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SME Finance in Africa

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Abstract: This paper uses cross-country firm-level surveys to gauge access to financial services and the importance of financing constraints for African enterprises. We compare access to finance in Africa and other developing regions of the world, within Africa across countries, and across different groups of firms. We relate firms' access to finance to firm and banking system characteristics and discuss policy challenges.

JEL Codes: G2; G3; O55

Keywords: Sub-Saharan Africa; Banking; Small- and Medium-Sized Enterprises

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1. Introduction

The vast majority of firms around the world fall into the category of micro, small or medium-sized enterprises. In terms of enterprises, more than 95% fall into this category; but even in terms of employment in low and lower-middle income countries, more than 50% of employees work in companies with fewer than 100 employees (Ayyagari, Demirguc-Kunt and Maksimovic, 2011a). While SMEs thus constitute an important component of the private sector in the developing world, they report significantly higher obstacles to their operation and growth than large enterprises (Beck et al., 2006a). Among these obstacles, the lack of access to appropriate financial services, especially lending services, looms large.

Africa's financial systems are small, shallow and costly, with limited outreach. This is not just reflected in aggregate financial development indicators but also in firm- and household data gauging the use of formal financial services (Beck and Cull, 2014). However, financial systems in Africa have also seen dramatic changes over the past two decades, in market structure and stability. And there are enormous differences across the region, ranging from well-developed financial systems in middle-income countries, such as Mauritius and South Africa, to shallow banking systems offering only the most rudimentary financial services in impoverished countries like Central African Republic and South Sudan.

This paper surveys the state of SME Finance in Sub-Saharan Africa. We use Enterprise Survey data from the World Bank to explore cross-country and cross-firm variation in the use of financial services. We document lower use of financial services by firms inside than outside Africa and of smaller and younger firms. We use regression analysis to relate firms' access to finance to an array of firm and country characteristics and gauge whether these relationships are different inside and outside Africa. We also discuss several persistent and new challenges for SME Finance in Africa.

While a large literature has established a positive impact of financial deepening on economic growth and poverty alleviation, especially and foremost in developing countries (Levine, 2005), recent evidence using firm-level data has pointed to SME finance as an important channel. The literature has identified different channels through which financial development affects firm and, ultimately, aggregate growth. First, the availability of external finance is positively associated with the number of start-ups—an important indicator of entrepreneurship—as well as with firm dynamism and innovation (e.g., Aghion, Fally and Scarpetta, 2007; Ayyagari, Demirgüç-Kunt and Maksimovic, 2011b). Second, finance allows existing firms to exploit growth and investment opportunities, and to achieve larger equilibrium size (e.g., Beck, Demirgüç-Kunt and Maksimovic, 2006b). Finally, firms can safely acquire a more efficient productive asset portfolio where the infrastructure of finance is in place, and they are also able to choose more efficient organizational forms such as incorporation (e.g., Demirgüç-Kunt, Love and Maksimovic, 2006).

This paper also relates to a large literature on firms' financing obstacles. Following a seminal paper by Fazzari, Hubbard and Petersen (1988), a large body of empirical literature has emerged to estimate financing constraints of firms.¹ A firm is typically defined to be financially constrained if a windfall increase in the supply of internal funds results in a higher level of investment spending. This literature has mostly applied balance sheet data. Beck et al. (2006a), on the other hand, use firm-level survey data and find that older, larger, and foreign-owned firms report fewer financing obstacles. A growing literature has been using firm-survey data to explore country covariates of access to credit and firms' financing constraints, focusing, among others, on foreign bank entry (Clarke, Cull and Martinez Peria, 2006), legal system efficiency (Beck, Demirguc-Kunt and Levine, 2005) and regulatory frameworks (Beck, Demirguc-Kunt and Levine, 2006c).

¹ See Schiantarelli (1995) and Hubbard (1998) for surveys.

The remainder of this paper is structured as follows. Section 2 provides descriptive evidence on firms' access to financial services inside and outside Africa, the size gap in corporate finance and the importance of financing constraints. Section 3 presents regression analysis to gauge firm and country covariates of access to credit and differential effects inside and outside Africa. Section 4 discusses policy challenges for SME finance in Africa and section 5 concludes.

2. Enterprise access to finance in international comparison

The Enterprise Surveys of the World Bank Group allow a detailed exploration of variation in the use of financial services across firms with different characteristics. These surveys have been conducted over the past 10 years in over 100 countries with standardized survey instruments and a uniform sampling methodology.² The surveys try to capture business perceptions of the most important obstacles to enterprise operation and growth, but also include detailed information on companies' management and financing arrangements. Sample sizes vary between 250 and 1,500 companies per country and data are collected using either simple random or randomly stratified sampling. The sample includes formal enterprises of all sizes, different age groups, and different ownership types in manufacturing, construction, services, and transportation. Firms from different locations, such as the capital city, major cities, and small towns, are included.

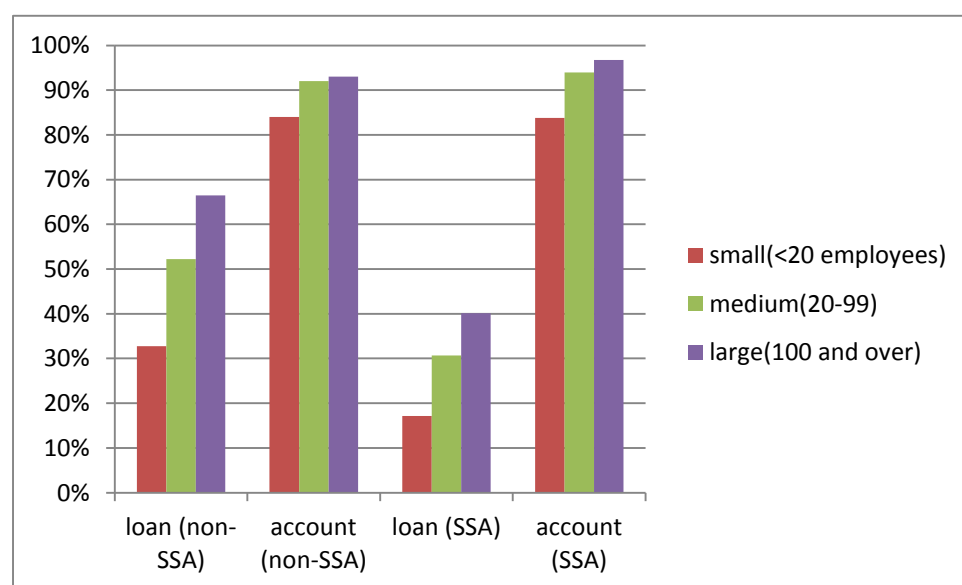
Figure 1 shows that the use of bank loans in Sub-Saharan Africa is lower than in other developing regions of the world.³ Across all three size groups (defined by the number of employees), enterprises within Africa are less likely to have a loan than those outside Africa,

² See www.enterprisesurveys.org for more details. Similar surveys were previously conducted under the leadership of the World Bank and other IFIs in Africa (Regional Project on Enterprise Development), the Central and Eastern European transition economies (Business Environment and Enterprise Performance Surveys) in the 1990s, and world-wide in 2000 (World Business Environment Survey).

³ Please note that in the following, we will use the expressions Africa and Sub-Saharan African interchangeably. We do not include North African countries in our analysis.

with large firms in Africa even less likely to have a loan than mid-sized firms outside Africa. In terms of having access to checking or saving account facilities, on the other hand, there is no significant difference between enterprises inside and outside Africa and only a small gap between small, mid-sized and large enterprises.

