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Where does microfinance flourish? Microfinance institution performance in macroeconomic context

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ABSTRACT

We study whether and how the success of microfinance institutions ("MFI"s) depends on the country-level context, in particular macroeconomic and macro-institutional features. Understanding these linkages can make MFI evaluation more accurate and, further, can help to locate microfinance in the broader picture of economic development. We collect data on 373 MFIs and merge it with country-level economic and institutional data. Evidence arises for complementarity between MFI performance and the broader economy. For example, MFIs are more likely to cover costs when growth is stronger; and MFIs in financially deeper economies have lower default and operating costs, and charge lower interest rates. There is also evidence suggestive of substitutability or rivalry. For example, more manufacturing and higher workforce participation are associated with slower growth in MFI outreach. Overall, the country context appears to be an important determinant of MFI performance; MFI performance should be handicapped for the environment in which it was achieved.

1. Introduction

The microfinance movement is large and growing. It is reported that more than 100 million customers worldwide are borrowing small loans from around 10,000 microfinance institutions ("MFI"s).[2] A great deal of attention and funding has been directed toward microfinance by the development community over the past few decades.

Levels of success, however, vary across MFIs. Some fail, while others grow to reach millions of borrowers, covering costs in the process. In this context, evaluation of MFIs is a critical exercise. Indeed, a growing literature seeks to discover ingredients of MFI success. The focus of this literature is justifiably on institution-specific practices and techniques – contract design, management techniques, and organizational structure.

Much less studied are whether and how an MFI's success depends on the macroeconomic and institutional structure and outcomes of the country where it is located. Is the relationship between an MFI and its host economy best characterized by interdependence, rivalry, or a dualistic independence? Is it harder to break even in a poor or low-growth economy, so that a longer period of start-up subsidization is reasonable? Does the broader institutional environment matter for MFI performance, above and beyond any impact it has on growth? Here is where this paper's focus lies.

These questions are important for several reasons. For one, MFIs are often assessed and compared for purposes of evaluation, funding, and replication. But any comparison that does not take into account the macroeconomic and macro-institutional environment, if these are found to non-negligibly predict MFI performance, is incomplete. Accounting for context allows a clearer picture of institutional success and failure to emerge.

For example, consider two much-studied and widely imitated MFIs: Bank Rakyat Indonesia (BRI) and the Grameen Bank of Bangladesh. Often omitted in discussions of these institutions is that the macroeconomic context over much of their histories was very different: Indonesia averaged 5.0% growth in real GDP per capita over 1980-1997, while Bangladesh averaged 1.7%. How much of BRI's success and financial sustainability during this period was due to institution-specific practices and how much came simply because the economy was booming?[3] Conversely, might the Grameen Bank have

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[2] See Bellman (2006).

[3] Henley (2009) argues that BRI and other Indonesian micro-banks owe most of their recent success to the Indonesian macroeconomic boom. In essence, the argument goes that regarding specific policies, contracts, or institutional arrangements, the picture is much more one of continuity than of change, especially compared to the rapid macroeconomic acceleration.

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achieved greater financial sustainability[4] had it operated in a more vibrant macroeconomic context?

Consider also the example of a significant worldwide economic slowdown. Would we expect it to bring boom times and/or rapid growth for MFIs (as it might for bankruptcy law firms)? Or, should donors be more willing to subsidize MFIs given the prevailing economic headwinds? Or, perhaps MFIs will tend to sail through largely unaffected.

Understanding the macroeconomic impact on MFIs may also help a growing number of investment funds that target their dollars toward MFIs, sometimes with the dual goal of earning returns for investors and achieving social impact.[5] Since they value financial returns, these funds cannot afford to ignore major determinants of MFI financial success – though for dual-purpose investors the return implications would have to be weighed against social impact considerations.

Beyond sharpening MFI evaluation, answers to the question of where MFIs flourish can provide indirect evidence on how micro-credit works and how it fits into the process of development.[6] For example, is it rivalrous or complementary with a development path based on industrialization, manufacturing, and foreign trade and investment? Does it work best in the context of well-developed institutions, or do good institutions tend to squeeze it out, perhaps prematurely?

These are broad questions that do not find unequivocal answers in economic theory. Take income growth, for example. High growth can increase demand and create new niches for micro-enterprises to fill as well as profitable expansion opportunities for existing ventures. A growing economy might also raise households' current or expected future incomes to the degree that they are willing to take on more risk by investing capital in a business venture. Ingredients of growth – increasing physical and human capital, better institutions, technological advancement – may also make micro-entrepreneurship more profitable.

On the other hand, microfinance may depend on a poor economy to survive. Perhaps it thrives where there is a vibrant informal economy, a situation that tends to grow rarer as an economy and its institutions develop. Related, it seems plausible that the growing abundance of wage-earning opportunities that often accompanies growth may siphon away current and potential clients from MFIs. Default may also be higher, since growth of economic opportunities can weaken borrowers' incentives to maintain their MFI relationships. A deceleration of growth may also raise demand for products produced by micro-enterprises as consumers substitute away from imports or higher quality goods.[7]

As an intermediate option, it may be that most micro-credit clients operate in small, segmented local markets that are not very sensitive to macroeconomic conditions.[8] In short, the relationship between growth and MFI performance does not at all seem pinned down by a priori considerations, raising the need for empirical evidence.

Consider also an institutional outcome such as corruption. It may be that high corruption taxes micro-enterprise operations and creates barriers to their expansion, reducing demand for and quality of micro-loans. On the other hand, corruption may make it easier for micro-enterprises to avoid regulations, or may push would-be entrepreneurs out of the formal economy and the formal credit market and into informal micro-enterprise with demand for micro-loans.

This paper addresses empirically the question of MFI dependence on the broader context. While we cannot answer definitively all the questions raised above (we do not fully solve potential omitted variable issues), the goal is a set of stylized facts on the nature and magnitude of MFI dependence on the country context.

