



ECONOMICS - MENA ENTERPRISE SURVEY REPORT WORKING PAPERS: **Volume 2**

JOBS, ACCESS TO CREDIT AND INFORMALITY IN THE MIDDLE EAST AND NORTH AFRICA



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MENA Enterprise Survey Report Working Papers: Volume 2

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Jobs, access to credit and informality in the Middle East and North Africa*

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ABSTRACT

This paper explores the link between jobs, access to finance, and informality. Using longitudinal firm-level data for countries in the Middle East and North Africa, it documents that jobs creation is positively associated with access to finance. At the same time, the findings show that access to finance is lower for firms that are more exposed to competition from informal firms. As a possible mechanism underlying this result, the paper provides evidence that firms that suffer informal competition have worse *expectations* on future sales growth, which in turn are associated with fewer loan applications.

Keywords: employment, access to credit, informality, MENA countries

JEL codes: J00, E26, O53

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1 Introduction

The economic environment in the Middle East and North Africa (MENA) regions is characterized by a long-lasting stagnation in job creation. Over the period 2016-2019, employment growth was about 1.4%, which is well below the performance of lower-middle and upper middle-income countries (respectively 4,8% and 3,3%). One crucial determinant of employment growth is finance. Recent evidence documents the importance of such relationships for MENA countries, especially in regard to the positive effect of access to credit on employment and investment (Ayyagari et al., 2021). Yet, an obstacle to the virtuous role of the financial system is represented by the *disconnectedness* of private firms from the banking sector. This has been shown to be a distinguishing feature of MENA countries and a possible element contributing to the poor job creation of the private sector in the region (De Lima et al., 2016; Amin, 2021). Another important feature of MENA countries is informality. Data from the World Bank Enterprise Survey (hereinafter, WBES) shows that 29% of MENA firms report to be exposed to competition from informal firms, with this share reaching more than 40% of firms in Lebanon and Tunisia. A large informal sector is a possible threat to the proper functioning of the economy and to the operation of formal firms which are negatively affected by the competition from informal ones (Distinguin et al., 2016; Rozo and Winkler, 2021; Avenyo et al., 2021).

This paper explores the link between jobs, finance, and informality. We begin our analysis by looking at the link between jobs and finance. Using longitudinal firm-level data for MENA countries, we document that jobs creation is positively associated with access to finance. At the same time, we show that access to finance is lower for formal firms more exposure to informal competition. As a possible mechanism underlying this result, we provide evidence that formal firms that are more exposed to informal competition have worse *expectations* on future sales growth, which in turn are associated with fewer loan applications.

Our analysis employs WBES data for a large sample of private companies from the MENA countries. This data have two important features. First, they have a panel dimension that we exploit to account for the evolution of firm's economic performance and characteristics across time and deal with the simultaneity bias. Second, the WBES is the only survey of firms in developing countries which provides - in addition to a large set of comparable financial variables and firms' characteristics - information on firms' expectations on their future performance. This is an unique type of information that we use to provide evidence of the existence of a demand channel explaining our main result.

We begin our analysis documenting the link between jobs and access to finance. Our results indicate that employment, employment growth, productivity, and wage are positively associated with loan availability for firms in MENA countries, confirming previous studies showing the beneficial effect of access to finance on job creation (Betz and Ravasan, 2016; Ayyagari et al., 2021). Next, we show that formal firms that report

suffering from competition of informal firms have a significantly lower probability of accessing credit, as proxied by loan availability. This result goes over and beyond standard measures for firms' creditworthiness and informational opacity such as age or size. We also document that exposure to competition from informal firms significantly reduces loan application. These results are robust to several checks of the estimation strategy, including sample selection, and the use of an IV strategy and matching technique. Finally, we explore a possible mechanism explaining this result. We provide suggestive evidence that the negative effect of competition from informal firms on formal firms' loan applications operates through a reduction in the firm's expected future sales. To this end, we show that expectations on future sales growth are significantly lower for firms reporting to be more exposed to competition from informal firms. Importantly, this effect is unrelated to differential realized sales in the past, a proxy for growth opportunities. Then, we show that expectations on future sales growth predict loan applications, which is positively correlated with employment growth.

Our paper is related and contributes to three strands of literature. First, our paper relates to the vast literature on the effect of the informal sector on the economy (Perry et al., 2007; Maloney, 2004; La Porta and Shleifer, 2014). Informality is a distinguishing characteristic of most developing economies and it is widely shown to impact the behavior and performance of firms operating in the formal sector. Ulyssea (2018) show that the coexistence and competition of informal firms with more productive (formal) companies lead to a misallocation of resources and potentially large losses in total factor productivity. Moreover, a number of studies have documented that informal competition has a negative effect on formal firms in terms of output (Rozo and Winkler, 2021), employment (Amin, 2021), productivity (Amin and Okou, 2020), quality of products (Banerji and Jain, 2007), and innovation (Avenyo et al., 2021). Lastly, Distinguin et al. (2016) provide evidence that the presence of informal competition makes formal SMEs' more likely to be credit-constrained. Our analysis contributes to this literature by showing that the impact of informality on the formal sector depends on the *perceived* threat that formal firms associate to informal competition. This, in turn, has relevant effects on firms' expectations, investment decisions, and borrowing choices. As such, our paper provides an important piece of the puzzle in the understanding of the effect of informality on the functioning of the formal economy.

Second, our paper speaks to the literature on the determinants of firms' access to finance in developing countries. Several studies have analyzed how availability of finance is linked to firms' characteristics (Beck et al., 2005, 2008) and emphasized the existence of obstacles to the supply of credit (Banerjee and Duflo, 2014; Kersten et al., 2017). Bigsten et al. (2003) use data from African countries to document how inefficiencies in the credit market lead micro-sized and small firms to a lower probability of loan access compared to larger companies. Kuntchev et al. (2014) make use of WBES data to show that credit availability is inversely

associated with firm size but positively related to productivity and the country’s financial deepening. [Betz and Ravasan \(2016\)](#) show that the characteristics of prevailing collateral practices affect the allocation of credit in MENA countries. Finally, [Ayyagari et al. \(2021\)](#) exploit the introduction of credit bureaus to identify a positive (exogenous) credit supply shock and show its beneficial effect on firms’ access to finance.¹ Our paper contributes to this strand of the literature by providing evidence that, in some contexts, the demand side of the story may be equally important. More specifically, we show that the characteristics of the economic environment –and in particular the *perceived* level and type of market competition– can have significant effects on firms’ demand for credit.

Finally, this paper is also related to the small but growing literature on the role of expectations in influencing firms’ decisions. The turmoil that followed the 2008-financial crisis gave new impulses to this field of research, with a number of studies connecting firms’ economic outcomes with their forward-looking expectations. Most of this literature called the attention to the role played by macroeconomic factors,² while only a few studies focused on firms’ expectations on their own future earnings. Within the latter, [Gennaioli et al. \(2016\)](#) show that for US companies corporate investment plans and actual investments are well explained by expected sales. Along the same line, [Boneva et al. \(2020\)](#) looks at UK firms to show substantial effects of expectations on pricing strategies and employment behavior. Finally, [Enders et al. \(2019a\)](#) study how changes in the outlook of German firms impact their real decisions, even if expectations turn out to be incorrect ex-post. We contribute to this literature by showing how firms’ expectations are affected by the competition of informal companies and that this effect goes beyond differences in firms’ fundamentals or realized performances. This may suggest that, even in absence of real obstacles, a firm’s lack of information or biased perception can significantly jeopardize its own growth through current investment decisions and demand for credit. Importantly, this is the first paper, to the best of our knowledge, providing evidence on expectations of firms within developing countries.

The paper proceeds as follows. Section 2 describes the data, the variables, and the sample composition. Section 3 describes the empirical analysis, presents the main results, and discusses the possible mechanisms explaining them. Section 4 summaries the analysis and discusses some policy implications of our results

2 Data

Our main source of data is the WBES dataset, a large sample of privately-held companies constructed from a standardized and globally comparable survey administrated by the World Bank. Because of our research

¹A companion literature uses randomized control trials to explore the effect of interventions alleviating micro-entrepreneurs’ financing constraints ([de Mel et al., 2008](#); [Banerjee et al., 2015](#); [Crepon et al., 2015](#); [Quinn and Woodruff, 2019](#)).

²See [Coibion et al. \(2018\)](#), [Enders et al. \(2019b\)](#), [Coibion et al. \(2020\)](#), [Coibion et al. \(2020\)](#), and [Tanaka et al. \(2020\)](#).

question, we restrict the sample to Middle East and North Africa (MENA) regions, for which we have establishment-level data in the Arab Republic of Egypt, Jordan, Lebanon, Morocco, Tunisia, West Bank and Gaza. The survey is representative of the non-agricultural private sector of each country and provides information on all size classes, including small firms with less than 20 employees. This feature is of high importance for our analysis, as smaller companies are also more likely to suffer the competition from the informal sector.

The analysis takes advantage of the longitudinal dimension of the WBES to deal with simultaneity bias or unobserved factors in the empirical strategy. From the total sample of 13,000 company-year observations we focus on about 2,000 firms, for which we are able to match at least two consecutive waves of the survey.³ We discuss possible selection issues in Section 2.

Our main measure of interest, *Constrained by informal*, is a binary variable identifying firms that perceive the competition from the informal sector as a major constraint. The original WBES survey explicitly asks to what degree practices of competitors in the informal sector are an obstacle to the current operations of the firm. We classify a company to be constrained by the informal sector if it declares such practices to be a major or very severe obstacle (the top two categories).⁴ Our measure has the great advantage of capturing an idiosyncratic component that goes beyond the mere diffusion of informal practices within the operating sector of a country. Instead, it represents a specific proxy for how much the company perceives informal competition as a jeopardizing factor for its own business. As such, it is likely to be accounted for when firms make their decisions and form their own expectations about the future.⁵

In this regard, the WBES dataset represents the only available survey providing forward-looking expectations on firms' future sales for MENA regions. This is a critical piece of information that made our study possible and allows to shed light on the mechanism at stake. We employ a continuous measure for firms expected sales growth in the next year ($\mathbb{E}(\text{Sales growth})$), as well as an ordinal measure capturing increasing, decreasing, or stable expected earnings (respectively, $\mathbb{E}(\text{Sales growth})$: *Positive*, *Negative*, or *Stable*).

