Unintended consequences of microfinance: Effects on credit access for small- and medium-sized enterprises

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Abstract
While competition in the financial system generally mitigates small- and medium-sized enterprises’ (SMEs) financing constraints, this paper theorises that competition by microfinance institutions (MFIs) has adverse effects through aggravating the ‘graduation problem’: Small firms outgrowing microfinance struggle to find financing as conventional financial institutions abstain from downscaling and developing suitable lending instruments for smaller firms if these market segments are narrowed down by upscaling MFIs. Using data from 51 countries between 2002 and 2015, microfinance is found to significantly lower SMEs’ access to credit. Credit bureaus can reverse this effect indicating that credit information infrastructure can reconcile a strong microfinance sector with functioning SME finance.

KEYWORDS
banks, competition, credit bureaus, financial sector development, microfinance, small and medium enterprises

1 | INTRODUCTION

Most of the firms in low- and middle-income countries (LMICs) belong to the segment of small- and medium-sized enterprises (SMEs). SMEs play a crucial role for national economies as they account for at least 50% of the formal workforce and significantly contribute to job creation (Ayyagari et al., 2014) as well as to economic growth, poverty
reduction and reduced income inequality (Beck et al., 2005). Yet the development and growth of many SMEs is restrained by institutional and market failures—most importantly by lack of access to finance, which disproportionately affects smaller and younger firms (Beck et al., 2008).

The main source of external finance for SMEs is institutional credit, i.e., loans from (formal) financial institutions. While competition in the formal banking system is generally found to mitigate financing constraints of SMEs (Carbó-Valverde et al., 2009; Ryan et al., 2014), increasing competition with the microfinance sector may negatively affect SMEs’ access to institutional credit. In their critique of microfinance, Bateman and Chang (2012) make the theoretical argument that funds are diverted from SMEs to microenterprises, which do not contribute much to aggregate economic development. Strong and upscaling microfinance institutions (MFIs) amplify what I refer to as the ‘graduation problem’. Successful small firms need to graduate to the conventional financial system, as MFI loans are commonly too small to fully meet the financing demands even of small SMEs. However, several obstacles hamper this graduation: In most LMICs, lending activities of MFIs are not recorded in credit bureaus such that MFI borrowers cannot build up a credit history. Moreover, conventional financial institutions already face many challenges in financing SMEs and may be further discouraged from downscaling and developing suitable lending instruments for smaller and more opaque firms if these market segments are narrowed down by upscaling MFIs. Hence, a strong microfinance sector may help to provide credit for poorer households and microenterprises but—as an unintended consequence—impede the access to external finance (of sufficient size) for (smaller) SMEs.

In order to investigate the extent to which microfinance affects (smaller) SMEs’ access to institutional credit, this study uses more than 56,000 firm-level observations from 51 countries—almost exclusively from LMICs. Building on the approach of Love and Martínez Pería (2014), I compute a within estimator and find a larger and more active microfinance sector to significantly lower the probability that SMEs have access to institutional credit. The findings are robust to various alternative specifications including an instrumental variable (IV) approach accounting for potential reverse causality issues (through interrelations between the conventional financial system and the microfinance sector). The effect is more profound for small firms with 10–19 employees and thereafter decreases with increasing firm size. Furthermore, it is shown that in regions where MFI loans are recorded at credit bureaus, the credit information infrastructure can reverse the negative effect and instead harness MFIs to improve SMEs’ access to loans. This suggests that adequate credit information infrastructure and reporting requirements may not only allow for functioning SME finance alongside a strong microfinance sector but may even improve efficiency of the financial system as firms graduate more smoothly from microfinance to (larger) loans at conventional financial institutions.

This paper contributes to various strands of the existing literature. One is the literature on competition between microfinance and commercial banks. Cozarenco (2015) shows that in Europe mainly emerging countries such as Romania and Serbia experience competition between microfinance and conventional banks, partly because regulations restrict microfinance in several high-income countries. Cross-country regression analyses by Cull et al. (2014) and Vanroose and D’Espallier (2013), who look primarily into LMICs, find that a better developed formal banking sector negatively affects loan sizes and profitability of MFIs. These findings suggest that MFIs are pushed to lower market segments by competition from downscaling banks. However, this is not necessarily the case: Country-specific evidence shows that MFIs in Madagascar react to the presence of commercial banks by increasing the average loan size and softening collateral requirements in order to be more attractive for potential clients from the (lower) SME segment (Baraton & Leon, 2021). This indicates that MFIs engage in competition with conventional financial institutions and that it is ultimately an empirical question who can prevail in these market segments.

The described strand of literature only investigates the impact of competition between microfinance and the conventional financial system from an MFI perspective. To the best of my knowledge, this paper is the first to analyse how competition with microfinance affects conventional financial institutions and their financing activities with regard to SMEs, which in turn influences firms’ access to institutional credit. Accordingly, this paper helps to assess microfinance more fully and to also bring forth hidden, unintended consequences of heavy investments into this sector. After all, MFIs use external funding from commercial banks to expand activities (e.g., Hermes et al., 2011; Isern & Porteous, 2005), and priority sector policies that target microenterprises potentially intensify such trends.
This study constitutes the first empirical investigation of Bateman and Chang’s (2012) argument that microfinance diverts funds away from SMEs to informal microentrepreneurs, which do not contribute much to aggregate economic growth, employment and productivity gains.

My work also makes a theoretical contribution by conceptualising three mechanisms as to how microfinance may affect SME financing activities by conventional financial institutions and may thus contribute to the graduation problem. The first mechanism is based on empirical evidence for competition between conventional financial institutions and MFIs (Baraton & Leon, 2021; Cull et al., 2014; Vanroose & D'Espallier, 2013). In line with the findings from Madagascar by Baraton and Leon (2021), it is argued that MFIs are able to engage in direct competition with downsizing banks. The second mechanism applies the theory of blockaded or deterred entry from industrial organisation (Tirole, 1988, Chapter 8): Conventional financial institutions may not find it profitable to pay the market entry costs, i.e., invest in new business strategies, new lending instruments and staff training, such that they are capable of serving smaller and more opaque firms, if these market segments are already narrowed down or occupied by MFIs. The last mechanism builds on literature on the outreach and growth of microfinance that records the usage of external funding from commercial banks in MFIs’ expansion (e.g., Hermes et al., 2011; Isern & Porteous, 2005). Hence, Bateman and Chang (2012) argue that banks reduce their SME lending, as it is often perceived as costly and risky, and instead invest these funds in MFIs, so that finance is diverted from SMEs to microfinance.

Finally, this paper is related to the strand of literature on the importance of credit registries and credit bureaus for SMEs’ access to finance. Empirical studies covering 24 countries in Eastern Europe and Central Asia (Brown et al., 2009) and 51 countries from all world regions and income levels (Love & Mylenko, 2003) show that the infrastructure for sharing credit information improves access to loans for SMEs and that smaller and more opaque firms benefit more. Using microdata from Rwanda, Agarwal et al. (2021) find credit information infrastructure to facilitate small firms’ graduation from microfinance to conventional financial institutions. The significance of my study is to provide first cross-country evidence for this effect. Since credit bureaus can mitigate and even reverse the negative effects of a strong microfinance sector on banks’ SME financing activities, these findings help to reconcile upscaling MFIs with functioning SME finance and can thus inform policy and decision makers in LMICs with a strong microfinance sector.

The rest of the paper is structured as follows. Section 2 examines the respective market segments of MFIs and conventional financial institutions through a literature review and descriptive analysis. Building on that, Section 3 develops a conceptual framework and hypotheses. Section 4 introduces the data, before Section 5 presents the regression model. Section 6 depicts the results along with robustness checks, and Section 7 summarises and concludes.

