same characteristics: they mainly operate in the manufacturing sector and make less use of personal loans (Appendix 3). Consequently, the turnover can be considered representative for the ERF sample and makes it possible to confirm that these small businesses are in the middle class.

## 2.2. Descriptive statistics on Government funding during the COVID-19 crisis

### 2.2.1. Country effect

Out of a sample of 2,278 small businesses considered enterprises of the middle class, 1,694 need financing, of which 42.85% did not request financial support from the government either because they were unaware of these programs (40%), or because they are aware but have decided not to apply (self-selection) (60%).

**Table 1: Distribution of the application for government support programs by country**

Country	No application for government programs				Application for government programs						Total
	Self-selection <sup>3</sup>		Not aware about programs		Total	Demand accepted		Demand refused		Total	
<b>Tunisia</b>	130	82%	29	18%	159	187	53%	165	47%	352	539
<b>Morocco</b>	67	42%	94	58%	161	82	39%	129	61%	211	372
<b>Egypt</b>	125	49%	128	51%	253	52	28%	132	72%	184	437
<b>Jordan</b>	114	75%	39	25%	153	62	28%	159	72%	221	374
<b>Total</b>	436	60%	290	40%	726(42.85%)	383	40%	585	60%	968(57.14%)	1694

Source: Author from ERF (2021)

Table 1 shows that the self-selection rate is almost twice as high in Tunisia as in Morocco (42%). In contrast, more than half of Moroccan and Egyptian small businesses are unaware of these

<sup>3</sup> The variable (*selfselection*) expresses the probability of being discouraged from applying to government programs. It is constructed from the FIR63 question on the ERF questionnaire, "Why did you not apply to any government programs?" The answer to the question is one of the following alternatives: 1.I am not aware of these programs; 2.It requires internet/smartphone and I don't have one; 3.Even if I apply, I think my application will be rejected;4.I will have to pay a bribe to apply for these programs;5. Bureaucracy/avoid interaction with government; 6. Not eligible; 7. No, none. If the company mentions one of the alternatives (from the second alternative to the sixth alternative) indicated above, the variable *Self selection* takes 1. If the company mentions the seventh alternative, the variable *Self selection* takes 0. So, the *Self selection* variable is a dichotomous variable.

government programs; which may show the lack of a vast fundraising campaign by these two countries.

On the supply side, for the sub-sample of 968 small businesses that applied for government programs, 40% of applications were accepted and in particular 53% in Tunisia and 39% in Morocco against 28% in Egypt and Jordan. It can be concluded that the Tunisian and Moroccan governments are more likely to interact with and help companies that needed financing during periods of crisis, in particular the COVID-19 period.

### 2.2.2. Pandemic crisis strategies

To combat the economic restrictions caused by the COVID-19 pandemic, small businesses adopted strategies such as : buying on credit from suppliers or taking advantage of advances from their customers (*Trade credit*), investing to develop the activity of digital marketing to promote their products (*Digital marketing*), and the use of digital platforms, social media and specialized applications to maintain their commercial activity without having a direct contact with the customer (*E-commerce*).

Table 2 shows that more than 60% of small businesses that have adopted at least one of these strategies applied for government programs. On the one hand, trade credit as an alternative financing strategy during the pandemic crisis cannot then replace the external financing provided by government measures during the COVID-19 crisis. On the other hand, companies that have adjusted their business model by adopting both E-commerce and Digital marketing strategies need financing in order to invest in research and development activities.

**Table 2: Distribution of the Government funding demand by strategy**

Strategy	Not Government support demand (Self-selection)		Government support demand						Total
			Demand granted		Demand refused		Total		
	N	%	N	%	N	%	N	%	
<b>Trade credit</b>	271	29,91%	235	37,01%	400	62,99%	635	70,09%	906
<b>Digital marketing</b>	252	27,81%	197	35,37%	360	64,63%	557	61,48%	809
<b>E-commerce</b>	435	48,01%	204	34,11%	394	65,89%	598	66%	1033

Source: Author from ERF (2021)