We match all this information with a wide set of financial characteristics of the company. First of all, we exploit data on the availability of outstanding loans or credit lines (*Loan availability*) at the time of the survey, which is a synthetic measure for firms' access to bank finance. Because we are interested in the

³The original number of waves for countries in the MENA region ranges between two and five, from 2007 to 2020. However, only in more recent years (i.e., the global dataset) firms are attached to a consistent panel identifier across waves that allows for longitudinal analyses. For most countries, two waves with panel identifiers are available: 2013–2019 for Jordan, Lebanon, Morocco, West Bank and Gaza, and 2013–2020 for Tunisia. The only exception is Egypt, for which three waves are available: 2013, 2016, and 2020. We account for differences across countries and timing with the inclusion of country-specific time fixed effects that purge the model from economy-wide factors that vary over time.

⁴We collapsed the two answers because there is no clear ranking between the available options and they are both identifying a significant perceived obstacle for the company. As a robustness check, we employed a categorical measure with unchanged results. The exact formulation of the questionnaires is provided in Table B1 of the Data Appendix.

⁵We also control for a dummy identifying those that started their activity as unregistered firms (*Originally informal*) or a continuous measure for the number of years since the firm was formally registered (*Years of formality*).

overall degree of connectedness of the company, our baseline specification does not impose any constraint on the original issuance of the loan. However, our results are broadly robust if we restrict the analysis to loans that are issued within shorter horizons (ten years, seven, five, two, or even one year before the interview). Second, we employ information on loan applications in the last year (*Loan application*) to provide preliminary evidence on whether the heterogeneous availability of funds is due to firms’ credit demand or is, instead, driven by a differential probability of banks’ acceptance. Our extensive set of controls include information on firms’ belonging sector (*Manufacturing, Retail, Other services*) and form of proprietorship (*Listed company, LLC, Sole proprietorship, Partnership, Ltd Partnership*), structural characteristics (*Size, Age*), exporting status (*Export*), realized past performance (*Sales growth*), and number of competitors (*N competitors*). All variables are defined in Tables B1 and B2 of the Data Appendix.

Selection and attrition Since we rely on the longitudinal dimension of the WBES dataset, it is worth discussing possible selection issues affecting our estimating sample. This has clearly to do with the non-random probability of response and the self-selection of companies that kept answering the survey in following waves, vis-à-vis firms that dropped out of the sample. Indeed, if such selection is somewhat simultaneously correlated with our main regressors of interest and dependent variables, it may create a bias driving our conclusions. In Table A1 of the Online Appendix, we tackle this issue by focusing on the full set of respondents in the original 2013-waves and testing the correlation between firms’ likelihood of being interviewed a second time and the variables employed in the analysis. Our estimates assuage concerns about systematic biases by showing no significance between firms’ probability of belonging to the panel and our main variables of interest (Constrained by informal, Loan availability, Loan application, and Investment).⁶ Nevertheless, we also provide additional robustness to our results by presenting Heckman selection models that deal with endogenous sampling selection and propensity score matching techniques (see Section 3.3.2).

3 Empirical analysis

3.1 Descriptive evidence

Table 1 presents some descriptive statistics for the main variables in the sample. Loans and credit lines are available only for 20% of the firms in the sample, suggesting that access to finance is underdeveloped. Yet, the share of firms applying for a loan is only mildly larger. We interpret this as evidence of the degree of disconnectedness from the banking sector of firms in the MENA region. Most firms finance working capital

⁶Results are presented in Table A1 of the Online Appendix. The only exception is represented by Age, whereby older firms are more likely to belong to the panel than younger companies, possibly because of their different probability of survival. However, since we always control for such a characteristic in our estimating regression, our estimates should still be unbiased.

through internally generated cash flow, and tend not to rely on external sources of funding. At the same time, alternative sources like private loans of owners are not often used to finance a firm’s business. All this translates into a relatively low impact of financial constraints and rationing: these are regarded to be relevant issues by a small share of firms (14% to 27% of constrained firms, depending on the definition). While all firms in our sample are formal, most of them started as unregistered businesses (90% were originally informal), which confirms the relevance of the informal sector in MENA countries. Among firms in our sample over the period 2013-2019, 30% report competition from the informal sector as a major constraint to their activity. At the country level, the share of firms constrained by informal competition is 20% in Jordan, 26% in West Bank and Gaza, 27% in Egypt, 33% in Morocco, 41% in Tunisia and 44% in Lebanon.

Table 1: Descriptive statistics

Variable	Average	Stdev	Min	Max
Employment (log)	3.375	1.317	0.693	8.294
Employment growth	1.578	13.72	-84.2	100
Loan availability	0.202	0.401	0.000	1.000
Loan application	0.332	0.471	0.000	1.000
Turned down	0.045	0.206	0.000	1.000
Account	0.782	0.413	0.000	1.000
No need	0.598	0.490	0.000	1.000
Rationing: not rationed	0.630	0.483	0.000	1.000
Rationing: partially rationed	0.151	0.358	0.000	1.000
Rationing: fully rationed	0.110	0.313	0.000	1.000
Investment	0.221	0.415	0.000	1.000
Age	2.864	0.756	0.693	5.094
Size	3.365	1.375	0.000	10.59
Export	0.181	0.385	0.000	1.000
Number of competitors	4.172	1.692	0.000	5.204
Manufacturing	0.586	0.493	0.000	1.000
Retail	0.092	0.289	0.000	1.000
Other services	0.322	0.467	0.000	1.000
Listed company	0.061	0.240	0.000	1.000
LLC	0.221	0.415	0.000	1.000
Sole proprietorship	0.380	0.486	0.000	1.000
Partnership	0.192	0.394	0.000	1.000
Ltd Partnership	0.137	0.344	0.000	1.000
E(Sales growth)	0.005	0.255	-1.000	1.000
E(Sales growth): Positive	0.489	0.499	0.000	1.000
E(Sales growth): Stable	0.257	0.437	0.000	1.000
E(Sales growth): Negative	0.254	0.435	0.000	1.000
Sales growth	-3.986	21.24	-98.99	99.83
Originally informal	0.898	0.303	0.000	1.000
Years of formality	2.842	0.758	0.000	5.357
Constrained by informal	0.293	0.455	0.000	1.000

Notes: Descriptive statistics for the main variables in the sample.

The focus of our analysis is on understanding how competition from informal firms shapes formal firms’ financial choices and future prospects. Table 2 we report distributions conditional on whether firms perceive the competition from the informal sector as a major constraint, i.e. whether *Constrained by informal* takes value 1. Firms suffering informal competition have a lower probability to have a loan or credit line. Yet, this is not linked with a larger rejection rate from the banking sector (*Turned down*). Instead, preliminary evidence shows that most of the difference is driven by the application process, whereby firms that are constrained by informal companies have a significantly lower credit demand compared to their unconstrained counterparts.

This heterogeneity is not reflected in other components of the loan covenant, suggesting that this evidence is not merely related to a differential risk or creditworthiness. Notice that firms that are suffering from informal competition are not even associated with a different probability of being credit rationed. As for other structural characteristics, constrained firms are somewhat smaller, tend to export relatively less, and are more concentrated in the manufacturing sector. As such, our estimating regression always accounts for a rich set of additional controls to account for these differences across the two groups.

Another dimension along which there is a difference between the two groups of firms is expectations on future sales growth: firms suffering from informal competition have significantly worse prospects on their future earnings (-3.15% vs. 2.13%, on average). Interestingly, such heterogeneity in expectations does not find a match in realized sales, which are somewhat similar across groups (and even less negative for constrained firms). This evidence suggests that it is unlikely that our proxy for informality simply reflects different fundamentals (i.e., good vs. bad firms).

Table 2: Conditional averages: Unconstrained vs constrained by informal competition

Variable	Unconstrained by informal	Constrained by informal	Diff mean p-value
Employment (log)	3.439	3.227	0.000
Employment growth	2.491	0.254	0.000
Loan availability	0.198	0.155	0.022
Loan application	0.327	0.259	0.002
Turned down	0.051	0.044	0.491
Account	0.828	0.806	0.232
No need	0.603	0.603	0.990
Rationing: not rationed	0.647	0.632	0.519
Rationing: partially rationed	0.145	0.159	0.432
Rationing: fully rationed	0.101	0.125	0.121
Age	2.772	2.794	0.903
Size	3.385	3.179	0.000
Export	0.186	0.168	0.022
Manufacturing	0.569	0.619	0.000
$\mathbb{E}(\text{Sales growth})$	2.129	-3.158	0.000
$\mathbb{E}(\text{Sales growth}): \text{Positive}$	0.523	0.390	0.000
$\mathbb{E}(\text{Sales growth}): \text{Stable}$	0.237	0.313	0.000
$\mathbb{E}(\text{Sales growth}): \text{Negative}$	0.240	0.296	0.000
Sales growth	-3.739	-3.665	0.875
Investment	0.206	0.156	
Originally informal	0.894	0.893	0.762
Years formality	2.839	2.841	0.925

Notes: conditional distributions of the main variables employed. In Column 1, we report averages for the sample of firms declaring no major constraints from the informal sector, while in Column 2 we focus on the subsample of constrained firms only. Column 3 reports the p-value of the t-test on equality of means.

3.2 Jobs and finance

We begin our analysis by looking at the role of finance as a determinant of job creation. To this end, we estimate the following model:

$$y_{i,t} = \alpha + \beta \text{Loan availability}_{i,t} + \gamma^\top X_{i,t} + \gamma_i + \lambda_t + \varepsilon_{i,t} \quad (1)$$

where $y_{i,t}$ is the outcome variable, alternatively, the number of employees (*Employment*), the labor productivity (*Productivity*), and the firm-level wage rate (*Wage*). $X_{i,t-1}$ is a vector of structural controls for firms' size, age, exporting behavior, and sector. γ_i and λ_t are, respectively, firm and time fixed effects.