## 2 | FINANCIAL LANDSCAPE

Higher degrees of competition in the banking sector improve SMEs’ access to finance according to empirical evidence (Carbó-Valverde et al., 2009; Love & Martínez Pería, 2014; Mercieca et al., 2009; Ryan et al., 2014). Canales and Nanda (2012) find competition to be even more important for smaller banks, as they tend to offer more attractive terms to SMEs in competitive environments while cherry picking and restricting credit in case of market power. One important consequence of competition is that banks have started to downscale and distribute smaller loans. Baraton and Leon (2021) note that these developments are underresearched, even though they began as early as the 1990s in Latin America and have spread to other regions (Ferrari & Jaffrin, 2006). Competition in the banking sector along with government pressure and profitability considerations are identified as primary reasons for banks to move down into new market segments (Isern & Porteous, 2005; Subhanij, 2016).

Microfinance, on the other hand, has experienced an upscaling to higher value segments of the market. The evolution of microfinance from a donor-financed and NGO-led sector in the 1980s to a diverse landscape of legal entities with a wide range of financial services is well documented in the academic literature and often controversially discussed under the term ‘mission drift’ (Mersland & Strøm, 2010). Even sceptics of a general mission drift in
microfinance, however, acknowledge that individual MFIs do sacrifice some breadth of outreach (number of clients, share of female borrowers) and do increase average loan sizes in pursuit of higher profits (Cull et al., 2007; Mersland & Strøm, 2010). Upscaling and a rise in average loan sizes are closely related to institutional transformation of NGOs into financial entities (D’Espallier et al., 2017)—in a few cases even into full commercial banks (e.g., Prodem in Bolivia, Bhandhan in India and Microcred in Madagascar; see Baraton & Leon, 2021). These developments along with advancements in lending patterns, loan terms and expansion to new customers and market segments are spurred by competition in the microfinance sector (Baquero et al., 2018; De Quidt et al., 2018). Baraton and Leon (2021) further argue that the commercialisation of microfinance has also led several MFIs, which did not change their legal status, to react to the needs of higher value segments such as small firms by expanding loan sizes and maturities.

Consistent with these developments of simultaneously downscaling banks and upscaling MFIs, I find support for competition between these financial institutions over certain market segments. Analogous to analyses in microfinance, where average loan size is commonly used as a proxy for different income levels of customers (e.g., Cull et al., 2018), I use average loan sizes to examine whether MFIs and conventional financial institutions serve similar customer segments.3

Figure 1 visualises the results when the average loan size by MFIs to SMEs is set in relation to the average size of institutional credit given to firms of different size. Data are available for 30 of the 51 countries in my sample so that the descriptive analysis serves as an approximation. The box plot suggests that MFIs and banks could potentially compete over firms with less than 10 employees, where the size of MFI loans amounts to more than 10% of institutional credit in roughly two thirds of the countries and to more than 30% in more than a quarter of the countries. MFI loans are too small to be of interest for firms with 20 or more employees (firm-size categories 3–5), where even upper whiskers hardly reach 10%. The picture seems less clear for firms with 10–19 employees (second firm-size category). Yet the fact that only about a third of the countries surpasses the 10% threshold and only five countries the 30% threshold indicates that already for firms with 10–19 employees, MFI loans are too small in most countries. In short, MFIs and conventional financial institutions could compete over loans to firms with less than 10 employees, while only in very few countries MFIs offer loan sizes that are large enough to attract firms with 10 or more employees.4

**FIGURE 1** Average size of MFI loans to SMEs relative to average institutional credit by firm-size categories on the country level. Source: Author’s analysis based on data from MIX Market and Enterprise Surveys [Colour figure can be viewed at wileyonlinelibrary.com]
**CONCEPTUAL FRAMEWORK AND HYPOTHESES**

The findings from the descriptive analysis exhibit the first part of what I refer to as the ‘graduation problem’: There is a necessity for successful firms to graduate from microfinance to the conventional financial system. In most countries, MFI loan sizes are too small to fully meet the financing needs of firms with more than 10 employees.

The second part of the graduation problem is that there are several barriers that impede graduation from microfinance to conventional finance, two of which are highlighted here. The first barrier concerns poor reporting by MFIs to the national system for sharing credit information. Data from World Bank’s Doing Business show that in less than 30% of LMICs, MFIs reported to credit registries or credit bureaus in the late 2000s (Bustelo, 2009). Reporting slightly improved until 2015 (Chavez Sanchez et al., 2016): 60% of countries in Europe and Central Asia included MFIs into their credit reporting systems, 35% in the Middle East and North Africa, 34% in Latin America and the Caribbean, 32% in East Asia and the Pacific, and 25% in sub-Saharan Africa and South Asia each. Yet this means that in most countries, MFI loans are still not recorded in publicly available systems, in particular in regions with poorer countries, less developed financial systems and stronger microfinance. Hence, firms may have a credit history with their (former) MFI but cannot exploit this financial footprint to receive loans from conventional financial institutions.

The second barrier arises because—even in countries where MFIs report to the credit information systems—the conventional financial system may not necessarily be ready to provide follow-up finance for small firms trying to graduate from microfinance. After all, it requires suitable lending instruments to serve such firms that may still lack audited financial statements, collateral and other characteristics central to standard procedures of traditional credit assessment. Conventional financial institutions may abstain from developing lending instruments for smaller firms if—in addition to the general challenges and perceived risk associated with SME loans—the profitability is compromised by competition from upscaling MFIs as is elaborated in the following.

At least three potential mechanisms can be identified how competition by MFIs may undermine firms’ access to loans in the conventional financial system and thus amplify the graduation problem. The first is direct competition with MFIs. As described above, MFIs in many LMICs experienced favourable conditions for growth and commercialisation and moved up the market to also serve better-off households and small firms through increased average loan sizes and maturities (e.g., Baraton & Leon, 2021; Cull et al., 2007; D’Espallier et al., 2017; Mersland & Strøm, 2010). MFIs could develop a strong position and benefit as incumbents from extensive business experience in lending to these market segments, fine-tuned lending instruments and informational advantages from existing lending relationships. The findings from Madagascar (Baraton & Leon, 2021) may be interpreted as suggestive evidence that MFIs are able to stand their ground and potentially even curb the market share of downscaling banks in these market segments.

A second, indirect effect might be at work simultaneously in line with standard economic theory of industrial organisation about barriers to market entry. Potential market entrants face sunk costs when entering the market. Market entry is unprofitable if these sunk costs are too high (blockaded entry) or high enough so that incumbents can engage in (costly) strategic behaviour to make market entry unprofitable (deterred entry) (Tirole, 1988, Chapter 8). In the context of downscaling banks, entry costs are mainly comprised of development of new business strategies, new lending instruments and staff training in order to be capable of serving smaller and more opaque firms. With a dominant microfinance sector, conventional financial institutions may not find it profitable to invest in such new strategies and instruments, and as a result, they may abstain from entering these market segments (blockaded or deterred entry).

The third mechanism is concerned with diversion of funds from the conventional financial sector to microfinance. Insights from several countries confirm that MFIs use external funding from commercial banks to expand activities (e.g., Hermes et al., 2011; Isern & Porteous, 2005). National policies and schemes that channel funds into priority sectors often target micro and small enterprises as well and thus potentially aggravate the diversion of resources from conventional finance towards microfinance usage. One example for a relatively strict regulatory requirement is in India where banks have to lend at least 40% of their portfolio to the priority sector, which
includes micro and small enterprises (Banerjee & Duflo, 2014). In their critique of microfinance, Bateman and Chang (2012) argue that banks may consider investments in microfinance more profitable than providing SME loans. Hence, banks may use their limited funds to refinance MFIs rather than increasing their SME loan portfolio even though SMEs have a significantly higher potential to contribute to economic growth and development.

Combining the first part of the graduation problem (i.e., necessity of successful small firms to move from microfinance to conventional finance for sufficient loan sizes) with the three mechanisms outlining how competition by MFIs hampers SME finance by conventional financial institutions leads to my main hypothesis. It states that the (positive) direct effect of MFIs on institutional credit by supplying microloans is outweighed by the (negative) indirect effect of amplifying the graduation problem.