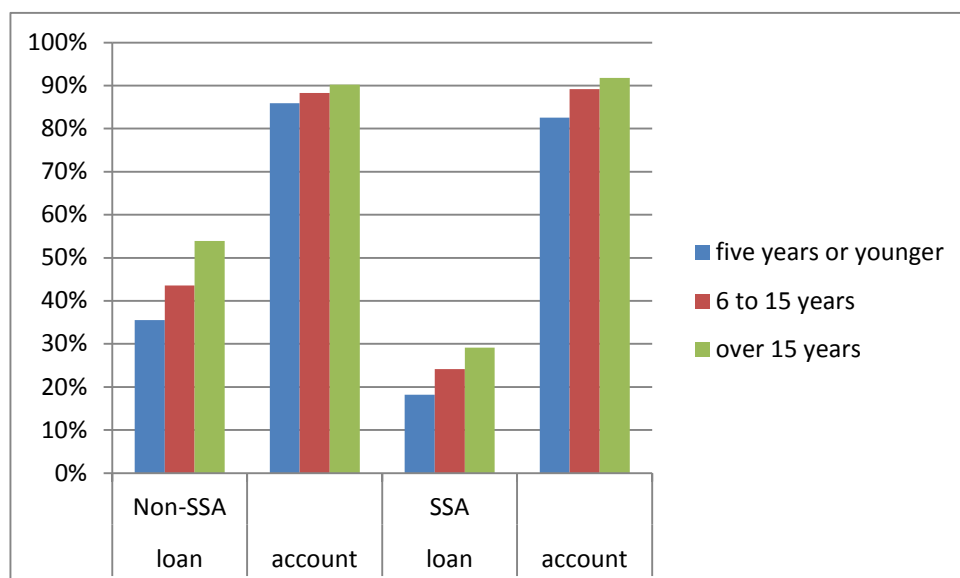
Figure 1: Use of formal account and loan services across firm size groups in international comparison



This graph shows the share of firms with a bank loan and a bank account across three size groups: small (fewer than 20 employees), medium (20 to 99 employees) and large enterprises (100 and more employees). Source: authors' calculations based on Enterprise Surveys (www.enterprisesurveys.org)

There is not only a gap in the use of lending services across firms of different sizes but also across firms of different ages, as illustrated in Figure 2. Older firms, defined as firms with more than 15 years of operation, are more likely to have a loan than firms with between 6 and 15 years of operation, which are in turn more likely to have a loan than enterprises with five or less years of operation. While these comparisons between African and non-African countries are illustrative, they do not control for other factors varying across countries. We will provide a more rigorous analysis in the next section.

Figure 2: Use of formal account and loan services across firm age groups in international comparison

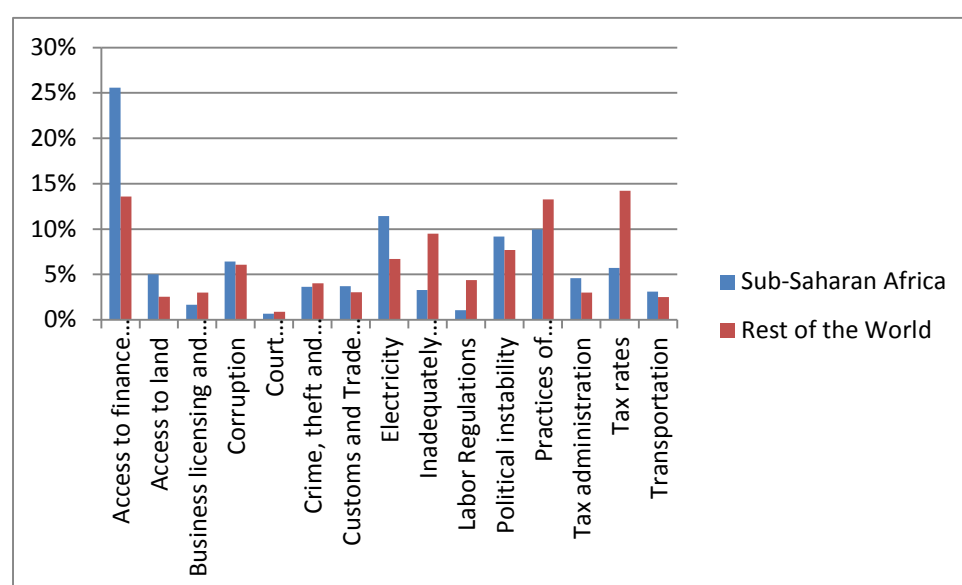


This graph shows the share of firms with a bank loan and a bank account across three age groups: young firms (five years or less since establishment), medium (6 to 15 years since establishment) and old (over 15 years since establishment). Source: authors' calculations based on Enterprise Surveys (www.enterprisesurveys.org)

While these two figures suggest an Africa factor in the access to external finance by enterprises, there is also a large within-regional variation across countries. While only three percent of enterprises in Guinea-Bissau have a formal loan, 53 percent do so in Mauritius. Many of the financially more developed economies also have a larger share of enterprises with a loan, although the relationship is not linear and there are many outliers. For example, in South Africa, often seen as one of, if not the, most developed financial systems on the continent, 34 percent of enterprises have a formal bank loan, while in Burundi, with a rudimentary banking system and a history of civil conflict, 35 percent have a formal bank loan. While the difference between the share of large and the share of small enterprises with a formal bank loan is 64 percent in Angola, it is close to zero in Eritrea. It is interesting to note that there is no significant correlation between the large-small enterprise gap and the overall share of enterprises with a formal bank loan across African countries.

Given the limited access to bank loans in Africa, it is not surprising that African enterprises are more likely to rate access to finance as the most important constraint to their operation and growth than enterprises outside Africa (Figure 3). More than 25 percent of firms in Africa rate availability and cost of finance as the most important obstacle, almost twice as many as outside Africa. Finance is also the most cited obstacle. As shown in previous work, access to finance is not only a self-reported obstacle, but turns into a growth constraint, especially for smaller firms and in more shallow financial markets (Beck, Demirguc-Kunt and Maksimovic, 2005) and is more binding than other constraints (Ayyagari, Demirguc-Kunt and Maksimovic, 2008).

Figure 3: Obstacles to Firms' Operation and Growth in International Comparison



This graph shows the growth obstacle noted as the most important one by firms in countries in Sub-Saharan Africa and outside Sub-Saharan Africa. Source: authors' calculations based on Enterprise Surveys (www.enterprisesurveys.org)

Enterprise survey data also allow an exploration of the reasons why enterprises do not have loans with formal financial institutions. Specifically, enterprises are asked for the reason that they did not apply for a loan with a formal financial institution over the past year. Table 1 shows the share of enterprises that quote lack of demand is significantly lower in

Africa (43%) than in other developing countries (62%), suggesting that lack of demand is a less important factor in Africa than elsewhere. High interest rates were also mentioned as a reason for not applying for loans (14% in Africa vs. 10% in other developing countries), which can have two interpretations. On the one hand, the return on investment projects could be too low in Africa. On the other hand, and as noted by many observers of African finance, the high cost of credit might impede the use of bank finance. As discussed above, interest rate spreads and thus lending rates are significantly higher in Africa than in non-African developing countries, which suggest that high costs are indeed a valid explanation for why credit is limited in Sub-Saharan Africa. Those high costs of credit can also be explained not only by the lack of competition noted above, but also by monetary and socio-political instability resulting in high risk premia.

The importance of monetary and socio-political stability can be appreciated when considering that the share of non-applicants due to high interest rates is especially high in DRC and Zimbabwe. Even more striking is the difference in the share of respondents indicating that application procedures are the reason for not applying: 16% of non-applicant enterprises in Africa as opposed to 7% in other developing countries. Collateral requirements also seem to be more of an impediment in Africa than in other regions of the developing world (9% vs. 4%), as is the need for bribes (4% vs. 2%). These data point to a large array of barriers both on the macroeconomic but also the bank-specific level for enterprises in Africa to access formal sources of external finance.