Table 3 shows the results for regression model ?? reporting in each column one of our labor market outcomes of interest. Estimates in column 1 indicate that employment is positively correlated with access to finance. That having access to bank credit has a positive and significant effect on the (log) number of employees confirms how external sources of funding may have a critical role in affecting firms' employment growth. This effect goes beyond structural controls for the age of the firm, the exporting activity of the firm, operating sector of the company, common time components that capture cyclical factors (time fixed effects), as well as firm-specific fixed effects absorbing any time-invariant characteristic (observable or not). Results also indicate evidence of a stronger job creation for younger and export-oriented companies. Noticeably, the positive effect of loan availability is not limited to the raw number of employees but extends to labor productivity (as proxied by sales per worker) and the average salary paid.

Table 3: Access to finance and jobs

Dependent variable:	Employment (1)	Productivity (2)	Wage (3)
Loan availability	0.132*** [0.0392]	0.256*** [0.0838]	0.155** [0.0672]
Age	-10.49*** [2.821]	-6.827 [5.066]	-0.776 [3.855]
Export	0.208*** [0.0565]	0.114 [0.110]	0.155* [0.0898]
Manufacturing	0.139 [0.0969]	0.352** [0.152]	0.246** [0.122]
Retail	-0.131* [0.0682]	0.221* [0.134]	0.203** [0.0995]
Model	OLS	OLS	OLS
Time FE	yes	yes	yes
Firm FE	yes	yes	yes
R2	0.0445	0.117	0.107
Observations	12605	11159	11581

Notes: within estimator with firm and time fixed effects. Measures are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

3.3 Finance and informality

Next, we explore the determinants of firms' access to finance and how this is related to competition from informal firms. We begin by looking at the characteristics of firms having access to a loan or credit-line from a bank. Then, we focus on the determinants of the firm's decision to apply for a loan.

Our baseline specification reads as follows:

$$y_{i,t} = \alpha + \beta \text{Constrained by informal}_{i,t-1} + \gamma^\top X_{i,t-1} + \lambda_t + \mu_{a(i)} + \varepsilon_{i,t} \quad (2)$$

where $y_{i,t}$ is the outcome variable. In our analysis this is a dummy taking value 1 if firm i at time t has a loan or credit-line and zero otherwise (*Loan availability*) or a dummy indicating if the firm has made an application for bank funding (*Loan application*). *Constrained by informal* is our dummy of interest, as defined in Section 2, and $X_{i,t-1}$ is a vector of structural controls for firms’ size, age, exporting behavior, number of competitors, belonging industry, and form of proprietorship. λ_t and $\mu_{a(i)}$ are, respectively, time fixed effects and a set of granular indicators for the geographical area of the company (41 in total).⁷ These are meant to capture time varying common factors and persistent heterogeneities linked with the operating environment of the firm. In our analysis, all regressors are lagged to rule out simultaneity bias. When $y_{i,t}$ is a binary measure (Loan availability, Loan application) equation 2 is estimated via a logistic model while when it is a continuous measure (Expected sale growth) it is estimated using a linear probability model. In all tables, we report White’s heteroscedasticity-consistent standard errors but our results are largely robust to alternative clusterings.

Discussion of the empirical strategy In assessing the effect of informal competition on firms’ connectedness to the banking sector we face two main empirical challenges.

The first one has to do with *omitted variable bias*, whereby relevant characteristics excluded from the model may drive the relationship between firms’ availability of bank finance and informal competition. For instance, if we missed to properly account for firms’ fundamentals that characterize the perception about informal pressure, and if this affects demand and/or supply of credit, our estimates may be biased. In order to assuage such concern, we augment our baseline specification with an extensive set of additional regressors that virtually cover any dimension available in the WBES survey. In our robustness checks, we account for past sales and productivity growth, capacity utilization, as well as granular information on main destination markets (local, national, or international), managerial characteristics (experience of the managers, female managers) and ownership (government ownership and female owners). All of which capture different dimensions of firms’ fundamentals. Moreover, we control for relevant characteristics of the local environment that may be spuriously associated with informality: the size of the city, measures of corruption (bribery depth or gifts to officials) and crime (loss from thefts and vandalism), as well as other shocks linked with the localization of the company (number and length of electric outages), together with geographic area fixed effects interacted with more granular sector controls (2-digit ISIC Rev. 3.1 level). Furthermore, in some specifications we enrich the vector X with controls for the issuance of the loan, whether the company was originally informal, and the number of years since formal registration occurred (see below). Finally,

⁷Geographical areas are defined as the localization group used as a stratum in the WBES sampling scheme. From the sampling methodology note of the WBES: “Geographical distribution is defined to reflect the distribution of the non-agricultural economic activity of the country; for most countries this implies including the main urban centers or regions of the country.”

we account for the introduction of firm-specific fixed effects (in our benchmark results) through conditional logistic and linear probability (within estimators) models. This allows us for purging all firms’ characteristics (observable and unobservable) that are stable over time.⁸

The second interrelated issue has to do with *endogeneity* and, in particular, with possible reverse causality (i.e., whereby it is access to credit that drives the perception of informal competition and not the other way round; [Friesen and Wacker, 2019](#)). For instance, firms that are constrained by banks may be unable to fund potentially profitable projects, increase their production scale, or upgrade toward higher levels of productivity. While this is unlikely to impact the actual operating environment of the company (i.e., access to credit of a specific firm does not affect its real competition), we cannot *a priori* exclude an effect on firms’ *perception* about the magnitude and relevance of the informal competition faced.

Notice that, if this were the case, we should observe significantly-different patterns in a firm’s probability of rationing. However, as shown in [Table 2](#), firms that suffer informal competition are linked neither with a differential likelihood of credit constraints (full or partial rationing), nor with actual or expected rejection rates on loan applications. Thus, our descriptive evidence seems to suggest that, at least in our sample of MENA countries, reverse causality should not be a relevant concern.

Nevertheless, we adopt a number of alternative approaches to deal with this potential endogeneity issue. First of all, we always employ lagged regressors so as to rule out simultaneity bias. This, however, does not address endogeneity if both the dependent variable and our measure of interest displays high degrees of persistence. Hence, we further shed light on this issue by restricting our estimating sample to companies with no credit access in $t - 1$. Even focusing on “switchers” only (i.e., firms with new loans that were disconnected in the previous waves), our results prove to be extremely robust (see [Table A2](#)). Moreover, unreported regressions linking past loan availability with current perception of informal competition show no correlation between the two, further suggesting that reverse causality is unlikely to drive our findings.⁹

Most importantly, we employ an IV approach to further take care of endogeneity. We rely on a cell-average method wherein we instrument informal competition with the proportion of all other firms that are constrained by informality and operate within the same 2-digit sector and geographical area of each company (at a given time). This approach, widely used in the literature (see, among many others, [Distinguin et al., 2016](#); [Dollar et al., 2006](#); [Fisman and Svensson, 2007](#); [Amin and Soh, 2021](#); [Amin, 2021](#)), allows us to capture an environmental component of the informal competition faced by a company that is, however, unrelated to

⁸Because of the structure of the dataset, we can only introduce firms’ fixed effects when dealing with loan availability and application. Notice that, in such case, identification is achieved exclusively exploiting data from Egypt, which is the only country for which we have three waves (as discussed in [footnote 3](#)). For expectations, the absence of a panel structure does not allow for such analysis.

⁹Notice that, while being largely insignificant (p value of 0.210), the coefficient of past loan availability on informal competition is even of opposite sign: positive rather than negative.

its specific characteristics, including fundamentals and past availability of banking funds. Notice that, by computing averages at the stratum level (intersection of industry and geographical area), we still document effects that go beyond sector and location fixed effects. First stage regressions confirm the sizable power of our instrument.

Finally, we further take care of self-selection and endogeneity by means of matching techniques. We rely on radius matching or a bias-corrected nearest neighbor matching estimator (as in [Abadie and Imbens, 2011](#)) to recover a subsample of companies with the same ex ante probability of being constrained by the informal sector. We then explore the average treatment effects on our main dependent variables. Results show good balancing properties of our procedures and are, again, largely consistent with the main analyses.

3.3.1 Loan availability

Table 4 shows the estimates for our model 2 when the dependent variable is *Loan Availability*, a dummy taking value 1 if the firm has a loan or a credit line and zero otherwise. Column 1 presents the marginal effects estimates using the pooled logistic estimator for the baseline specification.¹⁰ Access to finance is also significantly and positively associated with firms' size, while all other coefficients are insignificant. In column 2, we enrich the specification with two additional important controls: *Account* (a dummy for firms with checking or savings account) and *No need* (a dummy for firms that do not apply for a loan because of a lack of financial needs).¹¹ Results indicate that having an account does not influence loan availability and that firms not needing a loan are - reassuringly - significantly less likely to have a bank credit line. In column 3, we make sure that the effect of informality is not simply arising from a higher degree of competition. Even after augmenting the model with the approximate number of competitors, our results are virtually unchanged, suggesting that the effect of competition from informal firms goes over and beyond the effect of competition *per se*. In terms of magnitude of the effect, firms more constrained by competition from the informal sector have a 8.4% lower probability of accessing bank finance. Finally, we fully exploit the longitudinal dimension of the data set and allow for firm-specific fixed effects employing linear probability (within estimator in column 4) and conditional logistic models (column 5).¹² Even if we purge the specification from any observable and

¹⁰In all specifications, we control for a rich set of firm's structural characteristics to capture heterogeneities in firms' creditworthiness that can be potentially correlated with our measure of interest. To this aim, we always account for firms' size and age, which are essential determinants of firms' choices and are traditionally used as direct proxies for financial constraints. Moreover, we control for the form of proprietorship to absorb any heterogeneity in banks' willingness to grant credit associated to different forms of governance (which may entail a different degrees of financial solidity and opacity). Finally, we always account for firms' exporting status, sectoral classification, as well as time and geographical-area fixed effects so as to capture environmental factors that can impact a firm's fundamentals and result into a different creditworthiness (or credit demand), such as idiosyncratic shocks to the demand for goods in certain periods, industries, or countries.