We construct a panel of MFIs (from the Mix Market) that includes 2278 observations on 373 MFIs from 74 countries (in the largest regression). We analyze two types of MFI performance variables: operational self-sufficiency (the ratio of revenues to costs) and loan portfolio growth. Operational self-sufficiency is decomposed into three components: financial revenues and costs, losses due to default, and operating costs. These decompositions allow us in some cases to identify the channel through which a given macroeconomic variable affects MFI financial sustainability. MFI portfolio growth is decomposed into two components: extensive growth (in number of borrowers) and intensive growth (in average loan size).

Country-level data come from the World Development Indicators. The four focal indicators of economic performance and structure are per capita GDP growth, labor force participation rate, manufacturing's share in GDP, and private credit as a fraction of GDP. A number of auxiliary variables, such as inflation and income inequality, are also taken from the WDI. Institutional measures and outcomes, some of which are focused on credit markets, are also included, from the Kaufmann et al. (2009) governance indicators and the Doing Business indicators of the World Bank.

MFI performance indicators are predicted in linear regressions by the four key macroeconomic variables, a quadratic in previous-year income level, and MFI-level control variables. Given the lack of time variation in some of the macroeconomic variables, we focus on a pooled specification, but also run a specification that isolates within-MFI and between-MFI variation in the key variables. Given the nature of the data, we focus on estimation approaches that are robust to outliers and within-MFI error term correlation.

We find some strong macroeconomic predictors of MFI performance, often pointing to complementarity. First, MFIs cover costs better when macroeconomic growth is higher, due in large part to lower default rates and operating costs. The magnitudes are non-negligible: for example, the interquartile difference in growth rates (4.1 percentage points) is associated with about 1/6 of the interquartile difference in MFI operational self-sufficiency. Second, financial depth is also strongly associated with lower default and operating costs; however, this translates into lower interest rates rather than greater MFI self-sufficiency, suggesting that (potential) financial market competition is good for micro-borrowers, if not MFIs.[9] Specifically, the interquartile difference in the private credit to GDP ratio predicts a 5.3 percentage point lower MFI average interest rate and a 4.3 percentage point lower MFI interest markup, the latter mostly accounted for by the lower default and operating costs. Third, loans appear to grow faster when there is a higher manufacturing share, more foreign direct investment, and greater workforce participation, as if a vibrant labor market creates demand and better growth opportunities for micro-funded micro-enterprises.

Some evidence, however, suggests a more rivalrous relationship between microfinance and other modes of development. In particular, workforce participation, manufacturing share, and industry share all show up as negative predictors of extensive MFI growth, i.e. growth in number of borrowers. Evidently, microfinance tends to act as a substitute for wage labor opportunities. Also potentially reflecting this mix of complementarity and rivalry is the result that breaking even seems easier to do in richer countries, but only up to a point. The relationship turns negative beyond about $6000 (PPP), for approximately one quarter of the observations.

We also find the structure of the economy matters: a larger service sector predicts faster MFI growth, while a larger rural population and/or agricultural sector predicts dramatically lower default, operating costs, and interest rates. Higher inequality is associated with much higher default and operating costs, higher interest rates, and lower MFI sustainability.

The institutional variables yield some unsurprising results; for example, MFIs grow their clientele more slowly where there is more corruption. However, other results suggest that microfinance is a substitute for, or even benefits from, weak institutions.

[4] Morduch (1999) provides an analysis of Grameen financial results.
[5] See Silverman (2006), and Krauss and Walter (2008).
[6] Ahlin and Jiang (2008) explore the latter question theoretically.
[7] Patten et al. (2001) make a similar point.
[8] For example, work of Patel and Srivastava (1996) suggests that the official and unofficial economy in India move relatively independently of each other.
[9] These results hold controlling for direct measures of credit market institutions.

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Overall, the results provide evidence that MFI performance is non-negligibly driven by the surrounding macroeconomic and institutional environment. Consequently, an MFI should be judged in context.

The paper is organized as follows. Section 2 describes the data, variables, and expected relationships with MFI performance. Section 3 describes estimation methodology. Section 4.1 reports the baseline results. Sections 4.2 and 4.3 present the results on additional macroeconomic variables and institutional variables, respectively. Section 5 makes a case for a causal relationship and argues that the financial sustainability results are not driven by MFIs padding profits. Section 6 discusses the related literature. Section 7 concludes.

2. Data

Microfinance institution ("MFI") data come from the Mix Market (mixmarket.org). This organization's aim is to promote "investment and information flows" within the world of MFIs and donors, and to the public at large. Its publicly available website contains information on more than 1400 MFIs, more than 100 investors (e.g. Calvert Foundation), and nearly 200 partners (typically, umbrella organizations that facilitate multiple MFIs' operations).[10]

We collect data on all MFIs that meet certain criteria. First, Mix Market puts the reporting MFIs into five categories – one- through five-diamond – based on amount and reliability of information reported. We include only four- and five-diamond institutions. Institutions rated four-diamond and higher have financial statements audited by a third-party accounting firm or similar; thus this seems a reasonable cutoff for reliable and comparable data.[11] Second, the dataset includes only institutions that were founded no later than 2004 and that have four or more observations through 2007 on the key operational self-sufficiency variable, during June/July 2009. Further, the four years of data must correspond to a calendar-year fiscal year, for comparability to the annual country-level data discussed below. Third, MFIs reporting that the percentage of their operations currently comprised by microfinance is 80% or below are excluded.[12] Finally, MFIs from Afghanistan, East Timor, Kosovo, Palestine, and Serbia and Montenegro are excluded for lack of available country data.

In all, we have 373 MFIs with sufficient data for our largest regression, from 74 countries, each with 4-12 years of data (on at least the key MFI financial variable) over 1996-2007. Many are relatively small, though some large and well-known institutions are included, e.g. ASA, BRAC, and the Grameen Bank of Bangladesh. The breakdown by institutional type is as follows: 49 "cooperative/credit union"s, 31 "bank"s, 135 "non-bank financial institution"s, 146 "non-profit (NGO)"s, 4 "rural bank"s, and 8 "other"s. The breakdown by region is: 12 from South Asia,[13] 39 from East Asia and the Pacific, 79 from Eastern Europe and Central Asia, 22 from the Middle East and North Africa, 83 from sub-Saharan Africa, and 138 from Latin America and the Caribbean.