**Hypothesis 1.** A strong microfinance sector aggravates the constraints for SMEs to access institutional credit.

Smaller firms are likely to be more affected. Firms in the process of graduating from microfinance to the conventional financial system are the ones least likely to meet the usual prerequisites for a bank loan, i.e., to possess a credit history, audited financial statements, fixed assets as collateral, and the like.

**Hypothesis 2.** Smaller firms are more affected by the effects of the competition from the microfinance sector on SMEs’ access to institutional credit.

In line with the literature on commercialisation of microfinance, the effects from competition between banks and MFIs should be more severe for countries where the microfinance loan portfolio is dominated by for-profit MFIs (Cull et al., 2014). The reason being that profit-driven MFIs are more likely to offer larger loan sizes (D’Espallier et al., 2017) and thus to engage in competition with the formal banking system.

**Hypothesis 3.** Effects of the competition with the microfinance sector are more profound in countries where for-profit MFIs dominate the microfinance loan portfolio.

Credit information sharing schemes, on the other hand, should reduce the effects of a strong microfinance sector on banks’ SME lending activities. The reason is that they lessen information asymmetries by making data from firms’ former lending relationships available to other financial institutions where these firms may apply for follow-up finance. Country-level evidence from Rwanda indicates that this also facilitates the graduation from microfinance to conventional loans (Agarwal et al., 2021).

**Hypothesis 4.** Credit bureaus mitigate the effects of MFI competition on SMEs’ access to institutional credit.

4 DATA

The dataset was constructed by combining firm-, MFI- and country-level data from different databases of the World Bank, the two most important being the Enterprise Surveys (ES) for firm-level data and the MIX Market for microfinance data. The ES is a nationally representative firm-level dataset with repeated cross sections. Formally registered firms with five or more employees are interviewed using a standardised questionnaire that allows for cross-country comparison. The sampled firms primarily belong to the manufacturing and services sectors—firms from agriculture or finance are excluded. MIX Market constitutes the most comprehensive dataset on MFIs and is
commonly used in studies on microfinance (Cull et al., 2014, 2018; Mersland & Strøm, 2010; Vanroose & D’Espallier, 2013).

Since this study builds on the ES dataset, their definition of SMEs is adopted. I subdivide the category ‘small firms’ into very small (<10 employees) and small firms (10–19) and the category ‘medium-sized’ firms into smaller medium-sized (20–39) and larger medium-sized firms (40–99) to allow for a more nuanced analysis across SMEs. In particular, this categorisation enables an assessment of the graduation problem, as it comprises a sufficient number of firms in the relevant market segments (see Table 1): Almost 14 500 very small firms over which MFIs and banks may compete (see Section 2), almost 12 000 small firms facing the hypothesised graduation problem and roughly 10 000 smaller medium-sized and almost 9 000 larger medium-sized firms that should have grown beyond the graduation problem. On top of that, the sample is split relatively evenly across the five firm-size groups allowing for good estimates in every group. Three key variables in Table 1 underline that the firm-size groups behave as expected: access to loans, firm age and audited financial statements increase continuously towards the group of large firms.

Several observations had to be removed prior to the analysis, either due to missing data (country-year cases only appearing in ES or MIX Market; countries with only one time period—i.e. lacking within-country variation) or in order to exclude spurious variation from the analysis. For a very small set of countries, one or several leading MFIs stopped reporting such that the data show a sharp decline in MFIs’ gross loan portfolio on the national level that cannot be substantiated by struggles of the respective MFIs or the national microfinance sector.6 It was also confirmed that increases in the national MFI gross loan portfolio were not driven by MFIs starting to report to MIX Market during the study period.7

The resulting sample comprises 56 120 firm-level observations from 51 countries between 2002 and 2015 (for details, see Table S1). It is fairly balanced between low-, lower-middle income and upper-middle income countries but includes only two high-income countries. Table 2 reports the summary statistics. About 42% of firms have access to a loan or line of credit. The median firm size is 21 employees, which together with the 75th percentile of 65 employees indicates that most firms in the sample belong to the SME segment. The relative size of microfinance (gross loan portfolio of MFIs relative to private credit) ranges from 0.002% to almost 30% with an average (median) of 4.8% (2.9). Hence, the relative importance of microfinance varies widely across countries: In a few countries, it seems not to play any role, while in many countries, it accounts for a noteworthy share of overall private credit (especially when considering that both the number of loans and loan sizes tend to be much smaller in microfinance).

**Table 1** Distribution of firms across the five firm-size groups as well as mean and standard deviation (in brackets) of some key variables by firm-size categories

| Firm-size category | N   | Access to finance | Firm size (employees) | Firm age (years) | Fin. statements |
|--------------------|-----|-------------------|-----------------------|-----------------|----------------|
| Very small firms   | 14,498 | 0.238 (0.426) | 6.307 (1.688) | 14.409 (10.915) | 0.253 (0.435) |
| (1–9 employees)    |      |                   |                       |                 |                |
| Small firms        | 11,969 | 0.343 (0.475) | 13.640 (2.798) | 16.307 (12.329) | 0.343 (0.475) |
| (10–19 employees)  |      |                   |                       |                 |                |
| Smaller medium-sized firms | 10,212 | 0.435 (0.496) | 27.158 (5.509) | 18.348 (13.824) | 0.426 (0.495) |
| (20–39 employees)  |      |                   |                       |                 |                |
| Larger medium-sized firms | 8,717 | 0.532 (0.499) | 61.293 (16.950) | 21.154 (16.071) | 0.532 (0.499) |
| (40–99 employees)  |      |                   |                       |                 |                |
| Large firms        | 10,724 | 0.621 (0.485) | 447.969 (919.292) | 26.852 (21.028) | 0.715 (0.451) |
| (100 employees or more) |     |                   |                       |                 |                |
| Total              | 56,120 | 0.415 (0.493) | 104.603 (435.551) | 18.956 (15.561) | 0.436 (0.496) |

Source: Author’s analysis based on data from Enterprise Surveys.
| Variable                          | Obs.   | Mean   | Std. Dev. | Min  | p25  | p50  | p75  | Max  |
|----------------------------------|--------|--------|-----------|------|------|------|------|------|
| **Firm-level variables**         |        |        |           |      |      |      |      |      |
| Access to finance                | 56 120 | 0.415  | 0.493     | 0    | 0    | 0    | 0    | 1    |
| Loans for working capital/fixed assets | 51 781 | 0.401  | 0.490     | 0    | 0    | 0    | 0    | 1    |
| Financially unconstrained        | 36 876 | 0.549  | 0.498     | 0    | 0    | 0    | 1    | 1    |
| Firm size (employees)            | 56 120 | 104.603| 435.551   | 1    | 9    | 21   | 65   | 20 500|
| Firm age                         | 56 120 | 18.956 | 15.561    | 1    | 9    | 15   | 23   | 311  |
| Manufacturing                    | 56 120 | 0.600  | 0.490     | 0    | 0    | 1    | 1    | 1    |
| Exporter                         | 56 120 | 0.248  | 0.432     | 0    | 0    | 0    | 0    | 1    |
| Foreign-owned                    | 56 120 | 0.081  | 0.273     | 0    | 0    | 0    | 0    | 1    |
| Government-owned                 | 56 120 | 0.005  | 0.072     | 0    | 0    | 0    | 0    | 1    |
| Fin. statements                  | 56 120 | 0.436  | 0.496     | 0    | 0    | 0    | 0    | 1    |
| **Country-level variables**      |        |        |           |      |      |      |      |      |
| Relative size of microfinance    | 55 968 | 0.048  | 0.060     | 0.00002 | 0.003 | 0.029 | 0.064 | 0.293 |
| Lerner index                     | 53 477 | 0.290  | 0.113     | −0.018 | 0.230 | 0.274 | 0.329 | 1.072 |
| Priv. credit per GDP             | 56 120 | 0.387  | 0.247     | 0.039 | 0.198 | 0.336 | 0.503 | 1.119 |
| Legal rights index               | 56 120 | 5.802  | 2.448     | 0    | 4    | 6    | 8    | 10   |
| Bank branches                    | 56 120 | 14.301 | 15.514    | 0.505 | 4.531 | 8.598 | 17.791 | 92.045 |
| Credit bureau coverage           | 56 120 | 0.244  | 0.302     | 0    | 0    | 0.069 | 0.404 | 1    |
| GDP per capita                   | 56 120 | 4570.234 | 3882.296 | 223.404 | 1300.841 | 3077.315 | 6584.981 | 14 475.150 |
| Inflation                        | 56 120 | 0.062  | 0.049     | −0.013 | 0.028 | 0.054 | 0.081 | 0.306 |
| For-profit portfolio             | 55 968 | 0.637  | 0.350     | 0    | 0.376 | 0.768 | 0.941 | 1    |

