Structural and cyclical determinants of access to finance: Evidence from Egypt*

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Abstract

Using panel data on Egyptian firms to explore cyclical and structural determinants of access to finance, we find that firms with more educated and more experienced managers are more likely to open a checking account, often a prerequisite for obtaining credit. Firms that started operating in the informal sector before registering are less likely to engage with the banking system. Exploiting data on the location of firms and bank branches, we also show that firms located in areas with a greater presence of banks that invest more in government debt are more likely to be credit constrained due to crowding out of the private sector.

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1 Introduction

It is well established that financial development is connected to economic growth (Levine, 2005). While most studies rely on macroeconomic data, a growing literature use firm-level evidence to explore different mechanisms through which finance can influence private sector development in emerging economies (Beck et al., 2007). This paper discusses structural and cyclical aspects of access to finance using unique data on the location of firms and bank branches in the Middle East and North Africa (MENA).

We first examine the structural participation decision that looks at whether a firm has a checking account. We then study the provision of credit over the business cycle. In particular, we look at whether a firm is credit constrained. Credit-constrained firms fall in one of two categories: (i) firms that applied for a loan and were rejected; and (ii) firms discouraged from applying either because of unfavourable terms and conditions or because they did not think the loan application would be approved. As only firms that exhibit demand for credit can be constrained, this approach enables us to separately study demand and supply of credit - by instrumenting credit demand with a liquidity shock. The mechanisms that we analyse include entrepreneurial human capital, institutional quality and the intermediation capacity of the financial system.

Recent studies on access to finance in middle-income economies typically focus on credit constraints. For example, Popov and Udell (2012) explore how, in the context of the financial crisis, distress events in European banks tightened credit constraints in Eastern Europe. Gorodnichenko and Schnitzer (2013) examine how credit constraints affect Eastern European firms' ability to innovate. While our paper also examines credit constraints, we argue it is important to take one step back and also look at the prevalence of checking accounts, especially in emerging economies.

When deciding whether to open a checking account, firms trade off costs and benefits. Access to finance is valuable for firms with substantial growth opportunities, while the costs can consist of taxes, licensing requirements and social insurance contributions (Straub, 2005). Incurring these costs is worth less if the intermediation capacity of the banking system is weak and thus the likelihood of being credit-rationed is high. Beck et al. (2014) provide evidence on the empirical salience of the tax evasion channel. They find that there is less tax evasion in countries with better intermediation capacity.

A checking account is important for access to finance because it allows a bank to monitor inflows and outflows and thereby reduces the information asymmetries that plague lending to small firms.[1] For instance, the SME lending methodology proposed by Munro (2013) requires that a potential borrower opens a checking account and runs

[1] Beck et al. (2007) include account penetration among their indicators of banking sector outreach.

all transaction through this account for at least 6 months to establish reliable turnover and cash-flow figures before the bank would consider a loan application. But routing transactions through the checking account also comes at a cost for the firm because it can become more difficult to hide these revenues from tax authorities.

We explore how firms interact with the banking sector in MENA using data on Egypt as a laboratory. We focus on Egypt as this is the country where the issues that we are interested in are most salient. The size of the informal economy is particularly large and estimated to account for about 35% of GDP (Medina and Schneider, 2018). Informal firms are unregistered and typically excluded from the formal financial system. Moreover, as Figure 1 shows, even among registered firms, less than 70% had a checking account in 2013 and 2016 (60% and 69%, respectively). This figure is much lower in Egypt than in other MENA countries. This is one of the reasons why Egyptians often refer to their economy as a "cash economy". Last but not least, with a population of almost 100 million that is growing by close to 2 million individuals per year, Egypt is the pivotal country of the Southern Mediterranean.

Firm size is strongly associated with having a checking account. Figure 2 plots the median number of employees conditional on age for firms in the MENA region.[2] While old firms with a checking account tend to be larger than young firms with a checking account, unbanked firms remain small, regardless of age. The figure is also in line with the evidence of Eslava et al. (2019) and Hsieh and Klenow (2014) who find that employment growth for an average firm in the US is significantly higher than in Colombia, Mexico or India, where financial systems are less developed. They argue that the divergence in firm dynamics between the US and emerging economies suggests higher investments by US firms in process efficiency and quality as well as accessing domestic and foreign markets.

Figure 3 provides some insights as to why financially excluded firms remain small. First, financially excluded firms are less likely to invest; second, they are more likely to fund their investments exclusively from internal sources. It may well be that lack of access to external finance prevents some profitable investment opportunities from being realised.

In addition to the structural dimension, we consider how the intermediation capacity of the banking system varies over the business cycle. Whether a firm uses a checking account or operates on a cash-only basis can be considered as a structural feature of the firm and the financial system. At the same time, some firms with checking accounts are likely to be constrained in their access to credit, which may well depend on the business cycle.

Following the uprising of 2011, Egypt went through a difficult economic period.

[2]The figure reports predictions from a linear quantile regression net of year and industry fixed effects.

Output growth declined to levels barely above population growth. To assuage social pressures, the authorities increased public spending and subsidies by relying on lending by domestic banks, which resulted in higher government debt levels. Figure 4a shows that the share of public debt in the balance sheets of banks increased substantially in the aftermath of the Arab Spring. Figure 4b suggests that the authorities even had to monetise some of the debt by borrowing directly from the Central Bank of Egypt: the government's overdraft with the Central Bank increased from 6% of GDP in 2010 to a peak of 22% in 2016. This suggests that the banking system was not able to accommodate the refinancing needs of the public sector. Heavy borrowing by the government drove up interest rates and likely crowded out bank lending to the private sector.

In this paper, we develop a new measure of crowding out to study the participation of Egyptian firms in the financial system. In addition to bank balance sheet data, the measure exploits geographical information on the location of firms and bank branches to proxy crowding out: a firm that is surrounded by branches of banks that invest more in government debt will score high on the crowding out index.

The firm level data used in this paper come from the Middle East and North Africa Enterprise Survey (MENA ES). The MENA ES provides representative samples of the formal private sector in several MENA economies, including Egypt. It is a business environment survey that follows the World Bank's global methodology for enterprise surveys. Unlike in the other MENA economies, an additional Enterprise Survey was conducted in Egypt in 2016. This yields a panel of 600 Egyptian firms that answered the same questionnaire in 2013 and 2016. The availability of panel data mitigates the concern that our findings could be driven by the exceptional environment prevailing in the aftermath of the Arab Spring. To provide some evidence for the external validity of our results, we conduct a similar analysis using cross-sectional data from 2013 on the other countries participating in the MENA ES.

The extent to which financial exclusion has opportunity costs in terms of lost firm growth likely depends on entrepreneurial skill. La Porta and Shleifer (2014) examine the relation between entrepreneurial human capital and informality. Using data on informal enterprises, they find informal firms to be rather small and unproductive. They argue that the low levels of productivity reflect lack of skills on the side of the entrepreneurs. This is in line with the importance of entrepreneurial human capital documented by Gennaioli et al. (2013). We therefore expect firms run by CEOs with higher education or more experience to be more likely to be banked and more likely to access credit.

Institutions and in particular, secure property rights, can also affect the trade-off between higher costs and growth opportunities. If entrepreneurs cannot reap the reward for their efforts, they will not invest in the first place (Acemoglu et al., 2005).

Property rights are thus necessary to enable factor accumulation and technological progress. Using data from five Eastern European countries, Johnson et al. (2002) show that the perceived strength of property rights affects the willingness of entrepreneurs to reinvest their profits.