While the MFI sample is quite geographically dispersed and varied in other ways, e.g. size, we cannot claim it is a representative sample of the MFI universe. Rather, it is selected based on availability and quality of data, as well as desire to publicly report it.

MFI data are summarized in Table 1a. The focal MFI performance indicator is operational **self-sufficiency**. It is the ratio of annual financial revenue to annual total expense, which equals financial expense plus loan loss provision expense plus operating expense. Hence, a number greater than 100% indicates that the MFI has sufficient revenue to cover its costs, including cost of funds, default losses, and operating expenses.

In principle, success based on this key sustainability indicator can thus be traced to one or more of the following three categories: ***financial revenue versus financial costs*** (ignoring default); ***default costs***; and ***operating costs***.

Our main indicators of ***financial revenue versus costs*** are the financial revenue per dollar loaned, or for brevity the *average interest rate*, and the financial expense per dollar loaned, or for brevity the *average cost of funds*.[14] Financial revenue per dollar loaned equals interest revenue from loans plus revenue from other investments, all divided by the value of the loan portfolio. Since about 88% of the 373 MFIs are in the top category based on percentage of operations in microfinance (91-100%), and since our dataset excludes MFIs reporting less than 80% of operations in microfinance, revenues from other investments are likely to be typically negligible; hence, this variable can be considered a close proxy for the average interest rate. Financial expense per dollar loaned equals "all interest, fees and commissions incurred on all liabilities, including deposit accounts of clients held by the MFI, commercial and concessional borrowings, mortgages, and other liabilities", divided by the value of the loan portfolio. Regarding sources of funds for lending, there is significant heterogeneity in the data, even within MFI. More than 2/3 of MFIs report loans as a source of funds; 55% report grants; and about 1/3 each report shareholder equity and savings deposits. Obviously, quite a few MFIs have multiple sources of funds; and in general, few (less than 7% of MFI observations) report financial costs of zero. Variation in the financial expense rate thus reflects both differing capital market prospects and differing degrees of donor subsidization. Interest expenses may also come from non-loan assets; however, the loan portfolio makes up the lion's share of most MFI's assets (nearly 80% at the median observation). Thus the financial expense rate should serve well as a proxy for the average cost of funds.[15] We also combine these two measures into the net financial income per dollar loaned, or for brevity the *interest markup*. This indicator equals the difference between average interest rate and average cost of funds.

Two indicators are used to measure series ***default costs***. The *loan loss expense rate* is the amount provisioned for bad loans as a fraction of the average loan portfolio over the year.[16] This is supplemented by the *PAR-30*, which gives the fraction of the loan portfolio at risk (behind schedule with payments) for more than thirty days. This is an early indicator of default problems, and one perhaps more objectively measured (in terms of timing, at least) than the loan loss expense rate.

We measure ***operating costs*** mainly by the operating *cost per dollar loaned*, which equals annual operating costs divided by the year-average size of the loan portfolio. This can be decomposed as the product of the operating *cost per borrower* and the borrower per dollar loaned, the latter being (the reciprocal of) the *average loan* size.[17] In other words, lower operating costs per dollar loaned can come from lower operating costs per borrower or larger average loans. This is a potentially interesting decomposition if costs per borrower are largely fixed, i.e. do not vary much with loan size, as is often argued.

[10] Descriptive information here and below is taken from the mixmarket.org website during June/July 2009.

[11] Audit reports often explicitly state that they comply with international accounting standards, raising our confidence about the degree of comparability of data across banks. However, we also use several econometric approaches that allow for MFI-specific differences in reporting standards: clustering standard errors at the MFI-level and using only within-MFI variation. See Section 3.

[12] Institutional type and percentage of operations devoted to micro-finance are reported only as current variables rather than year-by-year.

[13] A number of MFIs from South Asia, especially India, are excluded for non-calendar year reporting.

[14] Average interest rate and average cost of funds are not reported, but the financial revenue per asset and financial expense per asset ratios are. Our variables renormalize these ratios by loan portfolio size, multiplying by year-average asset-holdings and dividing by year-average loan portfolio. (Year-average amounts are calculated as averages of the previous year's and current year's values, which apply to year-end.)

[15] Further evidence is that in regressions discussed later, the non-loan share of assets does not significantly predict financial expense rate, as would be expected if financial expenses came mainly from non-loan assets.

[16] This too is reported with average asset-holdings in the denominator; we renormalize by average size of loan portfolio.

[17] The average loan size is reported only in year-end amounts. To get the year-average figure, we use cost per borrower divided by cost per dollar loaned, or alternatively the year-average loan portfolio divided by the year-average number of active borrowers. In the vast majority of cases, both approaches yield non-missing values. When they do, they are virtually identical; one predicts the other with an $R^2 = 1.0000$. In a handful of cases, one of the two approaches yields a missing value but can be imputed from the other, and is.

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Table 1a
MFI Variable Descriptions.