Source: Author's analysis based on the data sources listed in the text.
5 | REGRESSION MODEL

To answer the central question as to what extent microfinance affects the access of SMEs to institutional credit, a within estimator is employed. The chosen linear probability model (LPM)\(^8\) builds on the approach of Love and Martínez Pería (2014), who study the effect of competition in the banking sector on firms’ access to finance. Their regression equation is nested in my own and augmented by the relative size of microfinance, by additional controls for firm characteristics and the lending environment, as well as by time dummies (see Table 3 for details):

\[
\text{access}_{i,c,t} = \beta (\text{relative size of microfinance})_{i,c,t-2} + \delta_1 (\text{firm characteristics})_{i,c,t} + \delta_2 (\text{lending env.})_{i,c,t-1} + \delta_3 (\text{macroeconomic env.})_{i,c,t-1} + \gamma_c + \gamma_t + \epsilon_{i,c,t}.
\]

The dependent variable access is captured by a dummy variable that is one if firm \(i\) in country \(c\) at time \(t\) has a line of credit or a loan from a financial institution (institutional credit) and zero otherwise. I deliberately include MFI loans in my outcome variable since it does not matter whether lending occurs from an MFI or a conventional financial institution as long as firms have access to affordable and sufficient finance.\(^9\)

The main interest lies in \(\beta\) as it measures the effect of microfinance on SMEs’ access to finance. The key explanatory variable, relative size of microfinance, is measured by the national gross loan portfolio of MFIs relative to private credit. Private credit to GDP is the standard variable for the size and activity of the formal financial sector (Beck et al., 1999) and the national gross loan portfolio of all MFIs (relative to GDP) is the equivalent for the microfinance sector. Setting these two variables in relation provides a measure of the size and activity of microfinance relative to the size and activity of the conventional financial sector. The variation in this variable largely stems from developments in the microfinance sector (within-country correlation between changes in the relative size of microfinance and the size of changes in MFI loans per GDP amount to \(r = 0.36\) \((r = 0.64)\) compared to \(r = -0.03\) \((r = -0.28)\) for private credit per GDP).\(^10\) I use within-country variation over time to estimate the effect. To isolate the effect from other confounding variables, the model controls for the influence that firm characteristics, the lending environment and the macroeconomic environment may have on access to finance (included variables along with their descriptions and sources are presented in Table 3). Unobservable differences between countries and time periods are controlled for by including country fixed effects \(\gamma_c\) and time dummies \(\gamma_t\).\(^11\) As in the underlying model by Love and Martínez Pería (2014), standard errors are clustered at the country-year level. In the robustness check, I cluster standard errors at the country level to account for potential bias in standard errors through serial correlation (Bertrand et al., 2004).

I assume that the measure for the relative size of the microfinance sector and the other country-level variables are exogenous from the dependent variable. Following Love and Martínez Pería (2014), I lag the country-level variables in order to lessen potential reverse-causality problems. In my analysis, however, the issue is aggravated by the fact the firms’ access to finance is probably related to the size and activity of the conventional financial system, which may, in turn, affect (or have affected) the size of the microfinance sector. Hence, I undertake an additional effort to address the reverse-causality issue through an IVs approach as a robustness check: The potentially endogenous variable relative size of microfinance is instrumented by its first, second and third order lags.

Compared to the other country-level variables, the key explanatory variable, relative size of microfinance, is lagged once more since banks’ (potential) entry into lower market segments most likely requires some lead time. The strategic decision to downscale is based on the market situation, which is influenced by the size and strength of the microfinance sector;\(^12\) and since data on MFI lending only appears annually, it can only be based on the market situation of the previous period \((t-1)\). If conventional financial institutions decide to downscale, they need to adapt their business strategy and develop suitable lending instruments for serving smaller and more opaque firms—as discussed in the conceptual framework (Section 3). Because of this lead time, downscaling banks probably only enter lower market segments in the subsequent period \((t+1)\). For these reasons, I prefer two lags for the key explanatory
| Variable | Description and data source |
|----------|-----------------------------|
| Access   | Dummy variable equal to 1 if firm has institutional credit, i.e., a line of credit or loan from a financial institution; from World Bank Enterprise Surveys (ES) |
| Loans for working capital/fixed assets | Dummy variable equal to 1 if firm used loans to finance working capital and/or fixed assets in the last fiscal year; from ES |
| Financially unconstrained | Dummy variable equal to 0 if firm's loan application was rejected or if the firm was discouraged from applying for credit (adverse loan conditions, complexity, expected rejection, etc.) and one if firm has access to credit; from ES |
| Rel. size of microfinance | National gross loan portfolio of MFIs relative to private credit; private credit per GDP from World Bank's World Development Indicators (WDI); MFIs' gross loans is extracted from MIX Market (First, the gross loan variable is interpolated on the MFI-level to correct for the few missing values when MFIs did not report the gross loan portfolio in a particular year. Second, the gross loan portfolio is summed over all reporting MFIs for the respective country and year to arrive at the country-year-level figures.) |
| [For-profit portfolio] | Share of MFI loan portfolio (at country-year level) managed by MFIs without non-profit status; from MIX Market |
| Firm characteristics | |
| Firm size (employees) | Number of full-time employees (temporary, full-time employees are converted into permanent, full-time equivalents using the average length of such employment); from ES |
| Firm age | Age of firm (in years); from ES |
| Manufacturing | Dummy variable equal to one if firm is in the manufacturing sector; from ES |
| Exporters | Dummy variable equal to one if at least 10% of firm's output are exported (directly or indirectly); from ES |
| Foreign-owned | Dummy variable equal to one if firm is owned to 50% or more by foreign organisations; from ES |
| Government-owned | Dummy variable equal to one if firm is owned to 50% or more by the government; from ES |
| Audited financial statements | Dummy variable equal to one if firm's financial statements are checked and certified by an external auditor; from ES |
| Lending environment | |
| Lerner index | Lerner index as competition measure in the banking sector (higher values corresponding to lower competition); from World Bank's Global Financial Development Database |
| Private credit per GDP | Domestic credit to the private sector as percent of the GDP; from WDI |
| [Bank branches] | Number of commercial bank branches per 100 000 adults; from WDI |
| [Legal rights index] | Strength of legal rights index: higher scores indicating better protection of borrowers' and lenders' rights (methodology from 2005 to 2014 with a score from 0 to 10); from World Bank's Doing Business Indicators |
| [Credit bureau coverage] | Number of individuals and firms included in public credit registries as share of the adult population; from World Bank's Doing Business Indicators |
| Macroeconomic environment | |
| Inflation | Annual growth rate of the consumer price index; from WDI |
| GDP per capita | Gross domestic product per capita (in constant US dollars); from WDI |

**Note.** Variables in squared brackets are only included in the robustness check or interaction analysis.
variable, but present results for a single lag as a robustness check (correlation of $r = 0.96$ between the first and second lag).