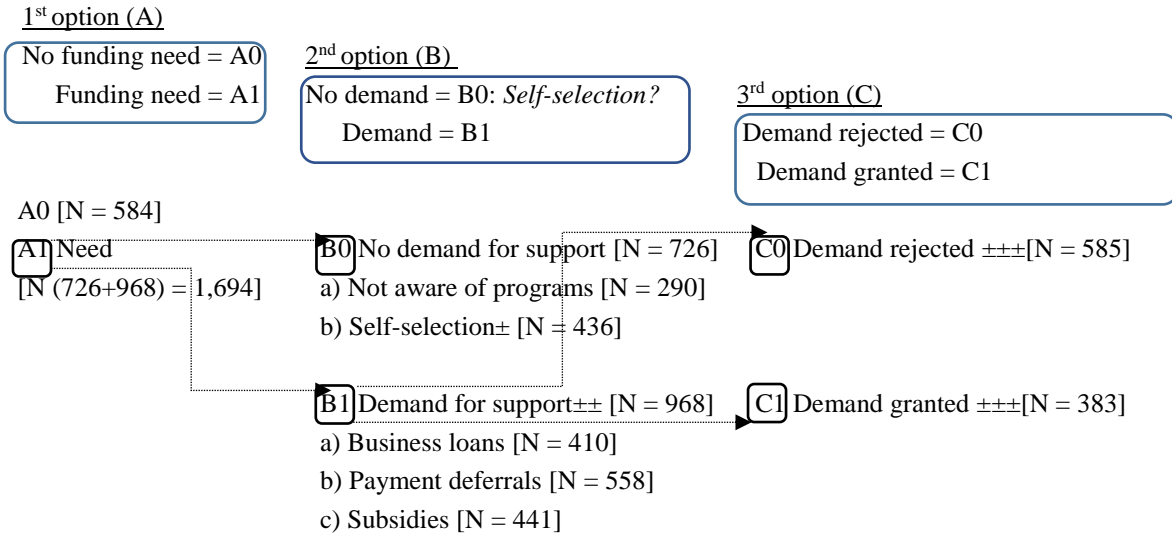
However, the application acceptance rate of these companies did are 37% for Trade credit, 35.01% for Digital marketing and 34.11% for E-commerce; which shows that these strategies have not allowed companies to benefit financial support from the government. It seems that trade credits are perceived by the government as a sufficient complement to lending; funding digitalization is not an emergency aid for developing countries selected; and the fact that applying to government programs while having a website or an online application is a signal that the company has less need for funding than non-connected companies. This result is coherent with the findings of Rafaella et al. (2022): small firms applied more frequently for government loans, but government programs were more likely to target better performing firms. They also highlight that government-guaranteed loan offers were higher for low-risk firms and lower for higher-risk firms.

### 3. Model Design and methodology



We design a sequential choice model best represented with a decision tree, which includes three binary options: (A) no support government need vs. funding need prior to (B) no demand for support (self-selection) vs. demand for support and (C) Demand rejected vs. Demand granted (See Figure 1 and Box 1 hereafter). Noteworthy is that the final choice in option C is the decision of the lenders' supply side: government support government.

**Fig. 1. Decision tree: the sequential funding/support model during COVID-19**



Notes: Sample (N= 2,278) ± Requires internet/smart phone (have none) + Don't think will get support + Need to pay bribe to get support + Others. ±± Several supports can combine. ±±± Not available. We compile C0 and C1 from cross sorting with the answers to the question addressing the best policy required to support business activity, (a), b) or c). If the answer is positive, we assume that the application was accepted (C1), otherwise rejected (C0).

Source: Author' calculations from OAMDI (2021) for the four MENA countries.

Our objective is mainly to test the impact of the strategies adopted against COVID-19 crisis on the application for government funding (deferrals, grants and loans) on the one hand and the decision to grant funding on the other. Both econometric models are built. The first model is a demand model having a dependent variable: Firm's self-selection. The second model is a supply-side model with the dependent variable being the funding decision made by the government (Application outcome).