Variable	Description	Obs.	Mean	Std. Dev.	% bet-ween	Median	25th %ile	75th %ile
Operational self-sufficiency	Financial revenue / (Financial expense + Loan loss provision expense + Operating expense)	2278	118%	55.3%	46.1%	115%	101%	134%
Sustainable	Equals 1 if *self-sufficiency* ≥ 100%, 0 if not	2278	0.757	0.429	48.1%	1	1	1
Loan Loss Expense Rate	Loan Loss Provision Expense / average gross loan portfolio	1795	2.87%	5.38%	32.3%	1.80%	0.78%	3.47%
PAR-30	Value of loans at-risk>30 days / average gross loan portfolio	2104	4.81%	7.70%	54.2%	2.77%	0.83%	5.81%
Average interest rate	Financial revenue / average gross loan portfolio	1918	40.8%	19.8%	80.1%	37.1%	28.2%	49.2%
Average cost of funds	Financial expense / average gross loan portfolio	1918	6.1%	6.6%	66.9%	4.8%	2.0%	8.6%
Interest markup	Difference between average interest rate and average cost of funds	1918	34.7%	18.1%	78.6%	30.6%	22.2%	43.4%
Cost per dollar loaned	Operating expense / average gross loan portfolio	1911	29.4%	26.7%	70.0%	22.3%	14.8%	35.8%
Cost per borrower	Operating expense / average number of active borrowers (constant 2005 international $)	1911	399	579	75.1%	255	132	449
Average loan size	Average gross loan portfolio / average number of active borrowers (constant 2005 international $)	1911	1968	2659	88.2%	1064	431	2442
MFI borrower growth	Log-difference in year-end number of active borrowers	1882	25.3%	34.3%	33.9%	21.0%	7.5%	37.0%
MFI loan-size growth	Log-difference in year-end (real gross loan portfolio / number of active borrowers)	1882	5.4%	30.3%	21.3%	4.8%	−7.3%	18.2%
MFI portfolio growth	Log-difference in year-end real gross loan portfolio	1882	30.8%	34.7%	35.5%	26.2%	12.5%	44.9%
Age	Age of the MFI (years)	2278	10.3	7.4	90.6%	9	5	14
$(\text{Assets per loans})_{t-1}$	Total of all net asset accounts / gross loan portfolio	1863	1.54	1.79	38.5%	1.28	1.15	1.51
Borrowers_{t-1}	Number of active borrowers (1000 s)	1863	60.6	360.8	85.2%	8.9	2.9	25.2

Note: For each variable, statistics are calculated based on the observations included in the regression that has the maximum number of observations and includes this variable. The %-between column gives the between-MFI variance as a fraction of the total variance.

Beyond financial sustainability, a second category of outcome variable focuses on ***growth of the MFI***. One measure is *portfolio growth*, annual growth in total dollars loaned. We focus on a decomposition of MFI portfolio growth into growth on the extensive and intensive margins. Since the loan portfolio is the product of the number of borrowers and the average loan size, portfolio growth is composed of *borrower growth*, i.e. annual growth in number of borrowers (extensive growth), and *loan-size growth*, i.e. annual growth in the average loan size (intensive growth).[18]

Finally, baseline MFI control variables include (current) MFI *institutional type* and *age*, calculated from the year the MFI was founded. A larger set of MFI controls includes a decomposition of assets, which reflect MFI size, into three quantities: the number of *borrowers*, the *average loan* size, and the ratio of *assets to loans*, i.e. assets to loan portfolio. (The latter ratio reflects the degree to which non-loan assets are supporting the MFI's lending operation; it may proxy for overhead.) The three quantities multiply together to equal the MFI's assets.[19]

Country-level data are described in Table 1b. Data on GDP levels and growth rates come from the World Development Indicators (WDI, 2009). We focus on real per capita *growth* as arguably the most informative single indicator of economic progress. It can be considered an approximate summary statistic for the various institutional, technological, and factor-accumulation related ingredients of development. The *workforce participation* rate is the labor force divided by the population aged 15+. This partly reflects the prevalence of labor opportunities in the economy, which may be complementary to microfinanced activities or may crowd them out. The *manufacturing* value-added to GDP ratio, similarly, captures the existence of a potentially alternate route to development that is associated with wage labor rather than small enterprise. The *private credit* variable equals the amount of domestic credit to the private sector, divided by GDP. It is arguably the most common measure of financial development in the finance and growth literature, and it is included to proxy the overall financial depth of the country in which the MFI operates.

Other variables from the WDI are the gini coefficient of inequality;[20] inflation; net foreign direct investment inflows and remittances, respectively, as percentages of GDP; percent of population in rural areas; and the share of GDP from agriculture, services, and industry, respectively.

A number of variables intended to capture aspects of the institutional environment are also included. The Kaufmann et al. (2009) governance indicators ("WGI") aggregate and normalize a number of existing country ratings along several institutional dimensions. They produce six annual series, in all of which a higher number reflects a more ideal institutional outcome: control of corruption, rule of law, regulatory quality, government effectiveness, political stability/lack of violence, and voice/accountability.

A complementary approach to measuring institutional characteristics, pioneered by de Soto (1989) and furthered by Djankov et al. (2002) and Botero et al. (2004), seeks to quantify specific barriers to doing business via case studies and consultation with experts. This is the approach taken in the Doing Business indicators of the World Bank.

From these indicators we include the number of procedures and the number of days required to start a business, to enforce a contract, and to register property. We also include the monetary cost and the monetary plus time cost (both as a percentage of income/capita[21]) to start a business. Also included are minimum capital requirements for starting a formal business, as a percent of income/capita. Finally, we include the total tax rate as a share of profit and the number of different tax payments due throughout the year (World Bank, 2008, pp. 74-5). In each of these cases, restrictive institutions and regulations may hamper microfinance customers in their microenterprise endeavors; but they also may push households out of the formal economy and into the market for microloans.

[18] Each of these growth variables is calculated as a log difference.

[19] Financial level variables (e.g. average loan size, cost per borrower) are reported on Mix Market in current USD. We convert values to constant PPP dollars by multiplying by local GDP expressed in constant PPP dollars and dividing by local GDP expressed in current USD.

[20] Since ginis are missing for most countries for most years, we extrapolate reported gini data over the years 1994-2007, linearly between reported datapoints and flatly on either side of the first and last reported datapoints. An alternative measure is 1994-2007 country-average gini; this is correlated with the extrapolated measure at 98% and gives very similar results.

[21] Time is valued at income per capita, so time cost as a fraction of GDP/capita is (days required)/250.

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Table 1b
Macroeconomic and institutional variable descriptions.