Do you have a loan?		
	yes	no
low/lower-middle-income countries Africa	16.52	83.48
low/lower-middle income countries ROW	28.64	71.36

↓

Did you apply for a loan?

Region	yes	no
Africa	27.76	72.24
Rest of the World	30.56	69.44

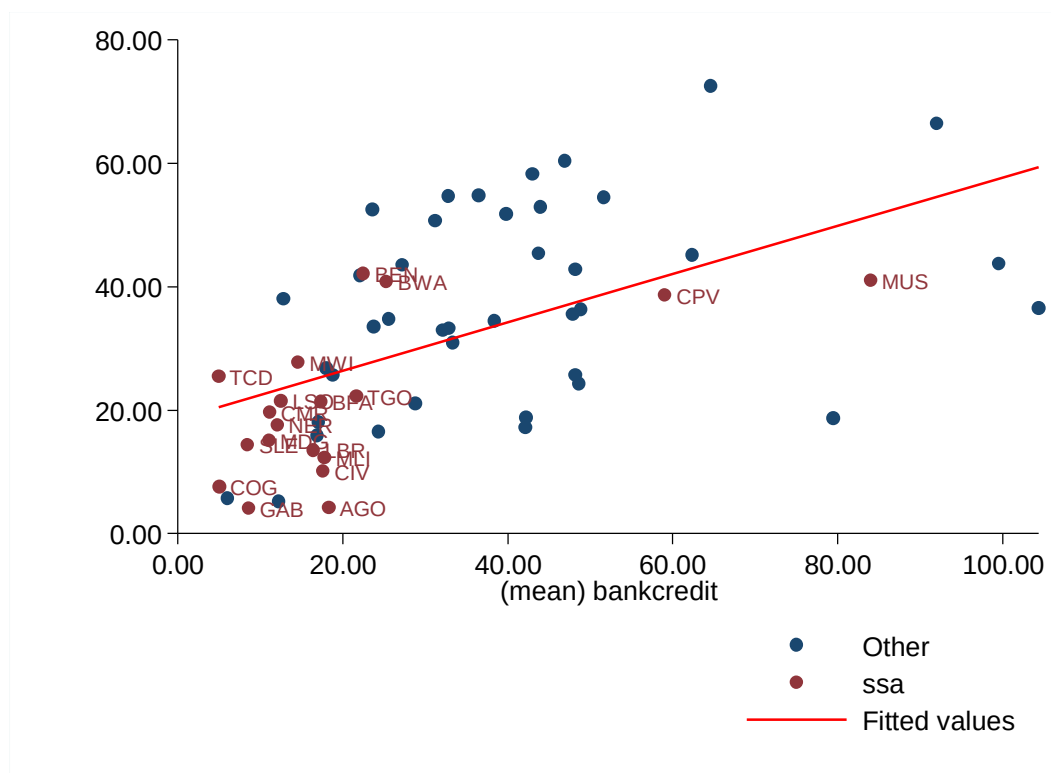
↘

Why did you not apply?

	Africa	Rest of the world
no need for a loan	43.24	62.22
application procedures are complex	15.91	7.05
interest rates are not favorable	14.03	10.27
collateral requirements are too high	9.01	4.28
size of loan or maturity are insufficient	2.05	1.15
necessary to make informal payments to	3.77	2.02
did not think it would be approved	7.76	7.10

How does the limited access of SMEs in Africa relate to the shallow financial markets documented in the literature (e.g., Beck et al., 2011; Beck and Cull, 2014)? Figure 4 plots the share of small firms with a formal bank loan against the total bank lending to the private sector relative to GDP, a standard indicator from the finance and growth literature. African countries are noted with their respective country codes. Figure 4 shows that while there is a positive correlation between financial depth and the share of small firms with a formal bank loan, almost all countries in Sub-Saharan Africa are below the regression line. That is, there are fewer small African firms with a formal loan than would be predicted by aggregate credit numbers.

Figure 4: Financial Depth vs. Outreach across the World



This graph shows the correlation between the Bank Credit to GDP and the share of small firms with a bank credit across countries. Source: authors' calculations based on Enterprise Surveys (www.enterprisesurveys.org) and the World Bank's Global Financial Development Indicators.

3. What explains access to finance by SMEs in Africa and elsewhere?

This section explores the covariates of the likelihood of having a loan from a formal financial institution. While the graphs in the previous section have shown that larger and older firms are more likely to have a formal loan and have provided evidence for an African gap in the use of finance by SMEs, firm size and age might be correlated with other firm characteristics and the “Africa gap” in corporate finance might reflect the variation in the composition of the firm population. The following regression analysis will allow us to isolate the firm characteristics that can explain the use of formal bank loans, gauge the existence of an African gap and assess whether the relationship between firm characteristics and access to

bank loans varies across firms inside and outside Africa.

A. Data and Methodology

We use an enterprise-level dummy variable from the Enterprise Surveys indicating whether a firm has a loan as the dependent variable in probit regressions that include an array of firm characteristics as well as country- and sector-specific variables. Specifically, we use the following probit regression, reporting marginal effects to gauge not only the statistical but also economic significance:

$$Loan_i = \alpha + \beta_1 FIRM_i + \beta_2 SECTOR_i + \beta_3 BANKING_j + \varepsilon_{ij} \quad (1)$$

where *Loan* is the aforementioned dummy variable and *FIRM* represents a set of variables that capture enterprise characteristics including size (small, medium, large), age, and ownership type (foreign, government, or private domestic). In line with the existing literature and the Figures in the previous section, we expect that larger and older firms are more likely to report that they have a loan. In the regressions that follow, large firm size is the omitted category and so we expect the coefficients for small and medium-sized firms to be negative and significant. We have less strong priors about the ownership variables. Government-owned firms might have greater access to loans in countries with state-dominated financial systems, but private domestic firms might have better investment projects and thus greater need for credit. Foreign firms might rely more heavily on alternative sources of funding, such as from their parent company, than on credit. Private domestic ownership is the omitted category in the regressions that follow. Again, we lack strong expectations about the sign of the coefficients for foreign and government ownership.

The firm-level characteristics also include a dummy variable indicating whether the principal owner of the enterprise is female, which we expect to have a negative coefficient based on the literature (Demirguc-Kunt, Klapper, and Singer, 2013). We also include dummy

variables describing each firm's organizational type (sole proprietorship, partnership, privately owned but not a sole proprietorship or partnership, and publicly traded). We expect that simpler organizational forms, such as sole proprietorships, might find it more difficult to establish credit histories and amass collateral that would enable them to borrow from external sources. However, publicly traded firms have access to capital markets, and thus might rely less on external credit despite greater organizational complexity than other ownership forms. The omitted organizational form is a category called "other" for firms that were not classified into one of the four types described above.

For models that include only firm-level characteristics as explanatory variables, we include country- and sector- fixed effects. We also cluster error terms at the country level to allow for correlation of error terms within but not across countries. In a second set of regressions, we replace country dummies with a dummy variable for countries in Sub-Saharan Africa to gauge whether there is a systematic difference in firms' access to external finance in- and outside the region. In a third step we include two country characteristics - the log of GNI per capita and population density – as explanatory variables. Richer economies typically have more developed financial systems and Allen et al. (2012) show the importance of low population density in explaining shallow financial markets in Africa. Finally, we interact the firm-level characteristics with a dummy for countries in Sub-Saharan Africa to gauge whether there are differences in the extent to which firm characteristics co-vary with the use of formal lending services in Sub-Saharan Africa relative to other developing regions. In this last set of regressions, we also include the dummy variable for Sub-Saharan Africa by itself.