¹¹Note that *Account* captures demand for credit by the firm as long as that comes with an overdraft facility. At the same time, *No need* entails a spurious relationship with informal competition if this decision is itself influenced by the exposure to informal competition.

¹²Notice that the sample size with conditional logistic that rely on the time-variation in the dependent variable models drops substantially. Nevertheless, our main results are qualitatively similar to the ones presented.

unobservable time-invariant characteristic (including the firm’s location and any other persistent factor that may affect the firm-bank relationship), firms that are constrained by informal competition are found to have a significantly lower probability of access to bank loans.

Finally, one may be worried that our measure of access to bank funds collapses credit lines and loans that are issued in different times and that, potentially, can date back to many years in advance. To tackle this issue we restricted loan availability to a shorter time horizon for the issuance (10, 7, 5, 2, or 1 year) obtaining results that are virtually unchanged. Results are provided in Table A3 of the Online Appendix.¹³

Table 4: Competition from informal firms and loan availability

Dependent variable:	Loan availability				
	(1)	(2)	(3)	(4)	(5)
Constrained by informal _{t-1}	-0.0632*** [0.0192]	-0.0714*** [0.0193]	-0.0840*** [0.0225]	-0.175* [0.0942]	-2.187* [1.163]
Account _{t-1}		0.0374 [0.0252]	0.00199 [0.0277]	-0.165* [0.0953]	-0.719 [0.937]
No need _{t-1}		-0.0448*** [0.0165]	-0.0467** [0.0192]	-0.0530 [0.0738]	0.404 [0.806]
Age _{t-1}	0.00293 [0.0135]	0.00594 [0.0137]	-0.00164 [0.0158]	-4.018** [2.037]	-21.45 [19.82]
Size _{t-1}	0.0383*** [0.00645]	0.0344*** [0.00672]	0.0374*** [0.00802]	0.527 [1.074]	24.85 [33.83]
Export _{t-1}	0.00420 [0.0197]	0.00916 [0.0196]	0.0186 [0.0263]	0.143 [0.174]	0.176 [1.357]
Number of competitors _{t-1}			-0.00550 [0.00561]		
Model	Logit	Logit	Logit	Within	Cond. logit
Time FE	yes	yes	yes	yes	yes
Geographic area FE	yes	yes	yes	no	no
Firm FE	no	no	no	yes	yes
Observations	1982	1931	1379	1398	62
Pseudo R2 (R2)	0.181	0.186	0.195	0.139	0.355

Notes: logit marginal effects, within estimator, and conditional logistic models. Variables are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

3.3.2 Loan application

Table 5 shows the estimates for our model when we use as dependent variable a dummy taking value 1 if the firm makes a loan application and zero otherwise. Results of the logit estimates indicate that the effect of being exposed to informality competition on the probability of a loan application is consistently negative across various econometric specifications and samples. In particular, the effect of *Constrained by informal* is negative when controlling for whether or not the firm does need a loan and the firm has an account (which may imply that the firm can use the overdraft) (column 2), or if we control for the number of firm’s competitors (column 3). In terms of magnitude of the effect, firms more constrained by competition from

¹³Notice that the dataset also contains information on the size and duration of the most recent loan or credit line, as well as the required collateral and its approximate value. Unfortunately, such measures are not populated and the estimating sample size drops substantially (fewer than 200 observations). With the available data no effect of informality emerges.

the informal sector have a 7.2% lower probability of making a loan application. Results do not change when we use the within firm estimator (column 4) and when we estimate the model using the conditional logit (column 5): being exposed to competition from informal firms reduces the loan application by formal firms.

Table 5: Competition from informal firms and loan application

Dependent variable:	Loan application				
	(1)	(2)	(3)	(4)	(5)
Constrained by informal $_{t-1}$	-0.0483** [0.0206]	-0.0530** [0.0209]	-0.0715*** [0.0239]	-0.354*** [0.0895]	-3.371** [1.491]
Account $_{t-1}$		0.0223 [0.0253]	0.00938 [0.0287]	-0.0777 [0.0990]	-1.310 [1.348]
No need $_{t-1}$		-0.0399** [0.0185]	-0.0399* [0.0216]	0.170** [0.0755]	-0.0892 [1.441]
Age $_{t-1}$	0.00682 [0.0145]	0.00778 [0.0147]	0.00566 [0.0170]	-7.575*** [2.094]	1.724 [1.191]
Size $_{t-1}$	0.0348*** [0.00735]	0.0307*** [0.00762]	0.0372*** [0.00909]	0.810 [1.166]	0.889 [0.778]
Export $_{t-1}$	0.00865 [0.0229]	0.0111 [0.0232]	0.0171 [0.0316]	0.178 [0.171]	0.787 [1.354]
Number of competitors $_{t-1}$			0.00204 [0.00639]		
Model	Logit	Logit	Logit	Within	Cond. logit
Time FE	yes	yes	yes	yes	yes
Geographic area FE	yes	yes	yes	no	no
Firm FE	no	no	no	yes	yes
Additional controls	yes	yes	yes	yes	yes
Observations	2065	2008	1443	1446	64
Pseudo R2 (R2)	0.197	0.199	0.222	0.262	0.481

Notes: logit marginal effects, within estimator, and conditional logistic models. Unreported controls follow the specification in Table 5. Variables are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Robustness checks We perform a number of robustness tests to check the validity of our results. To begin, we take care of selection issues by employing Heckman-type selection models (Heckman, 1976; Lewis, 1974; Gronau, 1974). In essence we model a firms' probability of belonging to the panel (i.e., being interviewed in two consecutive waves of the WBES survey) adding as an excluded regressor firms' belonging stratum (the intersection of sector and country). We then augment the original specification with the inverse Mill's ratio of the selection regression. As shown in Table A4, our main conclusions are largely unchanged.

One possible concern with our results is that firms that report to be constrained most by informal competition are the ones that operated as informal firms in the past and only recently switched to a formal form of business. If this were the case, the lower connectedness with the banking sector may only capture a matter of timing whereby constrained firms are those having had a shorter periods to establish a banking connection. To assuage this concern we augment our baseline specification with a direct indicator about whether the company was originally operating informally, together with a measure for number of years since the formal registration. Results for both loan availability (reported in Table A5 column 1) and loan

application (reported in Table A6 column 1) show that the coefficient for our main variable of interest does not change and that these measures turn out to be largely insignificant. Moreover, our findings hold when we add a large set of additional regressors that assuage concerns about possible confounding factors. This includes measures for past investment in physical assets and growth opportunities (past productivity and sales growth), more granular controls for the destination market of firms' products (local, national, or international), controls for management characteristics and ownership (existence of a board of directors, years of past experience of the management, presence of females in the board, share of government ownership, female owners), characteristics of the location of the firm and exposure to local shocks (dummies for the size of the city, as well as the number and length of electric outages), the degree of capacity utilization of the company, and measures for problems related to the local environment (including the share of bribery depth, the share of gifts, the share of losses from theft and vandalism, or whether the company feels to be constrained by corruption or by crime). Results for loan availability (reported in Table A5 column 2-5) and for loan application (in Table A6 column 2-5) show that our main finding continues to hold: firms more exposed to informal competition are less likely to have a loan or a credit line and to apply for a loan.

Despite our results are robust to a large number of controls for firms' fundamentals, one residual concern may still be reverse causality. In particular, it is possible that our findings merely reflect the negative effect of access to finance onto firms' perception about the pressure exerted by informal competitors. This is linked with the very definition of our variable of interest, which is subjective in nature and may capture some spurious relationships with past performances and growth, rather than actual heterogeneities in the informal competition faced by the company. While descriptive evidence we discussed above already showed this is unlikely to be the case, we performed two additional exercises to further assuage such concern.

First, we develop an instrumental variable approach to directly tackle endogeneity issues. In particular, we rely on a cell-average method widely used in the literature (Distinguin et al., 2016; Dollar et al., 2006; Fisman and Svensson, 2007) and instrument firm-specific perception about informal competition with the share of other firms declaring relevant constraints from the informal sector within the same environment. At each point in time, we define the averaging cell at the intersection of the 2-digit sector and geographical region of the company. This approach is meant to isolate a component of informal competition that is related to the operating environment of the firm and, as such, is not subject to swings due to firm-specific factors. Indeed, a firm's access to banking finance is unlikely to drive other firms' perception about the diffusion and relevance of informal competitors, therefore addressing our primary concern. In Table A7, we present the estimates of IV-linear probability models. Results largely confirm our previous findings and point at a very negative and significant effect of informal competition onto firms' availability of loans.¹⁴ Again, this effect

¹⁴Notice that, because we define averaging cells at the intersection of industry and geographical area, we are still documenting

seems to operate through a 10%-lower probability of application, possibly implying that the effect mainly operates through a reduction in credit demand (we further discuss this issue in the following sections). Notice that, underidentification and weak-identification tests confirm the power of our instrument, which, in line with prior expectations, is positively correlated with *Constrained by informal*.

As an additional exercise, we further take care of self-selection and endogeneity by means of matching estimators. In essence, we employ propensity-score techniques to select a sample of firms that are constrained by the informal sector or not (i.e., treated and control group) and that are similar along a broad set of characteristics but differ for their actual condition of facing informal competition (i.e., with the same ex-ante probability of being treated). We then implement two different estimators for the average treatment effect (ATT), one based on nearest neighbor matching with bias correction as in [Abadie and Imbens \(2011\)](#), and the other based on the radius matching. In computing the propensity score, we exploited the full set of firms' characteristics employed so far. [Table A8](#) reports the balancing properties of the procedure and shows no difference in firms' characteristics between the treated and control group after the matching, thus reassuring about the success of the balancing. In [Table A9](#), we present the estimated ATT and confirm the negative effect of informal competition on loan availability and loan applications.

3.3.3 Channel: Expectations on future sales

Firms that report to be more constrained by competition from informal firms are less likely to demand a loan (see [Table 5](#)). As we documented in the previous section, this choice is not related to differences in firm's age, size, export activity, or to the fact that the firm is different in its need for a loan or has access to a bank account (which may be a substitute for loans if the firm has an overdraft facility) or by self-selection, endogeneity, or reverse causality.

