Banks and Microbanks

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based at New York University, focused on finding answers
to how financial sectors can better meet
the needs of poor households.

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Abstract

We combine two datasets to examine whether the scale of an economy's banking system affects the profitability and outreach of microfinance institutions. We find evidence that competition matters. Greater bank penetration in the overall economy is associated with microbanks pushing toward poorer markets, as reflected in smaller average loans sizes and greater outreach to women. The evidence is particularly strong for microbanks that rely on commercial-funding, use traditional bilateral lending contracts (rather than group lending methods favored by microfinance NGOs), and take deposits. We consider plausible alternative explanations for the correlations, including relationships that run through the nature of the regulatory environment and the structure of the banking environment, but we fail to find strong support for these alternative hypotheses.

1. Introduction

In 2011, there were only 3.6 ATMs in Bangladesh for every 100,000 adults, and only 7.9 commercial bank branches.[1] In Bolivia, there were 26 ATMs for every 100,000 adults, and only 9.7 commercial bank branches. Bangladesh and Bolivia, though, are both notable as early sites in which microfinance first took root and grew rapidly. Was the relative lack of financial depth in the banking system a help or a hindrance to microfinance? This paper is a first attempt to gauge how the presence of formal, regulated providers of financial services in an economy affects the profitability and outreach of financial institutions targeted narrowly to the under-banked and unbanked.

Microfinance banks ("microbanks") target low-income communities, and most make loans without requiring collateral (or are far more flexible than most mainstream commercial banks about the kinds of collateral required to secure loans). They are micro not because of their institutional scale but because of the scale of typical transactions with customers. Loan sizes range from under $100 to roughly $5000, and operational scale varies from several hundred customers to several million. The most famous microbank, Grameen Bank, served over 8 million customers in Bangladesh with an average loan balance of $144 in 2011.[2] If the growth of microfinance has demonstrated nothing else, large numbers of low-income borrowers can be served while achieving a remarkably high level of repayment. Billions of dollars in loans to over two hundred million borrowers are

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[1] Data are from IMF Financial Access Survey (fas.imf.org, accessed 12/11/12). Mexico, for comparison, had 14.9 ATMs and 45.8 commercial bank branches per 100,000 adults in 2011.
[2] Armendáriz and Morduch (2005) describe the economics of microfinance, and Cull, Demirgüç-Kunt, and Morduch (2009) describe recent trends and data. Data on Grameen Bank loan balance and customer size are from Grameen Bank (http://www.grameen-info.org/index.php?option=com_content&task=view&id=453&Itemid=527 accessed December 6, 2012).

outstanding, and data from top lenders show that only 2-3 percent of those are delinquent in recent years (Cull, Demirgüç-Kunt, and Morduch, 2009).[3]

The industrial organization of microfinance and the broader banking sector has received little attention so far, but as central banks set the stage for the rapid expansion of "inclusive banking," it becomes integral to understand how efforts to reach low-income and excluded populations relate to larger economic and financial contexts. The small scale of transactions means that microbanks tend to operate in niches which are little-penetrated by mainstream commercial banks, though competition is emerging, especially with the increasing commercialization of microfinance. Economic theory suggests that a more developed banking sector can both help and hinder the profitability of microbanks. The balance rests largely with the relative strengths of positive spillovers from agglomeration effects and a stronger regulatory environment versus negative spillovers that arise as competition undermines the dynamic incentives at the root of microfinance loan contracts. Determining the balance is ultimately an empirical question. Our results show that the strongest impacts on microbanks of competition from the formal financial sector are on the nature of microbanking services and markets, though we also find that competition reduces the profitability of the microbanks with clienteles that are most likely to overlap geographically with those of banks. Competition appears to drive microbanks toward niches characterized by smaller-scale loans (suggesting poorer customers) than would otherwise be the case.

To a large extent, competition has gone under-studied due to lack of data, regarding both the reach of formal (non-microbank) providers of financial services and

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[3] These calculations are for a sample of leading microfinance institutions that serve 18 million borrowers. Loans are defined as delinquent if they are at least thirty days overdue.

the performance and outreach of microfinance institutions themselves. Recent improvements in the data on both fronts enable us to undertake our analysis. We build on Beck, Demirguc-Kunt, and Martinez Peria (2007) which contains indicators of banking sector outreach for 99 countries that are constructed from aggregate data provided by bank regulators. The focus is on banks because they provide the vast majority of financial services in developing countries. As regulated institutions, their statistical information is relatively reliable and comparable across the sector.

We add measures of the number of bank branches, ATMs, and loan and deposit accounts to complement standard indicators of the depth and efficiency of financial systems, such as the ratio of private credit to GDP and net interest margins.[4] The additional variables add potentially useful information (for example, the correlation between branches per square kilometer and the ratio of private credit to GDP is 0.44: strong but far from perfect). Firms report facing less severe financing obstacles in countries that score higher on the added measures of banking outreach, even when the level of private credit is controlled for in regressions (Beck, Demirguc-Kunt, and Martinez Peria, 2007). We show that the added banking outreach measures are significantly associated with the profitability and outreach of microfinance institutions whereas other measures of banking sector development and efficiency are not.

Our primary goal is to offer evidence on the effects of competition on the profitability and outreach of microfinance institutions. By combining a dataset on the performance of microfinance providers with another on the outreach of banks, we also

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[4] Recent empirical research indicates strongly that financial development as measured by these indicators has a causal effect on economic growth (Beck, Levine, and Loayza 2000; Levine 2005; Levine, Loayza, and Beck 2000; and Rajan and Zingales 1998).

hope to make a contribution to the broader issue of how competition can affect access to financial services, especially among the poor.

The rest of the paper is organized as follows. Section 2 describes recent research on competition between financial institutions, especially microfinance institutions. In section 3 we describe our data, lay out the basic regression equation, and discuss our hypotheses. In section 4 we present the base results comparing the relationship between bank penetration measures and microfinance outcomes with that between other standard measures of financial development and microfinance performance. We then compare the characteristics of microfinance institutions in high- and low-bank penetration areas, and discuss the exogeneity of the bank penetration measures. Section 5 builds on the base results in an attempt to identify the types of microfinance institutions that account for the basic relationships we find between bank penetration and microfinance outreach and profitability.

Relative to NGOs, commercially-oriented microbanks tend to make larger loans and serve fewer women as a share of customers. But we find that with greater bank penetration, commercially-oriented microbanks push toward deeper outreach to the poor (as proxied by smaller average loans sizes) and greater outreach to women.

Section 6 explores competing explanations and the robustness of causal claims. The first centers on selection issues by focusing on the subset of older microfinance institutions (those in existence prior to 1996). Since a substantial part of the entry of banks in developing countries has occurred in recent years, that is, after 1995, it is plausible that this subset of institutions was most likely to be affected by competition. Stronger results for this subset can be viewed as support for the notion that competition

with banks had a causal effect on microfinance outcomes. Weaker results would indicate that our base results are driven by new entrants to microfinance. This could indicate that selection effects drove microfinance institutions with particular performance profiles to locate in areas with greater bank presence, but that competition with those banks was not causally linked to outcomes. We then turn to the potential roles of banks' ownership type (foreign and state), the degree of concentration in the banking sector, and regulation and supervision for microfinance outcomes. As described below, there are plausible reasons to believe that our results for the bank penetration variables reflect aspects of banking sector structure or incentives brought about by supervision rather than competition, but the data do not support that conclusion.

In our analysis, bank branch penetration is measured at the country level but microfinance lending occurs locally and thus we cannot be sure that banks are operating in the same local markets as MFIs. In section 7, we therefore separate MFIs by the nature of their clientele (rural, small city, large city) to test whether competition from banks has more pronounced effects on MFIs that operate in urban areas where banks are more likely to have branches. To round out our discussion of the effects of competition from banks, we also examine whether bank branch penetration affects the range of MFI product offerings and the pricing of loans. For readers that remain concerned that bank branch development could be endogenous to the profitability and outreach of microfinance institutions, we provide instrumental variables regressions in section 8. Concluding remarks appear in Section 9.

2. Financial Sector Competition

This is one of the first papers that we know of regarding competition between microfinance institutions and other providers of financial services. Vanroose and D'Espallier (2013) ask related questions and find that microfinance institutions reach more clients and are more profitable in countries where the formal banking sector is less developed. This suggests that microfinance institutions fill niches left uncovered by lagging bank development, but it also is consistent with our interpretation that as the formal banking sector develops, it puts competitive pressure on microfinance providers. This interpretation is also consistent with Hermes, Lensink, and Meesters (2009) who use a stochastic frontier analysis to show that MFIs are more efficient where the formal financial system is better developed.[5] Our study pushes further to develop and test hypotheses regarding how this competition plays out for different types of microfinance providers and for different types of borrowers. In robustness checks, we also use instrumental variables regressions to address the potential endogeneity of our indicators of formal banking sector development.

Like Vanroose and D'Espallier (2013) we find some evidence consistent with the notion that measures of physical penetration of the formal banking sector are associated with less MFI profitability. Those authors focus on the number of ATMs as their measure of formal penetration while we use the number of bank branches, but both sets of results point in a similar direction. Those authors find that MFIs are less profitable where headline interest rates in the formal financial system are higher, and they speculate that this reflects MFIs' reliance upon the domestic banking system for additional funding. They are not, however, able to test this proposition directly and clearly not all MFIs rely

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[5] See also Hermes, Lensink, and Meesters, 2011, for a further refinement of their stochastic frontier analysis using data from MFIs.

on banks for funding to the same extent (Cull, Demirguc-Kunt, and Morduch, 2009). A key advantage of our data is that we have information on MFIs' sources of funding, and so we test explicitly whether MFIs that rely on commercial sources (such as loans from banks) are more likely to be affected by the presence of formal banks in terms of their profitability and outreach than those that rely on other sources (such as donations and subsidized loans).

One seemingly contradictory result is that Vanroose and D'Espallier (2013) find that MFIs display less outreach in countries with better developed formal banking systems, whereas we find greater outreach where bank branch penetration is deeper, especially for commercially-oriented MFIs. However, that apparent contradiction is easily resolved when one considers the definitions of outreach in the two papers. Vanroose and D'Espallier measure the *breadth* of outreach using the number MFI of clients and the size of their loan portfolios, whereas we focus on the *depth* of outreach using average loan size and the share of lending to women as proxies for the extent to which MFIs serve poorer clients.

Maksudova (2010) also investigates interactions between the formal banking system and microfinance. She uses measures of money and banking (M2, M3, and the ratio of private credit to GDP) to ask whether microfinance Granger-causes country-level economic growth. She finds substantial heterogeneity in the pathways, and concludes that there is some evidence that microfinance reacts to competition and serves as a counter-cyclical force during macroeconomic crises – but "Real world examples, however, suggest an ambiguous direction of these interactions, thus motivating further research in this domain." (p. 18.)

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Baquero, Hamadi, and Heinen (2012) use combined data from three rating agencies to construct measures of concentration and competition within the microfinance sector. They find that non-profit institutions are relatively insensitive to competitive pressures, while for-profit institutions are sensitive. Competition pushes the for-profit microfinance institutions to reduce interest rates charged to borrowers, creating greater consumer surplus. The study's main focus is on competition within the microfinance sector, while our focus is on competition between microlenders and commercial banks. Like our study, Baquero et al. (2012) illustrate that institutions are responsive to market conditions, and that those responses vary by whether or not the institution is a non-profit or a for-profit organization.

Brière and Szafarz (2011) construct microfinance country equity indices to estimate a market beta using the Capital Asset Pricing Model. They find that returns in microfinance have been closely correlated with that of the broader financial sector since 2001, suggesting complementarity. At the same time, an optimally diversified equity portfolio would include up to 20 percent of stocks from microfinance institutions.

There is also a growing literature on competition between microfinance institutions themselves. Assefa, Hermes, and Meesters (2010) construct a Lerner index to measure competition within the microfinance sector itself, and find that lower levels for that index (reflecting greater competition) are associated with worse financial performance (operational self-sufficiency, return on assets, and profit margins). Although it is not their focus, they also control for standard measures of formal financial sector development (private credit/GDP, interest rate spreads) in their regressions, but they do not find strong relationships with financial performance. Similar to Vanroose and

D'Espallier (2013), Assefa, Hermes, and Meesters (2010) find that their measure of competition is associated with fewer active MFI clients, but they find no strong relationships between competition and depth of outreach (lending to women and average loan size). Again, our focus is on competition between banks and microfinance institutions (though we do control for competition within the microfinance sector using microfinance penetration levels), and the additional information that we have on MFI characteristics (such as sources of funding) enable us to detect strong relationships between bank penetration and both MFIs' depth of outreach and financial performance.

McIntosh, de Janvry, and Sadoulet (2005) (MDS) study the effects of entry by new providers of microfinance on large incumbent microfinance institutions in Uganda. Entry was tilted toward areas where there was a high pre-existing level of penetration by microfinance institutions and banks, and high pre-existing utilization of the formal banks, all indications that microfinance institutions compete with banks. Although they do not test whether entry affects incumbents' profitability, they do show that repayment rates declined in areas where entry was most pronounced, which should have a negative impact on profits. On outreach, there is no evidence that loan sizes changed as a result of entry (with larger loans being a proxy for less outreach), that client dropout rates rose, or that new client enrollment declined, though MDS speculate that this is because the Ugandan microfinance market was far from saturated. There is, however, evidence that the average savings balance at incumbent microfinance institutions declined, consistent with the notion that clients deployed some of those savings with the new entrants, a further sign of competition.

MDS point out that certain clients find it easier to migrate to new entrants than others, in large part because of their ability to signal their creditworthiness. For example, borrowers with large businesses and substantial cash flows are more likely to leave incumbent lenders as new entrants arrive. In part, this is likely due to demand considerations as these borrowers are more likely to prefer more flexible financing than the group lending arrangements that are prevalent in Uganda (and elsewhere) can provide, though it also indicates that entrants are able to identify the incumbents' most promising clients. Their evidence also suggests that clients 'double-dip,' borrowing from both entrants and incumbents at the same time, an issue termed "overlapping" in Bangladesh (e.g., Chaudhury and Matin, 2002). Coupled with the decline in repayment rates, this suggests that lenders are not able to identify a borrower's total outstanding indebtedness, an information problem emphasized in McIntosh and Wydick (2005). However, repayment rates do not decline in districts with higher education levels, consistent with the notion that those borrowers better understand dynamic incentives and the consequences of non-repayment. In short, the Ugandan results suggest that borrowers with a particular profile are more likely to be poached by new entrants than others. In principle, those new entrants could be banks rather than microbanks.

Indeed, evidence suggests that small banks develop deep relationships that enable small borrowers to convey 'soft information' about their creditworthiness. Proxies for the strength of those bank-borrower relationships are associated with lower interest rates on loans and reduced collateral requirements (Berger and Udell, 1995) and with greater credit availability (Petersen and Rajan, 1994, 1995). There are also some indications that large banks are increasing their lending to small businesses. For example, the distance

between small firms and their lenders is increasing, bank-borrower communication is becoming more impersonal, and distant firms are no longer required to be the highest quality credits, suggesting they have better access to credit (Petersen and Rajan, 2002). In short, microfinance institutions have grown and expanded their clienteles at the same time that banks have become more proficient at lending to small businesses, and thus increased competition between these two types of financial services providers is likely, at least over a certain range of customers.

3. Data and Hypotheses

If banks provide competition for microfinance institutions, greater branch penetration could compel microfinance institutions to explore new market niches, furthering access by making smaller loans (presumably to less wealthy customers) and lending more to women. We should see that as a negative relationship between branch penetration and the average size of microfinance loans and a positive relationship between branch penetration and the share of women borrowers (smaller loans sizes and more lending to women are both proxies for the depth of outreach).