**Firm's self – selection<sub>ik</sub>**

$$= \begin{cases} 0 & \text{if Government support was needed and not applied for in 2020/2021} \\ 1 & \text{if Government support was needed and applied for in 2020/2021} \end{cases}$$

**Application outcome<sub>ik</sub>**

$$= \begin{cases} 0 & \text{if Government support was denied in 2010/2021} \\ 1 & \text{if Government support was granted in 2020/2021} \end{cases}$$

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

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

Wherein explanatory variables are the following: X<sub>j</sub>= business's pandemic crisis strategies; W<sub>j</sub> = characteristics of the business; Z<sub>j</sub>= current activity of the business during COVID-19; V<sub>j</sub>= funding activity of the business; R<sub>j</sub>=Control dummies, and ε<sub>j</sub>is the error term. (Appendix 4)

Since the two dependent variables we use are binary, the probit regression in our case is justified. However, we suspected that there may be a possibility of endogeneity of the variables Xi (*business's pandemic crisis strategies*) in the supply model. Indeed, the causal relationship may be in both directions: between the dependent variable and Xi. It is therefore difficult to know whether the dependent variable determines the explanatory variable in question or the reverse. We have to analyze two correlated decisions,

## 4. RESULTS AND DISCUSSION

### 4.1. Firm's self-selection

Table 3 reports the results of the estimation of self-selection according to each strategy adopted against COVID-19 separately<sup>4</sup> - *Trade credit* (model 1.a), *Digital marketing* (model 1b), *E-commerce* (model 1.c) and then for the subsample of firms that adopted Business-model adjustments (model 1.d) and all the strategies (model 1.e).

The COVID-19 control strategies -*Trade credit* (model 1.a), *Digital marketing* (model 1.b) and *E-commerce* (model 1.c) have a positive and significant effect on the probability of self-selection. Buying on credit from suppliers or receiving advances from its customers discourage the firm to demand funding from government programs. This result is consistent with Scott et al., (2014)'s study that suggests that firms increase their use of trade credit when they face financing constraints imposed by banking institutions. Al-Hadi and Al-Abri (2022) have found that the recourse to trade credits was a substitute to bank loans during more restrictive credit-supply periods. Firms that use *Digital marketing* as COVID-19 control strategies increase their probability of self-selection with 10,42%

*E-commerce* influences positively the probability of self-selection with 16.46%. This can be explained by the fact that firms investing in one-commerce were less affected by the health crisis. This was confirmed by Apedo-Amah et al., (2021)'s study who concluded that digitally-enabled firms are expected to be less affected by lockdown measures because they were able to maintain business operations via digital technologies (e.g., online sales).

Regarding model (1.d), *Business model adjustments* (i.e., using both Digital marketing and E-commerce strategies) influence positively and significantly the probability of self-selection with 13.26%. Indeed, the strategies of digitalization of the activity to reduce the direct contact with the customers during the pandemic crisis made that the companies chose not to ask for financial support from the government. This result is coherent with Abidi et al., (2022)'s study who concluded that firms that proceeded with business digitalization during the COVID-19 pandemic crisis were more resilient to the supply and demand shocks caused by the pandemic. According to Carpenter and Petersen (2002), restrictions are more severe for innovative firms because they have more information asymmetry with credit institutions. By analogy, this explains the fact that firms that have invested in the digitalization of the business are more discouraged from applying for government programs.

Model 1.e was estimated on the subsample of firms that used all strategies at once. However, only Digital marketing has a positive impact on the probability of self-selection for this subsample.

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<sup>4</sup> Each sub-model includes one strategy separately, no matter the firm has adopted another strategy at the same time or not