At the structural level, we find that firms with more educated and more experienced CEOs are are more likely to obtain a checking account. Firms that operated informally before registering are also less likely to open an account. The results thus support the importance of the human capital channel advanced by La Porta and Shleifer (2014). Perceptions of institutional quality, on the other hand, are not strongly associated with financial inclusion. The same applies to our measures of local financial intermediation capacity.

A similar picture emerges for credit constraints. Firms with more educated and more experienced CEOs are less likely to be credit-constrained and discouraged to apply for a loan. However, we also find that crowding out reduce credit supply. Firms located in areas with a greater presence of banks that invest more in government debt are more likely to be credit constrained. The latter result does not generalise beyond Egypt. This appears plausible as government refinancing needs in the other MENA countries did not increase to the same extent or they were covered by corresponding deposit inflows. In other words, crowding out was particularly severe in Egypt.

The remainder of this paper is organised as follows. The next section discusses different candidate factors that could affect the participation of Egyptian firms in the financial system. Section 3 describes the data of the firm-level and banking data that we use to estimate the empirical model introduced in Section 4. Section 5 explores the results. The last section is a conclusion.

2 Candidate factors affecting the participation of firms in the financial system

Firms trade-off the costs and benefits of participating in the formal banking system. Straub (2005) modifies a continuous investment model with moral hazard based on Holmstrom and Tirole (1997) to allow for a trade-off between informality and access to the financial system. We use this model to explore candidate factors affecting this trade-off in one way or another.

2.1 Informality and intermediation capacity of the banking system

In the model of Straub (2005), entrepreneurs decide whether to operate formally or informally. Operating formally entails costs in the form of registration costs, time

consuming processes and taxes. However, it also comes with access to bank finance, public goods and services, such as licensing and the judicial system. The judicial system in turn facilitates the recovery of loans in case the borrower defaults. Informal borrowers will find it easier to evade the judiciary and, as a result, are less attractive borrowers. In addition, operating formally is worth less when the likelihood of being excluded from formal credit markets is high.

The setting in Straub (2005) is not fully congruent with the data used in this paper as all firms in the data that we use are registered. Even though there are surveys that sample the informal sector, they suffer from their own problems - notably representativeness, which is difficult to assess without a reliable sampling frame. Our sample of firms operating in the formal sector provides us with two angles from which to investigate. First, some of the firms that are registered report whether they started operating in the informal sector. Second and perhaps more importantly, as Figure 1 shows, Egypt is a cash economy with 31% of formal private sector firms in 2016 operating on a cash-only basis.

The decision to become banked is similar to the registration decision. Operating on a cash-only basis facilitates tax evasion but impedes access to the financial system. A checking account is important for financial access because it reduces the information asymmetries that plague lending to small firms. In particular, account information helps the bank to establish reliable turnover and cash-flow figures, which in turn is crucial for creating rudimentary financial statements. Banks are therefore likely to withhold financing from a borrower that operates on a cash-only basis. Whereas Jappelli and Pagano (2002) and Brown et al. (2009) are concerned with information sharing between creditors, we focus on the initial acquisition of information.

Everything else equal, firms should be less likely to be banked if the intermediation capacity of the banking system is weak. In this paper, we use measures of both the cyclical and structural dimension of the banking system's intermediation capacity. Though of interest in its own right, controlling for the cyclical position of the Egyptian economy is also necessary to isolate the effects of the other candidate explanations outlined below. To measure cyclical variation in credit supply, we construct a crowding out index that exploits information on the location of firms and bank branches, as in Betz and Ravasan (2016) and Popov and Udell (2012). A firm that is surrounded by many bank branches that invest more in government debt will score high on the crowding out index. The idea is that firms located in the vicinity of branches of banks that rapidly increased their government debt holdings are more likely to be financially constrained.

2.2 Entrepreneurial human capital

Gennaioli et al. (2013) stress the importance of human capital for economic development. Drawing on Lucas (1978), their theoretical framework distinguishes between the human capital of workers and that of entrepreneurs. Whereas the human capital of workers enters as an input into the production function, the human capital of the entrepreneur also affects firm productivity independently. Using Enterprise Survey data, they show that entrepreneurial human capital has a large effect on firm productivity.

La Porta and Shleifer (2014) examine the relation between entrepreneurial human capital and informality. Using data on informal enterprises, they show that informal firms tend to be small and unproductive. They argue that the low levels of productivity reflect lack of skills on the side of the entrepreneurs.

We therefore expect firms run by highly educated CEOs to be more likely to be banked and more likely to access credit. Operating outside the financial system carries higher opportunity costs for better managers, in terms of lost growth, which costs may easily outweigh the benefits. CEOs with higher education are expected to exhibit greater levels of financial literacy that enable them to deal with the documentation demands made by banks.

2.3 Institutions

In the post-war period, the economies of the MENA region adopted a state-centered development model. This model has several distinct features. One of them is a public sector that assumes the role as employer of last (and sometimes first) resort. For example, some countries issued employment guarantees for university graduates (World Bank, 2004). For lack of sophisticated mechanisms for redistribution, public goods were also provided in kind, through subsidies. In Egypt, fuel subsidies accounted for 6 percent of GDP in the fiscal year 2013/2014 (IMF, 2015).

More recently, policy makers in MENA have recognised that access to finance is conducive to private sector development, which in turn is the only way to provide a sufficient number of jobs for the young and fast growing population. However, financial systems in the region are dominated by banks and bank credit is mainly directed to large and well-connected enterprises (World Bank, 2011). In response, the authorities and central banks have adopted financial development objectives - sometimes implicitly, sometimes explicitly. The measures taken in most countries include schemes to incentivise bank lending to SMEs, the introduction or revamping of credit bureaus, secured transactions rules and insolvency laws.

Acemoglu et al. (2001) and Acemoglu et al. (2005) argue that institutions and, in particular, secure property rights are a fundamental cause of economic growth. If

entrepreneurs cannot reap the reward for their efforts, they will not invest in the first place. Property rights are thus necessary to enable factor accumulation and technological progress. The law and finance literature also stresses the importance of property rights for financial development (La Porta et al., 1998, 2008). However, in this case, it is property rights perceptions of the financiers that matter, which we cannot investigate as we have survey data on firms, i.e. the borrowers, but only data on the geographical location and balance sheets of banks.

Using data from five Eastern European countries, Johnson et al. (2002) find that entrepreneurs are less likely to reinvest their profits if they perceive property rights not to be secure. Moreover, they are more likely to underreport output when institutional quality is poor (Johnson et al., 2000). Acemoglu and Johnson (2005) distinguish between what they refer to as property rights institutions and contracting institutions. Whereas property rights institutions guard the individual against expropriation from the government or elites, contracting institutions regulate transactions between private parties, such as debtors and creditors. High quality institutions thus give incentives to firms to operate formally. As firms in our data report information on perceptions of property rights and the quality of the judicial system, we are also able to explore these issues empirically.

3 Data

The data used in this paper come from the MENA Enterprise Survey (MENA ES) that provides representative samples of the formal private sector in six MENA economies: Egypt, Jordan, Lebanon, Morocco, Palestine and Tunisia.[3] The survey covers firms with at least five employees in the manufacturing and services sectors, where services includes retail, wholesale, hospitality, repairs, construction, transport and information technology (IT) firms. It does not include firms operating in agriculture, fishing, extractive industries, utilities and several service sectors - such as financial services, education and health care.

The MENA ES follows the World Bank's global methodology for Enterprise Surveys. It addresses a broad range of business environment issues such as access to finance, the quality of infrastructure, governance and the extent of corruption, the prevalence of crime, the intensity of competition and firm performance. The samples are stratified by firm size, sector of activity, and location within the countries. The MENA ES covers 6,083 firms with sample size ranging from 407 firms in Morocco to 2,897 in Egypt.