Competition should also depress microfinance profits, since microbanks would likely lose some of their better customers to commercial banks. We would thus expect a negative relationship between branch penetration and measures of microfinance profitability.

The literature also suggests that commercially-oriented microbanks focused on standard bilateral loans to individual customers (as opposed to the "group loans" with joint liability made famous by Grameen Bank) will be more affected by competition with

banks than would be non-governmental organizations (NGOs) with the strongest social missions as reflected by depth of outreach.[6] We therefore test whether commercially-oriented providers of microfinance, whose client profiles are probably closer to those prized by banks that are interested in this market niche, are affected by competition to a greater extent than other providers. As emphasized in Cull, Demirgüç-Kunt, and Morduch (2009), commercially-oriented microfinance institutions are more likely to have for-profit status and to employ an individual lending method, with larger loans, fewer women customers, lower costs per dollar lent, higher costs per borrower, and greater profitability. By contrast, NGO microfinance institutions are more likely to be non-profits, relying on group lending methods that entail smaller loans, more female clients, greater reliance on subsidized funding, higher costs per dollar lent, and less profitability. By identifying the types of microfinance institutions that have the strongest relationships with our branch penetration variables, we aim to further underscore the plausibility of our results as reflecting the effects of competition.

Data

We combine data on bank penetration from 99 developed and developing countries from Beck, Demirguc-Kunt, and Martinez Peria (2007) with data from 346 leading microfinance institutions from 67 developing countries. Country coverage is not perfectly overlapping across the two data sets, and missing data for some of the control variables in our regressions further reduces the sample. We are therefore left with 342 observations from 238 microfinance institutions in 38 developing countries in our largest regressions

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[6] See, for example, Cull, Demirguc-Kunt, and Morduch (2011) on the differential effects of regulation and supervision on these two groups.

that incorporate bank penetration variables. Because competition between microfinance institutions is also likely to affect their financial performance and outreach to underserved market segments, we also include country-level information on the overall penetration of MFIs in many regressions though this reduces our sample somewhat (to 273 observations from 195 microfinance institutions).

The data on microfinance institutions were collected by the Microfinance Information eXchange (or the MIX), a not-for-profit private organization that aims to promote information exchange in the microfinance industry. These data include outreach and impact data, financial data, audited financial statements, and general information on specific microfinance institutions.[7] These institutions are large by the standards of the microfinance industry, with nearly 18 million active microfinance borrowers and a combined total of $25.3 billion in assets (in purchasing power parity terms). Participation by microfinance institutions in the MIX is voluntary, and thus the sample is skewed toward institutions that have stressed financial objectives and profitability. We expect that these are more likely to compete with banks than are smaller, less profit-oriented microfinance institutions, and thus are well suited to the analysis we undertake below.

The microfinance data are collected for publication in the *Microbanking Bulletin* (MBB) and have been adjusted to help ensure comparability across institutions when measuring profitability.[8] In addition to standard entries from the balance sheet and income statement, the dataset contains qualitative information on the lending style

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[7] This is a substantial increase over the MIX database used in Cull, Demirgüç-Kunt, and Morduch (2007), which contained information from 124 MFIs in 49 countries. That data set was a variant of the so-called MBB 9 database. In this paper, we use a variant of the MBB 10 database. There are 540 observations in our database because some MFIs report information for multiple years.

[8] These include adjustments for inflation, the cost of subsidized funding, current-year cash donations to cover operating expenses, donated goods and services, write-offs, loan loss reserves and provisioning, a reclassification of some long-term liabilities as equity, and the reversal of any interest income accrued on non-performing loans.

employed by the MFI (group versus individual-based lending), the range of services it

offers, its profit status, ownership structure, charter status, and sources of funds. Many of

these serve as important controls in the regressions that follow.

We estimate the following basic regression:

(1) MFI Outcome$_{it}$ = α + β$_1$Bank Penetration$_{it}$

        + β$_2$MFI Penetration$_{it}$

+ β$_3$Real Yield$_{it}$ *+ β$_4$Capital Costs/Assets$_{it}$* *+β$_5$Labor/Costs$_{it}$*	MFI Productivity
+β$_6$Village Bank Lending$_{it}$ *+β$_7$Solidarity Group Lending$_{it}$*	MFI Lending Method
+B$_8$Ln(age)$_{it}$ *+B$_9$Ln(assets)$_{it}$*	Other MFI Characteristics
+β$_{10}$Inflation Rate$_{it}$ *+ β$_{11}$Real GDP Growth Rate$_{it}$* *+ β$_{12}$KKM Index of Inst. Development$_{it}$* *+B$_{13}$Rural Population Share$_{it}$* *+B$_{14}$Rural Population Growth$_{it}$* *+B$_{15}$Region$_{it}$* *+ ε$_i$*	Country Characteristics

Where *Outcome* is a measure of either the profitability or depth of outreach of

microfinance institution *i* in year *t*. The profitability measures that we use are the

Financial Self-Sufficiency (FSS) Index and return on assets (ROA). Both measures are

adjusted as described above. The FSS ratio is a measure of an institution's ability to

generate sufficient revenue to cover its costs.[9] Values below one indicate that it is not

doing so. We prefer that ratio because it offers a more complete summary of inputs and

outputs than standard financial ratios such as return on assets or return on equity. Our

proxies for the depth of outreach of a microfinance institution are the share of its

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[9] The financial self-sufficiency ratio is adjusted financial revenue divided by the sum of adjusted financial expenses, adjusted net loan loss provision expenses, and adjusted operating expenses. It indicates the institution's ability to operate without ongoing subsidy, including soft loans and grants. The definition is from *MicroBanking Bulletin* (2005), p. 57.

borrowers that are women and its average loan size relative to the average per capita income of the bottom 20% in the country. Smaller loan sizes and a higher share of lending to women are correlated with deeper outreach to the poor and excluded groups.

We estimate the models using a robust clustering method that accounts for both heteroskedasticity and correlation across multiple observations from the same microfinance institution.[10] Because observations from the same institution are likely to be correlated, OLS techniques can underestimate errors (thus overestimating significance levels). Including fixed effects for microfinance institutions was not possible because we have no more than three observations for any single institution. For most institutions, we have only one.

The key explanatory variables in our analysis are measures of bank penetration, namely the number of bank branches in a country measured per capita (which we refer to as demographic penetration) and per square kilometer (geographic penetration, hereafter). Beck, Demirguc-Kunt, and Martinez Peria (2007) offer additional measures of penetration based on the number of ATMs and the number and size of deposits and loan accounts. The branch penetration measures are likely to be a better reflection of the potential for personal contact with clients, which we speculate would be necessary to compete for the clients of microfinance institutions.

Because competition between microfinance institutions is also likely to affect their financial performance and outreach to underserved market segments, we include the number of total microfinance borrowers in a country as a share of the overall population and the poor population, which is taken from the Global Microscope on the Microfinance

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[10] We also clustered standard errors at the country level and derived similar qualitative results. We do not present those results here.

Business Environment produced by the Economist Intelligence Unit (EIU). Qualitative results are similar for either measure of penetration and thus we present only the results using MFI borrowers as a share of the poor population in what follows. We expect greater microfinance penetration to be associated with lower profitability and, perhaps, greater outreach to women and the poor (proxied by smaller average loan size) if such competitive effects are substantial. The inclusion of this variable reduces our sample by about one-third, and thus it does not appear in some of the robustness checks described below that focus on specific sub-populations (though it does appear in the base results and all extensions that use the full sample).

In focusing on the number of branches in a country, we cannot distinguish whether these branches belong to small or large banks, or where they are located within a country. We are therefore open to the possibility that banks might compete for a subset of clients of microfinance institutions, through either relationship lending based on soft information or new methods based on hard information that are favored by larger banks. That said, because our analysis is restricted to developing countries with relatively under-developed banking systems, we suspect that relationship lending based on soft information would be the most likely method for banks to compete with microfinance institutions.

Because banks are so much larger than microfinance institutions in almost all developing countries, the decisions of banks to extend their branch networks were likely to be made independent of the presence and activities of microfinance institutions. It is therefore logical to treat the penetration variables as exogenous in our regressions, though we will return to this issue below.

In the base regressions we also replace the branch penetration variables with standard measures of financial development that have been used in the literature on financial development and growth (Levine, 2005). The measures we use are the ratios of private credit and liquid liabilities to GDP, which reflect the size of the banking sector, and the interest rate spread, that is, the difference between prevailing lending and deposit interest rates, as a proxy for banking sector efficiency.[11] To the extent that all of these measures are correlated with microfinance profitability and outreach, it would seem unlikely that our penetration measures capture the potential for banks to reach microfinance customers, as we had hoped, and thus cast doubt on the notion that we are picking up the effects of competition in our regressions. By contrast, if we find significant relationships only for the branch penetration variables, it reinforces our case.

We then alter our base regressions by interacting the branch penetration variables with variables reflecting the degree of commercialization of each microfinance institution. As described above, commercialized microfinance institutions have a profile distinct from others, earning higher profits by making larger loans at lower cost per dollar lent (Cull, Demirguc-Kunt, and Morduch, 2009). The variables we use are a dummy variable indicating that an institution receives the majority of its funding from commercial sources, another indicating whether the institution makes loans on an individual (as opposed to a group liability) basis, another indicating whether it takes deposits, and a final dummy variable indicating whether it is chartered as a non-governmental organization.[12]

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[11] For descriptions of standard indicators of financial development and their use see Beck, Demirgüç-Kunt, and Levine (2000).

[12] Commercial funding includes deposits and commercial borrowing which is divided by total funding. Total funding also includes donations, non-commercial borrowing (i.e., at non-market rates), and equity,

Most of the control variables in equation (1) are the same as those used in other studies of MFI performance and outreach (Ahlin and Lin, 2006; Ahlin, Lin, and Maio, 2011; Cull, Demirgüç-Kunt, and Morduch, 2007). *Yield* is the real gross portfolio yield, a measure of average interest charges faced by customers. Because loan losses are not netted out of the revenues, this measure is intended to capture the ex-ante interest rate charged by the lender rather than the ex-post interest rate realized on the portfolio.[13] In other studies, portfolio yields have been positively linked to profitability measures (Cull, Demirgüç-Kunt, and Morduch, 2007, 2011). The ratios of *capital costs* and *labor costs* to assets are included in the regressions as measures of the productive efficiency of microfinance institutions. The same studies find that those costs measures are negatively linked to profitability.

We control for the lending methods of the microfinance institutions with dummy variables for *village bank lending* and *solidarity group lending*. Solidarity group lenders employ contracts based on joint liability. Loans are made to individuals, but the group, which has between 3 and 10 members depending on the institution and location, shoulders responsibility for a loan if a member cannot repay. Village bank lenders tend to make loans to larger groups. In some cases, each branch forms a single, large group and is given a degree of self-governance. In Uganda's village banks, for example, joint liability loans are made to groups of twenty or more. There is no extensive screening, no collateral is required, loans are smaller, and interest rates are higher than for other lenders (McIntosh, de Janvry, and Sadoulet, 2005). The omitted category in our regressions is

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which tends not to reflect true commercial investment for most microfinance institutions (Cull, Demirguc-Kunt, and Morduch, 2009).

[13] Real portfolio yield = (nominal portfolio yield – inflation rate)/(1 + inflation rate). Nominal portfolio yield = (interest on loan portfolio + fees and commissions on loan portfolio)/gross loan portfolio.

therefore "individual lenders" (shorthand for microbanks that lend to individuals using standard bilateral contracts between the lender and a single borrower).[14]

Institution-specific characteristics are captured by controls for the *age* and size (measured by *total assets*) of microfinance institutions. Well-established microbanks might have a different profile than recent entrants, especially in terms of profitability. Similarly, larger microbanks might be better able to take advantage of scale economies that improve their profitability, though they may rely on larger loans to do so.

The regressions also include a number of country-level controls. The *inflation rate* and *real GDP growth* summarize the macroeconomic environment. High inflation makes it difficult for borrowers and lenders to contract with one another, though the impact on lending by microfinance institutions is somewhat muted (Ahlin and Lin, 2006). Growth has a strong impact on MFI performance, in terms of financial sustainability, lower default rates, and growth in loan size (Ahlin and Lin, 2006; Ahlin, Lin, and Maio, 2011). Overall, these results suggest that the country context is an important determinant of MFI performance.

Institutional development is captured by the *KKM index*, a measure of broad institutional development created by Kaufmann, Kraay, and Maztruzzi (2007). Although group lenders use informal mechanisms to secure high levels of repayment, microfinance institutions that lend to individuals might benefit from adherence to the rule of law and well-functioning supporting institutions that help to enforce contracts such as courts, which could improve their profits and enable them to make smaller loans. The *rural population* share (in 1990) is included because forming solidarity groups might be more

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[14] In the regressions that interact the individual lending dummy with the bank penetration variables, we change the omitted category to include both the solidarity group lenders and the village banks.

difficult in sparsely populated areas and contact between borrowers and individual lenders that are not located nearby is likely to be problematic. We also include *rural population growth* (since 1990), since McIntosh, de Janvry and Sadoulet (2005) found that most of the microfinance entry in Uganda in the 1990s occurred in rural areas. We therefore want to control for the possibility that rapidly growing rural areas might attract microfinance institutions with a different profitability-outreach profile. Finally, *region* is a matrix of dummy variables for each main region of the developing world, with "Latin America and the Caribbean" as the omitted category, since profitability-outreach profiles might differ along regional dimensions that are not captured by our other regressors.

Summary statistics for all of our dependent and explanatory variables, and descriptions of how they were constructed, are available in appendix A. We present the correlations between country-level averages for those variables in Table 1.[15] The bi-variate relationships follow expectations based on the existing literature that uses this (or a similar) database. For example, the correlations are consistent with the notion that larger, commercially-funded microfinance institutions are more profitable, make larger loans, and have lower costs per dollar of assets.

4. Base Results

Base results for the outreach measures (average loan size and the share of women borrowers) are in Table 2; those for profitability (financial self sufficiency−FSS−index and return on assets) appear in Table 3. The results for many of the control variables are in line with previous estimates (Ahlin and Lin, 2006; Ahlin, Lin, and Maio, 2011; Cull,

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[15] We report correlations at the country level rather than the MFI level so as not to artificially inflate significance levels.

Demirguc-Kunt, and Morduch, 2007, 2011). For example, the cost and portfolio yield

variables are strongly correlated with profitability in the predicted ways (negative for

cost, positive for portfolio yield), and the village and solidarity group lending variables

are strongly associated with smaller loans sizes and more lending to women. [16] The rural

population growth variable is strongly associated with greater lending to women,

suggesting the importance of rural controls. The MFI penetration variable (borrowers as a

share of poor population) is associated with smaller loan sizes and greater lending to

women, consistent with the notion that competition between MFIs is associated with

deeper outreach to underserved market segments.

The key variables in our analysis are the bank branch penetration variables. If

competition from banks affects microfinance institutions, spurring outreach by

compelling them to pursue new market niches, we would expect a negative relationship

between bank penetration and average loan size, which is true for the demographic

branch penetration variable (per capita branches) in Table 2, model 2. We expect a

positive relationship with the share of women borrowers, which we see for the

geographic penetration variable (branches per sq. km) in model 6. We also expected bank

penetration to have a dampening effect on the profits of microfinance institutions.