One possible channel explaining our main result is that difference among firms in terms of how much they are threatened by competition from informal firms affect the level of their expectations for future performance. To test for this, we exploit the response to a question introduced in the most recent wave of the WBES where the firm is asked whether the growth in sales are expected to be negative, stable, or positive. [Table 6](#) reports the estimates of a multinomial regression in which these three alternatives are regressed on our explanatory variable (*Constrained by informal*) controlling for area and time fixed effects and our full set of controls.¹⁵ Results in column 1-3 indicate that firms which report to be more exposed

effects that go above the average dynamic at the sector and location levels.

¹⁵Since the question on expected expectations is only available for the last wave of the survey, this estimation is performed cross-sectionally (i.e., matches current expectations with competition from the informal sector in the same wave). Notice that because expectations are formed in time t and regard firms' earnings at the one-year horizon, and since *Constrained by informal* refers to the recent past, there is no overlap in the timing of the two variables so that we can safely avoid the use of lagged regressors.

to competition from informal firms are significantly more likely to report negative or stable expected sales growth and significantly less likely to report positive expected sales growth.¹⁶ This finding is confirmed when we consider as outcome a continuous version of the variable measuring expected sales growth (column 4) and when we consider only the sample of firms in the panel (column 5): firms more exposed to informal competition have worse expectations on future sales growth. One important observation concerns the actual level of firm-sales growth (*Sales growth*): these results holds controlling for the realized growth of sales, which turn out to be positively correlated with growth expectations.

Table 6: Competition from informal firms and expectations on future sales

Dependent variable:	E(Sales growth)			E(Sales growth)	
	Negative (1)	Stable (2)	Positive (3)	Continuous (4)	Continuous (5)
Constrained by informal_{t-1}	0.0412*** [0.0122]	0.0509*** [0.0145]	-0.0921*** [0.0153]	-4.103*** [0.735]	-2.812** [1.424]
Age $_{t-1}$	-1.362** [0.616]	-2.094*** [0.791]	3.456*** [0.864]	81.53** [40.01]	80.39 [71.88]
Size $_{t-1}$	-0.0251*** [0.00552]	-0.0279*** [0.00630]	0.0531*** [0.00626]	1.507*** [0.299]	1.608*** [0.553]
Sales growth $_{t-1}$	-0.00471*** [0.000370]	-0.00120*** [0.000420]	0.00591*** [0.000435]	0.232*** [0.0194]	0.130*** [0.0352]
Export $_{t-1}$	-0.0451*** [0.0169]	0.000915 [0.0201]	0.0442** [0.0208]	2.054** [0.989]	2.169 [1.756]
Sample	Full			Full	Panel
Model	Multinomial logit			OLS	OLS
Time FE	yes			yes	yes
Geographic area FE	yes			yes	yes
Additional controls	yes			yes	yes
Observations	4313			4191	1265
Pseudo R2 (R2)	0.231			0.310	0.367

Notes: OLS estimates and multinomial logistic marginal effects. The dependent variable in columns 1-3, we employ a categorical variable taking value -1, 0, and +1 in case of negative, stable, and positive expected sales growth, respectively. In Column 4, we employ a continuous measure for firms' expected sales growth in the following year. Because expectations are forward looking, all regressors are simultaneous. Unreported controls follow the specification in Table 4. Variables are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

As a final step in our argument, we explore the relation between future sales expectations and loan application. In Table 7, columns 1 and 2 consider this link using the categorical version of the the expected sales growth variable. Column 1 indicates that - one controlled for firm size - better expected sales growth does not seem to increase the probability of loan application. Yet, when expectations are interacted with the firm size, a different pattern emerges. As shown in column 2, having positive sales growth expectation increases the probability of loan application even though the effect decreases with the size of the firm. Since firm size is positively correlated with loan application, this suggests that the role of expectations is important but becomes less important for firms which have characteristics which make them more likely to need a loan. These same findings are confirmed when we use the continuous variable for measuring expected sales growth (see column 3 and 4).¹⁷

This finding adds to previous evidence in the literature on the effect of informal competition on formal

¹⁶Expectations are specific to the firm and unknown to the bank. Controlling for firms' fundamentals and realized growth

Table 7: Expectations on future sales and loan application

Dependent variable:	Loan application			
	(1)	(2)	(3)	(4)
$\mathbb{E}(\text{Sales growth}): \text{Stable}$	-0.0343 [0.0352]	-0.00274 [0.0929]		
$\mathbb{E}(\text{Sales growth}): \text{Stable} \times \text{Size}$		-0.00864 [0.0258]		
$\mathbb{E}(\text{Sales growth}): \text{Positive}$	-0.0165 [0.0333]	0.145* [0.0784]		
$\mathbb{E}(\text{Sales growth}): \text{Positive} \times \text{Size}$		-0.0462** [0.0210]		
$\mathbb{E}(\text{Sales growth})$			-0.0393 [0.0531]	0.225* [0.121]
$\mathbb{E}(\text{Sales growth}) \times \text{Size}$				-0.0745** [0.0308]
Size	0.0319*** [0.00943]	0.0623*** [0.0181]	0.0328*** [0.00939]	0.0346*** [0.00941]
Model	Logit	Logit	Logit	Logit
Time FE	yes	yes	yes	yes
Geographic area FE	yes	yes	yes	yes
Additional controls	yes	yes	yes	yes
Observations	1263	1263	1263	1263
Pseudo R2	0.189	0.189	0.189	0.193

Notes: logit marginal effects. The dependent variable is a dummy measure for loan application in the last year. Because of data availability, expectations refer to sales growth for the following year. Other regressors are timed consistently with previous analyses. Unreported controls follow the specification in Table 4. Variables are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

firms. While in general increased competition between firms is expected to be welfare enhancing, this is not obvious when competition is between formal and informal firms. In this case, competition may indeed be detrimental to formal firms and to the overall economy (Friesen and Wacker, 2019). As noted by (Rozo and Winkler, 2021), a larger informal sector may end up hurting formal firms' performance in several ways, including (unfair) cost competition and by reducing the quality of local public goods. Our results indicate another negative effect due to informal competition: by worsening (sales growth) expectations it reduces the demand for credit by the firm.

Taken together, these results suggest that a mechanism explaining the poor employment performance of formal firms in MENA countries is due to the negative effect of informal competition on access to finance, the latter being an important determinant of employment creation.

we make sure that we are not capturing a spurious relationship.

¹⁷Interestingly, our results are in line with previous analyses of the relationship between competition from informal firms and firm size. La Porta and Shleifer (2014) highlights that firms perceive the threat from informal firms as a different obstacle to their business depending on firm characteristics. Gonzalez and Lamanna (2007) show that the formal firms most affected by informal competition are those that resemble informal firms the most. Our results confirm these predictions. By showing that the induced reduction in loan application due to lower expected sales growth is differentially larger for small firms, we provide evidence that the negative effect of informal competition varies depending on firm's characteristics and it is more negative for smaller firms, i.e. those more similar to informal firms.

4 Concluding remarks

This paper explores the link between jobs, finance, and exposure to informal competition for firms in MENA countries. Using longitudinal data from the WBES survey, we document that job creation is facilitated by access to finance, which - in turn - is reduced when the firm is exposed to competition from informal firms. We provide suggestive evidence that a possible mechanism explaining this result is that firms that are more exposed to competition from informal firms have worsen expectations for future sales growth that in turn make them less likely to apply for a loan, depressing job creation.

Our results have some clear policy implications. The first concerns which policy to implement to favour employment creation in MENA countries. Because job creation is influenced by the functioning of the finance sector, our findings indicate that reducing the *disconnectedness* which characterizes firms in MENA countries is a possible strategy to foster employment growth. Our results provide a novel demand-side view on the determinants of *disconnectedness*, documenting that the presence of informal competition negatively influences the demand for finance. This implies that increasing the supply of credit and easing the access to credit should not be considered the only possible strategies to increase the use of finance by firms in MENA countries. Second, our results provide a novel motivation for reducing informality. Reducing informality would benefit the overall economy by inducing formal firms to increase loan applications and thus employment in response to a lower competition threat from informal firms. Third, our results show that policy interventions to support firms should be designed taking into account that the *perception* of a constraint is as important as the existence of an actual constraint in driving firms' behavior. As we document in our analysis, a firm's decision not to apply for a loan is influenced by the perceived competition threat from informal firms, which is not necessarily correlated with an existing actual threat.

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Online Appendix

Table A1: Attrition

Dependent variable:	Panel				
	(1)	(2)	(3)	(4)	(5)
Size	0.000673 [0.00568]	-0.00199 [0.00633]	0.000206 [0.00588]	-0.000120 [0.00574]	0.00131 [0.00582]
Age	0.0242*** [0.00792]	0.0317*** [0.00862]	0.0265*** [0.00807]	0.0240*** [0.00792]	0.0232*** [0.00799]
Export	0.0137 [0.0166]	0.0198 [0.0181]	0.0112 [0.0170]	0.0135 [0.0166]	0.0143 [0.0167]
Manufacturing	0.148 [0.153]	0.286 [0.273]	0.149 [0.152]	0.151 [0.153]	0.150 [0.153]
Retail	0.213 [0.154]	0.346 [0.274]	0.213 [0.154]	0.215 [0.154]	0.216 [0.154]
Other services	0.213 [0.152]	0.341 [0.272]	0.213 [0.152]	0.216 [0.152]	0.215 [0.153]
Listed company	-0.00170 [0.0637]	0.000831 [0.0773]	0.00520 [0.0651]	-0.000125 [0.0637]	-0.0104 [0.0643]
LLC	-0.0169 [0.0611]	0.00524 [0.0740]	-0.00870 [0.0624]	-0.0153 [0.0611]	-0.0217 [0.0616]
Sole proprietorship	-0.0379 [0.0611]	-0.00927 [0.0739]	-0.0290 [0.0625]	-0.0355 [0.0611]	-0.0433 [0.0616]
Partnership	-0.0158 [0.0617]	0.0128 [0.0745]	-0.00760 [0.0631]	-0.0137 [0.0617]	-0.0203 [0.0623]
Ltd Partnership	-0.0378 [0.0620]	-0.00804 [0.0747]	-0.0278 [0.0634]	-0.0360 [0.0620]	-0.0428 [0.0626]
Constrained by informal		-0.00239 [0.0154]			
Loan availability			-0.00155 [0.0161]		
Loan application				0.0141 [0.0140]	
Investment					0.000102 [0.0144]
Model	Logit	Logit	Logit	Logit	Logit
Geographic area FE	yes	yes	yes	yes	yes
Observations	5219	4347	5063	5219	5181
Pseudo R2	0.0328	0.0367	0.0331	0.0328	0.0327