[3]Djibouti and Yemen are also covered in MENA ES but we do not use data on these two countries because we cannot implement our methodology to construct a measure of crowding out: data on bank branches in Yemen are not readily available and Djibouti hardly has any spatial variation.

Data collection took place in the aftermath of the Arab Spring. Respondents were interviewed in 2013 and 2014, but the reference period of the survey is the fiscal year 2012. The fact that data collection took place during exceptional times for the region is reflected in the concerns expressed by firms. Respondents are asked to choose, from a list of fifteen questions describing the business environment, the one that currently represents the greatest obstacle to their enterprise. In the MENA ES economies, 32 percent of firms name political instability as the top obstacle compared to only 10 percent in the rest of world (EBRD et al., 2016).

Owing to the availability of longitudinal data, we use Egypt as a laboratory. Unlike in the other MENA ES economies, an additional Enterprise Survey was conducted in Egypt in 2016. This yields a panel of 600 Egyptian firms that answered the same questionnaire in 2013 and 2016. The availability of panel data mitigates the concern that our finding are driven by the exceptional environment prevailing in the aftermath of the Arab Spring. In addition, the questions that we are interested in are most apparent in the Egyptian data as it has both a high share of unbanked firms and a strong variation in credit supply. Even though the analysis focuses on Egypt, we also use cross-sectional data on the other MENA economies for check the robustness and discuss the external validity of our estimates.

The MENA ES measures access to finance along a range of dimensions. We represent structural participation in the financial system with an indicator variable that takes value 1 if the firm has a checking or savings account, and 0 otherwise. Credit constrained firms either had their loan application rejected or were discouraged from applying. Credit constraints are measured with a standard set of questions. The MENA ES first asks firms whether they have applied for a loan in the last fiscal year. Those who respond affirmatively are then asked whether the loan application was approved or rejected. Firms that did not apply for a loan are asked for the main reason they did not apply. Those firms that respond "no need for a loan" are classified as not credit constrained. Firms that cite other reasons such as complex application procedures, too high interest rates or collateral requirements, or simply did not believe that the application would be approved are considered discouraged.

The share of credit constrained firms in the MENA region is low, but this reflects mainly weak overall demand for loans.[4] According to EBRD et al. (2016), the share of firms that are credit constrained is lower in MENA than in any other region of the world. But this low share of credit-constrained firms does not necessarily reflect successful loan applications; instead, many firms report that they have enough capital and do not need a loan.[5] Figure 5 shows that Egypt and Palestine exhibit the low-

[4]For a comprehensive description of financial sectors in MENA, see World Bank (2011).

[5]As only firms that need a loan can be credit constrained, the share of credit-constrained firms cannot exceed the share of firms that need a loan.

est level of loan demand in MENA. At the same time, most firms in these economies that need a loan report to be credit constrained. Within the region, the banking systems of Egypt and Palestine also display the weakest intermediation capacity. Figure 5 further shows that rejections are rare; most credit-constrained firms in the region are discouraged from applying.

In addition to firm-level data from the MENA ES, we use data on the location of bank branches in six countries.[6] Branch addresses have been converted into coordinates using the geocode utility developed by Ozimek and Miles (2011). Information on branch location enables us to represent the banking system in the vicinity of the firm, as in Popov and Udell (2012).

We combine information on branch location with balance sheet data on the six largest Egyptian banks from Orbis Bank Focus to construct the crowding out index: National Bank of Egypt, Banque Misr, Banque du Caire, Commercial International Bank, Qatar National Bank and HSBC. The six banks account for about 60% of total assets in Bank Focus. National Bank of Egypt, Banque Misr and Banque du Caire are owned by the government, with Banque du Caire a subsidiary of Banque Misr. Commercial International Bank is a private domestic institution. Qatar National Bank and HSBC are foreign banks. We use banks' security holdings as a proxy for government bonds, which is justified by the absence of corporate bond markets in Egypt.

In Egypt, public debt is mainly held by government-owned banks. Government-owned banks have a substantial footprint in the sector, representing about 45% of total assets in 2015. Figure 6 presents the evolution of balance sheet composition for the three categories of financial institutions: public domestic, private domestic, and foreign-owned banks as share of total assets of the banking system.[7] In 2010, for example, public debt held by government-owned banks accounted for 14% of all banking system assets. Public banks held a larger share of government debt prior to the revolution and they absorbed most of the additional debt issued in its aftermath.

Figure 7 illustrates the spatial variation in bank branches that the crowding out index exploits. The first plot shows the distribution of sampled firms reflecting the concentration of economic activity in Egypt, i.e. along the flow of the Nile. The figure further shows that the public banks have a wider geographical footprint than private domestic and foreign institutions, which have fewer branches and tend to be concentrated in major population centres.

We measure cyclical variation in credit supply with our crowding out index. This index draws on bank balance sheet data and information on the location of firms and bank branches to proxy crowding out. A firm that is surrounded by many branches of

[6] We thank Ralph de Haas for sharing with us data on bank branches in Morocco, Tunisia, Egypt, and Jordan.

[7] Banking system assets are obtained as the sum of total assets of all banks with balance sheet information in Bank Focus.

banks that invest more in government debt will score high on the crowding out index. At the level of bank j the crowding out index is computed as

$$\text{crowding out}_j = \sum_{t=2013}^{2015} \frac{s_{jt} - l_{jt}}{\sum_j a_{jt}} - \sum_{t=2010}^{2012} \frac{s_{jt} - l_{jt}}{\sum_j a_{jt}} \tag{1}$$

where s_{jt} and l_{jt} denote security holdings and loans of bank j and $\sum_j a_{jt}$ refers to total assets in the banking system. The level of the crowding out index assigned to firm i is then obtained as the branch-weighted average of equation 1, which takes into account all branches within a circle of radius 10km centered on the sample firm.

We also consider two other measures of local financial conditions that are more structural. First, local financial inclusion is given by the share of firms with a checking account in the circle centered on firm i. Second, local financial intermediation is captured by the share of firms with a loan outstanding in the neighbourhood of firm i.

4 Empirical strategy

Our empirical analysis proceeds in two steps. First, we examine the firm's structural decision to participate in the financial system. Second, we look at the determinants of demand for and supply of credit. We start by estimating the following equation in first differences

$$\begin{aligned} \Delta \text{ account}_i = \beta_1 * \Delta \text{ human capital}_i + \beta_2 * \Delta \text{ institutional quality}_i \\ + \beta_3 * \text{ local financial conditions}_i + \boldsymbol{X_i}\boldsymbol{\zeta} + U_i \end{aligned} \tag{2}$$

where account_i is an indicator variable taking value 1 if the firm i reports to have a checking or savings account, and 0 otherwise. Δ account_i refers to the change in account status between 2013 and 2016.

To measure entrepreneurial human capital, we use an indicator variable that takes value 1 if the firm's CEO has a university degree, and 0 otherwise. Along with education, we also control for experience and gender of the CEO. Experience captures the number of years of experience of the CEO in the sector (but not necessarily in the firm).

We measure institutional quality along several dimensions. In the aftermath of the revolution, Egyptian CEOs most frequently cited political instability as the top obstacle to the enterprise (EBRD et al., 2016). We use a question that asks respondents to rate the extent to which political instability is an obstacle to the enterprise on a five point scale. We collapse responses into a binary indicator equal to 1 if the CEO considers political instability a major or very severe obstacle, and 0 otherwise.