6 | RESULTS

6.1 | Relative size of the microfinance sector and firms’ access to institutional credit

The baseline regression, presented in the first column of Table 4, supports the first hypothesis: The effect of the relative size of microfinance on firms’ access to institutional credit is negative and significant at the 1% level. Columns 2–9 report robustness checks for my baseline regression and arrive at similar effect sizes and significance levels. Results are robust when using only one lag for the key explanatory variable (Column 2), when clustering standard errors at the country level (Column 3) to account for the potential influence of serial correlation (Bertrand et al., 2004), when including additional controls for the lending environment (Column 4) or when excluding firms that do not make use of loans as they self-report not to need additional capital (Column 5). I further show that results are robust when using a logit model (Column 6) or when giving each country the same weight (Column 7). The robustness checks also comprise alternative measures for financial access as dependent variable. Column 8 employs a dummy being one if a firm used loans to finance working capital and/or fixed assets in the last fiscal year. Building on Popov and Udell (2012), firms are financially constrained if their loan application was rejected or if they are discouraged from borrowing by adverse loan conditions, complex procedures, expected rejection, etc., to allow for simple comparison, I recode this dummy in Column 9 as being one if firms are unconstrained. Similar results materialise in these robustness checks.

The estimated effect $\beta$ of the relative size of the microfinance sector amounts to $-0.429$. This implies that a change of the relative size of microfinance by 1 standard deviation (0.060) decreases the probability of access to institutional credit by about 2.6 percentage points. Alternatively, when moving from the country with the smallest relative size of microfinance in the sample to that with the largest, the respective probability falls by 12.6 percentage points. The effect may be small for an average country in the sample where 41.5% of firms have access to finance, but is more important in the context of low-income countries where only 24.5% of firms enjoy such a privilege.

The control variables included in the baseline regression and the robustness checks mostly exhibit the expected signs. Larger and older firms as well as firms with audited financial statements and have significantly better access to finance. The effect of the manufacturing dummy is positive but very small and insignificant. In line with Love and
| Access to finance | Alternative measures for access to finance | Access to finance |
|-------------------|------------------------------------------|-------------------|
|                   | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|                   | baseline | single lag | SE clustered at country level | additional controls | excluding firms without capital needs | logit (marginal effects) | same weight for all countries | loans for working capital/fixed assets | financially unconstrained | IV |
| Rel. size microfinance | $-0.429^{***}$ | $-0.319^{**}$ | $-0.429^{**}$ | $-0.363^{**}$ | $-0.368$ | $-0.353^{***}$ | $-0.338^{***}$ | $-0.454^{**}$ | $-0.314^{*}$ | $-0.423^{***}$ |
|                   | (0.151) | (0.143) | (0.210) | (0.165) | (0.160) | (0.133) | (0.123) | (0.190) | (0.189) | (0.137) |
| Log firm size      | $0.0658^{**}$ | $0.0659^{***}$ | $0.0658^{***}$ | $0.0656^{***}$ | $0.0683^{***}$ | $0.0623^{***}$ | $0.0677^{***}$ | $0.0569^{***}$ | $0.0705^{***}$ | $0.0673^{***}$ |
|                   | (0.00436) | (0.00443) | (0.00517) | (0.00438) | (0.00471) | (0.00414) | (0.00412) | (0.00438) | (0.00447) | (0.00457) |
| Log firm age       | $0.00883^{*}$ | $0.00926^{**}$ | $0.00883^{*}$ | $0.00929^{**}$ | $0.00820^{*}$ | $0.00902^{**}$ | $0.00901^{*}$ | $0.00723$ | $0.00564$ | $0.00592$ |
|                   | (0.00452) | (0.00457) | (0.00523) | (0.00452) | (0.00471) | (0.00449) | (0.00471) | (0.00438) | (0.00496) | (0.00511) |
| Manufacturing      | $0.00348$ | $0.00363$ | $0.00348$ | $0.00263$ | $-0.013^{*}$ | $0.00347$ | $0.00292$ | $0.00255$ | $-0.029^{***}$ | $0.00115$ |
|                   | (0.00617) | (0.00623) | (0.00642) | (0.00619) | (0.00729) | (0.00601) | (0.00658) | (0.00583) | (0.00757) | (0.00708) |
| Exporter           | $0.0506^{***}$ | $0.0500^{***}$ | $0.0506^{***}$ | $0.0510^{***}$ | $0.0402^{***}$ | $0.0433^{***}$ | $0.0492^{***}$ | $0.0679^{***}$ | $0.0446^{***}$ | $0.0491^{***}$ |
|                   | (0.00765) | (0.00773) | (0.00896) | (0.00772) | (0.00710) | (0.00714) | (0.00808) | (0.0111) | (0.00659) | (0.00909) |
| Foreign-owned      | $-0.129^{***}$ | $-0.127^{***}$ | $-0.129^{***}$ | $-0.128^{***}$ | $-0.053^{***}$ | $-0.126^{***}$ | $-0.127^{***}$ | $-0.145^{***}$ | $-0.022^{***}$ | $-0.127^{***}$ |
|                   | (0.0135) | (0.0135) | (0.0166) | (0.0135) | (0.0101) | (0.0125) | (0.0132) | (0.0144) | (0.0100) | (0.0150) |
| Government-owned   | $-0.146^{***}$ | $-0.148^{***}$ | $-0.146^{***}$ | $-0.145^{***}$ | $-0.118^{***}$ | $-0.150^{***}$ | $-0.158^{***}$ | $-0.0784$ | $-0.123^{***}$ | $-0.144^{***}$ |
|                   | (0.0301) | (0.0313) | (0.0357) | (0.0301) | (0.0345) | (0.0293) | (0.0322) | (0.0485) | (0.0371) | (0.0310) |
| Fin. statements    | $0.0796^{***}$ | $0.0802^{***}$ | $0.0796^{***}$ | $0.0794^{***}$ | $0.0860^{***}$ | $0.0781^{***}$ | $0.0861^{***}$ | $0.0817^{***}$ | $0.0916^{***}$ | $0.0762^{***}$ |
|                   | (0.00933) | (0.00944) | (0.0114) | (0.00927) | (0.0117) | (0.00967) | (0.00967) | (0.00818) | (0.0128) | (0.00905) |
| Lerner index       | $-0.181$ | $-0.173$ | $-0.181$ | $-0.266^{*}$ | $-0.239$ | $-0.153$ | $-0.0810$ | $0.00482$ | $-0.154$ | $-0.0677$ |
|                   | (0.145) | (0.145) | (0.204) | (0.146) | (0.171) | (0.117) | (0.114) | (0.0817) | (0.133) | (0.0727) |
| Priv. credit per GDP | $0.154$ | $0.173$ | $0.154$ | $0.226$ | $0.162$ | $0.183$ | $0.194$ | $-0.139$ | $0.143$ | $-0.0438$ |
|                   | (0.156) | (0.155) | (0.217) | (0.156) | (0.156) | (0.150) | (0.143) | (0.130) | (0.126) | (0.131) |
| Log GDP per capita | $0.118$ | $0.119$ | $0.118$ | $0.0600$ | $0.262^{**}$ | $0.109$ | $0.0149$ | $-0.0640$ | $-0.0281$ | $0.167^{***}$ |
| Access to finance | Alternative measures for access to finance | Access to finance |
|------------------|------------------------------------------|------------------|
|                  |                                          |                  |
| (0.116)          |                                          | (0.116)          |
| (0.161)          |                                          | (0.126)          |
| (0.126)          |                                          | (0.126)          |
| (0.126)          |                                          | (0.109)          |
| (0.104)          |                                          | (0.118)          |
| (0.0625)         |                                          |                  |
| Inflation        | 0.236                                   | 0.221            |
|                  | (0.182)                                  | (0.186)          |
|                  | (0.257)                                  | (0.176)          |
|                  | (0.159)                                  | (0.187)          |
|                  | (0.165)                                  | (0.205)          |
|                  | (0.174)                                  | (0.145)          |
| Legal rights index | 0.0149**                             |                  |
|                  | (0.00715)                                |                  |
| Bank branches    | 0.00101                                 |                  |
|                  | (0.00192)                                |                  |
| Credit bureau coverage | −0.0565                           |                  |
|                  | (0.0390)                                 |                  |
| Observations     | 56 120                                  | 55 374           |
|                  | 56 120                                  | 41 603           |
|                  | 56 120                                  | 56 120           |
|                  | 56 120                                  | 51 197           |
|                  | 36 876                                  | 44 139           |
| R²               | 0.216                                   | 0.214            |
|                  | 0.216                                   | 0.217            |
|                  | 0.284                                   | 0.179            |
|                  | 0.202                                   | 0.167            |
|                  | 0.305                                   | 0.209            |
| Countries        | 51                                      | 50               |
|                  | 51                                      | 51               |
|                  | 51                                      | 50               |
|                  | 51                                      | 41               |