Although the coefficient for the demographic branch penetration variable is negative in

both the FSS index and ROA regressions, it does not achieve significance. However, in

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[16] Positive results for the real portfolio yield variable in the FSS and ROA regressions in Table 3 would
again appear to contradict results from Vanroose and D'Espallier (2013), who find that headline lending
and deposit rates at the country level are negatively associated with profitability for MFIs. However, we
include information on interest rates in the form of real yields for each MFI in our regression. We also
include the (MFI-specific) ratio of capital costs to total assets in the regressions and find that is strongly
negatively associated with MFI profitability. That variable could be picking up the negative effect of
interest rates on profitability found in Vanroose and D'Espallier (2013). Because our variables on real
yields and capital costs are computed at the MFI level, they are likely to offer more precise estimates than
country level interest rate variables.

subsequent tests described below in Section 7, we demonstrate that bank branch penetration is negatively associated with the financial performance of institutions with non-rural clienteles that are more likely to overlap with the branch footprint of banks.

The base results provide some indications that competition from banks compels microfinance institutions to expand their outreach. Also, we hypothesize that effects of competition from banks on both profitability and outreach should be more pronounced for more commercially-oriented microbanks than others. This is a key element of our identification strategy that we will return to below.

In contrast, standard measures of financial development (private credit/GDP, liquid liabilities/GDP, and bank interest rate spreads) are significant at the five percent level in only one of twelve possible cases in Tables 2 and 3. In the one significant case, higher interest rate spreads are associated with less lending to women. The general lack of significance for the standard indicators of financial development makes it more plausible that our measures of bank branch penetration are reasonable proxies for the competition imposed on microfinance institutions by banks.

The validity of the base results rests on the assumption that banks' decisions to expand their branch networks are made independent of the presence and activities of microfinance institutions. Given their respective sizes, we feel this is a reasonable assumption, and the data bear this out. If we think of our analysis as summarizing an experiment in which microfinance institutions are randomly assigned bank penetration levels, we would expect the types of microfinance institutions found in high and low-bank penetration areas to be similar. We would also hope that the characteristics other than bank penetration of the countries in which those institutions are located are similar.

In Table 4 we split the sample of microfinance institutions and the countries in which they reside into two sub-samples, based on high and low bank branch penetration. Countries with penetration levels above the sample median are defined as high penetration areas, those below are in low penetration areas. We do this separately for the demographic and geographic penetration variables. Microfinance institutions in high and low-penetration areas are not significantly different from one another, except that microbanks constituted as NGOs are more prevalent in high geographic penetration areas and institutions tend to be slightly older in high penetration areas for both geographic and demographic penetration. Regarding country characteristics, areas with low levels of demographic penetration are somewhat more rural and have slightly lower scores on the KKM index of institutional development. On the whole, however, the sample characteristics for high and low penetration areas are remarkably similar, suggesting that it is appropriate to treat those variables as exogenous in our regressions.

5. Which Microfinance Institutions Are Most Affected by Competition?

Although there are some significant relationships between bank branch penetration and microfinance outcomes for the full sample, we expect that the relationships should be stronger for some institutions than for others. We hypothesized, for example, that microfinance institutions that rely heavily on commercial sources of finance would be more likely to behave like banks. Those microfinance institutions also tend to make loans to individuals rather than to groups and tend not to be non-governmental organizations (Cull, Demirguc-Kunt, and Morduch, 2009). We therefore expect any competitive effects to be more pronounced for commercially-funded microfinance institutions that make

loans to individuals and less pronounced for those institutions that are NGOs when we

interact bank branch penetration with those variables. Another important aspect that

could help shape MFIs' tendencies to pursue more commercial objectives (and help

identify the institutions that are more likely to be competing with banks) is whether they

take deposits, in part because deposit taking typically triggers prudential supervision that

can be costly to comply with. We therefore expect the effects of competition with banks

to be more pronounced for deposit-taking microfinance institutions.

Depth of outreach

The negative relationship between bank branch penetration and average loan size

is much stronger for the microfinance institutions that we hypothesize would face

stronger competition from banks (Table 5). The demographic penetration variable is not

significant when the interaction with the commercial funding, individual lender, and

deposit-taker variables are introduced (models, 2-5). The coefficients on those interaction

terms are, however, negative, large (in absolute value), and highly significant. The

interactions with the geographic penetration variables (models 6-10) are similar, though

their significance levels are somewhat reduced. By contrast, for NGOs the negative

relationship is much less pronounced for demographic penetration and is significantly

different from zero at only the ten percent level (See F-statistic at bottom of table). The

geographic penetration variable is actually positively associated with average loan size in

model 6, though the effect is small. Given the respective size of the NGO coefficient and

the interaction term, the results suggest that at the very highest levels of geographic

penetration in our sample, NGOs grant larger loans than in other environments. Still, the

average loan size for NGOs is substantially smaller than that of other MFIs throughout almost the entire range of the geographic penetration variable. The patterns for both penetration variables in Table 5 are consistent with the idea that NGOs alter their outreach much less than commercially-funded "individual" lenders and deposit takers in response to competitive pressures from banks, presumably because the NGOs' focus was already on making small loans.

A similar pattern emerges for the share of lending to women borrowers (Table 6). When the commercial funding variable is interacted with either demographic or geographic penetration in models 2 and 7, the penetration variable is either not significant or weakly significant (model 2), but the interaction term is large, positive, and significant. Similarly, in the regressions that use the geographic penetration variable, the interaction between individual lending and bank branch penetration is positive, and is highly significant in model 10. While commercially funded institutions and those that make loans to individuals are both less likely to lend to women than others, their share of lending to women increases with greater bank branch penetration. By contrast, and similar to the average loan size regressions, the relationships between bank branch penetration and the share of lending to women are less pronounced for NGOs. In all, the results for both measures of bank branch penetration are consistent with the idea that commercially-funded microfinance institutions and those that make loans to individuals (rather than groups) increase outreach to women in response to competition from banks.

Profitability

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The results for profitability are weaker than those for depth of outreach. There are no significant negative relationships between the FSS index and demographic branch penetration for non-governmental organizations, commercially funded institutions, or individual lenders (Table 7, models 1-3, 5). However, the deposit-taker dummy variable is positive and significant while its interaction with demographic branch penetration is negative and weakly significant (model 4). While this could suggest that FSS declines for deposit takers as branch penetration increases, the positive weakly significant coefficient for the bank branch penetration variable cancels out the coefficient on the interaction term. Thus there is no significant relationship between demographic branch penetration and FSS for deposit takers (see F-statistic at bottom of Table 7 for model 4).

The positive coefficient for demographic branch penetration in model 4 suggests greater financial self-sufficiency for non-deposit takers as branches proliferate. Similarly, geographic branch penetration is positively linked to the FSS index in models 6-9, though its interactions with MFI characteristics are insignificant (weakly significant in one case). We view these positive relationships with the branch penetration variables as reflective of selection effects – meaning banks have tended to locate where the financial performance of MFIs is stronger – since this pattern inconsistent with greater competitive pressure from banks. We present only the results for the FSS index, noting that we found similarly insignificant relationships when using return on assets as the dependent variable.

Taken together, the results in this section support the notion that competition from banks compels commercially-funded microfinance institutions, those that make loans to individuals, and deposit-takers to increase their depth of outreach, but they do not provide

evidence that competition with banks worsens the financial performance of microfinance institutions, though we will return to this issue below in section 7.

6. Competing explanations

In this section, we first re-run our models on the sub-sample of well-established institutions, since much bank penetration occurred after these institutions were already operating. For them, significant results would be more likely to reflect the effects of competition rather than selection. Second, we test whether our measures of bank branch penetration are actually proxies for other features of the banking sector, by including variables related to ownership and sector concentration. Third, we test whether the significant relationships that we find are attributable to the effects of regulation and supervision of microfinance institutions rather than competition with banks.

Selection of Older Microfinance Institutions

One explanation for the significant relationships found between bank penetration and the depth of outreach of microfinance institutions hinges on selection rather than competition. That is, microfinance institutions with particular characteristics, including depth of outreach, may tend to enter markets with high (or low) bank penetration. To the extent that is so, it is inaccurate to ascribe our results to competition with banks.[17]

To address whether selection is driving our results, we re-run our models on the subset of microfinance institutions that were in existence prior to 1996. We do so because

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[17] We note that even if selection is driving our results, the pattern suggests that those that make smaller loans and lend more to women are fitting themselves into high density markets, and thus are complementary to the banks that are already there. They are therefore making a contribution to expanded outreach, though they might not be competing directly with banks.

our bank branch penetration variables come from the end of the period, and thus reflect the rapid expansion in the banking sectors of many developing countries since the mid-1990s. The ratio of credit to the private sector divided by GDP increased substantially from 1995 to 2005 in the transition countries of Europe and Central Asia, in the Middle East and North Africa, and in South Asia, and increased somewhat in sub-Saharan Africa (Figure 1). There was no increase in East Asia and the Pacific or in Latin America, in part due the systemic financial crises there, and thus this approach is less appropriate for microfinance institutions from those regions.

We present the models with interaction terms to capture our predictions about the types of microfinance institutions that would be most affected by competition with banks. We present only the results for geographic bank branch penetration to conserve space, though the results for demographic penetration are qualitatively similar to those already shown. As in the results for the full sample, demographic penetration is strongly linked to smaller loan sizes but not significantly linked to the share of lending to women for the sample of older microfinance institutions (results not reported).

The results for the sub-sample of older microfinance institutions are generally similar to those for the full sample (Table 8 and Table 9). For example, there is no significant relationship between geographic penetration and average loan size for non-governmental organizations. There is, however, a significant negative relationship for individual lenders. There is also a negative relationship for commercially-funded microfinance institutions (though here it is not statistically significant, while it was in the full sample). Demographic penetration (again, not shown) is, however, negative, large in absolute value, and highly significant for commercially-funded institutions, as it was for

the full sample. The results for average loan size are therefore very similar to those for the full sample.

The same is true for regressions on the share of women borrowers (Table 8). There is a significant positive relationship between geographic branch penetration and the share of lending to women for non-governmental organizations and individual lenders (see F-statistics at bottom of table), though we cannot reject the hypothesis that the effect is the same as for non-NGOs or non-individual lenders (due to the insignificance of the coefficients on the interaction terms in models 6 and 8). For commercially-funded institutions, the effect is somewhat stronger and we can reject the hypothesis that it is the same as for other microfinance institutions, since the coefficient on the interaction is significant, while that on the penetration variable is not (Table 8, model 7). As in the results for the full sample, older commercially-funded microfinance institutions appear more apt to have increased lending to women in response to competition from banks.

Results for profitability for the sample of older microfinance institutions differ from those for the full sample (Table 9). Models 2 and 3 indicate that geographic penetration is negatively related to the financial self-sufficiency index for all types of microfinance institutions. Model 1 indicates that the negative effects of branch penetration on financial self-sufficiency are more pronounced for NGOs given that the relationship is not significant for other types of microfinance institutions in that regression (see also the F-statistic at bottom of table). Model 4 indicates that geographic branch penetration is also negatively associated with financial self-sufficiency for deposit takers (see F-statistic at bottom of table), in line with expectations. Similar results do not hold, however, when we use return on assets as our measure of profitability.

At the risk of reading too much into a single regression, Model 1 suggests that older non-governmental organizations have a permanent reduction in FSS in countries with a high degree of competition from banks. The pattern is consistent with the notion that competition from banks compels those microbanks into a new market niche, and that, as a result, the FSS of non-governmental organizations suffers over time. The results are similar to findings on the effects of prudential supervision on the outreach and profitability of microfinance institutions: commercially oriented institutions are likely to curtail outreach, making larger loans and lending less to women to maintain their profitability. Less commercially oriented institutions, such as non-governmental institutions, maintain their outreach but their profitability declines as a result of the costs of regulation and supervision (Cull, Demirguc-Kunt, and Morduch, 2011).

The findings for the subset of older microfinance institutions therefore reinforce our findings for the full sample. Indeed, the findings for the FSS index are stronger than they were in the full sample regressions. Because much of the bank entry and expansion summarized in our indicators of branch penetration occurred after these microfinance institutions were in existence, the sub-sample results make it more likely that the relationships we find are due to competition with banks rather than the non-random entry of microfinance institutions into particular banking environments.

Banking Sector Ownership and Concentration

A limitation of our branch penetration variables is that we do not know the identities of the banks to which those branches belong. The number of branches could be a proxy for underlying aspects of the structure and ownership of the banking sector that are driving our results. For example, foreign banks might focus on wealthier clients, and

thus a high share of foreign ownership in the sector might coincide with a relatively less expansive branch network.[18] Alternatively, a high degree of state ownership in banking might imply an extensive branch network if the mandate of state-owned banks is to provide broad access to financial services.

To test for these possibilities, we include three new variables in our regressions: the share of total banking sector assets held by foreign- and state-owned banks, respectively, and concentration measured as the share of sector assets held by the three largest banks. If those variables are significant while the penetration variables are not, it might cast doubt on whether our results are due to competition or, at the least, it would help us to understand the nature of the competition that most affects microfinance institutions.

Ownership and concentration variables are, in fact, often significant in our regressions, but so too are the penetration variables. For example, greater state ownership in banking is associated with smaller loan sizes, whereas foreign ownership of banks is associated with larger loan sizes (Table 10). Controlling for ownership and concentration, the branch penetration coefficients are similar to those we have reported thus far. There is a negative, significant relationship between demographic branch penetration and average loan size for commercially funded institutions, those that make loans to individuals, and deposit takers (see F-statistics for models 2-4). For individual lenders, the relationship between branch penetration and loan size is statistically distinguishable from that of other MFIs as indicated by the significant negative coefficient on the interaction term in model 3. Similar patterns emerge for individual lenders for the geographic penetration as well (models 8 and 10). The negative relationship between branch penetration and average

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[18] See Clarke et al. (2003) for a discussion of the role of foreign banks in developing countries.

loan size is more muted for non-governmental organizations than other microfinance institutions (see, for example, the positive significant coefficient for NGO*demographic branch penetration in model 1).

Bank concentration is negatively associated with the share of lending to women, as one might expect (Table 11). As in our previous results, the interaction between penetration and both the commercial funding and individual lending variables is positive and significant (in all but one case in models 2, 3, 7, and 8).[19] The interaction between both measures of penetration and the non-governmental organization dummy is negative and significant (models 1 and 6), though we cannot reject that there is no relationship between either measure of penetration and the share of lending to women by non-governmental organizations based on the F-tests at the bottom of the table.

Finally, there is one strong relationship between our penetration measures and financial performance as measured by the FSS index in Table 12. Model 8 indicates that the FSS of individual lenders increases with the degree of geographic penetration. Again, this positive relationship likely reflect selection effects because microfinance institutions that make loans to individuals and banks are more likely to cover profitable locations. Generally weaker results for the profitability measures are, however, consistent with our main regressions. In short, the inclusion of bank ownership and concentration measures does not alter our conclusions. Bank branch penetration is associated with smaller loan sizes and more lending to women for commercially funded microfinance institutions and

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[19] We acknowledge, however, that we can only reject the hypothesis that the relationship between penetration and the share of lending to women is zero for commercially funded institutions when we use the geographic penetration measure (see F-test, model 7). In that sense, results are a bit weaker than when the bank ownership and concentration variables are not included in the regression.

those that make loans to individuals. Relationships are more muted for microfinance institutions that are non-governmental organizations.