**Table 3: Estimation of the self-selection model (marginal effects)**

Models Variables	(1.a) Trade credit	(1.b) Digital Marketing	(3.c) E- commerce	(4.d) Business model adjustments	(5.e) All the strategies
<b>Trade_credit</b>	0.1509*** (4.2620)				0.1453*** (4.1271)
<b>Digital marketing</b>		0.1042** (2.5515)			0.0410 (0.9330)
<b>E-commerce</b>			0.1646*** (3.5332)		0.1402*** (2.8085)
<b>Business model adjustments</b>				0.1326*** (3.4197)	
<b>Industry: Manufacturing</b> (ref : Trade and services)	0.0189 (0.5060)	0.0275 (0.7292)	0.0335 (0.8965)	0.0275 (0.7337)	0.0218 (0.5935)
<b>financing_constraints</b> (ref : no financing constraints)	0.0733* (1.9376)	0.0770** (2.0031)	0.0775** (2.0250)	0.0741* (1.9420)	0.0572 (1.5059)
<b>Informal_funding</b> (ref: no informal funding)	0.1222*** (2.6775)	0.1349*** (2.9256)	0.1227*** (2.6738)	0.1284*** (2.7899)	0.1111** (2.4695)
<b>Liquidityshortfall: Increase</b> (ref : constant)	-0.0382 (-0.5045)	-0.0249 (-0.3129)	-0.0166 (-0.2075)	-0.0204 (-0.2526)	-0.0473 (-0.6316)
<b>Liquidityshortfall: Decrease</b> (ref : constant)	0.0227 (0.4244)	0.0351 (0.6497)	0.0522 (0.9859)	0.0433 (0.8101)	0.0282 (0.5464)
<b>Business_status: Temporarily or definitely closed due to COVID-19</b> (ref : Temporarily or definitely closed due to other reasons)	-0.1038 (-0.5311)	-0.1246 (-0.6965)	-0.1401 (-0.8284)	-0.1484 (-0.8770)	-0.1354 (-0.7502)
<b>Business_status: Open</b> (ref : Temporarily or definitely closed due to other reasons)	-0.3058* (-1.7428)	-0.3459** (-2.2222)	-0.3866*** (-2.6725)	-0.3674** (-2.5388)	-0.3547** (-2.2128)
<b>Country: Tunisia</b> (ref : Jordan)	0.0338 (0.3788)	0.0327 (0.3555)	0.0350 (0.3964)	0.0344 (0.3798)	0.0490 (0.5543)
<b>Country: Morocco</b> (ref : Jordan)	-0.3458*** (-7.8873)	-0.3589*** (-7.9953)	-0.3701*** (-8.2168)	-0.3655*** (-8.1475)	-0.3652*** (-8.3490)
<b>Country: Egypt</b> (ref : Jordon)	-0.1625*** (-3.3632)	-0.1846*** (-3.7077)	-0.2001*** (-3.9866)	-0.1934*** (-3.8814)	-0.2046*** (-4.1678)
Observations	541	541	541	541	541

Notes: Robust z-statistics in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors from ERF (OAMDI 2021).

*Financing constraints* and *informal lending* are significant and positive in all Models.

Regardless of the control strategy adopted, small businesses that suffer from *financing constraints* tend to be self-selected and not seek government funding during the pandemic crisis. According to Banerjee et al., (2020), information asymmetry is the fundamental cause of financing constraints and since the pandemic crisis has increased the information asymmetry between firms and funders, financing constraints may be the reason behind firms' self-selection. Similarly, access to external financing differs from a firm to another one. As a consequence, the level of internal financing is managed in advance to prevent financial gaps caused by lack of external financing (Harford et al., 2014), which may explain why firms suffering from financing constraints did not apply for government credits or grants.

The likelihood of self-selection declines when the small business finance itself through credit from friends or family (*informal lending*) and informal funding played an important role in the recovery of the activity during the pandemic crisis.

*Business status (Open)* is negative and significant in all models: the fact of being an always open company during COVID-19 decreases the probability of self-selection. In other words, firms that

are still working on site during the health crisis are more encouraged to apply for government funding programs. This can be explained by the fact to be still in operation while there are mobility restrictions imposed by the government causes the firm to experience a liquidity shortage and thus the need for external financing increases. This is consistent with the result of Cowling et al, (2021) that firms with slower business activity had more demands for external financing during the first two quarters of COVID-19.

*Country dummies* display negative and significant self-selection behaviour in all models: small businesses in Egypt and Morocco are not prone to self-selection.