Variable	Description	Obs.	Mean	Std. dev.	% between	Median	25th %ile	75th %ile
$Income_{t-1}$	Real GDP per capita (1000 s of constant 2005 international $)	2278	3.9	2.9	97.8%	3.4	1.4	5.9
Growth	Annual growth in real GDP per capita	2278	4.1%	4.2%	60.7%	3.7%	1.9%	6.0%
Workforce participation	Labor force/Population aged 15+	2278	66.5%	10.0%	98.7%	65.2%	60.8%	72.5%
Manufacturing	Manufacturing, value added (% GDP)	2278	15.4%	5.5%	95.1%	16.0%	11.9%	18.7%
Private credit	Domestic credit to private sector (% GDP)	2278	28.9%	18.3%	89.5%	24.8%	17.2%	37.0%
Remittances	Workers' remittances and compensation of employees, received (% GDP)	2254	6.5%	7.2%	83.3%	4.0%	1.5%	9.1%
Services	Services, value added (% GDP)	2270	52.4%	9.3%	93.9%	54.2%	47.9%	58.5%
Industry	Industry, value added (% GDP)	2278	29.3%	8.5%	92.4%	29.1%	24.9%	33.0%
Foreign direct investment	Foreign direct investment, net inflows (% GDP)	2275	4.1%	4.9%	37.0%	3.2%	1.7%	5.4%
Inflation	Consumer price inflation	2157	6.4%	5.3%	49.4%	5.6%	2.9%	8.8%
Inequality	Gini coefficient extrapolated over 1994–2007	2255	43.9	8.9	98.4%	43.8	36.5	51.8
Stability	Index: Political stability and absence of violence/terrorism (−2.5 to 2.5; WGI)	2001	−0.62	0.63	90.8%	−0.65	−1.02	−0.19
(Lack of) Corruption	Index: Control of corruption (−2.5 to 2.5; WGI)	2001	−0.58	0.40	90.8%	−0.62	−0.84	−0.32
Procedures to start business	Number of procedures to start a business (Doing Business)	1586	11.0	3.0	86.9%	11	9	13
Cost to start business	Cost to start a business (% of average income; Doing Business)	1585	76.1%	94.5%	80.2%	38.1%	21.3%	108.4%
Time to enforce contract	Time required to enforce a contract (calendar days; Doing Business)	1586	645	301	98.8%	588	465	842
Procedures to register property	Number of procedures to register property (Doing Business)	1328	7.0	2.1	96.4%	7	5	8
Time to register property	Time required to register property (calendar days; Doing Business)	1328	80	89	98.1%	48	33	92
Credit rights index	Index: legal rights of borrowers and lenders (0 to 10; Doing Business)	1343	4.3	2.2	92.1%	3	3	5
Credit information index	Index: credit information scope and accessibility (0 to 6; Doing Business)	1324	3.2	2.1	87.9%	3	1	5
Private credit bureau coverage	Number of individuals and firms listed in a private credit bureau (% adult population)	1295	14.1%	22.2%	70.8%	0.1%	0.0%	27.1%

Note: See note to Table 1a.

Doing Business indicators also measure credit market institutions. A credit rights index captures the efficiency of the legal environment supporting lending;[22] a credit information index captures quality and accessibility of credit information;[23] and two variables measure the fraction of individuals and firms covered by public credit registries and private credit bureaus, respectively.

Doing Business also includes an index capturing rigidity of employment law (difficulty of hiring, difficulty of firing, and rigidity of hours), which may affect outside options of potential micro-credit customers as well as expansion paths of actual customers.

3. Estimation Methodology

Let y_{ijt} be a year-t outcome of MFI i located in country j; M_{it} be a set of MFI-specific control variables at time t; and X_{jt} be a set of macroeconomic variables describing country j at time t. The baseline specification pools all MFIs and estimates

$$y_{ijt} = \alpha + \beta_M M_{it} + \beta_X X_{jt} + \beta_{income} inc_{j,t-1} + \beta_{income^2} inc^2_{j,t-1} + \epsilon_{ijt}.$$

The focal outcomes are operational self-sufficiency and extensive and intensive MFI growth. We also look at the three components of operational self-sufficiency: default, operating costs, and interest markups.[24]

We use a small set of empirical specifications as a source of discipline. The baseline set of MFI control variables includes a quadratic in age and institutional-type dummies. This is left minimal due to potential endogeneity concerns arising when MFI variables are featured on the right- and left-hand sides. We also discuss results using a larger set of MFI controls consisting additionally of (log of) the three components of MFI assets mentioned in the previous section: number of borrowers, average loan size, and assets per loans. Each of these is lagged by one year, i.e. corresponds to the final date of year *t-1*. The goal in using lagged rather than contemporaneous MFI size controls is to alleviate endogeneity concerns; however, to the extent that there is persistence in the MFI variables, endogeneity can remain an issue.

The baseline set of macroeconomic variables includes a quadratic in the lagged level of real PPP GDP/capita as a control. The focal macroeconomic variables, X_{jt}, include growth, workforce participation, manufacturing's share, and private credit. Additional tests add other macroeconomic or macroinstitutional variables one at a time to X_{jt}. With all variables besides growth, estimated effects are conditional on a given growth rate, and so do not include any effects on MFIs operating through effects on economic growth.

Certain characteristics of the data direct our choice of estimation procedure. First, errors may be correlated within MFIs, for example since individual MFIs do their own record-keeping or due to serially correlated MFI-specific shocks. Second, outlier problems are potentially severe, as preliminary work with the data made clear.

To address the outlier issue, we focus on estimating conditional median functions rather than conditional mean functions. That is, we report coefficient estimates using median regression, which minimizes the sum of absolute residuals rather than the sum of squared residuals and tends to be less susceptible to outlier problems than least squares. For robustness, median regression is supplemented by two other approaches. First, significance levels from "robust regression" are also reported. This is a procedure that drops extreme outliers (typically zero, at most two in our case) and then iterates using

[22] Eight components are related to collateral (e.g. types of collateral allowed, priority of secured creditors, existence of a unified collateral registry) and two to bankruptcy law (World Bank, 2008, p. 69).

[23] The six components reflect coverage depth and quality of information available via public or private credit registries (e.g. whether small loans are included and whether individuals have access to their credit ratings; World Bank, 2008, pp. 69-70).

[24] Within the following internally-related sets of variables, we use the same sample by dropping all observations that do not appear in every regression in the set: operating cost per dollar loaned, operating cost per borrower, and average loan size (costs); average interest rate, average cost of funds, and average interest markup (financial); and borrower growth, loan-size growth, and portfolio growth (growth).