Regulation and Supervision of Microfinance Institutions

The bank branch penetration variables might also be capturing the effects of regulation and supervision if well-developed banking sectors, as reflected in deeper bank branch networks, spur more stringent regulatory and supervisory scrutiny of financial institutions, including providers of microfinance. We doubt this could be the case because formal supervision is associated with less outreach, meaning larger loans and less lending to women, for commercially oriented microfinance institutions (Cull, Demirguc-Kunt, and Morduch, 2011). This suggests that commercially oriented institutions curtail outreach to maintain profitability in complying with prudential supervision. Yet, in our analysis, branch penetration is strongly associated with smaller loans and more lending to women. Thus it is unlikely that the branch penetration variables are capturing the effects of supervision of microfinance providers.[20]

But to be sure about this, we include in our regressions a variable for whether an institution faces onsite supervision, meaning supervisors are physically present when reviewing their books. About half of the institutions in our sample face onsite supervision. The supervisory variable is not significant when included in our basic regressions, and the results for the branch penetration variables (and their interaction with other variables) are unchanged. The onsite supervision variable is associated positively with average loan size and negatively with lending to women, as expected, when the

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[20] It might be possible that penetration is associated with less stringent supervision if, for example, extensive branch networks reflect a laissez faire approach to expansion and other aspects of supervision, though this seems unlikely to us.

banking concentration and ownership variables are included in the regression. But the results for the penetration variables remain largely unchanged. Since the qualitative results of the models with onsite supervision are so similar to those we have already presented, we do not present them here.

7. Client Orientation, Product Offerings, Loan Pricing, and Repayment

A potential concern with our analysis is that bank branch penetration is measured at a national level while competition between banks and MFIs is likely to occur in only a subset of geographic areas. It could be, for example, that in some countries most microfinance lending takes place in rural villages where there are no bank branches and no ATMs. In those cases, it would be wrong to ascribe a negative relationship between bank branch penetration and the average loan size of MFIs to competition. To address this possibility, we use a variable that describes the geographic composition of MFI clienteles, which is available for about two-thirds of the MFIs in our sample. We define a dummy variable ('rural clientele') that is equal to one if an MFI's rural customers exceed its combined number of customers living in small and large cities.[21]

We include that variable in the regressions and we also interact it with our measures of bank branch penetration (Table 13). We find that demographic branch penetration is significantly negatively associated with average loan size (model 1). However, the coefficient for the interaction between rural clientele and demographic branch penetration is positive, suggesting that competition from banks drives down loan size to a greater extent for MFIs that have predominantly urban clienteles. Indeed, for

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[21] The breakdown of MFI clients by rural areas, small cities, and large cities was determined by the MIX.

MFIs with rural clienteles the relationship between branch penetration and average loan size is not statistically significant (see F-statistic at bottom of table for model 1).

We also find that geographic branch penetration (which likely provides a better indicator of bank branch coverage in rural areas than the demographic penetration variable) is significantly positively associated with the share of lending to women for MFIs with a predominantly rural client base, but not for others (Table 13, model 4). Finally, demographic branch penetration is negatively associated with profitability (ROA) for clients with non-rural client bases (see negative significant coefficient for demographic penetration and the insignificant F-statistic at bottom of table for model 7 for MFIs with rural clienteles). This provides another indication that competition from banks is more likely to affect urban-oriented MFIs and could help explain why we found generally weak relationships between bank branch penetration and MFI financial performance in the base results.

To get a more complete sense of how competition from banks affects MFIs' behavior, we look at three additional outcomes: the range of product offerings and the pricing of loans (Table 14) and the delinquency rate on loans. In model 3, the geographic branch penetration measure is positively associated with the number of products offered by an MFI, though the coefficient does not quite achieve significance.[22] Similarly, in model 4, the geographic branch penetration is very nearly significantly associated with

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[22] The number of product offerings is reported in the MIX and is equal to the sum of the number of loan products, savings products, and non-financial products.

increased product offerings for MFIs with predominately rural clienteles (see F-statistic at bottom of table for model 4).[23]

We test for relationships between bank branch penetration and the pricing of MFI loans in regressions that use real portfolio yield as the dependent variable. Because real yields put the interest rates charged on loans in a fuller context, they provide fairer pricing comparisons across markets. Model 5 shows that demographic branch penetration is associated with significantly lower real portfolio yields. Each additional bank branch per 1000 residents is associated with a 0.0057 reduction in real portfolio yields (relative to a median of 0.21). As in our results on financial performance that control for MFI clientele, the demographic branch penetration variable appears to capture the effects of competition from banks on MFI loan pricing in urban areas better than in rural areas (note that the rural*demographic penetration coefficient is positive in model 6, and the F-statistic at the bottom of the table is only weakly significant).

In Uganda, competition between microfinance institutions led to lower repayment rates for incumbent providers (McIntosh, de Janvry, and Sadoulet, 2005). We would expect the same to be true for competition with banks, and we would again expect results to be stronger for the microfinance institutions most apt to compete, those that rely on commercially funded institutions that take deposits and lend to individuals.

To check this, we use the share of the portfolio that is at risk, defined as thirty or more days overdue, as the dependent variable in our regressions. We find results similar to those found elsewhere in the literature. For example, individual lenders have a higher share of at risk loans, while non-governmental organizations are a bit lower. We do not,

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[23] The geographic penetration variable does achieve significance when MFI borrowers as a share of the population appears in the regression (not shown), but that reduces our sample and renders coefficients in the portfolio yield regressions insignificant.

however, find any significant relationships between the branch penetration variables (or their interactions) and portfolio at risk (and thus we do not present those results in the paper). We acknowledge that the absence of significant results could stem from the inadequacy of our measure as an indicator of portfolio quality.

8. Instrumental Variables Regressions

We have argued that bank branch penetration is exogenous to the profitability and outreach of microfinance institutions. On a priori grounds this seems likely, based on the large size of banks relative to microfinance institutions. And indeed we have shown that the average characteristics of microfinance institutions and the countries in which they reside are very similar in high- and low-bank branch penetration environments. Moreover, our results are stronger for older microfinance institutions, whose existence predates much of the rapid expansion of banking sectors in the developing world since 1995.

Another concern is that a factor omitted from our regression is responsible for both relatively high levels of branching and increased outreach by microfinance institutions. And yet, the previous sections show that our results are robust to the inclusion of a number of potential candidates. In sum, our evidence to this point suggests that the relationships between branching and the performance of microfinance institutions are likely to be causal.

Despite the foregoing, the endogeneity of financial development, especially as it relates to economic growth, has long been a concern in this literature (See Levine, 2005). As a final check of the robustness of results, we therefore follow the example of other

authors by using dummy variables that identify the origin of countries' company or commercial law as being English, French, German, or Socialist as instruments for our measures of bank branch penetration (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998; Beck, Demirguc-Kunt, and Levine, 2003).[24]

The pattern of results in Table 15 is similar to that in the base models. For example, demographic branch penetration is strongly negatively related to average loan size (model 2). Moreover, the OLS and IV coefficients for that variable are very similar, and thus it is not a surprise that the Hausman test indicates that it is appropriate to treat demographic penetration as exogenous in that regression. That test does indicate that geographic branch penetration is endogenous (model 1), and the IV regression produces a negative significant coefficient whereas it had been insignificant in the OLS regression (Table 2, model 1). The relationships between the branch penetration variables and average loan size are therefore stronger in the IV models than in the base regressions.

Neither branch penetration variable is significantly associated with the percentage of women borrowers in the IV regressions (models 3 and 4). However, Hausman tests indicate that it is appropriate to treat the penetration variables as exogenous, and thus the OLS results for that variable are valid. The specification tests indicate that endogeneity could be a concern in the financial performance regressions. Significance levels for the demographic branch penetration variable are higher and coefficients are larger (in absolute value) in the IV regressions (models 6 and 8) than they were in the OLS regressions. The geographic branch penetration variable is insignificant in both the FSS and ROA regressions (models 5 and 7), but that was also true in the OLS regressions. Our

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[24] Other authors have included a dummy variable to identify countries that have Scandinavian legal origin. None of the microfinance institutions in our sample come from such a country, and thus that variable is dropped from our regressions.

instruments perform well in the models that include the demographic branch penetration variable in that they are relevant (partial Shea correlations of 0.29), and appear to be excludable, especially in the FSS regression (model 6). In short, the IV regressions reinforce the conclusions drawn from the OLS regressions and even indicate a stronger negative relationship between demographic branch penetration and MFI financial performance.

9. Conclusions

Around the world, policymakers, regulators, bankers, and activists are focusing on the promise of creating more inclusive financial sectors. Until recently, microfinance institutions have filled market niches, with seemingly little interaction with the rest of banking systems. As microfinance expands in parallel with the broadening of commercial banking sectors, the prospect for interaction—and direct competition—has increased sharply.

This paper has taken a first empirical step to refine questions around the industrial organization of traditional banking and microbanking. We find evidence that competition matters. Greater bank penetration in the overall economy is associated with microbanks pushing toward poorer markets, as reflected by smaller average loans sizes and greater outreach to women—though there is no strong relationship with their profitability.

We consider plausible alternative explanations for the correlations, including relationships that run through the nature of the regulatory environment, but we fail to find strong support for these alternative hypotheses. The evidence appears to be driven by direct competition and contestability.

The data do not allow us to explore the specific mechanisms behind the results. From a theoretical perspective, the result could emerge because microfinance institutions find it difficult to maintain dynamic incentives (created by the credible threat to deny loans in the future to defaulters) when better-off customers gain opportunities to obtain financial access in the broader banking system. That explanation, however, cannot be distinguished from the simpler hypothesis that microfinance institutions cannot compete effectively on price and/or quality of services. It remains for future work to explore these fundamental interactions.

The findings hold broad lessons for policymakers. First, in keeping with earlier studies (e.g., Baquero et al. 2012 and Cull, et al. 2011), there are systematic differences in the behaviors of particular types of microfinance institutions. Nonprofits respond to market pressure differently from for-profits. Those with a social orientation respond differently to regulations from those with a commercial ethos. The evidence on competition we find here is particularly strong for microbanks relying on commercial-funding and using traditional bilateral lending contracts (rather than group lending methods favored by microfinance NGOs).

Second, if a regulator's goal is to promote access to finance, regulating commercial banks can help through indirect channels. Specifically, our results suggest that regulation that affects the spread of the commercial banking sector can have (seemingly) beneficial positive spillovers by inducing commercial microfinance organizations to focus more sharply on poorer populations and women. An extension of this work would investigate the costs and benefits of such a shift. We find some evidence of negative impacts from competition in urban areas, and it would be helpful to

investigate whether moving the focus to the "lower-end" of the market may ultimately

reduce profitability more generally – and how it affects the ability to cross-subsidize

customers of different types.

Third, and most generally, microfinance organizations are found to be

economically responsive, and we find that their forms can shift. In the absence of

competition, commercialized microfinance tends to focus on better-off customers (as

proxied by gender and loan size). But the focus shifts depending on the economic

environment, and can move to a broader spectrum of customers. In this sense, we find

that the microfinance sector is dynamic, and historical patterns should not be assumed to

dictate the way of the future.

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Table 1. Correlation matrix using country-level averages for each variable

* represents statistical significance at the 5% level. Average loan size is the average loan size relative to the average per capita income of the bottom 20% in the country. Percent women borrowers is the share of women borrowers of a microfinance institution. The financial self-sufficiency index is a ratio which is greater than one if an institution generates sufficient revenue to cover its costs. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. Rural population(%, 1990) is the share of rural population in 1990. Rural population growth is the annual rural population growth rate averaged over 1991 – 2000. Log of MFI age is the log of the age of the institution and Log of assets(PPP) is the log of total assets in purchasing power parity terms. Village banking lending is a dummy variable that takes the value one if village bank lenders make loans to larger groups. Solidarity group lending and individual lending are dummy variables equal to one if the loan is made to an individual, but the former assumes joint liability. KKM is the Kaufmann, Kraay, Mastruzzi index of institutional development. GDP growth rate is annual real GDP growth rate. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources.

Variable	Average loan size	Percent women borrowers	Financial self-sufficiency index	Return on assets	Geographic branch penetration	Demographic branch penetration	Rural population (% 1990)	Rural population growth (%)	Real yield	Capital costs / Assets	Labor costs/ Assets	Log of MFI age
Geographic branch penetration	-0.3134*	0.2523	0.1086	-0.0579								
Demographic branch penetration	-0.3168*	-0.0786	-0.1251	-0.1155	0.3733**							
Rural population (% 1990)	0.1249	0.1079	-0.1198	-0.2218	0.1891	-0.4289**						
Rural population growth (%)	0.173	0.164	-0.0271	-0.0619	-0.0059	-0.4529**	0.6872**					
Real yield	-0.1171	0.1674	0.2855**	0.2729*	-0.1667	-0.1186	0.012	0.1038				
Capital costs / Assets	0.0362	0.1419	-0.1988	-0.2363	-0.2548	-0.0494	0.0829	-0.0657	0.6228**			
Labor costs/ Assets	-0.185	0.3430**	-0.2034	-0.2008	-0.2164	-0.0474	0.0116	-0.103	0.6558**	0.8144**		
Log of MFI age	0.1253	-0.1859	0.3730**	0.2632*	0.1772	0.0125	0.0151	0.1889	-0.0107	-0.2524*	-0.2044	
Log of assets (PPP)	0.2397*	-0.1258	0.2137	0.178	0.2447	-0.0308	-0.0782	0.0603	-0.3286**	-0.2734*	-0.3976**	0.4271**
Village banking lending	-0.189	0.4380**	0.1823	0.1693	0.0148	-0.0836	0.2514*	0.1838	0.3332**	0.2778*	0.3440**	0.0227
Solidarity group lending	-0.1814	0.2267	-0.4693**	-0.4828**	0.1483	-0.1066	0.2575*	0.1039	-0.0952	0.0782	0.1232	-0.3282**
Inflation	-0.0022	0.0851	-0.4144**	-0.4556**	-0.086	-0.0691	-0.2352	-0.2789*	-0.4215**	0.0791	0.0143	-0.0996
KKM	0.0224	-0.1422	0.1136	0.1049	-0.0184	0.4873**	-0.4379**	-0.2121	0.1425	-0.0233	0.0339	0.2421*
GDP growth rate	0.1083	0.0753	0.1188	-0.0069	0.1205	-0.0112	0.1281	0.1652	0.2608*	0.1318	-0.0345	-0.1235
NGO	-0.1833	0.3043**	-0.1516	-0.1899	0.2447	0.0512	-0.0739	0.076	0.0541	0.1361	0.153	0.0619
Commercially funded	0.2640*	-0.1155	0.3307**	0.2784*	0.1145	-0.129	-0.0682	0.2977**	-0.0693	-0.2026	-0.2995**	0.5237**
Individual lending	0.3093**	-0.5884**	0.2722*	0.2668*	-0.1621	0.1689	-0.3604**	-0.2511*	-0.0955	-0.1874	-0.2460*	0.3078**

Table 1. Correlation matrix of variables (continued)

Variable	Log of assets (PPP)	Village banking lending	Solidarity group lending	Inflation	KKM	GDP growth rate	NGO	Commercially funded
Geographic branch penetration								
Demographic branch penetration								
Rural population (% 1990)								
Rural population growth (%)								
Real yield								
Capital costs / Assets								
Labor costs/ Assets								
Log of MFI age								
Log of assets (PPP)								
Village banking lending	-0.1875							
Solidarity group lending	-0.1033	-0.3146**						
Inflation	0.0967	-0.1638	0.173					
KKM	0.1417	-0.1203	-0.1897	-0.0879				
GDP growth rate	-0.1861	-0.0496	-0.0175	-0.3095**	0.1198			
NGO	-0.0778	0.1016	-0.0817	0.1106	-0.0372	0.1542		
Commercially funded	0.5088**	-0.1005	-0.2427*	0.1033	0.1419	-0.06	-0.0326	
Individual lending	0.1828	-0.3630**	-0.6882**	-0.0488	0.2483*	0.083	-0.1026	0.2864**

obs = 49 countries

** Represents statistical significance at the 5% level

* Represents statistical significance at the 10% level

Table 2. The effect of variables representing the development of the banking sector on the outreach of MFIs

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. Average loan size is the average loan size relative to the average per capita income of the bottom 20% in the country. Percent women borrowers is the share of women borrowers of a microfinance institution. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. Private credit / GDP and Liquid liabilities / GDP are the ratios of private credit and liquid liabilities to GDP, respectively, where GDP is gross domestic product. Interest rate spread is the difference between prevailing lending and deposit interest rates. Rural population(%, 1990) is the share of rural population in 1990. Rural population growth is the annual growth rate of the rural population averaged over 1991 – 2000. Log of MFI age is the log of the age of the institution and Log of Assets(PPP) is the log of total assets in purchasing power parity terms. Village banking lending is a dummy variable that takes the value one if village bank lenders make loans to larger groups. Solidarity group lending and individual lending are dummy variables equal to one if the loan is made to an individual, but the former assumes joint liability. Individual lending dummy is the omitted category. KKM is the Kaufmann, Kraay, Mastruzzi index of institutional development. GDP growth rate is annual real GDP growth rate. Europe and Central Asia, Africa, South Asia, East Asia and Pacific, Middle East and North Africa are dummy variables that take the value one if the country is located in Europe and Central Asia, Sub-Saharan Africa, South Asia, East Asia and Pacific, Middle East and North Africa, respectively. The omitted category is Latin America and the Caribbean.