A second part of the analysis incorporates banking sector characteristics as regressors to test whether specific features of African banking systems can account for the low levels of credit usage. Where reliable credit histories and collateral registries are underdeveloped, as in

much of Africa, banks must rely on alternative methods to manage credit risk and ensure repayment, and some types of banking systems may be better at this than others. For example, where credit registries do not exist, information about existing borrowers is exchanged informally among bank executives, which is, obviously, only feasible in small and concentrated banking systems with old-boys networks that in turn strengthen the oligopolistic nature of such banking systems. There is also a tendency towards personal and bank guarantees where real estate and mobile assets cannot serve as collateral. Long relationships between a financial institution, or even a specific loan officer, and the borrower can help overcome problems of information asymmetry and thus risk (Berger and Udell, 1995). Recently, a more nuanced view has been put forward that large and foreign banks could have an advantage relative to other institutions in financing SMEs through arms-length lending technologies, such as asset-based lending, factoring, leasing, fixed-asset lending, credit scoring, and centralized organizational structures (see Berger and Udell, 2006 and De la Torre, Martinez Peria and Schmukler, 2010).

The debate on relationship vs. transaction based lending techniques also has implications for which institutions can cater cost-effectively to SMEs. Relationship lending might be better done by small, community based financial institutions, while transaction-based lending is more cost-effectively done by large financial institutions that can exploit the necessary scale economies that investment in technology implies. In many developing countries, this debate has an additional dimension, as smaller banks are often owned by domestic shareholders, while large financial institutions are often foreign-owned. Using data for 91 banks across 45 countries, Beck, Demirguc-Kunt and Martinez Peria (2011) find that foreign banks are more likely to use transaction-based lending techniques and more centralized business models than domestic banks. However, they also show that foreign banks do not tend to lend less to SMEs than other banks. Beck, Ioannidou and Schäfer (2012)

show for Bolivia that foreign and domestic banks do indeed cater partly to the same clientele, but with different lending techniques; foreign banks' lending depends, however, on the existence of credit registries and effective collateral protection, an observation confirmed using cross-country analysis (Claessens and van Horen, 2014). It thus seems that both relationship and transaction-based lending techniques can be appropriate for SME lending and that both domestic and foreign-owned banks can cater to SMEs.

We therefore include in the regressions six banking sector variables that proxy for the prevalence of the alternative lending methods used by different types of banks. First, we include branch penetration per capita to capture the geographic outreach of the banking system, a pre-condition for relationship-based lending.⁴ Next, we include two variables that measure the shares of banking sector assets held by majority-foreign and majority-government owned banks, respectively. The omitted category in these regressions is therefore the share of banking assets held by private domestically owned banks. If the transaction-based lending techniques favored by foreign banks have expanded access to credit, we would expect a positive coefficient for the foreign bank asset share variable. At the same time, despite strong foreign bank presence in Africa, it seems more likely to us that the relationship lending methods practiced by private domestic banks remain more prevalent than the transaction-based methods, in which case foreign-owned bank share would have a negative coefficient. There is, in fact, some cross-country evidence supportive of a negative relationship between foreign bank presence and credit usage (Detragiache, Tressel, and Gupta, 2008). For the share of assets held by government banks, it has been argued that state-owned banks can promote wider access to credit, though supporting empirical evidence is difficult to come by (Cull and Martinez Peria, 2010). Moreover, after the wave of divestiture by African governments in the 1990s and early 2000s, fewer large state-owned banks exist,

⁴ We also considered alternative outreach indicators, including the number of loan accounts, but most of those had limited cross-country coverage.

and thus we would expect no strong relationship between government banks' asset shares and usage of credit.

A fourth banking sector variable is the share of assets held by the three largest banks in each country. We use this as a proxy for the prevalence of large banks that can potentially exploit the necessary scale economies to undertake transaction-based lending. At the same time, sector concentration could merely reflect a less competitive lending environment, and the extent to which large banks are currently pursuing transaction lending to previously underserved market segments is unknown, and so the coefficient for this variable could be either negative or positive. Finally, we include two variables that measure banking sector efficiency: the ratio of overhead costs to total banking assets and the net interest margin. Relationship lending is typically more costly per dollar lent than transaction-based approaches, which is reflected in higher interest margins. These variables can therefore be seen as proxies for the prevalence of relationship lending. Depending on whether relationship or transactions-based approaches are more effective at expanding credit usage, the coefficients for these variables could be positive or negative. At the same time, within Africa, it could be that relationship lending is far less efficiently pursued than in other regions, and that transaction-based approaches have been slow to take off. A negative coefficient for the overheads and interest margins variables would therefore be interpreted as a reflection of low credit usage stemming from an inefficient banking system.

The models that include country-level banking variables are similar to those that include only firm-level characteristics as explanatory variables in many respects. Both include sector fixed effects and error terms are clustered at the country level to allow for correlation of error terms across firms within a country. We also interact the firm-level characteristics with a dummy for countries in Sub-Saharan Africa to gauge whether there are differences in the extent to which those variables co-vary with the use of formal lending

services in Sub-Saharan Africa relative to other developing regions. One key difference, however, is that the models that incorporate banking variables cannot include country fixed effects because those variables tend to be time-invariant.

In a final set of regressions, we interact the banking variables with firm characteristics to test whether specific features of banking systems are associated with reduced credit usage for certain types of firms. For example, concentrated financial systems might imply less credit usage among informationally opaque small firms. We conclude by allowing those interactions to have different coefficients for Africa than for the rest of the developing world. This enables us to test whether relationships between banking characteristics, firm characteristics, and credit usage are less (or more) pronounced in Africa.

B. Regression Results

The results in Table 2 indicate that smaller firms are around 30 percent and medium-size firms 13 to 14 percent less likely to have a formal loan than large firms. We also find that foreign-owned firms are about eight percent less likely to have a formal loan, presumably because they have access to internal funding within the multinational enterprise.

Government-owned firms are also less likely to use formal lending than other firms. Older firms are more likely to have a formal loan. There is also some evidence that firms organized as partnerships and sole proprietorships, the simplest organizational forms, are less likely to have a formal loan. All of these results for the firm characteristics variables are in line with the literature and our hypotheses. All columns include sectoral dummies, with error terms clustered at the country level to control for omitted variables leading to correlation among error terms. While column 1 contains country fixed effects, we replace them in column 2 with a dummy for Sub-Saharan Africa, which enters negatively and significantly at the one

percent level. The coefficient estimate indicates that even after controlling for firm characteristics, African firms are 19 percent less likely to have a bank loan.

In column 3, we include dummy variables for all six World Bank regions as well as two time-variant country variables, the log of GNI per capita and population density. We find that firms in more densely populated countries are more likely to have a bank loan, while the income level is not significantly associated with the likelihood of having a loan. We also find that compared to the Latin America and Caribbean region (the omitted region), firms in South Asia, North Africa and the Middle East, and Europe and Central Asia are less likely to have a bank loan, with the effect even stronger for North Africa and the Middle East than for Sub-Saharan Africa.