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Table 2
Baseline (Pooled) Results.

	Self-sufficiency	PAR-30	Loan loss expense rate	Average Interest rate	Interest Markup	Cost per Borrower	Cost per Dollar loaned	Borrower growth	Loan-size growth
$Growth_{jt}$	1.38^{aaa}	-0.125^{aaa}	-0.0716^{aaa}	-0.128	-0.049	-7.09^{aab}	-0.184	0.071	0.184
	(0.30)	(0.031)	(0.0159)	(0.215)	(0.177)	(1.55)	(0.117)	(0.242)	(0.164)
$Workforce_{jt}$	-0.227	0.0089	-0.0100	-0.065	0.009	0.53	-0.0206	-0.171^{-ba}	0.207^{bbc}
	(0.142)	(0.0170)	(0.0094)	(0.105)	(0.107)	(1.10)	(0.0886)	(0.113)	(0.090)
$Manufacturing_{jt}$	0.489^{ccc}	-0.0185	0.0143	0.374^{baa}	0.219^{-ba}	-0.67	-0.040	-0.232^{-cc}	0.355^{baa}
	(0.238)	(0.0309)	(0.0170)	(0.182)	(0.170)	(1.86)	(0.169)	(0.162)	(0.131)
Private $Credit_{jt}$	0.0002	-0.0214^{aab}	-0.0170^{aaa}	-0.267^{aaa}	-0.217^{aaa}	-1.02^{cb-}	-0.177^{aaa}	-0.0619	0.0072
	(0.0634)	(0.0073)	(0.0034)	(0.055)	(0.057)	(0.59)	(0.048)	(0.0579)	(0.0404)
$Income_{j,t-1}$	3.08^{bab}	-0.242^{-c}	0.117	-1.34	-1.38	48.4^{aaa}	-3.39^{aba}	0.23	-0.837^{-bb}
	(1.41)	(0.197)	(0.090)	(1.45)	(1.38)	(13.6)	(1.09)	(1.09)	(0.756)
$Income^2_{j,t-1}$	-0.276^{abc}	0.0234^{-b}	-0.0114	0.182	0.127	-1.69^{-b-}	0.291^{aba}	-0.0007	0.0675^{-cb}
	(0.119)	(0.0172)	(0.0069)	(0.151)	(0.144)	(1.46)	(0.104)	(0.0952)	(0.0683)
Age_{it}	2.41^{aaa}	0.0829^{-c-}	-0.0196^{-a}	-0.283	-0.734^{bba}	-6.52^{b-}	-1.13^{aaa}	-1.52^{aaa}	-0.529
	(0.49)	(0.0608)	(0.0324)	(0.291)	(0.259)	(3.40)	(0.26)	(0.39)	(0.316)
Age^2_{it}	-0.0535^{aaa}	0.00178^{-c}	0.00155^{-a}	0.00226	0.0111	0.125	0.0220^{aaa}	0.0292^{aaa}	0.0124
	(0.0136)	(0.00219)	(0.00101)	(0.00730)	(0.0062)	(0.089)	(0.0064)	(0.0111)	(0.0082)
Observations	2278	2104	1795	1918	1918	1911	1911	1882	1882
MFIs	373	371	373	373	373	373	373	373	373

Note: Each column corresponds to a separate regression, with the dependent variable listed atop the column. Median regression coefficients are reported, with bootstrapped standard errors in parentheses. Significance at 1%, 5%, and 10% is denoted by a, b, and c, respectively. Significance in the median regression is denoted by the first letter, significance in the robust regression by the second letter, and significance using the median p-value of six OLS regressions dropping varying numbers of outliers by the third letter. Included in all regressions are MFI institutional-type dummies.

weighted least squares with weights negatively related to residual size, until the weights and coefficient estimates converge. Second, the top and bottom {0,1,2,3,4,5}% of the sample based on the dependent variable is eliminated and OLS is run in each of these six cases.[25] The median significance level of the six estimated coefficients is reported. Of course, these three approaches need not give the same results; however, when the results do coincide, it increases confidence thatresults are not being driven by outliers.

To address potential within-MFI standard error correlation, we bootstrap standard errors and confidence intervals for both the median and robust regressions, clustering the bootstrap by institution.[26] This approach does not require homoskedasticity or error terms to be independent within MFIs. Standard errors for each parameter estimate are calculated straightforwardly from the bootstrapped estimates. Significance levels of tests for zero coefficients come from eliminating two symmetric tails of the parameter estimate data (e.g. the top and bottom 2.5% for significance at 5%) and checking whether zero is contained within the remaining data. For OLS, significance levels are calculated using standard methods and clustering at the institution level.

We also estimate a variation on the baseline specification that separates within-MFI and between-MFI variation for the key macroeconomic variables. That is, the focal regressors are decomposed into a within-MFI median (e.g. the median macroeconomic growth rate for the years the MFI reports data) and a deviation from this median,[27] and both components are included in the regressions. Significance levels are calculated as before.

A key advantage of isolating within-MFI variation in the estimation is the ability to control for unobserved MFI (or country) attributes that may be correlated with the macroeconomic context and important for MFI financial sustainability. For example, it may be that more profitable or profit-driven MFIs choose to locate in faster growing economies. Or, it may be that a slow-changing omitted country variable, e.g. some aspect of culture, is (partially) responsible for both the macroeconomic growth and the MFI performance. A result obtained using only within-MFI variation is less vulnerable to these kinds of concerns.

However, a potential disadvantage of within-MFI variation is that it only picks up high-frequency relationships between the variables. For example, it cannot directly address the question of whether MFIs in consistently high-growth economies have an easier time achieving self-sufficiency than those in consistently low-growth economies. It also potentially decreases the signal/noise ratio in slow-moving variables. (This is especially true for the three focal variables besides growth, for which most of the variation is between MFIs; see Table 1b.) Estimation using only between-MFI variation thus sheds light on more low-frequency relationships between the variables under analysis, with the above omitted variable caveats. (Section 5.2 discusses this issue further.)