	Average loan size					Percent women borrowers				
	Geographic branch penetration	Demographic branch penetration	Private credit / GDP	Liquid liabilities / GDP	Interest rate spread	Geographic branch penetration	Demographic branch penetration	Private credit / GDP	Liquid liabilities / GDP	Interest rate spread
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial variable	0.0179	-0.4356***	7.2426	9.2538*	-0.0148	0.0071***	-0.005	0.2288	0.1787	-0.0035***
	[0.017]	[0.159]	[5.302]	[5.127]	[0.009]	[0.003]	[0.012]	[0.193]	[0.256]	[0.001]
MFI Borrowers as % of poor	-0.0467*	-0.0959***	0.0201	0.0181	0.0251	0.0024	0.0036	0.0053**	0.0050*	0.0065**
	[0.025]	[0.028]	[0.033]	[0.027]	[0.032]	[0.004]	[0.004]	[0.003]	[0.003]	[0.003]
Rural population (%, 1990)	0.0197	-0.0212	0.0655**	0.0727***	0.0744***	-0.0032	-0.0049	-0.0004	-0.0004	-0.0074***
	[0.027]	[0.030]	[0.026]	[0.026]	[0.027]	[0.004]	[0.004]	[0.003]	[0.003]	[0.002]
Rural population growth(%)	0.2045	-0.5572	0.5344	0.6034*	-0.2352	0.1382***	0.1002*	0.0689**	0.0646**	0.1040***
	[0.389]	[0.535]	[0.354]	[0.320]	[0.307]	[0.051]	[0.053]	[0.033]	[0.033]	[0.027]
Real yield	-8.4738**	-7.0134**	-5.2475**	-5.4046**	-6.9016***	0.2626	0.3137	0.3597*	0.3381	0.2757
	[3.263]	[3.014]	[2.348]	[2.388]	[2.340]	[0.251]	[0.268]	[0.211]	[0.207]	[0.211]
Capital costs / Assets	1.7866	-0.6439	5.0905	4.2182	1.6806	0.3384	0.1373	0.4301	0.3814	0.6152
	[5.040]	[5.158]	[4.973]	[4.784]	[4.285]	[0.531]	[0.542]	[0.528]	[0.516]	[0.501]
Labor costs / Assets	1.0937	-0.9006	-1.1551	-0.9233	1.8119	0.4035	0.4666	0.1819	0.1989	0.2753
	[4.108]	[4.372]	[3.509]	[3.562]	[2.777]	[0.506]	[0.531]	[0.524]	[0.520]	[0.476]
Log of MFI age	-0.5024	-0.3484	-0.6716**	-0.6537*	-0.3559	-0.0049	0.0117	0.0105	0.0127	0.0373
	[0.353]	[0.351]	[0.339]	[0.345]	[0.284]	[0.036]	[0.036]	[0.034]	[0.034]	[0.032]
Log of assets (PPP)	0.4591***	0.3019*	0.3287***	0.3230***	0.3476***	0.0213	0.0161	0.0152	0.0155	0.0143
	[0.164]	[0.158]	[0.122]	[0.121]	[0.104]	[0.013]	[0.015]	[0.011]	[0.011]	[0.009]
Village banking lending	-1.6613***	-1.7065***	-1.8517***	-1.9329***	-1.7483***	0.1352**	0.1279*	0.1590***	0.1593***	0.2585***
	[0.460]	[0.476]	[0.471]	[0.475]	[0.466]	[0.064]	[0.066]	[0.059]	[0.059]	[0.052]
Solidarity group lending	-1.7749**	-1.8707**	-1.4964**	-1.4885**	-0.8564	0.1420***	0.1400***	0.1489***	0.1492***	0.1268***
	[0.762]	[0.765]	[0.706]	[0.713]	[0.548]	[0.046]	[0.047]	[0.046]	[0.046]	[0.046]
Inflation	-0.0826	-0.122	0.0395	0.0373	-0.0993***	0.0124**	0.0099**	0.0129***	0.0118***	0.0105***
	[0.093]	[0.092]	[0.085]	[0.081]	[0.038]	[0.005]	[0.005]	[0.004]	[0.004]	[0.004]
KKM	0.4844	0.1701	0.9659	0.6073	1.2615	0.1287	0.1419	0.0426	0.0401	-0.1286
	[0.693]	[0.739]	[0.750]	[0.649]	[0.833]	[0.125]	[0.120]	[0.096]	[0.099]	[0.078]
GDP growth rate	-0.11	0.0772	-0.027	-0.0067	-0.0616	0.0111	0.0164	0.0093	0.01	0.0077
	[0.084]	[0.094]	[0.070]	[0.068]	[0.077]	[0.015]	[0.015]	[0.012]	[0.012]	[0.009]
Europe and Central Asia	1.7329	-0.9067	2.1632	2.1432	-0.2749	0.2231*	0.1465	0.1313	0.1105	0.1107
	[1.065]	[1.383]	[1.526]	[1.304]	[0.859]	[0.130]	[0.147]	[0.109]	[0.115]	[0.092]
Africa	1.6739	1.6749	0.1121	-0.8137	-0.7965	-0.0199	0.104	0.0134	-0.0006	0.0985
	[1.890]	[1.965]	[1.525]	[1.606]	[1.296]	[0.147]	[0.140]	[0.108]	[0.106]	[0.094]
South Asia	-3.5245**	-2.0139	-3.9094***	-5.9557***	-6.0796***	0.0653	0.2904*	0.148	0.113	0.4699***
	[1.502]	[1.340]	[1.242]	[1.890]	[1.283]	[0.160]	[0.147]	[0.121]	[0.129]	[0.116]
East Asia and Pacific	-1.6334*	-1.1295	-2.2824**	-3.2175**	-2.8422***	0.1799	0.2917***	0.1241	0.1151	0.1994**
	[0.910]	[0.821]	[1.015]	[1.379]	[0.812]	[0.109]	[0.108]	[0.090]	[0.098]	[0.082]
Middle-East and North Africa	-2.4871**	-0.6943	-4.7163***	-8.8145***	-2.1192*	-0.1228	0.1876	0.1809*	0.1328	0.2164**
	[1.120]	[1.472]	[1.069]	[2.912]	[1.109]	[0.227]	[0.151]	[0.096]	[0.146]	[0.092]
Constant	0.2966	7.5028**	-4.118	-5.0465	-1.0748	-0.109	0.0574	-0.2249	-0.2031	0.086
	[2.286]	[3.640]	[3.195]	[3.188]	[2.306]	[0.240]	[0.340]	[0.242]	[0.260]	[0.210]
Observations	273	273	298	298	255	221	221	255	255	217
Number of firms	195	195	215	215	182	164	164	189	189	158
Adjusted R²	0.259	0.293	0.264	0.268	0.306	0.244	0.21	0.186	0.184	0.395

Standard Error in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 3. The effect of variables representing the development of the banking sector on the performance of MFIs

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. The financial self-sufficiency index is a ratio which is greater than one if the institution generates sufficient revenue to cover its costs. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. Private credit / GDP and Liquid liabilities / GDP are the ratios of private credit and liquid liabilities to GDP, respectively, where GDP is gross domestic product. Interest rate spread is the difference between prevailing lending and deposit interest rates. Rural population(%, 1990) is the share of rural population in 1990. Rural population growth is the annual growth rate of the rural population averaged over 1991 – 2000. Log of MFI age is the log of the age of the institution and Log of Assets(PPP) is the log of total assets in purchasing power parity terms. Village banking lending is a dummy variable that takes the value one if village bank lenders make loans to larger groups. Solidarity group lending and individual lending are dummy variables equal to one if the loan is made to an individual, but the former assumes joint liability. Individual lending dummy is the omitted category. KKM is the Kaufmann, Kraay, Mastruzzi index of institutional development. GDP growth rate is annual real GDP growth rate. Europe and Central Asia, Africa, South Asia, East Asia and Pacific, Middle East and North Africa are dummy variables that take the value one if the country is located in Europe and Central Asia, Sub-Saharan Africa, South Asia, East Asia and Pacific, Middle East and North Africa, respectively. The omitted category is Latin America and the Caribbean.

	Financial self-sufficiency index					Return on assets				
	Geographic branch penetration	Demographic branch penetration	Private credit / GDP	Liquid liabilities / GDP	Interest rate spread	Geographic branch penetration	Demographic branch penetration	Private credit / GDP	Liquid liabilities / GDP	Interest rate spread
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial Variable	0.0015	-0.0006	0.1352	-0.0507	0.0002	0.0014	-0.0013	-0.0414	-0.0467	-0.0002
	[0.003]	[0.008]	[0.167]	[0.199]	[0.001]	[0.001]	[0.003]	[0.063]	[0.067]	[0.000]
MFI Borrowers as % of poor	0.0026	0.0022	0.0032	0.0023	0.0005	0.0005	0.000	0.0008	0.0008	0.0004
	[0.002]	[0.003]	[0.002]	[0.002]	[0.003]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Rural population (%, 1990)	0.0060*	0.0053*	0.0048**	0.0046*	0.0021	0.0015	0.0007	0.0018*	0.0018*	-0.0002
	[0.003]	[0.003]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]	[0.000]
Rural population growth(%)	-0.1027**	-0.1040**	-0.1128***	-0.1209***	-0.0761**	-0.013	-0.015	-0.0206*	-0.0206*	0.000
	[0.048]	[0.049]	[0.032]	[0.033]	[0.034]	[0.017]	[0.017]	[0.011]	[0.011]	[0.009]
Real yield	1.2372***	1.2314***	1.0896***	1.0711***	0.9737***	0.4016***	0.3983***	0.3619***	0.3660***	0.3314***
	[0.239]	[0.241]	[0.233]	[0.225]	[0.241]	[0.075]	[0.075]	[0.085]	[0.084]	[0.092]
Capital costs / Assets	-2.2106***	-2.2207***	-2.1527***	-2.1749***	-2.2546***	-0.6190***	-0.6312***	-0.6670***	-0.6609***	-0.7101***
	[0.431]	[0.435]	[0.389]	[0.390]	[0.390]	[0.171]	[0.168]	[0.160]	[0.161]	[0.161]
Labor costs / Assets	-2.3898***	-2.3835***	-2.2186***	-2.2087***	-1.9748***	-1.0308***	-1.0295***	-0.9266***	-0.9299***	-0.6363***
	[0.411]	[0.413]	[0.390]	[0.390]	[0.357]	[0.297]	[0.288]	[0.286]	[0.287]	[0.149]
Log of MFI age	-0.006	-0.0054	0.0058	0.0073	0.0149	-0.0259**	-0.0251*	-0.0252**	-0.0252**	-0.0133*
	[0.027]	[0.026]	[0.024]	[0.024]	[0.026]	[0.013]	[0.013]	[0.011]	[0.011]	[0.007]
Log of assets (PPP)	-0.0011	-0.0026	0.0127	0.0136	0.007	0.0042	0.0025	0.0094**	0.0095**	0.0063*
	[0.013]	[0.013]	[0.012]	[0.012]	[0.010]	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]
Village banking Lending	0.1156**	0.1176**	0.1259***	0.1299***	0.1356***	0.0288	0.0309	0.0316*	0.0318*	0.0302*
	[0.049]	[0.049]	[0.047]	[0.047]	[0.048]	[0.020]	[0.019]	[0.018]	[0.018]	[0.017]
Solidarity group Lending	-0.017	-0.0182	-0.013	-0.0139	-0.0347	0.0148	0.0135	0.0147	0.0146	0.0003
	[0.038]	[0.038]	[0.037]	[0.037]	[0.035]	[0.012]	[0.012]	[0.011]	[0.011]	[0.012]
Inflation	-0.0077*	-0.0082**	-0.0094**	-0.0106***	-0.0083**	-0.0027	-0.0033**	-0.0025*	-0.0024*	-0.0022
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]
KKM	0.0312	0.0343	0.037	0.043	-0.0017	0.0417	0.0443	0.0468	0.0469	0.0025
	[0.080]	[0.081]	[0.065]	[0.067]	[0.058]	[0.032]	[0.034]	[0.030]	[0.029]	[0.017]
GDP growth rate	0.0019	0.0029	0.0013	0.0008	0.0006	-0.0017	-0.0005	-0.0004	-0.0006	-0.001
	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]
Europe and Central Asia	-0.0943	-0.0986	-0.0147	-0.0485	0.0905	0.0057	-0.0019	0.0044	0.0055	0.0488
	[0.115]	[0.124]	[0.103]	[0.109]	[0.109]	[0.038]	[0.046]	[0.039]	[0.038]	[0.033]
Africa	0.0249	0.0458	0.136	0.1229	0.1632	-0.0211	-0.0024	-0.0367	-0.0336	0.0019
	[0.113]	[0.103]	[0.102]	[0.101]	[0.121]	[0.045]	[0.034]	[0.038]	[0.036]	[0.031]
South Asia	-0.4209***	-0.3844***	-0.3452***	-0.3366***	-0.2614***	-0.1963**	-0.1611**	-0.1809**	-0.1708**	-0.0648**
	[0.130]	[0.117]	[0.105]	[0.112]	[0.088]	[0.086]	[0.066]	[0.073]	[0.073]	[0.029]
East Asia and Pacific	-0.1712*	-0.1401*	-0.1439**	-0.1256*	-0.0606	-0.0782**	-0.0484*	-0.0586**	-0.0552*	-0.0235
	[0.094]	[0.078]	[0.066]	[0.071]	[0.062]	[0.038]	[0.028]	[0.026]	[0.028]	[0.020]
Middle-East and North Africa	-0.2059	-0.16	-0.0953	-0.0512	-0.016	-0.0793	-0.0354	-0.0449	-0.0293	-0.0107
	[0.133]	[0.123]	[0.080]	[0.113]	[0.081]	[0.049]	[0.042]	[0.030]	[0.041]	[0.022]
Constant	1.0628***	1.1332***	0.8447***	0.9235***	1.0689***	0.0309	0.1108	-0.0582	-0.0601	0.0006
	[0.308]	[0.330]	[0.284]	[0.281]	[0.236]	[0.090]	[0.092]	[0.083]	[0.082]	[0.061]
Observations	257	257	295	295	252	258	258	296	296	253
Number of firms	186	186	213	213	181	186	186	213	213	181
Adjusted R^2	0.473	0.472	0.492	0.492	0.416	0.366	0.362	0.414	0.414	0.519

Standard Error in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Comparison of MFI characteristics by level of branch penetration

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. The sample is split into low and high branch penetration at the median. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources. Village banking lending is a dummy variable that takes the value one if village bank lenders make loans to larger groups. Solidarity group lending and individual lending are dummy variables equal to one if the loan is made to an individual, but the former assumes joint liability. Log of MFI age is the log of the age of the institution and Log of Assets(PPP) is the log of total assets in purchasing power parity terms. Rural population is the share of rural population in 1990. Rural population growth is the annual growth rate of the rural population averaged over 1991 – 2000. KKM is the Kaufmann, Kraay, Mastruzzi index of institutional development. GDP growth rate is annual real GDP growth rate.