Notes: logit marginal effects. The estimating sample is composed of the entire set of firms interviewed in the 2013-wave of the WBES. The dependent variable is a dummy taking value of 1 if the firm is included in our panel estimation (i.e., it is interviewed in the following wave), and 0 otherwise. All regressors are timed at the beginning of period. Measures are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table A2: Loan availability and loan application: Restricting the sample to firms with no loan in $t - 1$

Dependent variable:	Loan availability (1)	Loan application (2)
Constrained by informal	-0.0714*** [0.0269]	-0.0831*** [0.0278]
Account	-0.0285 [0.0250]	-0.00862 [0.0283]
No need	-0.00700 [0.0223]	-0.0163 [0.0246]
Age	-0.00498 [0.0158]	0.00962 [0.0180]
Size	0.0277*** [0.00847]	0.0231** [0.00995]
Export	0.0356 [0.0293]	0.0452 [0.0375]
N competitors	-0.00816 [0.00604]	0.00353 [0.00722]
Model	Logit	Logit
Time FE	yes	yes
Geographic area FE	yes	yes
Additional controls	yes	yes
Observations	1002	1067
Pseudo R2	0.162	0.220

Notes: logit marginal effects. This table replicates the analysis in Column 3 of Tables 4 and 5, while restricting the sample to firms with no access to credit in the previous wave (i.e., switchers only). All regressors are lagged once. Unreported controls follow the specification in Table 4. Measures are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table A3: Loan availability: Restricting the timing of the issuance

Dependent variable: Issuance:	Loan availability				
	10 years (1)	7 years (2)	5 years (3)	2 years (4)	1 year (5)
Constrained by informal	-0.0764*** [0.0222]	-0.0730*** [0.0219]	-0.0690*** [0.0216]	-0.0582*** [0.0203]	-0.0663*** [0.0254]
Account	0.00839 [0.0279]	0.00602 [0.0280]	0.00274 [0.0281]	0.0215 [0.0283]	0.0457 [0.0388]
No need	-0.0464** [0.0192]	-0.0462** [0.0191]	-0.0487*** [0.0188]	-0.0439** [0.0183]	-0.0599** [0.0233]
Age	-0.00655 [0.0157]	-0.00700 [0.0156]	-0.00600 [0.0156]	-0.00281 [0.0148]	0.0135 [0.0198]
Size	0.0382*** [0.00792]	0.0374*** [0.00779]	0.0364*** [0.00768]	0.0289*** [0.00734]	0.0235** [0.00962]
Export	0.0195 [0.0259]	0.0222 [0.0254]	0.0154 [0.0252]	0.0103 [0.0237]	0.0265 [0.0304]
N competitors	-0.00520 [0.00558]	-0.00621 [0.00549]	-0.00683 [0.00537]	-0.00548 [0.00509]	-0.00959 [0.00650]
Model	Logit	Logit	Logit	Logit	Logit
Time FE	yes	yes	yes	yes	yes
Geographic area FE	yes	yes	yes	yes	yes
Additional controls	yes	yes	yes	yes	yes
Observations	1371	1362	1351	1277	906
Pseudo R2	0.197	0.202	0.199	0.227	0.209

Notes: logit marginal effects. This table replicates the analysis in Column 3 of Table 4, while restricting the availability of loans to an issuance occurring within the last 10, 7, 5, or 2 years (respectively in columns 1, 2, 3, and 4). All regressors are lagged once. Unreported controls follow the specification in Table 4. Measures are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table A4: Heckman selection model

Dependent variable:	Loan availability (1)	Loan application (2)
Constrained by informal	-0.0566*** [0.0187]	-0.0534** [0.0210]
Account	0.0155 [0.0221]	0.00799 [0.0247]
No need	-0.0495*** [0.0177]	-0.0413** [0.0198]
Age	-0.0121 [0.0129]	-0.00371 [0.0145]
Size	0.0342*** [0.00773]	0.0373*** [0.00864]
Export	0.0394* [0.0230]	0.0405 [0.0256]
Manufacturing	0.0346* [0.0191]	0.0469** [0.0214]
Retail	0.00516 [0.0303]	-0.0176 [0.0336]
Listed company	0.0491 [0.183]	0.0731 [0.208]
LLC	0.0559 [0.182]	0.103 [0.206]
Sole proprietorship	0.0229 [0.181]	0.0820 [0.205]
Partnership	0.0328 [0.181]	0.0878 [0.206]
Ltd Partnership	0.0284 [0.182]	0.0884 [0.206]
Model	Heckman	Heckman
Time FE	yes	yes
Geographic area FE	yes	yes
Additional controls	yes	yes
Observations	10386	10444
Selected	1911	1969
Not selected	8475	8475
Wald χ^2	296.31	498.86
Inverse Mill's ratio	-0.0309*	-0.0308

Notes: Heckman selection model. In this table, we explicitly model the probability of being included in our analysis in a two-step Heckman-type selection model (Heckman, 1976; Lewis, 1974; Gronau, 1974). The selection equation models a firms' probability of belonging to the panel (i.e., being interviewed in two consecutive waves of the WBES survey) depending on firms' age, size, and belonging stratum (the intersection of sector and country, excluded in the main specification). The inverse Mill's ratio is included as an additional regressor in the original specification (reported in the bottom panel). All regressors are timed consistently with previous analyses. Unreported controls follow the specification in Table 4. Measures are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table A5: Loan availability: Additional controls

Dependent variable:	Loan availability				
	(1)	(2)	(3)	(4)	(5)
Constrained by informal	-0.0720*** [0.0193]	-0.0723*** [0.0222]	-0.0714*** [0.0224]	-0.0706*** [0.0226]	-0.124*** [0.0368]
Years formality	-0.0453 [0.0699]	-0.0660 [0.0775]	-0.0726 [0.0782]	-0.0184 [0.0945]	-0.158 [0.235]
Originally informal	0.0110 [0.0290]	-0.0125 [0.0340]	-0.00828 [0.0341]	-0.00496 [0.0354]	0.0147 [0.0548]
Sales growth		0.00131 [0.000861]	0.00113 [0.000883]	0.000964 [0.000890]	-0.000519 [0.00141]
Productivity growth		-0.00142* [0.000851]	-0.00125 [0.000875]	-0.00106 [0.000879]	0.000286 [0.00137]
Investment		-0.0213 [0.0212]	-0.0175 [0.0213]	-0.0172 [0.0215]	-0.0534 [0.0353]
Local market			0.00185 [0.0322]	-0.000510 [0.0326]	-0.0401 [0.0552]
National market			-0.00431 [0.0274]	-0.000114 [0.0277]	-0.0165 [0.0488]
Years manager experience			0.000594 [0.000896]	0.000270 [0.000917]	0.000942 [0.00146]
Government ownership			-0.00112 [0.00128]	-0.000787 [0.00126]	0 [.]
Female top manager			-0.00299 [0.0430]	-0.0121 [0.0439]	-0.0392 [0.0576]
Female owner			-0.00838 [0.0223]	-0.0113 [0.0232]	-0.00817 [0.0356]
City 1				0.0763 [0.0684]	0.00338 [0.0934]
City 2				0.129* [0.0660]	0.0707 [0.0907]
City 3				0.0881 [0.0651]	-0.0251 [0.0847]
City 4				0.0872 [0.0645]	-0.0354 [0.0879]
Electric outages (N)				0.000427 [0.000297]	-0.000343 [0.000714]
Electric outages (length)				0.00394 [0.00492]	0.0135 [0.00863]
Bribery depth					-0.00111** [0.000498]
Gifts (share)					0.000534 [0.000471]
Constrained by corruption					0.0518 [0.0387]
Loss from theft					-0.00124 [0.00540]
Constrained by crime					-0.000215 [0.000480]
Capacity utilization					-0.0000916 [0.000737]
Model	Logit	Logit	Logit	Logit	Logit
Time FE	yes	yes	yes	yes	yes
Geographic area FE	yes	yes	yes	yes	yes
Additional controls	yes	yes	yes	yes	yes
Observations	1914	1411	1388	1359	527
Pseudo R2	0.187	0.216	0.215	0.219	0.273

Notes: logit marginal effects. All regressors are lagged once. Unreported additional regressors follow the specification in Column 3 of Table 4. Measures are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table A6: Loan application: Additional controls