Three additional indicators proxy the quality of third-party enforcement. We use the extent to which the respondent agrees with the following statements: "The court system is fair, impartial, and uncorrupted", "I am confident that the judicial system will enforce my establishment's contractual and property rights in business disputes", and "The court system is quick". Responses are coded from 1 "strongly disagree" to 4 "strongly agree"." The second measure corresponds closely to the concept of contracting institutions proposed by Acemoglu and Johnson (2005).

The vector X includes various firm characteristics, including whether the firm started in the informal sector before registering the business, firm age and firm size - a young firm is less than 10 years old and a small firm has less than 50 employees. We also add industry and Egyptian governorate fixed effects. U_i is a disturbance term that captures time-varying unobservables of the firm.

Whether a firm uses a checking account or operates on a cash-only basis can be considered as a structural feature of the firm and the financial system. At the same time, some firms with checking accounts are likely to be constrained in their access to credit, which may well depend on the business cycle. We deal with the supply of loans by estimating the following equation:

$$\begin{aligned}\Delta \text{ credit-constrained}_i = \gamma_1 * \Delta \text{ human capital}_i + \gamma_2 * \Delta \text{ institutional quality}_i \\ + \gamma_3 * \text{ local financial conditions}_i + \boldsymbol{X_i\theta} + U_i\end{aligned} \tag{3}$$

where credit-constrained is an indicator variable taking value 1 if the firm i reports that either (i) the most recent loan application was rejected by the bank or (ii) the firm was discouraged from applying, and 0 otherwise. The firm can be discouraged either because of unfavourable terms and conditions or because the CEO did not think the loan application would be approved by the bank. The terms and conditions that can discourage firms include complex application procedures, unfavourable interest rates, high collateral requirements, and insufficient size of loan and maturity. Δ credit-constrained$_i$ refers to the change in being constrained between 2013 and 2016.

The other variables are defined as in equation 2. When the change in credit constrained status is the dependent variable in the analysis, the vector of firm characteristics X also includes whether the firm reports that its financial accounts were audited by an external auditor, that it has foreign ownership, and exports more than 10% of its sales. Table 1 reports descriptive statistics on the variables used in the regression analysis.

In a second step, we account for endogenous credit demand. By construction, only firms that have demand for a loan can be credit-constrained. To tease out how our candidate explanation affect credit supply, we need exogenous variation in demand. In a similar fashion to Gorodnichenko and Schnitzer (2013), we rely on a negative liq-

uidity shock as an instrumental variable for credit demand. Liquidity shock is a binary variable equal to 1 if the firm experienced a loss due to spoilage, a power outage, or was asked to pay a bribe in 2015, and 0 otherwise.

More specifically, the loss due to power outages is obtained as follows: "Please estimate the losses that resulted from power outages either as a percentage of total annual sales or as total annual losses". The responses to this question are transformed into an indicator equal to 1 if the firm experienced any losses due a power outage, and 0 otherwise. We proceed analogously with the measure of losses due to spoilage. The common feature of these events is that they befall the firm. Though firms may differ in their susceptibility to such events, these differences arguably are absorbed by the firm-specific fixed effect.

5 Results

5.1 Financial inclusion

Entrepreneurial human capital is associated with financial inclusion. As shown in Table 2 that reports estimates of equation 2, firms where the education of the CEO increased between 2013 and 2016 are more likely to have opened a checking account during this period. Typically, an increase in managerial education is due to the change of the CEO. We therefore also control for changes in managerial experience, which likewise is associated with financial inclusion. At the same time, replacing a male CEO with a woman (or replacing a female CEO with a man) cannot explain whether the firm opened a bank account. Table 2 also shows that firms that operated informally before registering are less likely to become banked.

We do not find evidence that local intermediation capacity incentivises firms to engage with the banking system. Table 3 explores the relationship between local financial conditions and the probability that a firm opens a bank account between 2013 and 2016. We consider three different measures of credit supply and one measure for a demand shock. We do not find that the share of firms with a bank account in the neighbourhood of the respondent ("local financial inclusion") influences the decision to open an account between 2013 and 2016. Similarly, the share of neighbouring firms with a loan outstanding ("local financial intermediation") does not appear to play a major role either. In addition, our measure of crowding out is not statistically significant.

Similarly, a negative liquidity shock does not push firms toward the banking system. The last column of Table 3 explores whether demand for funds coming from a negative liquidity shock can lead firms toward opening an account. However, it turns out that a firm incurring losses due to spoilage, a power outage, or a request for a bribe

from a governmental official cannot explain financial inclusion. It appears likely that in times of need, unbanked firms turn to informal providers of finance.

In our context, the evidence on institutional quality is weak. The results in Table 4 exploit three different variables to proxy for the perceived quality of institutions. Political instability was most frequently mentioned as the top obstacle by Egyptian firms in both 2013 and 2016. However, the change in political instability over this period cannot explain the propensity of firms to open a bank account. At the same time, the change in the perception of the enforcement of property rights - which perhaps is to a greater extent a structural feature of the business environment than political instability - is positively associated with the decision to open a bank account. Nevertheless, another structural measure, namely the perception that the judiciary is fair and impartial, cannot explain financial inclusion. The same applies to perceptions of the speed at which the court system operates.

At least two reasons come to mind why in our context the results differ from those in Johnson et al. (2002). First, the phrasing of our questions is somewhat different. In Johnson et al. (2002), respondents are asked for the share of firms that respondents believe make extra-legal payments to government officials to obtain services, licenses, etc. Second, it may well be that perceived institutional quality affects the decision to register and become formal rather than the decision to open a bank account.

5.2 Credit constraints

In addition to structural features of the participation of firms in the financial system, we consider cyclical factors, such as whether firms report to be constrained in their access to credit. Table 5 indicates that our index of crowding out is associated with an increase in the prevalence of credit constraints between 2013 and 2016. Commercial banks, and in particular those owned by the government, supported the rapid rise of government debt instead of giving credit to firms in the private sector. As a result, we find that firms surrounded by branches of banks that invested more in government debt were more likely to be credit constrained.

Crowding out affects credit constraints mainly through discouragement. Credit constrained firms can fall into two categories: (i) firms that applied for a loan and were rejected; and (ii) firms discouraged from applying either because of unfavourable terms and conditions or because they did not think the application would be approved. The terms and conditions that discourage firms include complex application procedures, unfavourable interest rates, high collateral requirements, and insufficient size of loan and maturity. In Egypt, the vast majority of credit-constrained firms is discouraged; rejected loan applications are rare (EBRD et al., 2016). Accordingly, the second column of results in Table 5 shows that crowding out led to an increase in dis-

couraged firms, while the third column suggest that it did not affect the loan rejection rate.

Table 5 shows that firms with more educated CEOs were less likely to be credit constrained. However, while they are less likely to be discouraged, firms with more educated CEOs are more likely to report an increase in rejection. But overall, given that the relatively low share of firms that are rejected, this translates in a lower incidence of credit constraints for these firms. At the same time, firms that started informally before registering were more likely to be credit constrained. In the fourth column, we show that the firms that opened a bank account between 2013 and 2016 were less likely to report an increase in credit constraints.

In Table 6, we also consider the change in the demand for finance (by considering whether the firm reports to have a need for external finance) and how it affects credit constraints. To address the endogeneity issue between the need for finance and the credit constraints, we use an instrumental variable for the demand for finance: whether a firm reports it was affected by liquidity shock - more specifically. whether the firm experienced a loss due to spoilage, a power outage, or was asked to pay a bribe. We argue that these incidents affect credit constraints only through the demand for loan and the case of the exogeneity of the instrument is strong. The first column of Table 6 reports the estimates from the first stage regression and shows that liquidity shock is positively associated with the demand for finance. The F-test statistic (the squared-root of the t-test statistic in a just-identified model) is above 10, suggesting that the instrumental variable is not weak.