	Geographic branch penetration			Demographic branch penetration		
	Low	High	Difference	Low	High	Difference
NGO	0.400	0.600	-0.2000**	0.454	0.553	-0.0991
			(0.0673)			(0.0697)
Commercially funded	0.567	0.565	0.0026	0.534	0.620	-0.0858
			(0.0729)			(0.0741)
Individual lending	0.374	0.330	0.0439	0.331	0.388	-0.0575
			(0.0655)			(0.0674)
Village banking lending	0.130	0.190	-0.0596	0.154	0.165	-0.0109
			(0.0505)			(0.0514)
Solidarity group lending	0.530	0.550	-0.0196	0.569	0.494	0.0751
			(0.0684)			(0.0698)
Capital costs / Assets	0.089	0.076	0.0132	0.086	0.079	0.0076
			(0.0082)			(0.0083)
Labor costs / Assets	0.104	0.093	0.0112	0.099	0.098	0.0013
			(0.0095)			(0.0099)
Log of MFI age	1.926	2.150	-0.2240*	1.945	2.161	-0.2157*
			(0.1045)			(0.1084)
Log of assets(PPP)	16.181	15.982	0.1986	16.231	15.870	0.3608
			(0.3341)			(0.3585)
Rural population (%, 1990)	55.189	47.926	7.2632	59.658	43.458	16.2000*
			(6.7826)			(6.3387)
Rural population growth (%)	0.806	0.314	0.4920	0.952	0.168	0.7840
			(0.4586)			(0.4472)
Real Yield	0.243	0.209	0.0339	0.221	0.230	-0.0093
			(0.0468)			(0.0471)
Inflation	9.422	9.057	0.3655	9.320	9.159	0.1603
			(3.2719)			(3.2723)
KKM	-0.429	-0.244	-0.1845	-0.621	-0.052	-0.5696***
			(0.1665)			(0.1402)
GDP growth rate	3.914	5.047	-1.1335	4.088	4.873	-0.7846
			(1.2189)			(1.2265)

Table 5. The effect of bank branch penetration on the average loan size by type of MFI

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. P-values from corresponding F-tests are in square brackets at the bottom of the table. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. Average loan size is the average loan size relative to the average per capita income of the bottom 20% in the country. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources. Individual lending is a dummy variable equal to one if the loan is made to an individual. Though we do not present the coefficients to conserve space, all models include all of the controls that appear in the base results in Tables 2 and 3. These are real portfolio yield, capital costs/assets, labor costs/assets, village banking dummy, solidarity group lending dummy, log of MFI age, log of total assets, inflation rate, real GDP growth rate, KKM index of institutional development, rural population share, rural population growth rate, and regional dummies.

	Dependent Variable: Average Loan Size									
	Demographic Branch Penetration					Geographic Branch Penetration				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Branch penetration	-0.8619***	-0.2058	-0.0322	-0.2055	0.0478	-0.0366	0.0445	0.0484***	0.0359*	0.057
	[0.212]	[0.173]	[0.126]	[0.138]	[0.238]	[0.031]	[0.030]	[0.017]	[0.021]	[0.065]
NGO	-4.5138***				-2.5282**	-1.8651**				-1.2423
	[1.250]				[1.071]	[0.763]				[0.764]
NGO × Branch Penetration	0.6063***				0.3257**	0.0735**				0.0688
	[0.173]				[0.151]	[0.036]				[0.051]
Commercially Funded		4.3078***			1.7652		1.3041			0.417
		[1.420]			[1.068]		[1.004]			[0.905]
Commercially funded × Branch penetration		-0.6593***			-0.2556*		-0.0717			-0.0506
		[0.194]			[0.142]		[0.050]			[0.036]
Individual lending			7.3308***		7.1292***			3.1530***		3.4761***
			[2.062]		[2.111]			[1.061]		[1.224]
Individual lending × Branch penetration			-0.8493***		-0.8943***			-0.0898**		-0.1406***
			[0.261]		[0.277]			[0.038]		[0.051]
Deposit taker				3.0739***	2.4453***				1.5886***	1.7071**
				[0.808]	[0.854]				[0.495]	[0.658]
Deposits* Branch penetration				-0.3290***	-0.2925**				-0.0331	-0.0618*
				[0.116]	[0.141]				[0.025]	[0.037]
MFI Borrowers As % of Poor	-0.1065***	-0.1273***	-0.1149***	-0.1014***	-0.1489***	-0.0686***	-0.0364	-0.0567**	-0.0523**	-0.0544**
	[0.028]	[0.030]	[0.028]	[0.029]	[0.029]	[0.025]	[0.030]	[0.027]	[0.025]	[0.027]
Observations	273	238	273	273	238	273	238	273	273	238
Number of firms	195	182	195	195	182	195	182	195	195	182
Adjusted R^2	0.354	0.335	0.404	0.314	0.465	0.275	0.248	0.288	0.269	0.298
Branch penetration + interaction term (P-value in parentheses)										
NGO	-0.256*				0.373**	0.037**				0.126***
	(0.069)				(0.041)	(0.019)				(0.005)
Commercially funded		-0.865***			-0.208		-0.0272			0.00642
		(0.000)			(0.357)		(0.435)			(0.932)
Individual lending			-0.882***		-0.847***			-0.0414		-0.0836
			(0.000)		(0.004)			(0.226)		(0.198)
Deposit taker				-0.535***	-0.245				0.00278	-0.00479
				(0.002)	(0.217)				(0.893)	(0.926)

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Table 6. The effect of branch penetration on the percent women borrowers by type of MFI

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. P-values from corresponding F-tests are in square brackets at the bottom of the table. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. Percent women borrowers is the share of women borrowers of a microfinance institution. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources. Individual lending is a dummy variable equal to one if the loan is made to an individual. Though we do not present the coefficients to conserve space, all models include all of the controls that appear in the base results in Tables 2 and 3. These are real portfolio yield, capital costs/assets, labor costs/assets, village banking dummy, solidarity group lending dummy, log of MFI age, log of total assets, inflation rate, real GDP growth rate, KKM index of institutional development, rural population share, rural population growth rate, and regional dummies

	Dependent Variable: Percent Women Borrowers									
	Demographic Branch Penetration					Geographic Branch Penetration				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Branch penetration	-0.016	-0.0232*	-0.0024	0.0034	-0.0789***	0.0086**	0.0026	0.0059**	0.0050*	-0.0033
	[0.015]	[0.014]	[0.014]	[0.015]	[0.026]	[0.003]	[0.003]	[0.003]	[0.003]	[0.007]
NGO	0.0928				-0.1285	0.1863***				0.0574
	[0.084]				[0.091]	[0.064]				[0.072]
NGO × Branch Penetration	0.0154				0.0554***	-0.0025				0.003
	[0.012]				[0.016]	[0.003]				[0.005]
Commercially Funded		-0.2408***			-0.2935***		-0.2485***			-0.1939**
		[0.090]			[0.093]		[0.073]			[0.080]
Commercially funded × Branch penetration		0.0362**			0.0605***		0.0155***			0.0149***
		[0.015]			[0.015]		[0.004]			[0.004]
Individual lending			-0.2354**		-0.1788*			-0.2769***		-0.2075***
			[0.093]		[0.100]			[0.067]		[0.068]
Individual lending × Branch penetration			-0.0021		-0.0029			0.003		0.0064**
			[0.014]		[0.017]			[0.003]		[0.003]
Deposit taker				0.0455	-0.0548				-0.0425	-0.0784
				[0.084]	[0.098]				[0.065]	[0.075]
Deposits* Branch penetration				-0.0133	0.0018				0.0035	0.0007
				[0.012]	[0.015]				[0.003]	[0.002]
MFI Borrowers As % of Poor	0.0044	0.0069	0.0038	0.0041	0.007	0.0036	0.0016	0.0027	0.0019	0.0025
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]
Observations	221	189	221	221	189	221	189	221	221	189
Number of firms	164	148	164	164	148	164	148	164	164	148
Adjusted R²	0.253	0.268	0.26	0.206	0.366	0.279	0.335	0.296	0.241	0.372
Branch penetration + interaction term (P-value in parentheses)										
NGO	-0.000515				-0.0235	0.00608**				-0.000321
	(0.964)				(0.214)	(0.020)				(0.928)
Commercially funded		0.013			-0.0184		0.0181***			0.0116**
		(0.454)			(0.424)		(0.000)			(0.043)
Individual lending			-0.00445		-0.0818***			0.00892***		0.00308
			(0.772)		(0.003)			(0.001)		(0.613)
Deposit taker				-0.00983	-0.0771***				0.00853**	-0.00263
				(0.428)	(0.001)				(0.014)	(0.686)

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Table 7. The effect of bank branch penetration on the financial self-sufficiency index by type of MFI
Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. P-values from corresponding F-tests are in square brackets at the bottom of the table. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. The financial self-sufficiency index is a ratio which is greater than one if the institution generates sufficient revenue to cover its costs. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources. Individual lending is a dummy variable equal to one if the loan is made to an individual. Though we do not present the coefficients to conserve space, all models include all of the controls that appear in the base results in Tables 2 and 3. These are real portfolio yield, capital costs/assets, labor costs/assets, village banking dummy, solidarity group lending dummy, log of MFI age, log of total assets, inflation rate, real GDP growth rate, KKM index of institutional development, rural population share, rural population growth rate, and regional dummies.

	Dependent Variable: Financial self-sufficiency index									
	Demographic Branch Penetration					Geographic Branch Penetration				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Branch penetration	0.0179	0.0091	0.0093	0.0219*	0.0144	0.0060*	0.0069*	0.0045**	0.0060**	-0.001
	[0.011]	[0.012]	[0.010]	[0.013]	[0.022]	[0.003]	[0.004]	[0.002]	[0.002]	[0.006]
NGO	0.1021				0.0483	0.0222				-0.0021
	[0.071]				[0.073]	[0.050]				[0.054]
NGO × Branch Penetration	-0.0113				-0.0026	0.0004				0.0027
	[0.010]				[0.013]	[0.002]				[0.005]
Commercially Funded		0.0272			-0.0064		0.0667			0.06
		[0.082]			[0.085]		[0.058]			[0.058]
Commercially funded × Branch penetration		0.0033			0.0103		-0.0049			-0.0027
		[0.011]			[0.013]		[0.005]			[0.004]
Individual lending			-0.0353		-0.0018			-0.0674		-0.0681
			[0.060]		[0.069]			[0.043]		[0.047]
Individual lending × Branch penetration			0.0028		0.0001			0.0059*		0.0086**
			[0.009]		[0.010]			[0.003]		[0.004]
Deposit taker				0.1674***	0.1339*				0.07	0.0684
				[0.063]	[0.075]				[0.047]	[0.052]
Deposits* Branch penetration				-0.0172*	-0.0071				0.0004	0.0027
				[0.010]	[0.012]				[0.003]	[0.004]
MFI Borrowers As % of Poor	0.0101**	0.0097***	0.0099**	0.0094**	0.0094**	0.0069**	0.0083**	0.0075***	0.0060**	0.0069**
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
Observations	265	235	265	265	235	265	235	265	265	235
Number of firms	190	178	190	190	178	190	178	190	190	178
Adjusted R^2	0.45	0.463	0.442	0.457	0.457	0.469	0.477	0.472	0.474	0.48
Branch penetration + interaction term (P-value in parentheses)										
NGO	0.00656				0.0117	0.00641				0.00171
	(0.530)				(0.474)	(0.014)				(0.659)
Commercially funded		0.0125			0.0247		0.00209			-0.0037
		(0.185)			(0.204)		(0.558)			(0.604)
Individual lending			0.0121		0.0145			0.0103**		0.00762
			(0.280)		(0.476)			(0.010)		(0.259)
Deposit taker				0.00469	0.00725				0.00647*	0.00173
				(0.606)	(0.688)				(0.055)	(0.799)

Table 8. The effect of geographic branch penetration on the outreach indicators by type of MFI, "old" MFIs only

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. P-values from corresponding F-tests are in square brackets at the bottom of the table. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. The sample includes only those MFIs that were in existence prior to 1996. Average loan size is the average loan size relative to the average per capita income of the bottom 20% in the country. Percent women borrowers is the share of women borrowers of a microfinance institution. Geographic branch penetration is the number of bank branches in a country measured per square kilometer. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources. Individual lending is a dummy variable equal to one if the loan is made to an individual. Though we do not present the coefficients to conserve space, all models include all of the controls that appear in the base results in Tables 2 and 3. These are real portfolio yield, capital costs/assets, labor costs/assets, village banking dummy, solidarity group lending dummy, log of MFI age, log of total assets, inflation rate, real GDP growth rate, KKM index of institutional development, rural population share, rural population growth rate, and regional dummies.