#### **4.2. Application outcome**

Both univariate probit and seemingly bivariate probit apply to our supply model by including each pandemic crisis strategy separately, then the Business-model adjustments variable (model 2.d and model 2.dbis) and finally all the strategies variables at the same time (model 2.e and model 2.ebis). According to Wald test of rho which approves the endogeneity of COVID-19 control strategies variables, we retained the estimators of a seemingly unrelated bivariate probit only for the model including *E-commerce* as a control strategy (model 2.cbis) because this strategy is an endogenous variable. Additionally, it is the only strategy *E-commerce* that influences significantly and negatively the decision to receive government funding: investing in digital platforms to increase communication with employees and customers decreases the probability of benefiting from government programs (model 2.dbis and model 2.e). This strategy adopted was perceived as a signal that these small businesses did not have an urgent need for financing and they were not the target of the government during the health crisis. Governments in developing countries have limited resources to save the country's economy. They prioritized financing the companies with a lack of liquidity rather than encouraging the activity's digitalization. This is consistent with Cowling et al., (2021), who highlighted that government programs targeted poorer firms (firms less than 5 years old) during the COVID-19 health crisis.

The *business model adjustments* variable is negative but not significant (model 2.d). Indeed, adjusting the firm's business model, to deal with social distancing, doesn't affect the probability of benefiting from government programs by 22.27%. This result is contradictory to Berguiga and Adair (2022): when enterprises adjust their business model and when they use financial technology (fintech). The use of the smartphone for marketing and placing orders, of the Internet, of online social media, and of specialised applications or digital platforms reduces the rejection decisions for government support programs. On the other hand, Karim et al., (2021) argued that the government plays a mediating role to encourage firms to adapt technologically. Indeed, Business-model adjustments are expensive and require the availability of internal and external financing resources (Xu and Birge, 2006). Financing this initiative was difficult with banking institutions and the government should provide financial subsidies in order to assist in the digitization of the business model of some companies (Kho Guan Khai et al., 2020).

*liquidityshortfall (Decrease)* influences significantly and positively the probability of acceptance of funding request only for model 2.cbis. This sign is expected since firms with decreasing revenues compared to the same period in 2019 provide the government with a choice criterion that reduces the information asymmetry in the lender-borrower relationship.

*Country dummies* (*Tunisia, Morocco* in models 2.a, 2.b, 2.d and 2.e and *Egypt* in model 2.cbis) are positive and significant for models 2.a, 2.b, 2.d and 2.e. The rejection decisions for government support programs for small businesses in these countries are low.