The second column of results in Table 6 reports 2SLS (two-stage least squares) estimates and shows that the change in the need for loans (instrumented with the liquidity shock) has a strong effect on the increase in credit constraints. As in Table 6, the index of crowding out is associated with credit constraints. But when we consider whether firms were discouraged or rejected, the third and fourth columns of Table 6 also indicate that discouragement is driving the relationship. In other words, crowding out is associated with an increase in discouragement but not in rejection.

The credit constraints regressions also control for the change in foreign ownership and exporter status. While the estimates are statistically significant in the OLS regressions, Table 6 clarify that these estimates reflect the higher demand for loans. Conditional on demand, exporters and foreign-owned firms are not more likely to be credit constrained.

The results hold for different variants of the crowding out index. In Table 7, we also use the instrumental variable strategy but use different measures of our crowding out index. While our standard measure consider the bank branches that are in a 10km radius around the firm, we also use alternative measures where we take into account 20 or 50 bank branches in the vicinity of the firm. The first column of results in Table

7 is identical to the specification in the second column of Table 6. The estimates in the second column (20 bank branches) or third column (50 banks branches) are very close. In the fourth column, we only consider the proximity of public banks (10km radius around the firm) and find that the results are qualitatively similar: crowding out is associated with an increase in credit constraints.

In principle, entrepreneurial human capital can affect financial inclusion via two main channels. The first channel operates via financial literacy. It may well be that more educated entrepreneurs are more comfortable dealing with banks and thus less likely to be discouraged by the procedural aspects of a loan application. The second channel concerns firm quality. To the extent that this channel matters, entrepreneurs with more human capital should run firms that on average are more attractive to banks. Table 8 compares the empirical salience of the two channels.

The results suggest that human capital does not work through financial literacy. The dependent variable in the first column of results in Table 8 is an indicator variable equal to 1 if the respondent did not apply for a loan because of complex application procedures, and 0 otherwise. These firms are a subset of the firm that are classified as discouraged. If entrepreneurial human capital would work via financial literacy, the measures of education and experience should have negative (and statistically significant) estimated coefficients. But this is not the case. At the same time, firms that started their operations informally are more likely to report increasing discouragement resulting from procedures.

Our measures of firm quality are associated with entrepreneurial human capital. The second column of results in Table 8 is based on an indicator equal to 1 if the firm has a website, and 0 otherwise. The third column looks at an indicator equal to 1 if the firm engaged either in process or product innovation during the previous financial year, and 0 otherwise. Finally, the dependent variable in the last column is equal to 1 if the firm reports having expansion plans, and 0 otherwise, but this last question is administered only to manufacturing firms. Consistent with the role of human capital in technology diffusion advance by Nelson and Phelps (1966) and Benhabib and Spiegel (1994), firms with a university educated CEO are more likely to have a website and to innovate. They are also more likely to have expansion plans.[8]

5.3 Beyond Egypt

To provide some external validity of our results that are based on a panel on Egyptian firms, we also use data from the Enterprise Survey on five other countries in the region: Jordan, Lebanon, Morocco, Palestine and Tunisia. For these countries, we can only use

[8]The 2013 wave of the Enterprise Survey contained questions on management practices. Unfortunately, these questions were not part of the 2016 edition. This is why we use the variables discussed above instead.

a cross-section of firms with data from 2013. Unlike in Egypt in 2016, there was no follow-up survey in the other countries of the region. We cannot look at changes in financial inclusion or credit constraints between 2013 and 2016 but consider the level in 2013. We find that the results of Table 9 (that do not include firms from Egypt) are qualitatively similar to those of Table 2. Managerial education (but not manager experience) is associated with financial inclusion, while firms that started their operations in the informal sector are less likely to have a checking account. Using cross-sectional data, we also find that younger and smaller firms are less likely to interact with banks.

In Table 10, we do not use an instrumental variable approach to take into account the need for external finance as in Table 6. Instead, we use a two-stage Heckman selection model and use the liquidity shock as an exclusion restriction. The estimates in the first column show that the liquidity shock is associated with the need for external finance. Our measure of crowding out is also associated with the demand for loans. The second column indicates that firms with a more educated or experienced manager are less likely to be credit constrained. The third column finds that this is driven by discouragement, while the fourth column finds that managerial education and experience are not associated with being rejected. However, and unlike in our panel of Egyptian firms, the crowding out index is not associated with credit constraints. This is likely to be due to the fact that, following the Arab Spring, the rapid increase in government bonds held by banks was much more significant in Egypt than in the other countries of the region.

6 Conclusion

For several reasons, Egypt can be considered as a useful laboratory to answer the following question: why are firms disconnected from the banking system? First, the informal economy accounts for a significant share of overall economic activity. Many firms in the formal sector in Egypt operate on a cash-only basis. They are excluded from the banking system *de facto*, even when they are formally registered.

Second, while informality and financial exclusion play a role in explaining the low demand for credit, crowding out due to higher government borrowing can also discourage firms to apply for bank loans. Following the uprisings of 2011, Egypt went through a difficult economic period. Output growth declined to levels barely above population growth. To assuage social pressures, the authorities increased spending and subsidies by relying on lending by domestic banks, which resulted in higher public debt levels. This may have reduced bank lending to the private sector.

This paper uses a new measure of crowding out to explore if cyclical and structural issues in the business environment affect the participation of Egyptian firms in

the financial system. In addition to bank balance sheet data, the measure exploits geographical information on the location of firms and bank branches to proxy crowding out. A firm that is surrounded by bank branches that invest more in government debt will score high on the crowding out index.

We find that crowding out reduce credit supply for firms in the private sector in Egypt. Firms surrounded by bank branches that invest more in government debt are more likely to be credit constrained and discouraged to apply for a loan. We also show that firms that started operating in the informal sector before registering are less likely to open a bank account. Firms with more educated and more experienced managers engage more with the financial system and are less credit-constrained.

We also consider other countries in the region, beyond Egypt, as many firms operating in the formal sector in MENA do not have a checking account. They have adjusted production strategies to an environment where borrowing from a bank is not an option and are disconnected from the financial system. The results of this paper suggest that while crowding out affect the cyclical demand for loans of firms that have a bank account, it does not have a strong impact on the structural issue of the large share of firms that are completely disconnected from the financial sector, in good times and bad times of the economic cycle. Instead, measures to improve the business environment and the financial literacy of firms' managers may help improve financial inclusion in the region.