Note. Regressions employ country fixed effects, time dummies and robust standard errors clustered at the country-year level. Data sources are described in Section 3. The dependent variable access to finance is a dummy variable capturing whether the firm has a loan or line of credit. The two alternative measures for access to finance indicate whether the firm has loans for working capital/fixed assets or whether it is financially unconstrained. Relative size of microfinance equals the national gross loan portfolio of MFIs relative to private credit. Log firm size is the logarithm of the firm size (number of employees). Log firm age is the logarithm of the firm’s age (in years). Manufacturing is a dummy variable capturing whether the firm belongs to the manufacturing sector. Exporter is a dummy variable measuring whether the firm exports at least 10% of its output. The ownership dummies (…-owned) identify the owner, whereas the base category is private domestic ownership. Financial statements is a dummy variable indicating whether the firm has an audited financial statement. The Lerner index measures bank competition (higher values corresponding to lower competition). Private credit per GDP captures depth of the conventional financial system. Log GDP per capita is the logarithm of the gross domestic product per capita (in constant dollars). Inflation measures the annual growth rate of the consumer price index. The strength of legal rights index measures the protection of borrowers’ and lenders’ rights. Bank branches are the number of commercial bank branches per 100,000 adults. Credit bureau coverage measures the proportion of the adult population listed in credit bureau databases. For robustness checks, Column 2 uses just one lag for the key explanatory variable, Column 3 robust standard errors clustered at the country level, Column 4 additional controls, Column 5 exclusion of firms not making use of loans as they have sufficient capital, Column 6 a logit model (average marginal effects are reported for comparison), Column 7 same weights for every country and column, Column 8 loans for working capital/fixed assets as dependent variable, Column 9 financially unconstrained as dependent variable, Column 10 an IV approach instrumenting the relative size of microfinance by its first, second and third order lags.

Standard errors are in parentheses.

Source: Author’s analysis based on the data sources discussed in the text.

*p < 0.10. **p < 0.05. ***p < 0.01.
Martínez Pería (2014), firms with private domestic ownership are found to have significantly better access to loans. A more competitive and deeper conventional financial system, captured by the Lerner index and private credit per GDP, also mitigates firms’ financing constraints (yet both are [mostly] insignificant). With regard to the macroeconomic environment, firms in wealthier countries (higher GDP per capita) are better off, but the effect is only significant in some robustness checks. Surprisingly there is also a positive sign for inflation suggesting that inflation rates above the long-term national average are supposed to improve firms’ access to finance. A model with within and between effects puts this into perspective (unreported): The between effect of inflation is negative indicating that higher average levels of inflation are harmful for firms’ access to finance.

The analysis so far assumed that the relative size of the microfinance sector is exogenous from firms’ access to institutional credit. However, firms’ access to finance is mainly influenced by the size and activity of the conventional financial system, which may, in turn, affect the (relative) size of microfinance. Hence, reverse causality may enter the picture. To account for that, the potentially endogenous variable is instrumented by its first, second and third order lags. As can be seen in column 10 of Table 4, this IV approach arrives at a similar effect size (−0.423) and significance level (p = 0.002) in support of the main finding of this study.

6.2 | Heterogeneous effects by firm size

Table 5 presents the findings with regard to the second hypothesis concerning firm size. The interaction between the key explanatory variable and firm size has the expected positive sign such that the negative effect of microfinance on firms’ access to institutional credit decreases with increasing firm size. However, the effect is insignificant (Column 1; p = 0.355).

One reason for the insignificance could be that the model wrongly imposes a linear structure on the interaction. Significant results materialise for firms with 10–19 employees (Column 2; p = 0.028) when allowing for a non-linear relationship. The non-linearity is introduced by interacting the key explanatory variable with a factorial variable for the five firm-size categories (using larger medium-sized firms with 40–99 employees as base category).13 The left panel in Figure 2 visualises the resulting average marginal effects for the different firm-size groups along with the 90%, 95% and 99% confidence intervals. The effect is most negative (−0.594) for firms with 10–19 employees and thereafter steadily increases (i.e., becomes smaller) before taking a small surprising drop for large firms. Hence, there is partial support for Hypothesis 2. The findings are robust to alternative specifications (single lag for key explanatory, standard errors clustered at country level, additional country-level controls, or exclusion of firms not making use of loans as they self-report not to need additional capital; see Table S2 and Figure S7).

Since the dependent variable, access to finance, captures institutional credit and does not differentiate between loans originating in the microfinance or the conventional financial sector, these findings may be interpreted as follows. Very small firms with less than 10 employees still have access to loans of appropriate size in the microfinance sector (see Section 2) and thus stand to benefit from microfinance more. Small firms with 10–19 employees, however, that might try to graduate from MFIs to larger follow-up loans in the conventional financial system, may find it hard to access such finance because of the negative effect of competition by MFIs on banks’ SME lending; also, they do not get appropriate loan sizes from MFIs and thus stand to be more negatively affected by microfinance.

This interpretation is further buttressed by the fact that the share of SMEs with institutional credit steadily increases in my sample with increasing firm size as depicted in the right panel of Figure 2. The jump between firms with less than 10 employees and firms with 10–14 employees demonstrates that very small firms with less than 10 employees are significantly more constrained with regard to institutional credit. Hence, if it were not for the described graduation problem from microfinance to the conventional financial sector, I would expect firms with less than 10 employees to face the worst impact. However, in line with the graduation problem, I find small firms with 10–19 employees that need to move from microfinance to larger loans in the conventional financial system to be most negatively affected by the relative size of the microfinance sector.
TABLE 5  Regressions including the interaction of relative size of microfinance with log-transformed firm size and firm-size categories