Dependent variable:	Loan application				
	(1)	(2)	(3)	(4)	(5)
Constrained by informal	-0.0506** [0.0209]	-0.0400* [0.0242]	-0.0415* [0.0248]	-0.0413* [0.0250]	-0.117*** [0.0412]
Years formality	-0.0945 [0.0745]	-0.122 [0.0900]	-0.124 [0.0919]	-0.0890 [0.100]	0.0505 [0.244]
Originally informal	0.0347 [0.0325]	0.0141 [0.0387]	0.00520 [0.0391]	0.00511 [0.0402]	0.00398 [0.0609]
Sales growth		0.000866 [0.000922]	0.000669 [0.000962]	0.000774 [0.000968]	-0.000582 [0.00165]
Productivity growth		-0.00152* [0.000888]	-0.00129 [0.000928]	-0.00136 [0.000927]	-0.000467 [0.00152]
Investment		-0.0375 [0.0242]	-0.0354 [0.0247]	-0.0349 [0.0250]	-0.0654 [0.0439]
Local market			-0.0122 [0.0369]	-0.0195 [0.0371]	-0.0146 [0.0709]
LMain_national			-0.00123 [0.0322]	-0.00419 [0.0324]	0.0182 [0.0649]
Years manager experience			-0.000142 [0.00102]	-0.000413 [0.00102]	0.0000948 [0.00169]
Government ownership			0.000321 [0.00177]	0.000592 [0.00179]	-0.000388 [0.00244]
Female top manager			0.0545 [0.0506]	0.0313 [0.0494]	0.0311 [0.0702]
Female owner			-0.00986 [0.0254]	-0.00993 [0.0261]	-0.0114 [0.0410]
City 1				0.0373 [0.0689]	-0.0764 [0.105]
City 2				0.119* [0.0647]	0.0429 [0.0983]
City 3				0.0709 [0.0612]	-0.0519 [0.0848]
City 4				0.107* [0.0582]	-0.0106 [0.0881]
Electric outages (N)				0.000673* [0.000393]	0.00175 [0.00177]
Electric outages (length)				0.00301 [0.00667]	-0.00419 [0.0132]
Bribery depth					-0.00145** [0.000650]
Gifts (share)					-0.0000411 [0.000553]
Constrained by corruption					-0.0217 [0.0422]
Loss from theft					-0.000938 [0.00632]
Constrained by crime					0.000290 [0.000525]
Capacity utilization					-0.000147 [0.000782]
Model	Logit	Logit	Logit	Logit	Logit
Time FE	yes	yes	yes	yes	yes
Geographic area FE	yes	yes	yes	yes	yes
Additional controls	yes	yes	yes	yes	yes
Observations	1987	1464	1439	1409	561
Pseudo R2	0.196	0.213	0.206	0.211	0.199

Notes: logit marginal effects. All regressors are lagged once. Unreported additional regressors follow the specification in Column 3 of Table 5. Measures are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table A7: IV estimates

Dependent variable:	Loan availability (1)	Loan application (2)
Constrained by informal	-0.590** [0.273]	-0.614** [0.307]
Account	0.0431 [0.0281]	0.0390 [0.0308]
No need	-0.108*** [0.0392]	-0.109** [0.0440]
Age	0.0244 [0.0181]	0.0282 [0.0203]
Size	0.0174 [0.0119]	0.0153 [0.0133]
Export	0.00551 [0.0274]	0.00503 [0.0302]
Model	2SLS	2SLS
Time FE	yes	yes
Geographic area FE	yes	yes
Additional controls	yes	yes
Observations	1951	2011
Underidentification (p-value)	0.000	0.000

Notes: 2SLS estimates. In this table, we instrument *Constrained by informal* with the average of firms' belonging stratum defined at the intersection of macro-sector (manufacturing vs services), geographical area, in the previous wave of the firm. All regressors are timed consistently with previous analyses. Unreported controls follow the specification in Table 4. Measures are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table A8: Balancing properties of the matching

Variable	Unmatched		Mean		% Bias	% Reduct. Bias	t-test	
	Matched	Treated	Control	t			$p > t $	
Age	U	7.5972	7.5971	1.1	–	0.16	0.876	
	M	7.5972	7.5961	12.4	-990.8	1.27	0.205	
Size	U	3.1893	3.5172	-24.3	–	-3.27	0.001	
	M	3.1889	3.1367	3.9	84.1	0.49	0.621	
Export	U	0.22887	0.2338	-1.2	–	-0.17	0.868	
	M	0.23485	0.20833	6.3	-437.9	0.73	0.464	
Account	U	0.88732	0.80986	21.7	–	2.96	0.003	
	M	0.87879	0.84091	10.6	51.1	1.25	0.211	
No need	U	0.54577	0.64366	-20.0	–	-2.88	0.004	
	M	0.56818	0.60227	-7.0	65.2	-0.79	0.428	
Egypt	U	0.38732	0.66338	-57.5	–	-8.24	0.000	
	M	0.41667	0.41288	0.8	98.6	0.09	0.930	
Jordan	U	0.04577	0.03099	7.7	–	1.14	0.254	
	M	0.04924	0.04924	0.0	100.0	0.00	1.000	
Lebanon	U	0.23239	0.10986	32.9	–	5.02	0.000	
	M	0.24242	0.24242	0.0	100.0	0.00	1.000	
Morocco	U	0.07394	0.0493	10.2	–	1.52	0.128	
	M	0.06439	0.05682	3.2	69.3	0.36	0.716	
State of Palestine	U	0.03873	0.06056	-10.1	–	-1.37	0.170	
	M	0.04167	0.04545	-1.7	82.6	-0.21	0.832	
Tunisia	U	0.22183	0.08592	38.3	–	5.96	0.000	
	M	0.18561	0.19318	-2.1	94.4	-0.22	0.825	
Manufacturing	U	0.59155	0.59155	0.0	–	–	1.000	
	M	0.61364	0.54167	14.6	–	0.000	0.094	
Retail	U	0.09859	0.07042	10.1	–	-0.82	1.49	
	M	0.0947	0.08712	2.7	73.1	0.30	0.763	
Other services	U	0.30986	0.33803	-6.0	–	-0.85	0.116	
	M	0.29167	0.37121	-17.0	-182.4	-1.9	0.112	
LLC	U	0.25	0.23803	2.8	–	0.40	0.691	
	M	0.25	0.25758	-1.8	36.7	-0.20	0.842	
Sole proprietorship	U	0.34155	0.38028	-8.1	–	-1.14	0.253	
	M	0.33333	0.375	-8.7	-7.6	-1.00	0.318	
Partnership	U	0.16901	0.14507	6.6	–	0.95	0.343	
	M	0.16667	0.1553	3.1	52.5	0.35	0.723	
Ltd Partnership	U	0.16197	0.14085	5.9	–	0.85	0.396	
	M	0.17045	0.17045	0.0	100.0	0.00	1.000	
Originally informal	U	0.84155	0.89296	-15.2	–	-2.24	0.025	
	M	0.83712	0.81818	5.6	63.2	0.58	0.565	
Sales growth	U	-3.4194	-4.5228	5.9	–	0.82	0.414	
	M	-3.7487	-3.9356	1.0	83.1	0.13	0.899	
Local market	U	0.39789	0.45493	-11.5	–	-1.64	0.102	
	M	0.39394	0.37121	4.6	60.2	0.54	0.592	
National market	U	0.52817	0.44366	16.9	–	2.42	0.016	
	M	0.52652	0.56439	-7.6	55.2	-0.87	0.383	
Board of directors	U	0.5493	0.61408	-13.1	–	-1.88	0.060	
	M	0.53788	0.56439	-5.4	59.1	-0.61	0.541	
Years manager experience	U	25.884	23.604	19.5	–	2.76	0.006	
	M	25.867	25.367	4.3	78.1	0.49	0.622	
Government ownership	U	0.94014	0.37183	8.7	–	1.43	0.154	
	M	0.35606	0.125	3.6	59.3	0.89	0.373	
Female top manager	U	0.05282	0.04507	3.6	–	0.52	0.604	
	M	0.05303	0.06061	-3.5	2.2	-0.38	0.708	
Female owner	U	0.23944	0.1169	32.4	–	4.92	0.000	
	M	0.22348	0.24621	-6.0	81.5	-0.62	0.539	
City 1	U	0.14437	0.09296	15.9	–	2.37	0.018	
	M	0.14773	0.1553	-2.3	85.3	-0.24	0.809	
City 2	U	0.29225	0.19155	23.6	–	3.48	0.001	
	M	0.2803	0.32955	-11.6	51.1	-1.23	0.220	
City 3	U	0.17958	0.14507	9.4	–	1.36	0.175	
	M	0.17424	0.19318	-5.1	45.1	-0.56	0.575	
City 4	U	0.30282	0.53239	-47.8	–	-6.69	0.000	
	M	0.31818	0.26894	10.3	78.6	1.24	0.215	
Constr. corruption	U	0.61972	0.35915	53.9	–	7.70	0.000	
	M	0.59848	0.60985	-2.4	95.6	-0.27	0.790	
Constr. crime	U	22.535	7.4648	43.1	–	6.81	0.000	
	M	17.424	17.424	0.0	100.0	-0.00	1.000	

Notes: Balancing properties from radius matching (0.2 stdev) in Table A9.

Table A9: Matching estimator: Average Treatment Effect

Outcome variable:	Abadie and Imbens (2002) estimator		Radius Matching (0.2 stdev)	
	Loan availability (1)	Loan application (2)	Loan availability (3)	Loan application (4)
Constrained by informal	-0.0845*** [0.0253]	-0.0819*** [0.0290]	-0.0434** [0.0185]	-0.0502** [0.0219]

Notes: Average Treatment Effects for Constrained by informal (i.e., our treatment variable). In the left panel, we perform the [Abadie and Imbens \(2011\)](#) estimator, while in the right panel, we employ radius matching with a 0.2-stdev caliper. Balancing properties are provided in Table A8 of the Online Appendix. All regressors are timed consistently with previous analyses. Measures are defined in Table B4. Robust standard errors in brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Data Appendix

Table B1: Definition: Dependent variables

Variable name	Definition
Loan availability	question k8: “At this time, does this establishment have a line of credit or a loan from a financial institution?”. Loan availability=1 if k8=yes and 0 otherwise.
Loan application	if k8=no, question bmk7: “What is the reason for not having a loan or line of credit at the moment?”. Answer bmk7a: “Because this establishment did not apply for a loan or line of credit”. Loan application=0 if bmk7a=yes and 1 otherwise (even if k8=yes).
$\mathbb{E}(\text{Sales growth})$: Positive	question bmd1a: “Considering the next year, are this establishment’s total sales expected to increase, decrease, or stay the same?”. Positive expectations=1 if bmd1a=“increase” and 0 otherwise.
$\mathbb{E}(\text{Sales growth})$: Stable	Stable expectations=1 if bmd1a=“stay the same” and 0 otherwise.
$\mathbb{E}(\text{Sales growth})$: Negative	Negative expectations=1 if bmd1a=“decrease” and 0 otherwise.
$\mathbb{E}(\text{Sales growth})$	question bmd1b: “In percentage terms, what is the expected change in total sales?”. $\mathbb{E}(\text{Sales growth})=\text{bmd1b}$ if $\mathbb{E}(\text{Sales growth})$: Positive=1, $\mathbb{E}(\text{Sales growth})=-\text{bmd1b}$ if $\mathbb{E}(\text{Sales growth})$: Negative=1, and 0 otherwise.
Turned down	if k8=no, question bmk7: “What is the reason for not having a loan or line of credit at the moment?”. Answer bmk7b: “Because the last application for a loan or line of credit was turned down”. Turned down=1 if bmk7b=yes and 0 otherwise.
Rationing	variable constructed as in Kuntchev et al. (2014) . Rationing=2 (fully constrained) if the firm does not have external sources of finance and applied for a loan and was rejected (question bmk7b) or did not apply because of the terms and conditions (question k17). Rationing=1 (partially constrained) if the firm has external sources of finance and the loan was approved in part, it was rejected, or because of the terms and conditions. Rationing=0 (not constrained) otherwise.