**Table 4: Estimation of the application outcome model (marginal effects)**

Models	(2.a)	(2.a bis)	(2.b)	(2.b bis)	(2.c)	(2.c bis)	(2.d)	(2.d bis)	(2.e)	(2.e bis)
Variables	Trade Credit Probit	Trade credit Bivariate Probit	Digital Marketing Probit	Digital Marketing Bivariate Probit	E-commerce Probit	E- commerce Bivariate Probit	Business model adjustments Probit	Business model adjustments Bivariate Probit	All the strategies Probit	All the strategies Bivariate Probit
<b>Trade credit</b>	-0.0441 (-1.3079)	-0.1633 (-1.2669)							-0.0440 (-1.3104)	
<b>Digital marketing</b>			-0.0376 (-1.1349)	-1.3404** (-1.9770)					0.0139 (0.3453)	
<b>E-commerce</b>					-0.0846** (-2.5757)	- 1.5651*** (-7.2803)			-0.0921** (-2.3016)	
<b>Business model adjustments</b>							-0.0509 (-1.5755)	-1.5742*** (-27.9181)		
<b>All the strategies</b>										-0.3225 (-1.3203)
<b>Industry: Manufacturing</b> <i>(ref: Trade and services)</i>	-0.0051 (-0.1618)	0.0030 (0.0342)	-0.0098 (-0.3123)	-0.0591 (-0.6849)	-0.0114 (-0.3638)	-0.0729 (-0.9113)	-0.0106 (-0.3371)	-0.0910 (-1.2049)	-0.0077 (-0.2436)	-0.0085 (-0.0976)
<b>Business_status: Temporarily or definitely closed due to COVID-19</b>	0.2539 (1.6308)	0.5928 (1.3782)	0.2511 (1.6068)	0.5920 (1.2049)	0.2398 (1.5217)	0.3189 (0.6742)	0.2452 (1.5660)	0.4493 (0.9779)	0.2415 (1.5228)	0.5740 (1.2958)
<b>Business_status: Open</b> <i>(ref: Temporarily or definitely closed due to other reasons)</i>	0.1531 (1.0512)	0.3328 (0.8287)	0.1534 (1.0438)	0.6910 (1.3443)	0.1552 (1.0492)	0.5272 (1.1716)	0.1517 (1.0310)	0.7038 (1.6138)	0.1615 (1.0808)	0.3512 (0.8430)
<b>Liquidityshortfall: Increase</b> <i>(ref: Constant)</i>	0.0148 (0.2043)	0.0561 (0.2743)	0.0130 (0.1800)	0.1283 (0.6557)	0.0218 (0.3019)	0.2720 (1.4568)	0.0178 (0.2460)	0.2794* (1.6924)	0.0266 (0.3687)	0.0966 (0.4599)
<b>Liquidityshortfall: Decrease</b> <i>(ref: Constant)</i>	0.0520 (1.0316)	0.1287 (0.9155)	0.0534 (1.0552)	0.1828 (1.3500)	0.0596 (1.1856)	0.2701** (2.0790)	0.0563 (1.1175)	0.2478** (2.1367)	0.0603 (1.2037)	0.1643 (1.1510)
<b>CHALLENGES</b> <i>(ref: No challenges)</i>	-0.0374 (-0.5950)	-0.0837 (-0.4864)	-0.0442 (-0.7056)	-0.1693 (-1.0793)	-0.0428 (-0.6776)	-0.0673 (-0.3821)	-0.0447 (-0.7128)	-0.1453 (-0.9662)	-0.0377 (-0.5958)	-0.0851 (-0.4946)
<b>financial_inclusion</b> <i>(ref: Excluded)</i>	-0.0306 (-0.9482)	-0.1008 (-1.1064)	-0.0361 (-1.1417)	0.0015 (0.0119)	-0.0325 (-1.0297)	0.0069 (0.0826)	-0.0346 (-1.0952)	0.0765 (1.0100)	-0.0243 (-0.7523)	-0.0798 (-0.8222)
<b>Country: Tunisia</b> <i>(ref: Jordan)</i>	0.2303*** (5.7673)	0.6214*** (5.2930)	0.2288*** (5.7056)	0.2682 (0.7737)	0.2216*** (5.5174)	0.2131 (1.3105)	0.2271*** (5.6583)	0.1312 (1.3118)	0.2176*** (5.3844)	0.5931*** (4.8607)
<b>Country: Morocco</b> <i>(ref: Jordan)</i>	0.0969** (2.0581)	0.2525* (1.9171)	0.1136** (2.4038)	0.5153*** (3.4639)	0.1151** (2.4631)	0.3965*** (3.3025)	0.1141** (2.4343)	0.4549*** (3.9934)	0.1038** (2.1759)	0.2804** (2.1736)
<b>Country: Egypt</b> <i>(ref: Jordan)</i>	-0.0064 (-0.1302)	-0.0103 (-0.0753)	0.0026 (0.0528)	0.2619 (1.3258)	0.0172 (0.3433)	0.3725*** (2.5796)	0.0062 (0.1238)	0.3484*** (3.0097)	0.0146 (0.2904)	0.0509 (0.3563)
<b>Constant</b>		-0.7775* (-1.7425)		-0.3467 (-0.5799)		-0.1175 (-0.2397)		-0.3534 (-0.7641)		-0.8334* (-1.8243)

Observations	956	931	956	931	956	931	956	956	956	931
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*Note:* Robust z-statistics in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. We added the variables: *Purchaseoncredit*, *EXPORT*, *Bankloans* and *Informal\_funding* as exogenous variables for the variable *Trade\_credit* and *EXPORT*, *Bankloans* and *Informal\_funding* for the variables *Digital\_marketing* and *E\_commerce* in the bivariate estimation.

*Source:* Author from ERF (OAMDI 2021).

## CONCLUSION

Using firm-level data from the Economic Research Forum (ERF), we investigated the impact of COVID-19 control strategies on the demand and supply decisions for 2278 small businesses enterprises belonging to the middle class of enterprises in four MENA countries: Tunisia, Morocco, Egypt and Jordan.