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Figures and Tables

Figure 1: Financial inclusion in Egypt and the MENA region

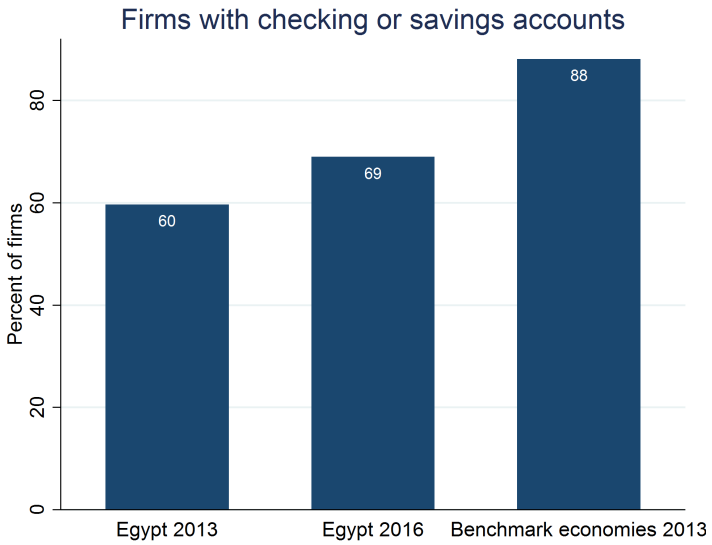


Figure 2: Median number of employees, by firm age and account status

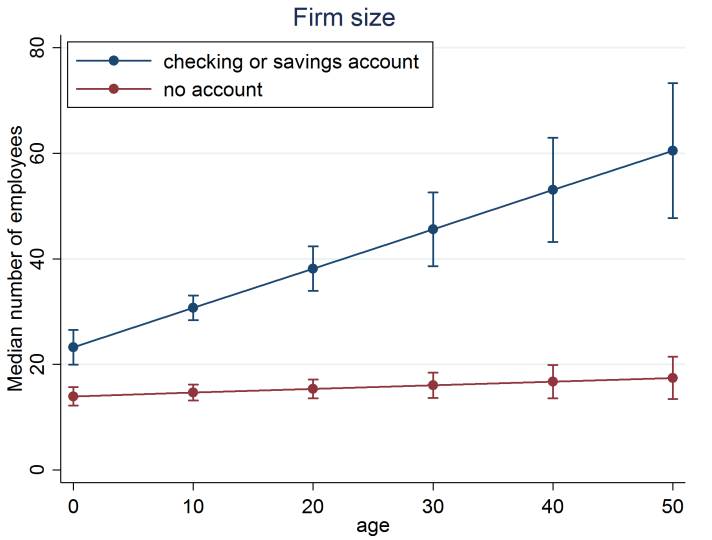
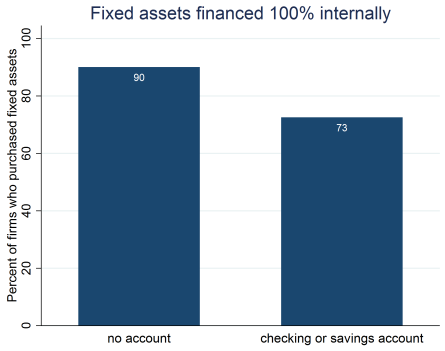


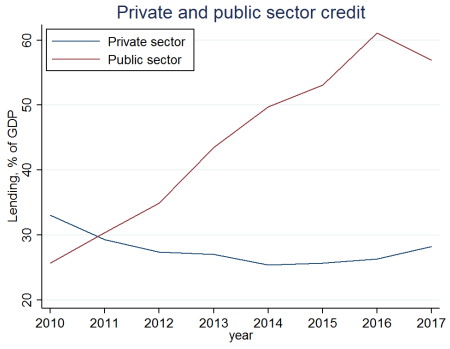
Figure 3: Financial inclusion and investment

(a) Financially excluded firms are less likely to invest

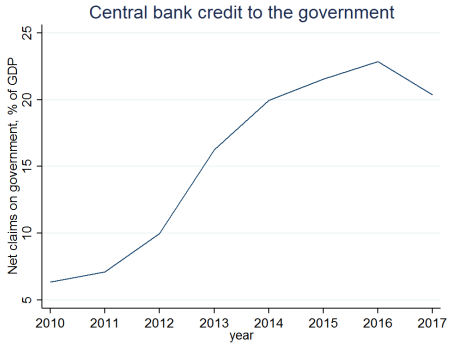


(b) Investments of unbanked firms depend on internal finance

Figure 4: Government borrowing from local banks in Egypt in 2010-2017



(a) The government borrowed heavily from public banks



(b) Public debt was partly monetized by the Central Bank

Figure 5: Credit constraints in MENA

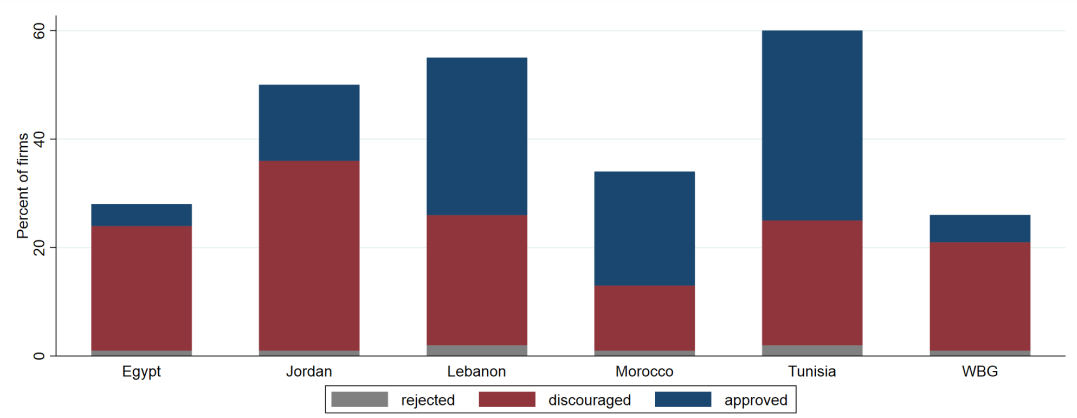
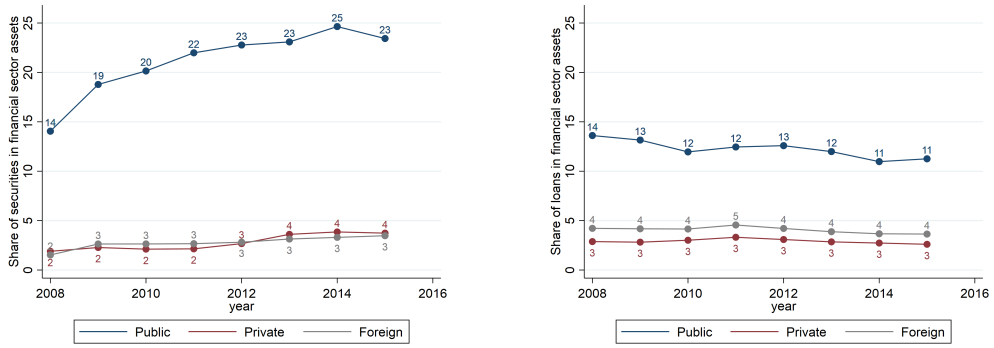


Figure 6: Securities and loans of banks in Egypt in 2010-2017

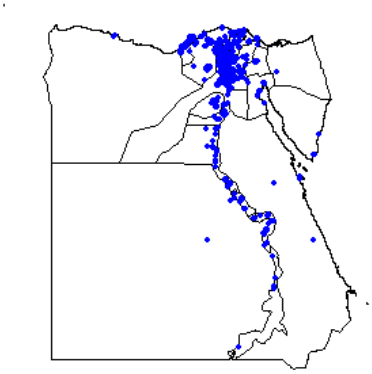


(a) Public banks increased their holdings of securities

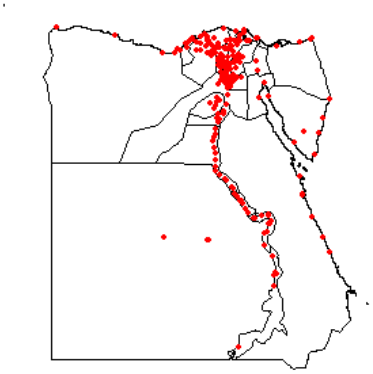
(b) Lending by public banks to the private sector slightly decreased