Table B2: Definition: Main regressors

Variable name	Definition
Constrained by informal	question e30: "To what degree are practices of competitors in the informal sector an obstacle to the current operations of this establishment?". Available options: i. no obstacle, ii. minor obstacle, iii. moderate obstacle, iv. major obstacle, or v. very severe obstacle. Constrained by informal=1 if e30= iv. or v., and 0 otherwise.
Originally informal	question b6a: "Was this establishment formally registered when it began operations?". Originally informal=1 if b6a=yes, and 0 otherwise.
Years of formality	question b6b: "In what year was this establishment formally registered?". Years of formality= $\ln(1+T-b6b)$, where T is the year of the survey.
Account	question k6: "Now let's talk about the establishment's current situation. At this time, does this establishment have a checking or savings account?". Account =1 if k6=yes and 0 otherwise.
No need	question k16: "Referring again to the last fiscal year, did this establishment apply for any loans or lines of credit?". If k16=no, question k17: "What was the main reason why this establishment did not apply for any line of credit or loan?", answer k17a: "No need for a loan – establishment had sufficient capital". No need=1 if k17a=yes, and 0 otherwise.
Age	question b5: "In what year did this establishment begin operations?". Age = $\ln(1+T-b5)$, where T is the year of the survey.
Size	question l2 "Looking back, at the end of two fiscal years ago, how many permanent, full-time individuals worked in this establishment? Please include all employees and managers". Size= $\ln(1+l2)$.
Export	question d3: "Coming back to the last fiscal year, what percentage of this establishment's sales were: national sales [d3a], indirect exports (sold domestically to third party that exports products) [d3b], direct exports [d3c]?". Export=1 if d3c > 10%.
Sales growth	question d2: "In the last fiscal year, what were this establishment's total annual sales for ALL products and services?". Question n3: "Three fiscal years ago, what were total annual sales for this establishment?". Sales growth is measured as a percentage change in sales between the last completed fiscal year and the previous period. All sales values are deflated to 2009 using each country's GDP deflators.
Number of competitors	question e2: "In the last fiscal year, for the main market in which this establishment sold its main product, how many competitors did this establishment's main product face?". The original answer was a cardinal measure distinguishing the following classes: i. 0, ii. 1, iii. 2–3, iv. 4–5, v. 6–10, vi. 11–180, or vii. too many to count. For conciseness, we generated a continuous measure by imposing the median number of each class and assuming the lowerbound of 181 for the last category vii. We then took the augmented log (1+). Our analysis is not sensitive to alternative choices or to the direct use of the original categorical measure.

Table B3: Definition: Additional regressors

Variable name	Definition
Productivity growth	annual labor productivity growth is measured by a percentage change in labor productivity between the last completed fiscal year and a previous period. Labor productivity is defined as the ratio between sales and the number of full-time permanent workers. All sales values are deflated to 2009 using each country's GDP deflators.
Investment	question k4: "In the last fiscal year, did this establishment purchase any new or used fixed assets, such as machinery, vehicles, equipment, land or buildings?". Investment=1 if k4=yes, and 0 otherwise.
Local market	question e1: "In the last fiscal year, which of the following was the main market in which this establishment sold its main product?". Available answers: i. Local (main product sold mostly in same municipality where establishment is located), ii. National (main product sold mostly across the country where establishment is located), and iii. International. Local market=1 if e1=i.
National market	National market=1 if e1=ii.
Board of directors	question bmb4: "Does the firm have a board of directors or a supervisory board?". Board of directors=1 if bmb4=yes, and 0 otherwise.
Years manager experience	question b7: "How many years of experience working in this sector does the top manager have?". Years manager experience=log(1+b7).
Government ownership	question b2: "What percentage of this firm is owned by each of the following". Government ownership=b2c, "% Government or State".
Female top manager	question b7a: "Is the Top Manager female?". Female top manager=1 if b7a=yes, and 0 otherwise.
Female owner	question b4: "Amongst the owners of the firm, are there any females?". Female owner=1 if b4=yes, and 0 otherwise.
City 1	question a3: "Size of locality". Available answers: i. "City with population above 1 Million", ii. "Over 250,000 to 1 million", iii. "50,000 to 250,000", iv. "Less than 50,000". City 1=1 if a3=iv, and 0 otherwise.
City 2	City 2=1 if a3=iii, and 0 otherwise.
City 3	City 3=1 if a3=ii, and 0 otherwise.
City 4	City 4=1 if a3=i, and 0 otherwise.
Electric outages (N)	question c7: "In a typical month, over the last fiscal year, how many power outages did this establishment experience?". Electric outages (N)=log(1+c7).
Electric outages (length)	question c8: "How long did these power outages last on average?". Electric outages (length)=log(1+c8).
Bribery depth	Bribery depth is computed similarly as the Graft Index from Gonzalez et al. (2007) . it is constructed from the following questions. Question c5: "In reference to that application for an electrical connection, was an informal gift or payment expected or requested?". Question c14: "In reference to that application for a water connection, was an informal gift or payment expected or requested?". Question g4: "In reference to that application for a construction-related permit, was an informal gift or payment expected or requested?". Question j5: "In any of these inspections or meetings (with tax officials) was a gift or informal payment expected or requested?". Question j12: "In reference to that application for an import license, was an informal gift or payment expected or requested?". Question j15: "In reference to that application for an operating license, was an informal gift or payment expected or requested?".
Gifts (share)	question j7: "It is said that establishments are sometimes required to make gifts or informal payments to public officials to "get things done" with regard to customs, taxes, licenses, regulations, services etc. On average, what percentage of total annual sales do establishments like this one pay in informal payments or gifts to public officials for this purpose?".
Constrained by corruption	question j30: "As I list some factors that can affect the current operations of a business, please look at this card and tell me the degree to which you think each factor is an obstacle to the current operations of this establishment". Available options: i. no obstacle, ii. minor obstacle, iii. moderate obstacle, iv. major obstacle, or v. very severe obstacle. Constr. corruption=1 if j30= iv. or v., and 0 otherwise.
Loss from theft	question i4: "In the last fiscal year, what were the estimated losses as a result of theft, robbery, vandalism or arson that occurred on this establishment's premises either as a percentage of total annual sales?".
Constrained by crime	question i30: "To what degree is Crime, Theft and Disorder an obstacle to the current operations of this establishment?". Available options: i. no obstacle, ii. minor obstacle, iii. moderate obstacle, iv. major obstacle, or v. very severe obstacle. Constr. crime=1 if i30= iv. or v., and 0 otherwise.
Capacity utilization	question f1: "In the last fiscal year, what was this establishment's output produced as a percentage of the maximum output possible if using all the resources available (capacity utilization)?".

Table B4: Variable description: Main measures

Variable name	Description
Dependent variables	
Loan availability	dummy for firms with an outstanding loan or credit line.
Loan application	dummy for firms that applied for a loan or credit line (independently of the outcome).
$\mathbb{E}(\text{Sales growth})$	continuous measure for firms' expected sales growth over the following year.
$\mathbb{E}(\text{Sales growth})$: Positive	dummy for firms expecting increasing sales in the following year.
$\mathbb{E}(\text{Sales growth})$: Stable	dummy for firms expecting stable sales in the following year.
Regressors	
Account	dummy for firms with a checking or savings account.
Constrained by informal	dummy for firms identifying practices of competitors in the informal sector as a major constraint.
Originally informal	dummy for firms originally starting their activity without being formally registered.
Years of formality	log-years since the firm was formally registered.
Age	log-age (1+).
Size	log-employees (1+).
Export	dummy for exporting firms.
Sales growth	realized sales growth over the last three years.
Number of competitors	log-number of competitors (1+).
Manufacturing	dummy for firms operating in the manufacturing sector.
Retail	dummy for firms operating in the retail sector.
Listed company	dummy for listed companies.
LLC	dummy for LLC firms.
Sole proprietorship	dummy for sole proprietorship firms.
Partnership	dummy for partnership firms.
Ltd Partnership	dummy for Ltd partnership firms.

Table B5: Variable description: additional regressors

Variable name	Description
Productivity growth	annual labor productivity growth.
Local market	dummy for firms mainly selling products to local markets.
National market	dummy for firms mainly selling products to national markets.
Board of directors	dummy for firms having a board of directors or a supervisory board.
Years manager experience	number of years of experience of the manager (in log).
Government ownership	share of the firm owned by the government.
Female top manager	dummy for firms with a female as a top manager.
Female owner	dummy for firms with a female owner.
City 1	dummy for firms operating in cities with population below 50,000.
City 2	dummy for firms operating in cities with population between 50,000 and 250,000.
City 3	dummy for firms operating in cities with population between 250,000 and 1,000,000.
City 4	dummy for firms operating in cities with population above 1,000,000.
Electric outages (N)	number of electric outages experienced in the last year (in log).
Electric outages (length)	average duration of electric outages experienced in the last year (in log).
Bribery depth	percentage of instances in which a firm was either expected or requested to provide a gift or informal payment during solicitations for public services, licenses or permits.
Gifts (share)	firms' informal payment (gifts to public officials to get things done) as a percentage of total sales.
Constrained by corruption	dummy for firms identifying corruption as a major constraint.
Loss from theft	losses due to theft and vandalism against the firm as a percentage of total sales.
Constrained by crime	dummy for firms identifying crime, theft and disorder as a major constraint.
Capacity utilization	percentage of capacity utilization.

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