The results in column 4 of Table 2 indicate that some of the firm characteristics are related to firms' access to finance in a different manner within Africa than outside. Here, we interact the firm characteristics with the dummy variable for Sub-Saharan Africa to test whether those characteristics relate to formal credit usage differently in Africa than in other developing regions. Coefficients for most of the firm characteristics, which now summarize relationships outside Africa, are similar to those in models 1 and 2. Small-, and medium-sized, and foreign- and government-owned firms are significantly less likely to have loans. The interactions for the age and firm size variables with the Africa dummy variable are insignificant, indicating that the same relationships hold in Africa as elsewhere. The interaction between the Africa dummy and foreign ownership is positive and significant, and of similar size as the negative coefficient for the foreign ownership variable. This suggests that foreign ownership reduces the likelihood of having a formal loan, though this effect is not significant in Africa as indicated by the p-value for the sum of the two coefficients at the bottom of the table. While privately owned firms (that are not sole proprietors or partnerships) are more likely to have access to external finance outside Africa, they are less

likely to have access to external finance in Africa as the sum of the positive level and negative interaction effects is negative (though insignificant). Sole proprietorships are less likely to have access to external finance in- and outside Africa, with the effect being stronger in Africa, as indicated by the negative and significant interaction term.

While the female manager dummy does not enter significantly by itself, its interaction with the Africa dummy enters positively and significantly. P-values at the bottom of the table show that the sum of the female manager coefficient and its interaction with Africa is significantly greater than zero, indicating that female-managed firms are also more likely to have credit than male-managed firms in Sub-Saharan Africa. These findings are somewhat consistent with results documented by Aterido, Beck and Iacovone (2013) using the same data source for African countries, who did not find any significant relationship between female ownership or management and access to credit. They explain their findings with differences in key characteristics and a potential selection bias – enterprises with female ownership participation are smaller and younger, and female entrepreneurs are less likely to run sole proprietorships than men. Furthermore, such firms are more likely to innovate and more prevalent in sectors that tend to rely less on access to external finance.

The results in Table 3 show a negative relationship between banking system inefficiency and firms' access to external finance. Here we include, one by one, six different indicators of banking system development. We do not find any significant relationship between firms' access to external finance and branch penetration, ownership structure or concentration of banking systems. We find negative and significant coefficients on both indicators of banking system inefficiency, overhead costs to total assets and the net interest margin. In line with our discussion above and noting the high overhead costs and net interest margins across Africa, these results suggest that (i) inefficient banking systems reduce access of African firms to external finance and (ii) relationship lending is still used across most of

Africa and the resulting high costs are related to limited access to external finance by enterprises. Our previous findings on firm characteristics and their interaction with the Africa dummy and the two other country characteristics (average income level and population density) are confirmed in Table 3.

In our final set of regressions in Table 4, we include interactions between banking variables and firm size and we allow their effects to differ for African firms. This enables us to examine whether specific banking sector characteristics have differential relationships with the credit usage of small and medium-sized firms in Africa. All models in Table 4 control for the same firm characteristics (and their interactions with the Africa dummy variable) as in Tables 2 and 3, though we do not show all of those coefficients to conserve space. As only overhead costs to total assets and the net interest margin entered significantly in Table 3, we focus on these two variables. The negative coefficients for small- and medium-sized firms are very stable in both models, as is the negative coefficient on the Africa dummy. While the net interest margin enters negatively and significantly, the overhead cost variable does not enter significantly by itself. However, we find significant and negative interaction terms between the small and medium-sized firm dummies and overhead costs, indicating that bank inefficiency is negatively associated with SMEs' access to external finance. None of the other double interaction terms enters significantly nor the triple interaction terms between firm size dummies, the Africa dummy and overhead costs. In the case of net interest margin, we find a positive and significant interaction term between the Africa dummy and the net interest margin, which is of similar size to the negative and significant coefficient on net interest margin. This suggests that in the case of Sub-Saharan Africa, there is no significant relationship between net interest margins and firms' access to external finance, unlike in other developing regions of the world.

In all, the regressions in this section suggest that while many of the same firm characteristics are associated with having formal loans in Africa as in other parts of the developing world, such as firm age and size, other relationships differ. Most notably, African female-managed firms appear to fare better in formal credit markets than both firms managed by females in other developing regions and those managed by African males. This could be because so few African firms are managed by women and those that survive are of high quality and because of the other selection biases described above. Firms organized as sole proprietorships and partnerships also appear to fare worse in Africa in formal credit markets than in other developing regions. On the other hand, there is no significant evidence that banking sector characteristics are more or less significant factors in explaining the lack of African firms' access to external finance than firms in non-African developing countries.

4. SME Finance in Africa – quo vadis?

The previous section provided a snapshot of firm and country characteristics that can explain access to bank finance by firms in Africa. Some of these findings relate directly to several on-going policy debates in the SME space. We will briefly review some of these recent developments and debates in this section.

A first important area, already referred to above is the lending techniques by banks in combination with the ownership structure of banking systems. While we did not find any significant relationship between foreign bank penetration and access to credit within Africa, a more granular view is needed. While the share of foreign-owned banks has further increased over the past twenty years, the composition of the foreign bank population has changed significantly, with a higher share of banks from other emerging markets, including from within Africa (Beck et al., 2011). These banks can bring expertise from similar markets with

them, while having the advantage of less organizational and hierarchical distance to their parent banks (Mian, 2006).

There are also specific transaction- and asset-based lending techniques that can be useful for catering to smaller and informationally more opaque companies. Leasing can be a prominent instrument for SME financing, especially for Africa. First, collateral requirements have been well documented as one of the main impediments that prevent African SMEs from accessing traditional forms of financing needed to acquire machinery and equipment. Leasing is asset-backed and its applications are often assessed based on the project's capacity to service lease payments. Accordingly, businesses and entrepreneurs that are denied traditional banking and commercial credit due to their lack of credit history and inability to provide sufficient guarantees can find a new financing alternative in the leasing market. This can also bring more businesses into the formal sector. Second, unlike bank credit, leasing directly provides the asset instead of financial resources needed to acquire it, which reduces the possibility to divert funds from their intended purposes. Leasing contracts involve less paperwork and more relaxed credit requirements as well, which leads to shorter waiting periods than for bank loans.

Similarly, factoring, the discounting of sales receivables, is attractive for small suppliers of large credit-worthy buyers, as it does not rely on information about the "borrower", but rather on the obligor (Klapper, 2006). Under a factoring contract, the factor purchases the seller's accounts receivable, with or without recourse, and assumes the responsibility to collect repayments. Originally limited to domestic contracts, international factoring has become popular as it eases the credit and collection burden created by international sales for exporters. Like leasing companies, factoring companies can only function with a legal framework governing these transactions, but they rely to a lesser extent

on the contractual framework of a country, so that they can help push a financial system towards the frontier of SME lending, even if this frontier is low.

A second important area is financial innovation, which includes new players and new products. While financial innovation has obtained a bad reputation in many developed financial systems, Africa critically depends on innovative activity by existing and new financial institutions. Transaction-based lending to SMEs can be seen as one such innovation. Other innovations include psychometric assessments as a viable low-cost, automated screening tool to identify high-potential entrepreneurs and evaluate risk and future potential, which have proven very successful in initial pilots in South Africa and other countries. Complementing credit services with other “extension-type” services, such as business development or entrepreneurial training can also be helpful. In general, taking a page from the microfinance lending manual might prove helpful in approaching smaller firms, which face not only financing but an array of other business constraints.

It is important to note that financial innovation does not arise by itself, but is a consequence of a competitive financial system with regulation that is not overly burdensome. It requires an open and flexible regulatory and supervisory approach that balances the need for financial innovation with the need to watch for fragility emerging in new forms. Such an approach has to take into account the unexpectedness of innovation, in terms of needs, technical possibilities and origin.