Figure 7: Spatial distribution of bank branches in Egypt

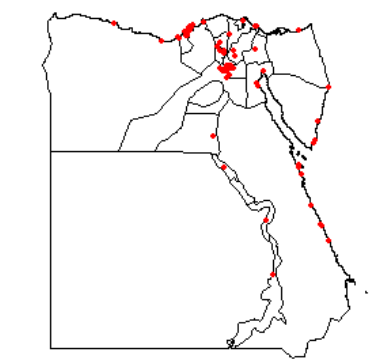
(a) Sample firms



(b) Public banks



(c) Private banks



(d) Foreign banks

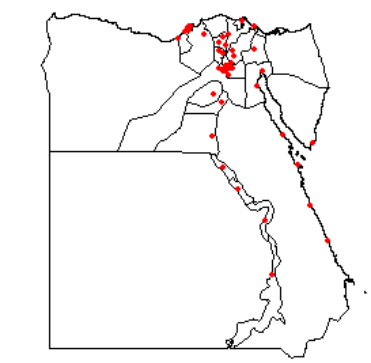


Table 1: Descriptive statistics

	Level in 2013		Δ 2016-2013	
Variable	Mean	SD	Mean	SD
Account	0.66	0.47	0.07	0.55
Credit constrained	0.24	0.43	-0.01	0.57
Discouraged	0.23	0.42	-0.01	0.57
Rejected	0.01	0.11	0.00	0.14
Need	0.30	0.46	0.01	0.61
CEO university education	0.81	0.39	0.00	0.45
CEO experience	21.26	12.26	0.00	1.00
CEO female	0.05	0.22	0.00	0.25
Local financial inclusion	0.71	0.20	0.05	0.21
Local financial intermediation	0.11	0.12	0.00	0.17
Crowding out index	0.95	0.80	2.13	0.37
Political instability	0.79	0.41	0.02	0.57
Property rights enforced	0.55	0.50	0.04	0.70
Courts impartial	0.57	0.49	-0.05	0.68
Courts quick	0.27	0.45	-0.01	0.64
Ownership	0.08	0.27	-0.01	0.32
Exporter	0.11	0.32	0.03	0.37
Audit	0.77	0.42	0.05	0.53
Procedures	0.07	0.26	0.03	0.38
Website	0.50	0.50	0.04	0.54
Innovator	0.29	0.45	-0.16	0.52
Expansion	0.77	0.42	-0.20	0.61
Initially informal	0.08	0.27		

Table 2: Financial inclusion and managerial characteristics

	(1)	(2)	(3)	(4)
Δ CEO university education	0.127**			0.142**
	(0.06)			(0.06)
Δ CEO experience		0.037*		0.047**
		(0.02)		(0.02)
Δ CEO female			-0.034	-0.024
			(0.08)	(0.09)
Initially informal	-0.153**	-0.170**	-0.157**	-0.168**
	(0.07)	(0.07)	(0.07)	(0.08)
Sample size	612	598	614	597
R^2	0.06	0.06	0.05	0.07

Variables with a Δ prefix are given by the first difference between the 2016 and the 2013 wave of the Enterprise Survey. The dependent variable is given by Δ account, where account is an indicator equal to 1 if the firm has a checking or savings account, and 0 otherwise. Robust standard errors are reported in parenthesis. All specifications include controls for firm size, firm age, sector and governorate-level fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

Table 3: Financial inclusion and financial system characteristics

	(1)	(2)	(3)	(4)
Local financial inclusion	-0.087			
	(0.13)			
Local financial intermediation		-0.064		
		(0.15)		
Crowding out index			-0.030	
			(0.03)	
Liquidity shock				0.052
				(0.05)
Δ CEO university education	0.124**	0.129**	0.104*	0.143**
	(0.06)	(0.06)	(0.06)	(0.06)
Δ CEO experience	0.050**	0.052**	0.042*	0.045**
	(0.02)	(0.02)	(0.02)	(0.02)
Δ CEO female	-0.037	-0.033	-0.035	-0.024
	(0.09)	(0.09)	(0.09)	(0.09)
Initially informal	-0.121	-0.108	-0.103	-0.168**
	(0.07)	(0.07)	(0.08)	(0.08)
Sample size	545	545	516	597
R^2	0.08	0.08	0.07	0.08

Variables with a Δ prefix are given by the first difference between the 2016 and the 2013 wave of the Enterprise Survey. The dependent variable is given by Δ account, where account is an indicator equal to 1 if the firm has a checking or savings account, and 0 otherwise. Local financial inclusion is given by the first difference of the share of firms with a checking or saving account among 20 sample firms closest to the respondent. Local financial intermediation is constructed analoguously, but refers to loans outstanding. The crowding out index is computed according to equation 1. Liquidity shock is equal to 1 if the firm experienced a loss due to spoilage, a power outage, or was asked to pay a bribe in 2015, and 0 otherwise. Robust standard errors are reported in parenthesis. All specifications include controls for firm size, firm age, sector and governorate-level fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

Table 4: Financial inclusion and institutional quality

	(1)	(2)	(3)	(4)
Δ political instability	0.064			
	(0.04)			
Δ property rights enforced		0.005		
		(0.03)		
Δ courts impartial			-0.030	
			(0.03)	
Δ courts quick				-0.055
				(0.04)
Δ CEO university education	0.135**	0.142**	0.140**	0.142**
	(0.06)	(0.06)	(0.06)	(0.06)
Δ CEO experience	0.045**	0.047**	0.048**	0.047**
	(0.02)	(0.02)	(0.02)	(0.02)
Δ CEO female	-0.019	-0.024	-0.022	-0.015
	(0.08)	(0.09)	(0.09)	(0.09)
Initially informal	-0.174**	-0.168**	-0.174**	-0.168**
	(0.07)	(0.08)	(0.08)	(0.08)
Sample size	590	597	597	597
R^2	0.08	0.07	0.08	0.08

Variables with a Δ prefix are given by the first difference between the 2016 and the 2013 wave of the Enterprise Survey. The dependent variable is given by Δ account, where account is an indicator equal to 1 if the firm has a checking or savings account, and 0 otherwise. Robust standard errors are reported in parenthesis. All specifications include controls for firm size, firm age, sector and governorate-level fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

Table 5: Credit constraints: OLS estimates

	(1) Δ constrained	(2) Δ discouraged	(3) Δ rejected	(4) Δ constrained
Crowding out index	0.065**	0.062**	0.004	0.052*
	(0.03)	(0.03)	(0.01)	(0.03)
Δ CEO university education	-0.115*	-0.154**	0.038**	-0.097
	(0.06)	(0.06)	(0.02)	(0.06)
Δ CEO experience	-0.014	-0.035	0.021**	-0.011
	(0.02)	(0.02)	(0.01)	(0.02)
Δ CEO female	-0.095	-0.102	0.007	-0.098
	(0.09)	(0.09)	(0.01)	(0.09)
Δ ownership	0.187**	0.190***	-0.002	0.203***
	(0.07)	(0.07)	(0.01)	(0.08)
Δ exporter	0.169***	0.147**	0.022	0.196***
	(0.06)	(0.06)	(0.02)	(0.06)
Δ audit	-0.068	-0.059	-0.009	-0.051
	(0.04)	(0.04)	(0.01)	(0.05)
Initially informal	0.223**	0.186*	0.037	0.214*
	(0.11)	(0.11)	(0.03)	(0.11)
Δ account				-0.104**
				(0.05)
Sample size	521	521	521	516
R^2	0.10	0.10	0.06	0.11