	Sample: Microfinance institutions in existence prior to 1996									
	Dependent Variable: Average loan size					Dependent Variable: Percent women borrowers				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Geographic branch	-0.1028	-0.0338	-0.0109	0.1098	0.2648	0.0219*	0.0125	0.0165***	0.019	0.0244
Penetration	[0.073]	[0.075]	[0.031]	[0.109]	[0.181]	[0.012]	[0.008]	[0.006]	[0.026]	[0.022]
NGO	-1.9842				-1.3824	0.1602*				0.0517
	[1.237]				[1.092]	[0.091]				[0.105]
NGO × Branch	0.0976				0.0524	-0.0058				0.0041
Penetration	[0.074]				[0.082]	[0.008]				[0.008]
Commercially		1.0464			0.9298		-0.3198***			-0.2929***
Funded		[2.158]			[2.041]		[0.089]			[0.095]
Commercially funded ×		-0.018			-0.1525		0.0120**			0.0133**
Branch penetration		[0.098]			[0.124]		[0.005]			[0.007]
Individual lending			2.7400**		3.2437**			-0.2689***		-0.2405***
			[1.134]		[1.345]			[0.085]		[0.089]
Individual lending ×			-0.1610*		-0.2642**			0.0008		0.0058
Branch penetration			[0.089]		[0.110]			[0.005]		[0.007]
Deposit taker				1.3657	1.4455				-0.067	-0.0021
				[0.913]	[1.259]				[0.090]	[0.086]
Deposits*				-0.142	-0.1653				0.0001	-0.02
Branch penetration				[0.095]	[0.137]				[0.021]	[0.017]
Observations	169	146	169	169	146	138	116	138	138	116
Number of firms	120	112	120	120	112	102	92	102	102	92
Adjusted R^2	0.309	0.279	0.335	0.289	0.347	0.343	0.429	0.382	0.325	0.461
Branch penetration + interaction term (P-value in parentheses)										
NGO	-0.0052				0.317*	0.0161**				0.0284
	(0.882)				(0.084)	(0.024)				(0.166)
Commercially funded		-0.0518			0.112		0.0245***			0.0377*
		(0.279)			(0.543)		(0.000)			(0.063)
Individual lending			-0.172*		0.000571			0.0173**		0.0302
			(0.054)		(0.997)			(0.035)		(0.164)
Deposit taker				-0.0322	0.0995				0.0192**	0.00434
				(0.329)	(0.404)				(0.015)	(0.733)

Table 9. The effect of geographic branch penetration on the performance indicators by type of MFI, "old" MFIs only

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. P-values from corresponding F-tests are in square brackets at the bottom of the table. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. The sample includes only those MFIs that were in existence prior to 1996. The financial self-sufficiency index is a ratio which is greater than one if the institution generates sufficient revenue to cover its costs. Geographic branch penetration is the number of bank branches in a country measured per square kilometer. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources. Individual lending is a dummy variable equal to one if the loan is made to an individual. Though we do not present the coefficients to conserve space, all models include all of the controls that appear in the base results in Tables 2 and 3. These are real portfolio yield, capital costs/assets, labor costs/assets, village banking dummy, solidarity group lending dummy, log of MFI age, log of total assets, inflation rate, real GDP growth rate, KKM index of institutional development, rural population share, rural population growth rate, and regional dummies.

| | Sample: Microfinance institutions in existence prior to 1996 | | | | | | | | | |
| | Dependent Variable: Financial self-sufficiency index | | | | | Dependent Variable: Return on assets | | | | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Geographic branch	-0.0136	-0.0259**	-0.0236**	-0.0067	-0.0119	0.0002	-0.003	-0.0022	0.0057	0.0071
Penetration	[0.010]	[0.010]	[0.011]	[0.021]	[0.018]	[0.005]	[0.004]	[0.004]	[0.010]	[0.010]
NGO	0.0136				-0.0064	0.0334				0.0167
	[0.051]				[0.060]	[0.027]				[0.026]
NGO × Branch	-0.0124**				-0.007	-0.0031				-0.001
Penetration	[0.006]				[0.006]	[0.002]				[0.003]
Commercially		0.0088			-0.028		-0.049			-0.0371
Funded		[0.077]			[0.076]		[0.057]			[0.046]
Commercially funded ×		0.0109			0.0097		0.0066			0.0047
Branch penetration		[0.008]			[0.007]		[0.006]			[0.004]
Individual lending			-0.1146**		-0.1072*			-0.0634*		-0.0640*
			[0.053]		[0.062]			[0.032]		[0.033]
Individual lending ×			0.0033		-0.0008			-0.0018		-0.0036
Branch penetration			[0.007]		[0.009]			[0.002]		[0.003]
Deposit taker				0.0749	0.0557				0.0115	0.0264
				[0.083]	[0.071]				[0.028]	[0.032]
Deposits*				-0.0193	-0.0133				-0.01	-0.014
Branch penetration				[0.022]	[0.019]				[0.010]	[0.011]
Observations	157	137	157	157	137	158	137	158	158	137
Number of firms	114	106	114	114	106	114	106	114	114	106
Adjusted R^2	0.588	0.575	0.568	0.575	0.564	0.426	0.44	0.446	0.432	0.454
Branch penetration + interaction term (P-value in parentheses)										
NGO	-0.026***				-0.0189	-0.00292				0.00608
	(0.007)				(0.286)	(0.397)				(0.545)
Commercially funded		-0.015			-0.00222		0.00364			0.0118
		(0.184)			(0.904)		(0.560)			(0.325)
Individual lending			-0.0203**		-0.0127			-0.00399		0.00347
			(0.018)		(0.475)			(0.299)		(0.731)
Deposit taker				-0.026***	-0.0253				-0.00433	-0.0069
				(0.010)	(0.063)				(0.078)	(0.185)

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Table 10. The effect of bank branch penetration on the average loan size by type of MFI, controlling for banking sector ownership and concentration
Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. P-values from corresponding F-tests are in square brackets at the bottom of the table. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. Average loan size is the average loan size relative to the average per capita income of the bottom 20% in the country. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources. Individual lending is a dummy variable equal to one if the loan is made to an individual. State ownership and foreign ownership are the shares of total banking sector assets held by state- and foreign-owned banks, respectively. Bank concentration is the share of sector assets held by the three largest banks. Though we do not present the coefficients to conserve space, all models include all of the controls that appear in the base results in Tables 2 and 3. These are real portfolio yield, capital costs/assets, labor costs/assets, village banking dummy, solidarity group lending dummy, log of MFI age, log of total assets, inflation rate, real GDP growth rate, KKM index of institutional development, rural population share, rural population growth rate, and regional dummies.

	Dependent Variable: Average Loan Size									
	Demographic Branch Penetration					Geographic Branch Penetration				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Branch penetration	-0.9616***	-0.5901**	-0.2815	-0.3572	-0.3646	-0.0598	0.0194	0.0266	-0.0205	0.09
	[0.249]	[0.292]	[0.193]	[0.244]	[0.376]	[0.072]	[0.055]	[0.049]	[0.057]	[0.080]
NGO	-4.4290**				-2.3818	-1.2825				-0.0904
	[1.961]				[1.597]	[1.127]				[1.037]
NGO × Branch Penetration	0.5001**				0.2399	0.0452				-0.021
	[0.212]				[0.224]	[0.037]				[0.056]
Commercially Funded		2.4835			-0.8074		1.9955			1.0425
		[2.655]			[2.109]		[1.810]			[1.399]
Commercially funded × Branch penetration		-0.275			0.1425		-0.1616			-0.1126
		[0.324]			[0.282]		[0.108]			[0.081]
Individual lending			8.5432***		8.5957***			4.9821***		5.2890***
			[2.632]		[2.907]			[1.420]		[1.718]
Individual lending × Branch penetration			-0.7678***		-0.9282***			-0.1053***		-0.1313**
			[0.290]		[0.353]			[0.038]		[0.055]
Deposit taker				1.636	2.5061*				-0.1408	0.0342
				[1.016]	[1.304]				[0.479]	[0.744]
Deposits* Branch penetration				-0.2362	-0.3994*				0.016	-0.0296
				[0.158]	[0.209]				[0.021]	[0.033]
State ownership	-9.8231**	-8.8495*	-11.0542**	-10.6523**	-3.4862	-11.7768*	-9.7902	-14.0310**	-13.1164*	-11.7074**
	[4.721]	[5.149]	[4.263]	[4.986]	[4.594]	[6.900]	[6.037]	[6.204]	[6.691]	[5.780]
Foreign ownership	0.3225	2.3737	0.059	1.9962	1.159	8.6312*	11.5636***	9.7837**	8.7216*	12.9576***
	[3.787]	[3.523]	[3.495]	[4.099]	[1.910]	[5.070]	[4.216]	[4.424]	[4.670]	[3.881]
Bank concentration	-1.4183	-1.5401	-1.8246	-1.7524	-0.1843	-4.904	-5.9664	-4.0072	-4.3889	-6.7157
	[2.916]	[3.823]	[2.581]	[3.035]	[3.113]	[3.415]	[4.269]	[3.200]	[3.373]	[4.255]
MFI Borrowers As % of Poor	-0.1999***	-0.1878***	-0.2072***	-0.1561**	-0.2317***	-0.066	-0.0085	-0.0704*	-0.0573	-0.0081
	[0.062]	[0.064]	[0.060]	[0.068]	[0.048]	[0.041]	[0.041]	[0.040]	[0.040]	[0.046]
Observations	192	168	192	192	168	192	168	192	192	168
Number of firms	149	140	149	149	140	149	140	149	149	140
Adjusted R^2	0.355	0.348	0.441	0.319	0.475	0.299	0.317	0.361	0.292	0.364

Table 10. Continued.

	Branch penetration + interaction term (P-value in parentheses)									
NGO	-0.462** (0.040)				-0.125 (0.635)	-0.0146 (0.815)				0.069 (0.197)
Commercially funded		-0.865*** (0.002)			-0.222 (0.457)		-0.142 (0.211)			-0.0226 (0.828)
Individual lending			-1.049*** (0.000)		-1.293*** (0.000)			-0.0787 (0.208)		-0.0413 (0.612)
Deposit taker				-0.593** (0.010)	-0.764** (0.030)				-0.00443 (0.940)	0.0604 (0.435)

Table 11. The effect of bank branch penetration on the percent women borrowers by type of MFI, controlling for banking sector ownership and concentration

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. P-values from corresponding F-tests are in square brackets at the bottom of the table. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. Percent women borrowers is the share of women borrowers of a microfinance institution. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources. Individual lending is a dummy variable equal to one if the loan is made to an individual. State ownership and foreign ownership are the shares of total banking sector assets held by state- and foreign-owned banks, respectively. Bank concentration is the share of sector assets held by the three largest banks. Though we do not present the coefficients to conserve space, all models include all of the controls that appear in the base results in Tables 2 and 3. These are real portfolio yield, capital costs/assets, labor costs/assets, village banking dummy, solidarity group lending dummy, log of MFI age, log of total assets, inflation rate, real GDP growth rate, KKM index of institutional development, rural population share, rural population growth rate, and regional dummies.

	Dependent Variable: Percent Women Borrowers									
	Demographic Branch Penetration					Geographic Branch Penetration				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Branch penetration	0.0124	-0.0309	-0.0198	-0.0148	-0.0629	0.0167	0.0033	0.0003	0.0044	0.0099
	[0.022]	[0.024]	[0.022]	[0.026]	[0.047]	[0.012]	[0.010]	[0.009]	[0.011]	[0.013]
NGO	0.3599***				0.0567	0.2792***				0.2052*
	[0.113]				[0.184]	[0.081]				[0.109]
NGO × Branch Penetration	-0.0295**				0.0155	-0.0068*				-0.0043
	[0.014]				[0.025]	[0.004]				[0.006]
Commercially Funded		-0.3530***			-0.2708		-0.2180*			-0.0951
		[0.129]			[0.165]		[0.126]			[0.132]
Commercially funded × Branch penetration		0.0557***			0.0528**		0.0162**			0.0105
		[0.020]			[0.024]		[0.008]			[0.008]
Individual lending			-0.2261**		-0.1886			-0.2455***		-0.0981
			[0.112]		[0.121]			[0.075]		[0.089]
Individual lending × Branch penetration			0.0028		0.0208			0.0047**		0.0037
			[0.015]		[0.017]			[0.002]		[0.003]
Deposit taker				0.0001	-0.1192				0.0138	0.011
				[0.164]	[0.165]				[0.112]	[0.130]
Deposits* Branch penetration				-0.0001	0.018				-0.0013	-0.0019
				[0.016]	[0.016]				[0.002]	[0.004]
State ownership	-0.4829	-0.6003	-0.139	-0.1404	-0.9527*	0.5275	0.195	0.1489	0.2967	0.2764
	[0.371]	[0.405]	[0.360]	[0.422]	[0.494]	[1.004]	[0.876]	[0.879]	[1.007]	[0.940]
Foreign ownership	-0.1675	0.1007	-0.3112	-0.1183	-0.0815	0.873	0.7424	0.1234	0.4151	0.7618
	[0.451]	[0.477]	[0.463]	[0.487]	[0.520]	[0.858]	[0.729]	[0.711]	[0.832]	[0.738]
Bank concentration	-0.7386**	-1.0529*	-0.7934**	-0.7374**	-0.9949*	-0.7370**	-1.1044**	-0.8648**	-0.8051**	-1.0559**
	[0.320]	[0.535]	[0.324]	[0.349]	[0.511]	[0.335]	[0.530]	[0.349]	[0.365]	[0.488]
MFI Borrowers As % of Poor	0.0034	0.0075	0.0021	0.0015	0.0081	0.0110*	0.0106	0.008	0.0072	0.0130**
	[0.007]	[0.009]	[0.007]	[0.008]	[0.009]	[0.007]	[0.007]	[0.006]	[0.007]	[0.007]
Observations	152	130	152	152	130	152	130	152	152	130
Number of firms	120	109	120	120	109	120	109	120	120	109
Adjusted R²	0.2	0.202	0.191	0.126	0.233	0.203	0.188	0.198	0.125	0.229

Table 11 Continued

Branch penetration + interaction term (P-value in parentheses)

NGO	-0.0172				-0.0473	0.00992			0.00558
	(0.381)				(0.153)	(0.369)			(0.609)
Commercially funded		0.0249			-0.0101		0.0195*		0.0204*
		(0.256)			(0.765)		(0.066)		(0.075)
Individual lending			-0.0171		-0.042			0.00503	0.0136
			(0.470)		(0.305)			(0.596)	(0.274)
Deposit taker				-0.015	-0.0448			0.00313	0.00795
				(0.471)	(0.279)			(0.766)	(0.521)

Table 12. The effect of bank branch penetration on the financial self-sufficiency index by type of MFI, controlling for banking sector ownership and concentration

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. P-values from corresponding F-tests are in square brackets at the bottom of the table. All models estimated via ordinary least squares. Standard errors allow for clustering at the firm level. The financial self-sufficiency index is a ratio which is greater than one if the institution generates sufficient revenue to cover its costs. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. NGO is a dummy variable equal to one if the institution is a non-governmental organization. Commercially funded is a dummy variable equal to one if the majority of funding comes from commercial sources. Individual lending is a dummy variable equal to one if the loan is made to an individual. State ownership and foreign ownership are the shares of total banking sector assets held by state- and foreign-owned banks, respectively. Bank concentration is the share of sector assets held by the three largest banks. Though we do not present the coefficients to conserve space, all models include all of the controls that appear in the base results in Tables 2 and 3. These are real portfolio yield, capital costs/assets, labor costs/assets, village banking dummy, solidarity group lending dummy, log of MFI age, log of total assets, inflation rate, real GDP growth rate, KKM index of institutional development, rural population share, rural population growth rate, and regional dummies.