Throughout most of the paper, we have focused on bank financing, as Africa’s financial systems are heavily bank-based, in line with its level of economic and financial development and the small size of most financial systems on the continent. However, new providers, techniques and products might as well come from outside the banking system and bring competitive pressures on incumbent banks. Leasing and factoring, two financing techniques mentioned above, can be offered by banks, but also by specialized non-bank

financial institutions. Further, one important constraint on bank finance is the lack of equity in enterprises. High leverage can prevent enterprises from pursuing more debt, so that lack of equity rather than lack of debt is the binding constraint. On a more general level, equity can be a potentially beneficial financing source for enterprises in their early years and for enterprises with a high risk profile. On the other hand, there are few if any instruments and vehicles for equity finance available in most African countries. Increasingly, there are some equity funds across Africa that specialize in SMEs. Business Partners International (BPI) Kenya SME Fund is a private fixed-life fund established in 2006, which invests in equity, quasi-equity and debt of Kenyan SMEs and has been very successful, ultimately attracting external financing from donors and private sources. There are several Aureos Capital Funds, focusing on East, West and South Africa, respectively, set up with support from donors.

A fourth important topic concerns a more granular analysis of SMEs. It is important to distinguish between segments within this group of enterprises that have different financing needs and profiles. A large share of enterprises in Africa consists of informal microenterprises whose establishment is often the result of a lack of alternative economic opportunities. Not being able to produce formal financial accounts or formal guarantees, it is hard to see this segment of the enterprise population becoming bankable over the medium- to long-term, at least not for credit services. They seem a natural target group for microcredit institutions and rely more heavily than other enterprises on informal finance providers. A second segment is medium-sized enterprises, often well established and often export-oriented companies. In most cases they have access to bank finance, but struggle to get access to equity finance, including through financial markets. Finally, there are small formal enterprises, some of which might have high growth potential. These firms – often also referred to as the missing middle – are usually too big for microfinance institutions, but not

formal or established enough for banks. It is especially this last segment that seems to be affected by shallow financial markets.

Another important distinction, partly overlapping with the size distinction is that between subsistence or lifestyle entrepreneurs and transformational entrepreneurs. Many of the subsistence or lifestyle enterprises are set up out of lack of alternative employment options for the owner in the formal sector. They rely almost exclusively on the owner, maybe with support from family members and/or friends. Very different from these subsistence entrepreneurs are transformational entrepreneurs, who are often leading larger enterprises that create jobs, while microfinance clients are only rarely of the transformational kind. For long-term effects on aggregate growth and job creation, a stronger focus on transformational enterprises is therefore needed.⁵

The distinction between subsistence and transformational entrepreneurs is also important when assessing the impact of policy reforms. Bruhn (2013), for example, finds that easing the process of business registration in Mexico led to an increase of business registration among entrepreneurial types, but a decrease among wage earner type entrepreneurs who were rather more likely to become wage earners after the reform.⁶ Similarly, Aterido, Hallward-Driemeier and Pages (2009) show that the distinction between small and micro-enterprises can be a very important one. Using enterprise survey data across 90 countries, they show that small firms with more than 10 employees are negatively affected by an adverse business environment to a larger extent than micro-enterprises with fewer than 10 employees.

⁵ Among transformational enterprises, there is often a further emphasis on “gazelles”, enterprises with exceptionally high growth rates over longer periods.

⁶ These differential effects are similar to recent work in the area of microfinance, where different effects of access to credit have been documented depending on the characteristics of the borrower (entrepreneurial type or not). See, for example, Banerjee et al. (2009).

5. Conclusions and looking forward

This paper documented firm and country covariates of SMEs' access to finance across Africa. We showed that enterprises in Africa are less likely to have a loan than in other developing regions of the world. While many of the firm and country covariates explaining access to bank financing are similar inside and outside Africa, we also find some interesting differences.

We also pointed to continuing and new challenges in the SME financing space in Africa. In this concluding section, we discuss the implications for research. Over the past decade, an array of new data sources has enabled more rigorous research into SMEs' operational and growth obstacles. In addition to aggregate financial sector indicators, the Enterprise Survey Data we have drawn on heavily in this paper have enabled a more granular look by allowing for differentiation between firms of different size, age, ownership and geographic location. More recently, these surveys have also been undertaken as panels, i.e. with the same firms being surveyed in subsequent waves, rather than as repeated cross-sectional surveys, which provides additional insights and allows additional hypothesis testing. Country-specific surveys of SMEs undertaken in, among others, South Africa and Kenya that focus on financing issues can provide additional insights. As in other regions, bank-level surveys that provide insights into banks' operating constraints in specific markets and their lending techniques are becoming more popular and can provide additional important information, as for example reported by Berg and Fuchs (2013).⁷ As credit registries are being established and collecting an increasing amount of information on borrowers and loans, this information can be a critical input into research, as is being done for other low- and middle-income countries. These additional, micro-level databases will thus provide an

⁷ This is similar to a cross-country survey undertaken by Beck, Demirguc-Kunt and Martinez Peria (2011), country-specific surveys as reported in De la Torre, Martinez Peria and Schmukler (2010), and the EBRD's Bank Environment and Performance Survey (BEPS) for the former transition economies.

important impetus for further research. They can enable assessments of different lending techniques, delivery channels and organizational structures conducive to small business lending. They can also be used to gauge the impact of specific interventions or policy reforms.

A second important area is that of entrepreneurship. Behind the growth of firms are individuals with different levels of motivation, education and management skills. Understanding the characteristics of successful entrepreneurs, and the effects of social networks and education, is important. The gender issue has also become an increasing focus, with research moving beyond simple gender comparisons to exploring different socio-economic and psychological characteristics of female and male entrepreneurs, e.g. risk aversion, and their effects on access to and use of financial services and entrepreneurial performance. Another important area, connected to entrepreneurship, relates directly to behavioral economics. Experimental economics can give important insights into issues such as cooperation between entrepreneurs and network building.

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Table 2

The dependent variable is a dummy variable indicating whether the firm has a bank loan. P-values are in brackets. *, **, *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models are estimated via Probit model (reporting marginal effects). All models include Sector 1-15 control dummies (model 1 includes country dummies as well) although we do not present them to conserve space. Standards errors allow for clustering at the country level. In regional dummies, we are omitting Latin America and the Caribbean category. Foreign- and government-owned are dummy variables indicating foreign or government participation in ownership. Log of age is log of years since establishment. Small and medium size are dummies indicating firms with fewer than 20 and between 20 and 99 employees, respectively. Female manager indicates that the main manager of the firm is female. Partnership, Private (but not partnership or sole proprietorship), Sole (proprietorship) and Public (listed) are dummy variables indicating the legal status of the firm. The log of Gross National Income (GNI) per capita is measured in USD and population density is midyear population divided by land area in square kilometres.