| Access to finance                                      | (1)             | (2)             |
|-------------------------------------------------------|-----------------|-----------------|
| Rel. size microfinance                                | −0.574**        | −0.262          |
|                                                       | (0.221)         | (0.184)         |
| Rel. size microfinance × log firm size                | 0.0476          |                 |
|                                                       | (0.0513)        |                 |
| Log firm size                                         | 0.0637***       |                 |
|                                                       | (0.00561)       |                 |
| Rel. size microfinance × (<10 employees)              | −0.146          | −0.197          |
|                                                       | (0.184)         | (0.0197)        |
| Rel. size microfinance × (10–19 employees)            | −0.332**        | −0.108***       |
|                                                       | (0.148)         | (0.0143)        |
| Rel. size microfinance × (20–39 employees)            | −0.138          | −0.0536***      |
|                                                       | (0.121)         | (0.0106)        |
| Rel. size microfinance × (100+ employees)             | −0.116          | 0.0602***       |
|                                                       | (0.136)         | (0.00996)       |
| Log firm age                                          | 0.00884*        | 0.0112**        |
|                                                       | (0.00451)       | (0.00436)       |
| Manufacturing                                         | 0.00322         | 0.00203         |
|                                                       | (0.00618)       | (0.00609)       |
| Exporter                                              | 0.0507***       | 0.0582***       |
|                                                       | (0.00763)       | (0.00738)       |
| Foreign-owned                                         | −0.129***       | −0.121***       |
|                                                       | (0.0134)        | (0.0130)        |
| Government- owned                                     | −0.147***       | −0.133***       |
|                                                       | (0.0300)        | (0.0295)        |
| Fin. statements                                       | 0.0796***       | 0.0831***       |
|                                                       | (0.00933)       | (0.00913)       |
| Lerner index                                          | −0.181          | −0.177          |
|                                                       | (0.145)         | (0.148)         |
| Priv. credit per GDP                                   | 0.155           | 0.160           |
|                                                       | (0.156)         | (0.157)         |
| Log GDP per capita                                     | 0.119           | 0.0979          |
|                                                       |                 | (Continues)     |
As can be seen in the left panel, the negative effect of microfinance becomes less severe when moving to smaller medium-sized firms (−0.401) and larger medium-sized firms (−0.262) as these are probably less opaque and more likely to meet the usual prerequisites for a bank loan such as a credit history, audited financial statements and fixed assets as collateral (and thus being less affected by the graduation problem). A 1 standard deviation change in the relative size of microfinance (or moving from the country with the smallest relative size of microfinance to the largest) lowers the probability of small firms’ access to institutional credit by about 3.6 (17.4) percentage points, which is more than twice the effect size of larger medium-sized firms.
Large firms not exhibiting the least negative average marginal effect can be rationalised by the fact that larger firms are less dependent on loans. They can generally choose from a more diverse set of financing options that include, amongst others, capital markets and equity finance (e.g., Demirgüç-Kunt et al., 2020). Stylised facts from my sample support this view: Over 70% of large firms without a loan explain non-application for credit by ‘no need for a loan’, while this share continuously diminishes to 45% for very small firms. Only 20% of large firms without a loan perceive finance as a major or very severe obstacle, while this number rises continuously to 37% for very small firms. Since this may distort (marginal) effects for large firms and SMEs are of main interest in this study, I do not present and discuss figures for large firms in the rest of the paper.

6.3 Heterogeneous effects by profit orientation in microfinance and credit bureau coverage

I expect the effect size to differ according to the degree of profit orientation in the national microfinance sector and according to the credit information infrastructure as hypothesised in Hypotheses 3 and 4. Table 6 reports the respective results. Profit orientation is captured by the share of the national MFI portfolio held by for-profit MFIs in the respective country-year. Contrary to the theoretical arguments, the interaction effect with the key explanatory variable is positive, but highly insignificant (Column 1; \( p = 0.798 \)). Similar results emerge in the robustness check (see Table S3). Thus, I do not find support for Hypothesis 3. Potentially, the direct effect of supplying institutional credit weighs stronger for for-profit MFIs (than the indirect effect of aggravating the graduation problem) as they provide loans of larger sizes and longer maturities that are more comparable to conventional loans.

Credit bureau coverage mitigates the negative effects of a strong microfinance sector as depicted in Table 6. While the interaction effect with the key explanatory variable exhibits the right sign, it is not significant either (Column 2; \( p = 0.646 \)). This is not too surprising given that in many LMICs one central weakness of credit bureaus is the non-recording of MFI loans. In those countries, MFI borrowers cannot build up credit histories that can be used when applying for loans at conventional financial institutions. To assess the potential of credit bureaus in mitigating the graduation problem, one has to focus on countries with ‘inclusive’ credit bureaus that do record MFI lending activities. Since such data on credit bureaus is not (openly) available on the country level, I employ subsample regressions at the regional level differentiating between regions where most countries record MFI loans in credit bureaus and regions where most countries do not. In regions where only a minor fraction of countries has such inclusive credit bureaus (25%–35%), the interaction is neither positive nor significant (Column 4). Only for the region where most countries (60%) capture MFI loans in their credit information sharing system (i.e., Europe and Central Asia), credit bureaus mitigate the negative effect of microfinance on firms’ access to institutional credit (Column 3). The findings are robust to alternative specifications (single lag for key explanatory, standard errors clustered at country level, additional country-level controls, or exclusion of firms not making use of loans as they self-report not to need additional capital; see Table S4).

The positive effect of credit bureaus in the sub-sample analysis is both statistically significant and economically relevant. In a country with low credit bureau coverage (0%, i.e., 1 standard deviation [30.2 percentage points] below the average of 24.4%), a 1 standard deviation change in the relative size of microfinance lowers the probability of access to institutional credit by 5.0 percentage points, while in a country with high credit bureau coverage (54.6%) the effect becomes positive. This means that such an environment of good credit information infrastructure can reverse the negative effect of microfinance and instead increase the probability of firms having access to institutional credit by 2.8 percentage points (if MFI lending is recorded at credit bureaus). Differentiating the effect further by the five firm-size categories shows that except for very small firms, all other firms significantly benefit from increased credit bureau coverage (and effect sizes are relatively similar across these firm-size categories as shown in Table S5). This also means that the group of firms with 10–19 employees, which is most vulnerable to the negative effect of
| Access to finance | (1) | (2) | (3) | (4) |
|-------------------|-----|-----|-----|-----|
| regions where MFI reporting to credit bureaus is widespread | regions where MFI reporting to credit bureaus is uncommon |
| Rel. size of microfinance | −0.488** (0.216) | −0.463*** (0.125) | −0.833*** (0.303) | −0.342*** (0.127) |
| Rel. size microfinance × for-profit portfolio | 0.0983 (0.383) | | | |
| Rel. size microfinance × credit bureau coverage | | 0.421 (0.914) | 2.367*** (0.595) | −1.832 (1.885) |
| Credit bureau coverage | | −0.0700 (0.0812) | −0.178*** (0.0638) | 0.199 (0.187) |
| Log firm size | 0.0658*** (0.00435) | 0.0656*** (0.00437) | 0.0664*** (0.00746) | 0.0654*** (0.00515) |
| Log firm age | 0.00883* (0.00452) | 0.00896** (0.00452) | −0.00111 (0.00771) | 0.00999* (0.00526) |
| Manufacturing | 0.00349 (0.00618) | 0.00329 (0.00618) | 0.000811 (0.00882) | 0.00450 (0.00776) |
| Exporter | 0.0505*** (0.00764) | 0.0506*** (0.00766) | 0.0591*** (0.0156) | 0.0473*** (0.00846) |
| Foreign-owned | −0.128*** (0.0135) | −0.128*** (0.0135) | −0.135*** (0.0238) | −0.126*** (0.0160) |
| Government-owned | −0.146*** (0.0301) | −0.145*** (0.0301) | −0.223*** (0.0471) | −0.110*** (0.0335) |
| Fin. statements | 0.0796*** (0.00934) | 0.0793*** (0.00933) | 0.0661*** (0.0164) | 0.0820*** (0.0103) |
| Lerner index | −0.181 (0.147) | −0.180 (0.154) | −0.456* (0.254) | −0.0726 (0.145) |
| Priv. credit per GDP | 0.159 (0.163) | 0.193 (0.143) | 0.0267 (0.105) | 0.354 (0.297) |
| Log GDP per capita | 0.118 (0.117) | 0.101 (0.129) | 0.0533 (0.144) | 0.00172 (0.159) |
| Inflation | 0.228 (0.186) | 0.247 (0.186) | 0.175 (0.343) | 0.551* (0.284) |
| Observations | 56 120 | 56 120 | 14 887 | 41 233 |
| $R^2$ | 0.216 | 0.217 | 0.134 | 0.248 |
| Countries | 51 | 51 | 16 | 35 |