4. Results

For brevity, not all results discussed in the text are reported in tables – unreported results are available from the authors upon request.

4.1. Baseline Results

Table 2 reports baseline results: coefficient estimates from median regressions along with significance levels from median, robust, and least squares regressions (see Section 3). Table 3 reports results for the same regressions with additional MFI size controls. Table 4 reports on a specification that separates between- and within-MFI variation in the focal macroeconomic variables.

4.1.1. Growth

Quite robustly, growth impacts positively an MFI's ability to cover costs, self-sufficiency. An additional percentage point of growth is associated with a 1.38 percentage point higher revenue/cost ratio (Table 2). A difference in growth equal to the interquartile range (IQR)[28] (4.1 percentage points) is associated with a 5.6 percentage point higher revenue/cost ratio, which is about 17% of self-sufficiency's IQR.

This basic result is confirmed with the richer set of MFI controls (Table 3), and is being driven both by within-MFI and between-MFI variation in growth (Table 4). Thus, while the macroeconomy is

[25] We eliminate all relevant tied observations. This leads to a few cases of asymmetry due to the mass points at zero for the default variables.

[26] We use 10,000 repetitions, except for the results relating to Sections 2 and 3, where we use 1000.

[27] In each case, only the observations used in the given regression are used to calculate the median.

[28] The interquartile range is a measure of dispersion less sensitive to outliers than the more commonly used standard deviation. It equals the difference between the 75th and 25th percentile values.

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Table 3
Baseline (Pooled) Results with MFI size controls.

	Self-sufficiency	PAR-30	Loan loss expense rate	Average Interest rate	Interest Markup	Cost per Borrower	Cost per Dollar loaned	Borrower growth	Loan-size growth
$Growth_{jt}$	1.08^{aaa}	-0.111^{aaa}	-0.0643^{aaa}	-0.190^{-c-}	-0.114	-2.18^{ca-}	-0.268^{aaa}	0.312	0.080
	(0.37)	(0.033)	(0.0176)	(0.178)	(0.146)	(1.22)	(0.099)	(0.232)	(0.178)
$Workforce_{jt}$	-0.252	0.0188	-0.00870	0.014	0.030	-0.176	0.0256	-0.160^{-cb}	0.151^{ccc}
	(0.169)	(0.0177)	(0.00945)	(0.107)	(0.108)	(0.822)	(0.0867)	(0.123)	(0.080)
$Manufacturing_{jt}$	0.411^{cbb}	-0.0025	0.0152^{-c}	0.357^{cba}	0.184^{-b}	0.59	0.065	-0.135	0.247^{baa}
	(0.254)	(0.0288)	(0.0163)	(0.193)	(0.178)	(1.46)	(0.145)	(0.163)	(0.134)
Private $Credit_{jt}$	-0.0034	-0.0200^{bbc}	-0.0167^{aaa}	-0.181^{aaa}	-0.142^{aaa}	-0.691^{cb-}	-0.109^{aaa}	-0.0434	0.0052
	(0.0748)	(0.0077)	(0.0035)	(0.050)	(0.051)	(0.423)	(0.039)	(0.0573)	(0.0415)
$Income_{j,t-1}$	0.26	-0.170^{-c}	0.134	2.03^{-ba}	1.78^{-bb}	-22.3^{b-}	0.869^{-cc}	-0.22	0.564
	(1.41)	(0.201)	(0.098)	(1.03)	(1.05)	(11.7)	(0.798)	(1.17)	(0.865)
$Income^2_{j,t-1}$	-0.064	0.0137^{-c}	-0.0119	-0.070	-0.077	2.23^{a-b}	-0.0061	0.024	-0.0358
	(0.117)	(0.0166)	(0.0075)	(0.104)	(0.106)	(1.13)	(0.0676)	(0.101)	(0.0817)
Age_{it}	0.550^{-bb}	0.121	-0.0213	0.757^{aaa}	0.349^{-cb}	-1.47	-0.091	-1.64^{aaa}	-0.461
	(0.548)	(0.077)	(0.0373)	(0.261)	(0.267)	(3.38)	(0.264)	(0.42)	(0.337)
Age^2_{it}	-0.0133^{caa}	0.00099	0.00158^{-b}	-0.0197^{aaa}	-0.0119^{bba}	0.0194	-0.00126	0.0318^{aaa}	0.00977
	(0.0131)	(0.00255)	(0.00106)	(0.0066)	(0.0063)	(0.0994)	(0.00620)	(0.0104)	(0.00882)
$\ln(Borrowers_{i,t-1})$	3.30^{aaa}	-0.243^{c-a}	0.0210	-3.21^{aaa}	-2.95^{aaa}	-34.5^{aaa}	-3.19^{aaa}	0.370	0.515
	(0.98)	(0.120)	(0.0629)	(0.50)	(0.55)	(7.9)	(0.52)	(0.741)	(0.621)
$\ln(Average\ loan_{i,t-1})$	4.50^{baa}	0.108	0.0167	-7.30^{aaa}	-7.81^{aaa}	167^{aaa}	-7.62^{aaa}	3.03^{bc-}	-3.04^{aaa}
	(1.78)	(0.159)	(0.0997)	(0.80)	(0.84)	(14)	(0.85)	(1.29)	(0.81)
$\ln[(Assets/loans)_{i,t-1}]$	-20.0^{aaa}	1.15^{b-c}	0.324	9.19^{aaa}	7.97^{aaa}	143^{aaa}	19.5^{aaa}	19.6^{aaa}	-2.53
	(4.4)	(0.64)	(0.307)	(2.71)	(2.92)	(33)	(3.7)	(5.0)	(2.99)
Observations	1863	1775	1740	1863	1863	1854	1854	1864	1864
MFIs	373	371	372	373	373	373	373	373	373

Note: See Note to Table 2.

certainly not an MFI's destiny, it seems to play a non-negligible role in an MFI's financial success. Further insight comes from looking at the components of self-sufficiency.