On the demand side, we have investigated the impact of every Covid 19 adaptive strategy separately then combined at once, on the self-selection decision of the firm. Our results showed that buying on credit from suppliers or taking advantage of advances from their customers (Trade credit), investing to develop the activity of digital marketing to promote their products (Digital marketing), and the use of digital platforms, social media and specialized applications to maintain their commercial activity without having a direct contact with the customer (E-commerce) affects positively the self-selection decision of firms. This result was a signal that adopting those strategies is more likely to discourage firms from applying for government programs. This may be justified by the fact that digitally-enabled firms were more resilient to COVID-19 shocks (Apedo-Amah et al., 2021). Besides, the self-selection decision depends also of the financing constraints of firms before Covid, the recourse to Informal funding and the country.

For the supply side, we proceeded with the same method as demand models. However, we suspected that there is an endogeneity bias for COVID-19 control strategies. So, we estimated supply models by a seemingly unrelated bivariate probit to eliminate this problem. Our results showed that E-commerce was the only endogenous strategy that decrease the firm's chance to benefit from government programs. This result is incoherent with Karim et al., (2021) that highlighted that public support has encouraged firms to be adapted technologically during COVID-19 crisis.

Our results can have several implications: First, our study argues that companies need to rely on their self-financing abilities, during times of crisis. Internal funding is also less expensive. However, for companies unable to have the funds to finance themselves, the self-selection decision may not be the best decision because it may be born because of false expectations.

Second, since the pandemic crisis has been a driver of digital transformation, companies that have adopted their business strategy to meet customer expectations have been more likely to benefit from government programs. Hence, the company must take precautions against any unexpected drop in demand due to an internal or external factor.

Finally, our research topic may have political implications in terms of state-imposed funding conditions in financial crises. The company will be able to anticipate an optimal level of preparation of its business model in order to avoid as much as possible any unexpected disruption.

Nevertheless, this study is subject to a certain number of limitations, mainly the selection bias in our sample due to the thresholds chosen to measure middle-class entrepreneurs in the WBES database, the turnover used as a proxy for their income, as well as the common characteristics (ERF vs. WBES) to identify the middle-class entrepreneurs.

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## APPENDIX

**Appendix 1: Descriptive Statistics of the annual turnover in the four MENA Countries (in Million)**

Country	Currency	N	mean	Sd	p25	p50	p75	min	max
<b>Egypt</b>	EGP	3066	74900	660000	1000	3500	15000	0,05	20400000
<b>Morocco</b>	MAD	1056	69000	416000	1000	5000	25000	12	8000000
<b>Tunisia</b>	TND	583	12500	38200	700	2000	7000	20	450000
<b>Jordan</b>	JOD	519	6735,47	43700	100	500	2000	4	825000

Source: Author from WBES (2019)

**Appendix 2: Distribution of categories of firms in MENA countries by annual income (percentile)**

Country	Income	Micro-enterprises (1-9 employees)	Small (10-49 employees)	Medium (50-99 employees)	Large (100+ employees)	Total
<b>Egypt</b>	<= 30%	597	294	13	16	920
	]30%; 80%]	256 (29,69%)	1014 (68,8%)	176 (66,7%)	120	1566
	>80%	9	165	75	331	580
	Total	862	1473	264	467	3066
<b>Morocco</b>	<= 30%	62	134	32	91	319
	]30%; 80%]	116 (52,72%)	219 (51,89%)	58 (50%)	129	522
	>80%	42	69	26	66	203
	Total	220	422	116	286	1044
<b>Tunisia</b>	<= 30%	29	74	37	35	175
	]30%; 80%]	65 (57,01%)	108 (46,55%)	51 (49,51%)	68	292
	>80%	20	50	15	31	116
	Total	114	232	103	134	583
<b>Jordan</b>	<= 30%	66	60	7	22	155
	]30%; 80%]	81 (41,32%)	124 (56,62%)	19 (52,77%)	35	259
	>80%	49	35	10	5	99
	Total	196	219	36	62	513
<b>Total</b>		<b>1392</b>	<b>2346</b>	<b>519</b>	<b>949</b>	<b>5206</b>

Source: Author from WBES (2019)