Note. Regressions employ country fixed effects, time dummies and robust standard errors clustered at the country-year level. Data sources are described in Section 3. The dependent variable access to finance is a dummy variable capturing whether the firm has a loan or line of credit. Relative size of microfinance equals the national gross loan portfolio of MFIs.
relative to private credit. For-profit portfolio captures the share of the national MFI portfolio held by profit-oriented MFIs. Log firm size is the logarithm of the firm size (number of employees). Credit bureau coverage measures the proportion of the adult population listed in credit bureau databases. Log firm age is the logarithm of the firm’s age (in years). Manufacturing is a dummy variable capturing whether the firm belongs to the manufacturing sector. Exporter is a dummy variable measuring whether the firm exports at least 10% of its output. The ownership dummies (…-owned) identify the owner, whereas the base category is private domestic ownership. Financial statements is a dummy variable indicating whether the firm has an audited financial statement. The Lerner index measures bank competition (higher values corresponding to lower competition). Private credit per GDP captures depth of the conventional financial system. Log GDP per capita is the logarithm of the gross domestic product per capita (in constant dollars). Inflation measures the annual growth rate of the consumer price index. The last two columns are subsample regressions for regions where most countries record MFI lending activities in credit bureaus (Europe and Central Asia; Column 3) and for regions where most countries do not (all other regions; Column 4).

7 | CONCLUSION

Theoretical and empirical work details the upscaling in the microfinance industry, which in combination with down-scaling banks has resulted in competition between MFIs and the conventional financial system. Existing empirical evidence shows that MFIs adapt their behaviour in response to the strength and activity of the conventional financial sector. Using firm-, MFI- and country-level data almost exclusively from LMICs, I am the first to present insights how this competition also affects the SME financing activities in the conventional financial sector. This is important since upscaling MFIs may discourage conventional banks from moving down the market and developing suitable lending instruments for smaller firms. As an unintended consequence of microfinance, firms’ access to institutional credit (of sufficient size) may thus be worsened: Small firms may fail to graduate from microfinance and fail to get follow-up finance in the conventional financial system when they need loans of larger sizes in order to continue their growth and development.

The findings indicate that the relative size of the microfinance sector significantly affects firms’ access to finance. A stronger and more active microfinance sector aggravates the financing constraints of SMEs. These results are robust to a range of different specifications, including an IV approach in response to potential reverse causality concerns. Effects differ by characteristics of the firms and the credit information infrastructure. Small firms with 10–19 employees are most severely affected and thereafter the negative effect becomes smaller with increasing firm size. Credit bureaus mitigate the negative effect of microfinance in regions where MFI lending is recorded in the respective facilities for sharing credit information. For these regions, good credit bureau coverage even turns the effect positive, which indicates that good credit information infrastructure can actually harness microfinance to improve SMEs’ access to institutional credit and thus facilitate graduation from microfinance to the conventional financial system.

This paper reveals certain tensions between microfinance and SMEs’ access to external finance—especially for small firms. In order to mitigate these unintended consequences of microfinance, decision makers have to consider means that ensure the sector’s compatibility with the conventional financial system. Graduation from microfinance to follow-up loans in the formal financial sector can be facilitated, for instance, by improving credit bureau coverage and by requiring MFIs of a certain size or legal status to report to credit bureaus. Yet more research is needed to better understand the interrelations between microfinance and the conventional financial system. This requires both in-
depth country case studies and cross-country analyses with longer time dimensions and/or panel structure that allow for advanced estimation strategies.

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Any remaining inaccuracies are, of course, the responsibility of the author alone.

CONFLICT OF INTEREST
The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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ENDNOTES
1 In their comprehensive overview of the empirical evidence, Ayyagari et al. (2017) identify four central challenges: (i) transaction costs rendering smaller loans more expensive per dollar lent; (ii) opaqueness of smaller firms leading to asymmetric information and problems of adverse selection and moral hazard; (iii) lack of collateral; (iv) weak legal institutions.

2 The discussions around the effects of competition are related to the literature on transaction and relationship lending. The seminal paper of Petersen and Rajan (1995) finds fiercer competition to negatively affect lending when banks rely on relationship lending. Yet more recent theoretical and empirical contributions call for a more nuanced view indicating that local interbank competition actually intensifies relationship-based lending (e.g., Boot & Thakor, 2000; Degryse & Ongena, 2007). Hence, I assume that competition generally fosters SME lending even if (smaller) banks may employ relationship lending.

3 The analysis is not driven by extreme values since winsorising leads to identical results.

4 Mainly the three outliers (Ecuador, Madagascar and Poland) that are not shown in the box plot for reasons of readability, exhibit average MFI loans to SMEs that could be economically relevant beyond the smallest firm-size category.

5 Except for the ES data, all datasets are openly available. Since ES data must not be transferred to a third party, data will only be shared on request and with permission of the Enterprise Analysis Unit.

6 For details on the removal criteria and the seven excluded country-year cases, see the Supporting Information: Figure S1 shows that decisions were straightforward and free from borderline cases.

7 For details, see the Supporting Information. The only country for which the decision was not completely clear-cut is Burundi. It was confirmed that all results carry through when excluding Burundi (e.g., baseline effect is $-0.476$, $p = 0.002$).

8 The LPM is preferred over logit/probit specifications since the latter are prone to the incidental variable problem when using an exhaustive set of fixed effects. I present a logit model as robustness check, though.
Even though the source of finance does matter, for instance, with regard to loan conditions and access to follow-up finance, I do not differentiate between conventional and MFI loans for two main reasons. First due to theoretical concerns, as neglecting the direct effect of MFIs (provision of microloans and thus increasing access to finance) would overestimate the hypothesised (negative) effect resulting from an aggravation of the graduation problem. Second for pragmatic reasons, as in the ES data loan sources are coded as ‘private commercial banks’, ‘state-owned banks or government agency’, ‘non-bank financial institutions’ and ‘other’. In the wake of commercialisation of microfinance, MFIs have adopted different legal status—including full banking licences—such that the ES categories do not allow for a clear-cut differentiation between MFI and conventional loans.

As a robustness check, I follow the approach chosen in the literature on the role of structures of financial systems for economic growth (e.g., Levine & Zervos, 1998), and plug in MFI loans per GDP and private credit per GDP as separate explanatory variables. Results (unreported) are very similar: The effect of microfinance is negative and significant; a one standard deviation lowers the likelihood of having access to finance by 2.4 percentage (compared to 2.6 in my preferred specification).

The included time dummies capture the periods before, during and after the financial crisis 2007/2008 (i.e., cover the years 2002–2006, 2007–2010 and 2011–2015).

Competition in the banking sector incentivises banks to downscale (see Section 2). However, the downscaling decision ultimately hinges on profitability considerations influenced by the situation in these market segments, for instance, whether upscaling MFIs narrow down or contest these segments. Hence, I see the relative size of microfinance as key to banks’ downscaling decision (and lag it twice for the reasons given above), whereas I see variables of the lending environment (e.g., for competition: Lerner index or private credit per GDP) primarily as controls for confounding factors for firms’ access to institutional credit (and thus only lag them once like the other country-level controls).

Larger medium-sized firms are chosen as base category since these largest SMEs have grown beyond the graduation problem and thus provide the most valid comparison group for the other SME categories. Effects on large firms might not be completely comparable for reasons outlined at the end of this subsection.

These five regions are East Asia and Pacific, Latin America and Caribbean, Middle East and North Africa, South Asia, and sub-Saharan Africa.

DATA AVAILABILITY STATEMENT

Except for the Enterprise Surveys, all datasets are openly accessible on websites of the World Bank Group. Enterprise Surveys data were provided by the Enterprise Analysis Unit of the Development Economics Global Indicators Department of the World Bank Group by permission. Since this data must not be transferred to a third party, data will only be shared on request to the corresponding author with permission of the Enterprise Analysis Unit.

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**SUPPORTING INFORMATION**

Additional supporting information may be found in the online version of the article at the publisher’s website.

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