Dependent variable		Loan			
		Basic	No country FE Add Africa dummy	No country FE Add Africa dummy, regional dummies, and country features	No country FE Add Africa dummy, regional dummies, and country features and interactions
		(1)	(2)	(3)	(4)
Firm	Foreign owned	-0.0848*** [0.000]	-0.0619*** [0.001]	-0.0806*** [0.000]	-0.1057*** [0.000]
	Government owned	-0.0345* [0.100]	-0.0781*** [0.006]	-0.0726* [0.081]	-0.0809** [0.042]
	Log of Age	0.0159*** [0.000]	0.0369*** [0.000]	0.0195** [0.021]	0.014 [0.182]
	Small size	-0.3073*** [0.000]	-0.2986*** [0.000]	-0.2929*** [0.000]	-0.2968*** [0.000]
	Medium size	-0.1388*** [0.000]	-0.1317*** [0.000]	-0.1267*** [0.000]	-0.1281*** [0.000]
	Female manager	-0.015 [0.162]	-0.017 [0.509]	-0.0075 [0.647]	-0.0221 [0.200]
	Partnership	-0.014 [0.585]	-0.0875* [0.052]	-0.0576* [0.077]	-0.0428 [0.287]
	Private	0.0275 [0.214]	0.0039 [0.902]	0.0233 [0.323]	0.0478* [0.067]
	Sole	-0.0305 [0.203]	-0.1072*** [0.002]	-0.0829*** [0.006]	-0.0306 [0.365]
	Public	-0.0148 [0.634]	-0.0889*** [0.003]	-0.0674** [0.044]	-0.0481 [0.196]
Regional dummies	Africa		-0.1898*** [0.000]	-0.2257*** [0.000]	-0.1742* [0.056]
	East Asia and Pacific			-0.082 [0.170]	-0.0911 [0.130]
	Europe and Central Asia			-0.0822* [0.080]	-0.0834* [0.082]
	Middle East and North Africa			-0.3068*** [0.000]	-0.3154*** [0.000]
	South Asia			-0.1838** [0.049]	-0.1940** [0.030]
Country features	Log of GNI per capita			0.0294 [0.134]	0.028 [0.152]
	Population density (%)			0.0003** [0.037]	0.0003** [0.019]
Interactions (Firm*Africa)	Foreign owned * Africa				0.0765** [0.011]
	Government owned * Africa				0.0884 [0.156]
	Log of Age * Africa				0.0125 [0.410]
	Small size * Africa				0.0099 [0.771]
	Medium size * Africa				-0.004 [0.904]
	Female manager * Africa				0.1095*** [0.005]
	Partnership * Africa				-0.0737 [0.275]
	Private * Africa				-0.0874* [0.088]
	Sole * Africa				-0.1639*** [0.004]
	Public * Africa				-0.0272 [0.685]
Observations		63222	63222	58871	58871
Pseudo R-squared		0.187	0.112	0.136	0.138
Number of countries		109	109	109	109
Number of African countries		41	41	41	41
Country Fixed Effects		Yes	No	No	No
Sector Fixed Effects		Yes	Yes	Yes	Yes

Banking sector variable in the regression	Basic	No country FE Add Africa dummy	No country FE Add Africa dummy, regional dummies, and country features	No country FE Add Africa dummy, regional dummies, and country features and interactions
<i>Testing the coefficients of H0s listed below</i>	(1)	(2)	(3)	(4)
Foreign owned + Foreign*Africa =0				[0.129]
Government owned + Govt*Africa =0				[0.957]
Log of Age + Log of Age*Africa =0				[0.022]
Small size + Small*Africa =0				[0.000]
Medium size + Medium*Africa =0				[0.000]
Female manager + Female*Africa =0				[0.013]
Partnership + Partnership*Africa =0				[0.032]
Private + Private*Africa =0				[0.355]
Sole + Sole*Africa =0				[0.000]
Public + Public*Africa =0				[0.164]

Table 3

The dependent variable is a dummy variable indicating whether the firm has a bank loan. P-values are in brackets. *, **, *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models are estimated via Probit model (reporting marginal effects). All models include Sector 1-15 control dummies although we do not present them to conserve space. Standards errors allow for clustering at the country level. In regional dummies, we are omitting Latin America and the Caribbean category. Foreign- and government-owned are dummy variables indicating foreign or government participation in ownership. Log of age is log of years since establishment. Small and medium size are dummies indicating firms with fewer than 20 and between 20 and 99 employees, respectively. Female manager indicates that the main manager of the firm is female. Partnership, Private (but not partnership or sole proprietorship), Sole (proprietorship) and Public (listed) are dummy variables indicating the legal status of the firm. The log of Gross National Income (GNI) per capita is measured in USD and population density is midyear population divided by land area in square kilometres. Branches commercial banks (per 100,000 adults) is the most recent available value, and % of Foreign owned banks and % of Government owned banks are) are the nearest available values to the year of the respective enterprise survey. Bank concentration is the assets of three largest banks as a share of assets of all commercial banks. Overhead costs is the average of overhead costs relative to total assets of all banks in a country and net interest margin is measured relative to total earning assets.

Dependent variable		Loan					
Banking sector variable		Branches, commercial banks (per 100,000 adults)	% of Foreign owned banks	% of Government owned banks	Concentration	Overhead costs / Assets ratio	Net Interest Margin
		(1)	(2)	(3)	(4)	(5)	(6)
Firm	Foreign owned	-0.1005*** [0.000]	-0.0956*** [0.000]	-0.0983*** [0.000]	-0.1095*** [0.000]	-0.1074*** [0.000]	-0.1071*** [0.000]
	Government owned	-0.0258 [0.593]	-0.0988** [0.037]	-0.0911* [0.063]	-0.0669** [0.045]	-0.0830** [0.034]	-0.0667* [0.064]
	Log of Age	0.0226 [0.102]	0.0137 [0.219]	0.0146 [0.178]	0.0134 [0.194]	0.0128 [0.232]	0.0099 [0.240]
	Small size	-0.3019*** [0.000]	-0.2981*** [0.000]	-0.2994*** [0.000]	-0.2983*** [0.000]	-0.2999*** [0.000]	-0.2980*** [0.000]
	Medium size	-0.1289*** [0.000]	-0.1264*** [0.000]	-0.1266*** [0.000]	-0.1302*** [0.000]	-0.1296*** [0.000]	-0.1299*** [0.000]
	Female manager	-0.0061 [0.745]	-0.0410*** [0.006]	-0.0357** [0.035]	-0.0206 [0.221]	-0.0235 [0.161]	-0.0269* [0.066]
	Partnership	-0.0228 [0.649]	-0.0727 [0.122]	-0.0765 [0.115]	-0.0514 [0.239]	-0.0432 [0.294]	-0.0257 [0.552]
	Private	0.0642** [0.042]	0.0374 [0.213]	0.0394 [0.181]	0.0537** [0.035]	0.0519* [0.051]	0.0518* [0.057]
	Sole	-0.0468 [0.169]	-0.0098 [0.800]	-0.0138 [0.727]	-0.0376 [0.276]	-0.0231 [0.504]	-0.0137 [0.685]
	Public	-0.0054 [0.875]	-0.0548 [0.207]	-0.0547 [0.203]	-0.0469 [0.218]	-0.041 [0.300]	-0.0461 [0.249]
Regional dummies	Africa	-0.0773 [0.566]	-0.1484 [0.154]	-0.1528 [0.130]	-0.1702* [0.060]	-0.1747* [0.057]	-0.2278*** [0.004]
	East Asia and Pacific	-0.0416 [0.634]	-0.1406** [0.013]	-0.1273** [0.013]	-0.1045* [0.099]	-0.0867 [0.174]	-0.1416*** [0.008]
	Europe and Central Asia	-0.0622 [0.386]	-0.0601 [0.270]	-0.0638 [0.221]	-0.0709 [0.141]	-0.0717 [0.147]	-0.0990** [0.015]
	Middle East and North Africa	-0.2847*** [0.000]			-0.3197*** [0.000]	-0.3196*** [0.000]	-0.3406*** [0.000]
	South Asia	-0.3081*** [0.000]	-0.1438 [0.110]	-0.1169 [0.262]	-0.2199** [0.011]	-0.1953** [0.029]	-0.2337*** [0.006]
Country features	Log of GNI per capita	0.0409* [0.094]	0.0315 [0.133]	0.032 [0.194]	0.0222 [0.264]	0.0278 [0.160]	0.0054 [0.820]
	Population density (%)	0.0003** [0.030]	0.0002 [0.242]	0.0002 [0.318]	0.0004*** [0.001]	0.0003** [0.037]	0.0003** [0.016]
Interactions (Firm*Africa)	Foreign owned * Africa	0.0317 [0.272]	0.0791** [0.010]	0.0710** [0.031]	0.0794*** [0.009]	0.0779** [0.010]	0.0838*** [0.003]
	Government owned * Africa	0.0191 [0.789]	0.122 [0.127]	0.1145 [0.163]	0.054 [0.380]	0.0931 [0.134]	0.0832 [0.148]
	Log of Age * Africa	0.0138 [0.434]	0.0083 [0.635]	0.0064 [0.710]	0.0137 [0.380]	0.014 [0.363]	0.0188 [0.140]
	Small size * Africa	0.0355 [0.454]	0.0101 [0.782]	0.0025 [0.949]	0.0087 [0.803]	0.0139 [0.687]	0.0186 [0.590]
	Medium size * Africa	-0.0032 [0.946]	-0.0097 [0.796]	-0.0158 [0.685]	-0.0049 [0.887]	-0.0041 [0.901]	-0.0019 [0.953]
	Female manager * Africa	0.0625 [0.104]	0.1375*** [0.002]	0.1302*** [0.007]	0.1073*** [0.009]	0.1132*** [0.004]	0.1099*** [0.004]
	Partnership * Africa	-0.0597 [0.537]	-0.0635 [0.425]	-0.0511 [0.537]	-0.0761 [0.284]	-0.0742 [0.279]	-0.0535 [0.446]
	Private * Africa	-0.0965 [0.286]	-0.0839 [0.165]	-0.0828 [0.175]	-0.1037** [0.044]	-0.0912* [0.077]	-0.069 [0.205]
	Sole * Africa	-0.1302 [0.128]	-0.2028*** [0.001]	-0.1891*** [0.005]	-0.1709*** [0.003]	-0.1701*** [0.003]	-0.1599*** [0.007]
	Public * Africa	-0.0957 [0.229]	-0.0597 [0.427]	-0.0546 [0.473]	-0.0341 [0.617]	-0.0345 [0.614]	0.0019 [0.978]
Banking sector variables	Branches (per 100,000 adults)	0.0018 [0.258]					
	% of Foreign owned banks (%)		-0.0006 [0.514]				
	% of Government owned banks (%)			-0.0007 [0.496]			
	Concentration (%)				0.0011 [0.284]		
	Overhead costs / Assets ratio (%)					-0.0013** [0.014]	
	Net Interest Margin (%)						-0.0194** [0.046]
Observations		36588	47975	47861	54700	57756	57756
Pseudo R-squared		0.134	0.131	0.131	0.139	0.138	0.144