	Dependent Variable: Financial Self-Sufficiency Index									
	Demographic Branch Penetration					Geographic Branch Penetration				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Branch penetration	0.000	0.0153	0.0071	0.0162	-0.0109	0.004	0.002	0.0035	0.0069*	-0.001
	[0.014]	[0.018]	[0.014]	[0.014]	[0.032]	[0.005]	[0.004]	[0.004]	[0.004]	[0.006]
NGO	-0.0252				-0.1723	-0.007				-0.0631
	[0.092]				[0.114]	[0.062]				[0.067]
NGO × Branch	0.0021				0.0276	0.000				0.0055
Penetration	[0.010]				[0.017]	[0.002]				[0.005]
Commercially		[0.102]			[0.116]		[0.082]			[0.077]
Funded		-0.0071			0.011		-0.002			0.0026
Commercially funded ×		[0.015]			[0.020]		[0.006]			[0.005]
Branch penetration			-0.1561**		-0.1914**			-0.1773***		-0.1913***
Individual lending			[0.067]		[0.081]			[0.048]		[0.051]
			0.0021		0.0045			0.0038**		0.0032
Individual lending ×			[0.009]		[0.012]			[0.002]		[0.002]
Branch penetration				0.2197**	0.1418				0.1508**	0.1632**
Deposit taker				[0.098]	[0.117]				[0.063]	[0.069]
				-0.0176*	-0.0008				-0.0037*	-0.0035*
Deposits*				[0.010]	[0.015]				[0.002]	[0.002]
Branch penetration	-0.2827	-0.2381	-0.3165	-0.0163	-0.0185	-0.0357	-0.1544	0.0097	0.3178	0.3117
State ownership	[0.244]	[0.228]	[0.259]	[0.247]	[0.313]	[0.307]	[0.304]	[0.334]	[0.315]	[0.335]
	-0.2861	-0.24	-0.2593	-0.2521	-0.2871	-0.106	-0.3176	-0.1578	-0.0615	-0.3269
Foreign ownership	[0.311]	[0.312]	[0.341]	[0.303]	[0.345]	[0.276]	[0.279]	[0.305]	[0.268]	[0.286]
	-0.197	-0.1648	-0.3528	-0.2375	-0.3073	-0.124	-0.0912	-0.2358	-0.199	-0.2618
Bank concentration	[0.294]	[0.327]	[0.305]	[0.288]	[0.350]	[0.294]	[0.327]	[0.301]	[0.289]	[0.335]
	0.0039	0.0053	0.0072	0.0058	0.0081	0.0042	0.0033	0.0066	0.0058	0.0059
MFI Borrowers	[0.005]	[0.005]	[0.005]	[0.004]	[0.005]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
As % of Poor	-0.0029	-0.0022	-0.0017	-0.0041	-0.0051	-0.0016	-0.004	-0.0023	-0.004	-0.0091***
Observations	[0.004]	[0.004]	[0.004]	[0.004]	[0.005]	[0.003]	[0.002]	[0.003]	[0.003]	[0.003]
Number of firms	-0.0196	0.0914	0.0075	0.0087	0.1483	-0.0173	0.0632	0.0127	0.0238	0.1520**
Adjusted R^2	[0.049]	[0.076]	[0.046]	[0.048]	[0.090]	[0.046]	[0.057]	[0.043]	[0.050]	[0.069]

Table 12. Continued

Branch penetration + interaction term (P-value in parentheses)

NGO	0.0021				0.0167	0.00401				0.00447
	(0.872)				(0.447)	(0.310)				(0.231)
Commercially funded		0.00815			0.000108		-0.0000317			0.00154
		(0.542)			(0.996)		(0.996)			(0.846)
Individual lending			0.00915		-0.00634			0.0073*		0.00222
			(0.517)		(0.820)			(0.088)		(0.726)
Deposit taker				-0.00142	-0.0117				0.00313	-0.0045
				(0.904)	(0.708)				(0.474)	(0.531)

Table 13. Controlling for rural-urban client bases
Notes: *1. Rural MFI dummy=1 if MFIs whose majority of customers are in rural areas (rural customers > large city customers + small city customers).

	Dep var: Avg loan size		Dep var: % women borrowers		Dep var: FSS index		Dep var: ROA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rural Client Base	-0.8878	-0.1312	-0.0758	-0.1705**	-0.1735***	-0.2021***	-0.0734***	-0.0863***
	[1.184]	[1.015]	[0.077]	[0.072]	[0.064]	[0.057]	[0.023]	[0.024]
Demographic branch	-0.1577*		0.0085		-0.0077		-0.0039**	
Penetration	[0.082]		[0.008]		[0.006]		[0.002]	
Rural*Demographic	0.098		0.0072		0.0026		0.0027	
Penetration	[0.106]		[0.009]		[0.009]		[0.003]	
Geographic branch		-0.0082		0.0002		0.0028		0.0002
Penetration		[0.021]		[0.002]		[0.002]		[0.001]
Rural*Geographic		-0.0188		0.0124***		0.006		0.0036**
Penetration		[0.044]		[0.004]		[0.005]		[0.002]
Observations	220	220	193	193	205	205	205	205
Number of firms	163	163	146	146	153	153	153	153
Adjusted R^2	0.223	0.213	0.149	0.198	0.519	0.524	0.385	0.389

Branch penetration + interaction term (P-value in parentheses)

Rural Clientele	-0.0596	-0.027	0.0157*	0.0125***	-0.00508	0.00876	-0.00123	0.00379**
	(0.624)	(0.411)	(0.078)	(0.000)	(0.512)	(0.138)	(0.603)	(0.040)

Table 14. Product offerings and real portfolio yields
Notes: *1. Rural MFI dummy=1 if MFIs whose majority of customers are in rural areas (rural customers > large city customers + small city customers). *2. Total number of different products = Total number of loan products offered + Total number of savings products offered + other product1 + other product2 + other product3. *3. Real Portfolio Yield = (Nominal portfolio yield - Inflation rate) / (1+ Inflation rate)

	Dep var: Number of Products				Dep var: Real Portfolio Yield			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rural Client Base		-1.1652		-1.1775		-0.0512**		-0.0661***
		[1.019]		[0.876]		[0.020]		[0.019]
Demographic branch	-0.0406	-0.0574			-0.0057***	-0.0068***		
Penetration	[0.069]	[0.083]			[0.002]	[0.002]		
Rural*Demographic		0.0453				0.0035		
Penetration		[0.115]				[0.003]		
Geographic branch			0.0332	0.0222			-0.0008	-0.0023**
Penetration			[0.021]	[0.030]			[0.001]	[0.001]
Rural*Geographic				0.0276				0.0037***
Penetration				[0.054]				[0.001]
Observations	220	220	220	220	220	220	220	220
Number of firms	163	163	163	163	163	163	163	163
Adjusted R^2	0.158	0.157	0.162	0.162	0.72	0.725	0.709	0.727

Branch penetration + interaction term (P-value in parentheses)

Rural Clientele		-0.0121		0.0498		-0.00334*		0.00142
		(0.901)		(0.170)		(0.062)		(0.120)

Table 15. The effect of variables representing the development of the banking sector on the outreach and performance of MFIs, instrumental variables regressions

Standard errors are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via two-stage least squares(IV). Standard errors allow for clustering at the firm level. Average loan size is the average loan size relative to the average per capita income of the bottom 20% in the country. Percent women borrowers is the share of women borrowers of a microfinance institution. The financial self-sufficiency index is a ratio which is greater than one if the institution generates sufficient revenue to cover its costs. Geographic branch penetration is the number of bank branches in a country measured per square kilometer and demographic branch penetration is the number of bank branches measured per capita. Branch penetration variables were instrumented using dummy variables representing the legal origin of the country. Legal origin variables are dummy variables that take on the value one if the legal origin is either French, German, Socialist or English, respectively. Private credit / GDP and Liquid liabilities / GDP are the ratios of private credit and liquid liabilities to GDP, respectively, where GDP is gross domestic product. Interest rate spread is the difference between prevailing lending and deposit interest rates. Rural population(%, 1990) is the share of rural population in 1990. Rural population growth is the annual growth rate of the rural population averaged over 1991 – 2000. Log of MFI age is the log of the age of the institution and Log of Assets(PPP) is the log of total assets in purchasing power parity terms. Village banking lending is a dummy variable that takes the value one if village bank lenders make loans to larger groups. Solidarity group lending and individual lending are dummy variables equal to one if the loan is made to an individual, but the former assumes joint liability. Individual lending dummy is the omitted category. KKM is the Kaufmann, Kraay, Mastruzzi index of institutional development. GDP growth rate is annual real GDP growth rate. Europe and Central Asia, Africa, South Asia, East Asia and Pacific, Middle East and North Africa are dummy variables that take the value one if the country is located in Europe and Central Asia, Sub-Saharan Africa, South Asia, East Asia and Pacific, Middle East and North Africa, respectively. The excludability test is based on an OLS regression in which the instruments replace the branch penetration variable. The hope is that the instruments are insignificant, and thus can be viewed as excludable.

	Average loan size		Percent women borrowers		Financial self-sufficiency index		Return on assets	
	Geographic Branch Penetration	Demographic Branch Penetration	Geographic Branch Penetration	Demographic Branch Penetration	Geographic Branch Penetration	Demographic Branch Penetration	Geographic Branch Penetration	Demographic Branch Penetration
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Financial variable	-0.3145**	-0.2875**	-0.0034	0.0044	-0.0088	-0.0221**	-0.0054	-0.0088**
	(0.1482)	(0.1154)	(0.0106)	(0.0132)	(0.0083)	(0.0093)	(0.0034)	(0.0036)
Observations	342	342	285	285	298	298	299	299
Number of firms	238	238	206	206	213	213	213	213
Adjusted R-squared	-0.2342	0.2235	0.1692	0.2027	0.4175	0.4320	0.2740	0.3615
Hausman test								
Chi-sq p-value	0.0051	0.7513	0.3198	0.434	0.1474	0.0201	0.0268	0.0661
Shea Partial R-squared	0.0443	0.2604	0.0417	0.2445	0.0952	0.2905	0.0955	0.2902
Excludability								
Instruments				French + German + Socialist				
P-value	0.2133		0.6651		0.3145		0.0767	
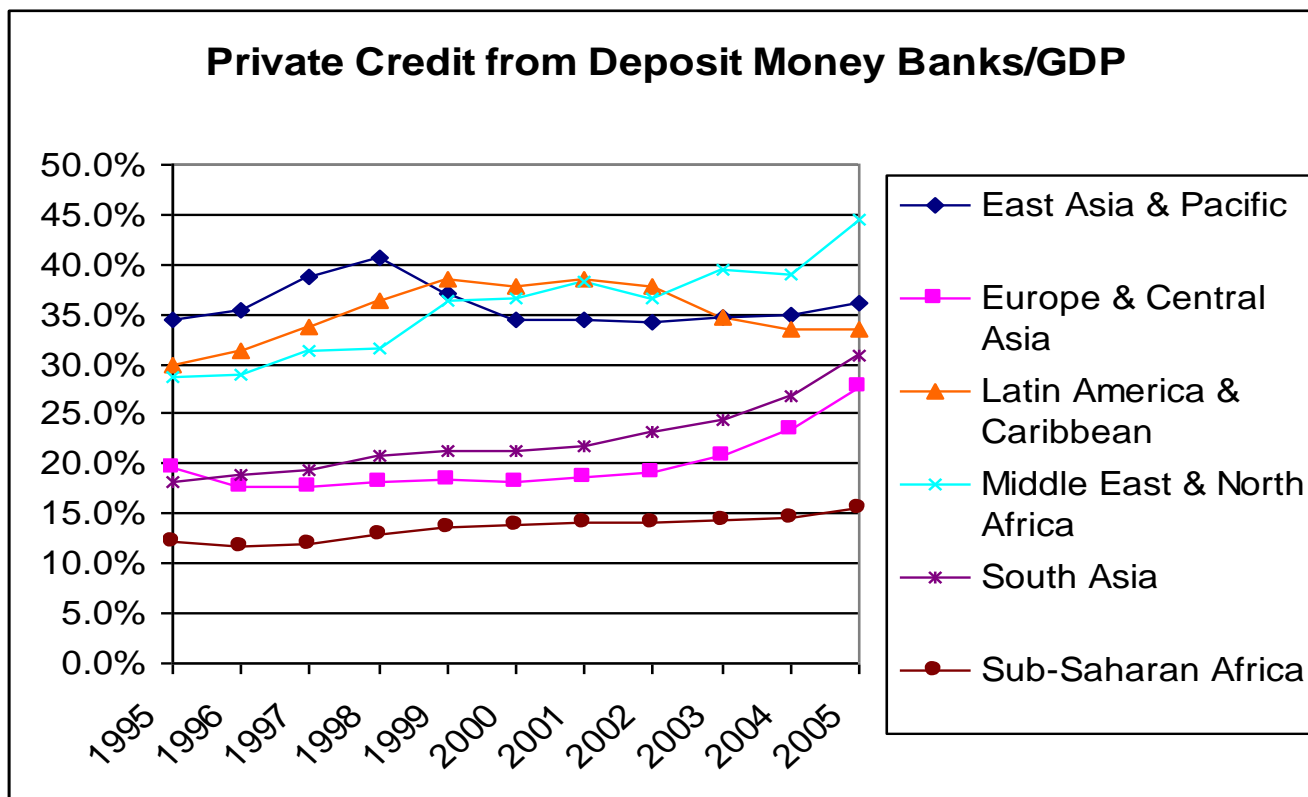
Figure 1

Appendix A. Variable Description and Summary Statistics

Variable Name	Definition	Mean	Median	Min	Max
Average loan size	Average loan size relative to the average per capita income of bottom 20%	2.05	1.18	0	37.78
Women borrowers(%)	Share of women borrowers	0.68	0.72	0	1
Financial self-sufficiency index	Ratio greater than one if institution generates sufficient revenue to cover its cost	1.04	1.04	-0.6	2.62
Return on assets	Adjusted return on assets	-0.02	0.01	-1.66	0.41
Geographic branch penetration	Number of bank branches measured per square kilometer	7.86	3.15	0.13	79.18
Demographic branch penetration	Number of bank branches per capita	5.29	4.17	0.41	23.36
Private credit / GDP	Ratio of private credit to GDP, averaged over 1991 - 2000	0.23	0.21	0.03	1.23
Liquid liabilities / GDP	Ratio of liquid liabilities to GDP, averaged over 1991 - 2000	0.32	0.27	0.07	1.05
Interest rate spread	Difference between lending rate and deposit rate	21.49	10.06	2.48	183.65
Rural population (%, 1990)	Rural population as a % of total population in 1990	55.86	51.2	16	94.6
Rural population growth	Annual rural population growth, averaged over 1991 - 2000	0.77	0.86	-3.79	3.36
Real yield	Real portfolio yield	0.23	0.21	-0.13	0.98
Capital costs / assets		0.08	0.06	0	0.39
Labor costs / assets		0.1	0.08	0.01	0.46
Log of MFI age	Log of the age of the MFI	2.07	2.08	0	3.87
Log of assets(PPP)	Log of assets in purchasing power parity terms	16.23	16.32	4.29	26.25
Village banking lending	Dummy equal to one if the MFI does village style lending	0.15	0	0	1
Solidarity group lending	Dummy equal to one if the MFI lends to individual but assumes joint liability	0.59	1	0	1
Individual lending	Dummy equal to one if the MFI lends to individual	0.79	1	0	1
Inflation		8.09	6.01	-4.57	51.46
KKM	Governance Index (Kaufmann et al)	-0.51	-0.48	-1.59	1.25
GDP growth rate		5.33	5.05	-7.72	17.85
Europe and Central Asia		0.2	0	0	1
Sub-Saharan Africa		0.21	0	0	1
South Asia		0.08	0	0	1
East Asia and Pacific		0.17	0	0	1
Middle-East and North Africa		0.07	0	0	1
Latin America and Caribbean		0.28	0	0	1

Appendix B

Country	Observations	Number of MFI firms
Albania	4	2
Armenia	9	6
Bangladesh	8	4
Bolivia	13	9
Brazil	4	4
Bulgaria	3	2
Burkina Faso	1	1
Cambodia	6	5
Chile	1	1
Colombia	8	6
Costa Rica	3	2
Croatia	3	2
Dominican Republic	1	1
Ecuador	19	14
Egypt, Arab Rep.	5	3
Ethiopia	27	15
Georgia	12	7
Ghana	19	16
Guatemala	1	1
Honduras	2	2
India	11	7
Indonesia	22	11
Kazakhstan	4	2
Kenya	3	2
Kyrgyz Republic	1	1
Madagascar	1	1
Malawi	2	2
Mali	3	2
Mexico	4	3
Mongolia	2	1
Mozambique	5	4
Nepal	2	1
Nicaragua	13	9
Pakistan	20	14
Paraguay	5	4
Peru	32	27
Philippines	33	28
Poland	1	1
Romania	8	4
Russian Federation	17	14
Rwanda	1	1
Senegal	5	3
South Africa	2	1
Tanzania	10	5
Thailand	1	1
Togo	2	1

Uganda	13	8
Venezuela, RB	1	1
Yemen, Rep.	2	2
49 countries	375	264