Variables with a Δ prefix are given by the first difference between the 2016 and the 2013 wave of the Enterprise Survey. The crowding out index is computed according to equation 1. Robust standard errors are reported in parenthesis. All specifications include controls for firm size, firm age, foreign ownership, exporter status, whether the firm was audited, sector and governorate-level fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

Table 6: Credit constraints: IV estimates

	(1) Δ need	(2) Δ constrained	(3) Δ discouraged	(4) Δ rejected
Liquidity shock	0.213***			
	(0.06)			
Crowding out index	0.022	0.043***	0.040**	0.003
	(0.03)	(0.02)	(0.02)	(0.01)
Δ CEO university education	-0.083	-0.052**	-0.092***	0.040**
	(0.06)	(0.03)	(0.03)	(0.02)
Δ CEO experience	-0.002	-0.018	-0.038***	0.020**
	(0.02)	(0.01)	(0.01)	(0.01)
Δ CEO female	-0.154	0.023	0.013	0.010
	(0.09)	(0.07)	(0.07)	(0.02)
Δ ownership	0.222**	-0.003	0.003	-0.006
	(0.09)	(0.06)	(0.06)	(0.02)
Δ exporter	0.232***	-0.006	-0.025	0.018
	(0.07)	(0.05)	(0.05)	(0.02)
Δ audit	-0.067	-0.023	-0.015	-0.008
	(0.05)	(0.02)	(0.03)	(0.01)
Initially informal	0.225**	0.056	0.023	0.034
	(0.10)	(0.07)	(0.07)	(0.03)
Δ need		0.742***	0.726***	0.016
		(0.15)	(0.16)	(0.08)
Sample size	521	521	521	521
R^2		0.74	0.71	0.07

Column (1) presents first stage estimates where Δ need is instrumented with liquidity shock. Liquidity shock equals 1 if the firm experienced a loss due to spoilage, a power outage, or was asked to pay a bribe in 2015, and 0 otherwise. Columns (2)-(4) show second stage IV estimates. The crowding out index is computed according to equation 1. Variables with a Δ prefix are given by the first difference between the 2016 and the 2013 wave of the Enterprise Survey. Robust standard errors are reported in parenthesis. All specifications include controls for firm size, firm age, foreign ownership, exporter status, whether the firm was audited, sector and governorate-level fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

Table 7: Credit constraints: robustness

	(1)	(2)	(3)	(4)
Crowding out index	0.043***			
	(0.02)			
Crowding out index 20nn		0.045***		
		(0.02)		
Crowding out index 50nn			0.047***	
			(0.02)	
Public bank				0.212*
				(0.11)
Δ CEO university education	-0.052**	-0.051*	-0.052**	-0.051**
	(0.03)	(0.03)	(0.03)	(0.03)
Δ CEO experience	-0.018	-0.015	-0.018	-0.015
	(0.01)	(0.01)	(0.01)	(0.01)
Δ CEO female	0.023	0.021	0.019	0.028
	(0.07)	(0.07)	(0.07)	(0.07)
Δ ownership	-0.003	-0.004	0.001	-0.013
	(0.06)	(0.06)	(0.06)	(0.06)
Δ exporter	-0.006	0.002	0.001	-0.012
	(0.05)	(0.05)	(0.05)	(0.05)
Δ audit	-0.023	-0.023	-0.023	-0.025
	(0.02)	(0.02)	(0.02)	(0.02)
Initially informal	0.056	0.057	0.058	0.048
	(0.07)	(0.07)	(0.07)	(0.06)
Δ need	0.742***	0.744***	0.750***	0.778***
	(0.15)	(0.15)	(0.15)	(0.15)
Sample size	521	521	521	521
R^2	0.74	0.74	0.74	0.74

Variables with a Δ prefix are given by the first difference between the 2016 and the 2013 wave of the Enterprise Survey. The dependent variable is given by Δ constrained, where constrained is an indicator equal to 1 if the firm had a loan application rejected or was discouraged from applying in the first place, and 0 otherwise. Columns (1)-(4) show second stage IV estimates where credit demand is instrumented with liquidity shock. The crowding out index is computed according to equation 1. Column (1) reproduces the results from Column (2) of Table 6. Column (2) presents results on for a crowding out index based on the 20 bank branches closest to the respondents. Column (3) shows corresponding results for the closest 50 branches. Column (4) looks at the share of public bank branches in the 10km circle centered on the firm. Robust standard errors are reported in parenthesis. All specifications include controls for firm size, firm age, foreign ownership, exporter status, whether the firm was audited, sector and governorate-level fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

Table 8: Financial literacy and firm quality

	(1) Δ Procedures	(2) Δ Website	(3) Δ Innovator	(4) Δ Expansion
Δ CEO university education	0.004	0.086**	0.076*	0.153**
	(0.04)	(0.04)	(0.04)	(0.07)
Δ CEO experience	-0.012	0.007	0.014	0.025
	(0.02)	(0.02)	(0.02)	(0.03)
Δ CEO female	0.004	0.098	0.142	-0.067
	(0.06)	(0.07)	(0.09)	(0.17)
Initially informal	0.160***	-0.055	0.021	0.066
	(0.06)	(0.07)	(0.07)	(0.12)
Sample size	603	601	603	291
R^2	0.04	0.05	0.05	0.10

Prrocedures equals one if the respondent did not apply for a loan because of complex application procedures. Innovator equals one if the company engaged in either process or product innovation during the previous financial year. The expansion plan variable is available only for manufacturing firms, which explains the smaller sample size. Variables with a Δ prefix are given by the first difference between the 2016 and the 2013 wave of the Enterprise Survey. Robust standard errors are reported in parenthesis. All specifications include controls for firm size, firm age, sector and governorate-level fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

Table 9: Regional results: financial inclusion

	(1)	(2)	(3)	(4)
CEO university education	0.063***			0.063***
	(0.01)			(0.01)
CEO experience		0.000		0.005
		(0.01)		(0.01)
CEO female			0.010	0.001
			(0.02)	(0.02)
Initially informal	-0.094***	-0.090***	-0.106***	-0.079***
	(0.03)	(0.03)	(0.03)	(0.03)
Sample size	2285	2235	2285	2235
R^2	0.12	0.11	0.11	0.12

The dependent variable is given by Δ account, where account is an indicator equal to 1 if the firm has a checking or savings account, and 0 otherwise. Robust standard errors are reported in parenthesis. All specifications include controls for firm size, firm age, sector and country-level fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.

Table 10: Regional results: credit constraints

	(1) Need	(2) Constrained	(3) Discouraged	(4) Rejected
CEO university education	-0.043	-0.126***	-0.123***	-0.004
	(0.06)	(0.03)	(0.04)	(0.01)
CEO experience	-0.039	-0.051***	-0.053***	0.002
	(0.03)	(0.02)	(0.02)	(0.01)
CEO female	0.204	-0.007	-0.005	-0.001
	(0.14)	(0.07)	(0.08)	(0.03)
Crowding out index	0.095*	-0.020	-0.008	-0.011
	(0.05)	(0.04)	(0.04)	(0.02)
Initially informal	-0.028	0.031	-0.017	0.048**
	(0.10)	(0.06)	(0.06)	(0.02)
Sample size	2167	2167	2167	2167

Column (1) presents first stage estimates from a Heckman procedure, with liquidity shock excluded from the second stage. Liquidity shock equals 1 if the firm experienced a loss due to spoilage, a power outage, or theft, and 0 otherwise. Columns (2)-(4) show second stage Heckman estimates. The crowding out index is computed according to equation 1. All specifications include controls for firm age, firm size, foreign ownership, exporter status, whether the firm was audited, sector and country-level fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent levels respectively.