**Appendix 3: Characteristics of middle-class small businesses**

Sample		WBES		ERF	
		N	%	N	%
<b>Industry</b>	<i>Manufacturing.</i>	987	64%	1240	55%
	<i>Retail &amp; services</i>	553	36%	1009	45%
	<i>Total</i>	1540	100%	2249	100%
<b>Personal loans</b>	<i>No personal loan</i>	1337	93%	1881	83%
	<i>Personal loan</i>	101	7%	397	17%
	<i>Total</i>	1438	100%	2278	100%
<b>Liquidity shortfall</b>	<i>Increase</i>			183	8.03%
	<i>Decrease</i>			1,784	78.31%
	<i>Constant</i>			311	13.65%
	<i>Total</i>			2,278	100%
<b>gender ownership</b>	<i>Female</i>	194	13%		
	<i>Male</i>	1336	87%		
	<i>Total</i>	1530	100%		
<b>Top manager gender</b>	<i>Female</i>	90	6%		
	<i>Male</i>	1442	94%		
	<i>Total</i>	1532	100%		
<b>Manager education</b>	<i>Tertiary (university) = 1</i>	143	70%		
	<i>Secondary school (at most) = 2</i>	55	27%		
	<i>Primary school (at most) = 3</i>	7	3%		
	<i>Total</i>	205	100%		

<b>manager experience</b>	<i>Beginner+Young &lt;=7</i>	167	11%		
	<i>Mature &gt;=8</i>	1335	89%		
	<i>Total</i>	1502	100%		

Source: Author from WBES (2019) and ERF (2021)

#### Appendix 4: Dictionary of variables

	<b>Name</b>	<b>Type</b>	<b>Definition</b>	<b>Units</b>	<b>Source</b>
<b>Business's pandemic crisis strategies</b>	<i>Trade credit (Purchased on credit from suppliers or advances received from customers)</i>	Discrete	<i>Mentioned=1 Not mentioned=0</i>	Dummy (0,1)	ERF Calculated
	<i>Digital Marketing</i>	Discrete	<i>Mentioned=1 Not mentioned=0</i>	Dummy (1,0)	ERF Calculated
	<i>E-Commerce</i>	Discrete	<i>Mentioned=1 Not mentioned=0</i>	Dummy (1,0)	ERF Calculated
	<i>Business-model adjustment= if use of Digital marketing and E-commerce</i>	Discrete	<i>Yes=1 No=0</i>	Dummy (1,0)	ERF Calculated
<b>Characteristics of the firm</b>	<i>Industry</i>	Discrete	<i>Manufacturing = 1 Trade and services = 2</i>	Dummy (1,2)	ERF Calculated
	<i>Financial inclusion (before covid)</i>	Discrete	<i>Excluded (no bank account) =0 Included (bank account) = 1</i>	Dummy (0,1)	ERF Calculated
<b>Activity of the firm</b>	<i>Current status of business</i>	Discrete	<i>Temporarily or permanently closed due to COVID-19 =1 Open =2 Temporarily or permanently closed for other reasons=3</i>	Ordinal (1,2,3)	ERF Calculated
	<i>Export</i>	Discrete	<i>Exporting if share &gt;0% =1 Non-exporting if share=0%=0</i>	Dummy (1,0)	ERF Calculated
	<i>liquidity shortfall</i>	Discrete	<i>Increase =1 Decrease=2 Constant =3</i>	Ordinal (1,2,3)	ERF Calculated
	<i>Challenges</i>	Discrete	<i>Mentioned=1 Not mentioned=0</i>	Dummy (0,1)	ERF Calculated
<b>Funding activity of the firm</b>	<i>Bank loans</i>	Discrete	<i>Contracted a business loan (mentioned) =1 Does not contract a business loan (not mentioned) =0</i>	Dummy (1,0)	ERF Calculated
	<i>informal funding</i>	Discrete	<i>Mentioned=1 Not mentioned=0</i>	Dummy (0,1)	ERF Calculated
	<i>Financing constraint</i>	Discrete	<i>Financial restrictions = 1 No = 0</i>	Dummy (1,0)	ERF Calculated
	<i>Purchase on credit</i>	Discrete	<i>Purchase or sales on credit =1 No=0</i>	Dummy (0,1)	ERF Calculated
<b>Country dummies</b>	<i>Country</i>	Discrete	<i>Tunisia=1 Morocco=2 Egypt=3 Jordan=4</i>	Ordinal (1,2,3,4)	ERF Calculated

Source: Author