Number of countries	59	75	74	88	102	102
Number of African countries	21	28	28	34	39	39
Country Fixed Effects	No	No	No	No	No	No
Sector Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Banking sector variable in the regression	Branches, commercial banks (per 100,000 adults)	% of Foreign owned banks	% of Government owned banks	Concentration	Overhead costs / Assets ratio	Net Interest Margin
<i>Testing the coefficients of H0s listed below</i>	(1)	(2)	(3)	(4)	(5)	(6)
Foreign owned + Foreign*Africa =0	[0.000]	[0.472]	[0.238]	[0.119]	[0.124]	[0.206]
Government owned + Govt*Africa =0	[0.894]	[0.785]	[0.769]	[0.744]	[0.919]	[0.770]
Log of Age + Log of Age*Africa =0	[0.003]	[0.114]	[0.125]	[0.025]	[0.021]	[0.005]
Small size + Small*Africa =0	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Medium size + Medium*Africa =0	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Female manager + Female*Africa =0	[0.102]	[0.033]	[0.033]	[0.019]	[0.012]	[0.020]
Partnership + Partnership*Africa =0	[0.323]	[0.039]	[0.052]	[0.025]	[0.033]	[0.162]
Private + Private*Africa =0	[0.682]	[0.365]	[0.410]	[0.250]	[0.360]	[0.703]
Sole + Sole*Africa =0	[0.027]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
Public + Public*Africa =0	[0.166]	[0.064]	[0.078]	[0.145]	[0.167]	[0.413]

Table 4

The dependent variable is a dummy variable indicating whether the firm has a bank loan. P-values are in brackets. *, **, *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models are estimated via Probit model (reporting marginal effects). All models include Sector 1-15 control dummies, Firm characteristics, other Regional dummies, Country features and Interactions of Firm characteristics & Africa, although we do not present them to conserve space. Standards errors allow for clustering at the country level. In regional dummies, we are omitting Latin America and the Caribbean category. Foreign- and government-owned are dummy variables indicating foreign or government participation in ownership. Log of age is log of years since establishment. Small and medium size are dummies indicating firms with fewer than 20 and between 20 and 99 employees, respectively. Female manager indicates that the main manager of the firm is female. Partnership, Private (but not partnership or sole proprietorship), Sole (proprietorship) and Public (listed) are dummy variables indicating the legal status of the firm. The log of Gross National Income (GNI) per capita is measured in USD and population density is midyear population divided by land area in square kilometres. Overhead costs is the average of overhead costs relative to total assets of all banks in a country and net interest margin is measured relative to total earning assets.

Dependent Variable		Loan	
Banking sector var		Overhead costs / Assets ratio	Net Interest Margin
		(1)	(2)
Africa	Africa	-0.1795*	-0.3505***
		[0.066]	[0.000]
Size	Small size	-0.2822***	-0.3117***
		[0.000]	[0.000]
	Medium size	-0.1197***	-0.1351***
		[0.000]	[0.000]
Banking sector	Overhead costs / Assets (%)	0.000	
		[0.812]	
	Net Interest Margin (%)		-0.0250**
			[0.029]
Banking sector * Size	Overhead costs / Assets * Small	-0.0028***	
		[0.000]	
	Overhead costs / Assets * Medium	-0.0013***	
		[0.000]	
	Net Interest Margin * Small		0.003
Size * Africa			[0.549]
	Net Interest Margin * Medium		0.001
			[0.694]
Size * Africa	Small * Africa dummy	0.028	0.078
		[0.672]	[0.301]
	Medium * Africa dummy	0.037	0.077
		[0.517]	[0.222]
Banking sector * Africa	Overhead costs / Assets * Africa	0.000	
		[0.969]	
	Net Interest Margin * Africa		0.0285***
			[0.007]
Banking sector * Size * Africa	Overhead costs / Assets * Small * Africa	-0.003	
		[0.762]	
	Overhead costs / Assets * Medium * Africa	-0.008	
		[0.334]	
	Net Interest Margin * Small * Africa		-0.010
Size * Africa			[0.298]
	Net Interest Margin * Medium * Africa		-0.012
			[0.146]
Observations		57756	57756
Pseudo R-squared		0.139	0.146
Number of countries		102	102
Number of African countries		39	39
Country Fixed Effects		No	No
Sector Fixed Effects		Yes	Yes

Banking sector variable	Overhead costs / Assets ratio	Net Interest Margin
<i>Testing the coefficients of H0s listed below</i>	(1)	(2)
Overhead + Overhead*Small =0	[0.001]	
Overhead + Overhead*Medium =0	[0.008]	
Net Interest Margin + Net Interest Margin*Small =0		[0.024]
Net Interest Margin + Net Interest Margin*Medium =0		[0.024]
Small + Small*Africa =0	[0.000]	[0.000]
Medium + Medium*Africa =0	[0.111]	[0.282]
Overhead + Overhead *Africa =0	[0.959]	

Net Interest Margin + Net Interest Margin *Africa =0	[0.636]
Overhead *Small + Overhead*Small*Africa =0	[0.543]
Overhead *Medium + Overhead*Medium*Africa =0	[0.259]
Net Interest Margin *Small + Net Interest Margin*Small*Africa =0	[0.394]
Net Interest Margin *Medium + Net Interest Margin*Medium*Africa =0	[0.159]