1) Growth could lead to higher micro-enterprise returns and allow MFIs to charge higher interest rates. But the impact of growth on the average interest rate is negative and typically insignificant. Growth often significantly goes with a lower cost of funds, perhaps partly because supply of grants and/or loans is pro-cyclical; but the net effect on the interest markup is not significantly different from zero (negative point estimates).
2) Growth clearly seems to bolster financial sustainability by reducing default, measured by both the loan loss expense rate and the PAR-30 (Table 2). An additional percentage point of growth is associated with a 0.07 percentage point lower loan loss expense rate and a 0.12 percentage point lower PAR-30. The IQR of growth is associated with declines in the loan loss expense rate and PAR-30 equal to 11% and 10%, respectively, of these variables' IQRs. This result is consistent with the view that higher growth provides greater solvency to the projects for which micro-banks lend, and seems to belie a strict dualism between micro-financed projects and the broader economy. Tables 3 and 4 confirm these results and show that the relationship holds using both within- and between-MFI variation in growth.
3) Growth also has a detectible negative relationship with an MFI's operating costs. An additional percentage point of growth reduces costs per borrower by $7 and costs per dollar loaned by 18 basis points, the latter result not quite significant (Table 2). An increase in growth equal to the IQR is associated with drops in costs per dollar loaned and per borrower equal to 4% and 9% of the respective IQRs. As discussed in Section 2, cost per dollar loaned can be lowered by reducing cost per borrower and/or by raising average loan size. But growth predicts smaller rather than larger loans (in levels), an effect driven by between-MFI variation in growth. Thus, growth appears to reduce costs *in spite of* the fact that it is associated with smaller loans. Indeed, controlling for loan-size, the negative effect of growth on cost per dollar loaned is highly significant and stronger quantitatively (Table 3; again, driven by between-MFI growth variation). Thus, it seems most plausible that any cost-reducing growth effect comes mainly via monitoring and collection costs.

Overall, the results with more MFI controls (Table 3) and those separating between- and within-MFI variation (Table 4) essentially echo the baseline results. One difference comes in the magnitudes: the between (median) variables have somewhat larger estimated effects of growth on self-sufficiency, default variables, and operating costs than do the within variables. This could be due to omitted variables; it could also be because persistent high growth matters more for MFI performance than high-frequency fluctuations (or that measurement errors are less pronounced). However, the within results are significant at the same levels in the majority of cases.[29] The estimated effect of growth on self-sufficiency is smaller – 1.08 percentage points – when the MFI size controls are used. It is possible that the size controls are capturing some effects of persistent macroeconomic growth, given that high macroeconomic growth can lead to MFI growth.[30]

The other key outcome variables capture MFI growth. Macroeconomic growth is positively but typically not significantly related to either MFI extensive growth or intensive growth. However, it is positive and significant in explaining overall MFI growth; one percentage point higher growth predicts 0.61 percentage points higher MFI portfolio growth. This effect is robust to MFI size controls, and is more robustly associated with within-MFI variation. Overall, then, it appears that good economic years are also good for MFI expansion, in a combination of both extensive and intensive growth. One interpretation is that micro-borrowers' ability to start and expand projects profitably tends to shift up and down with the economy as a whole, which would be another example of interdependence.

4.1.2. Labor force participation, Manufacturing

We group these together because both seem strongly associated with the extent of formal labor market opportunities.

Both variables are related to slower MFI borrower growth but faster MFI loan-size growth (Table 2). One percentage point of

[29] Results are somewhat similar when separate between and within regressions are run – that is, for OLS between and fixed effect regressions, and for the other two techniques with all dependent and independent variables set at their MFI-median and deviation-from-median values, respectively. However, within coefficients tend to be smaller, e.g. 0.81 for self-sufficiency; and apart from self-sufficiency (where 1% significance is retained in all cases) and PAR-30, typically not significant.

[30] However, including the MFI size controls in the Table 4 specification reduces the within coefficient more than the between coefficient, to 1.18 and 0.93, respectively.

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Table 4
Within and Between Results.

	Self-sufficiency	PAR-30	Loan loss expense rate	Average Interest rate	Interest Markup	Cost per Borrower	Cost per Dollar loaned	Borrower growth	Loan-size growth
Growth Median$_{ij}$	1.45^{aaa}	-0.146^{aaa}	-0.0861^{aaa}	-0.390	-0.026	-8.92^{aac}	-0.317	-0.136	0.196
	(0.51)	(0.038)	(0.0178)	(0.349)	(0.337)	(2.16)	(0.196)	(0.308)	(0.229)
Growth Deviation$_{ijt}$	1.39^{aaa}	-0.0718^{aaa}	-0.0469^{aaa}	-0.050	0.015	-2.58^{cc-}	0.032	0.341	-0.023
	(0.29)	(0.0322)	(0.0274)	(0.170)	(0.161)	(1.65)	(0.179)	(0.306)	(0.274)
Workforce Median$_{ij}$	-0.227	0.0108	-0.0025	-0.117	-0.007	0.26	-0.0072	-0.166^{cba}	0.166^{cbc}
	(0.145)	(0.0175)	(0.0101)	(0.101)	(0.108)	(1.14)	(0.0927)	(0.117)	(0.093)
Workforce Deviation$_{ijt}$	-0.117	-0.201^{aaa}	-0.0840^{c-}	-1.58^{ab-}	-1.24^{b-}	4.98^{cbc}	-0.575	0.189	-0.487
	(0.787)	(0.071)	(0.0677)	(0.43)	(0.44)	(4.41)	(0.471)	(0.664)	(0.580)
Manufacturing Median$_{ij}$	0.521^{cc-}	-0.0181	0.0206^{-c}	0.476^{baa}	0.294^{cba}	-0.70	-0.010	-0.223^{-c}	0.308^{baa}
	(0.256)	(0.0341)	(0.0189)	(0.182)	(0.174)	(1.91)	(0.180)	(0.176)	(0.136)
Manufacturing Deviation$_{ijt}$	0.184	0.0353	-0.0136	-0.452	0.135	6.64	-0.083	-0.405^{-c}	0.629^{-cc}
	(0.836)	(0.0689)	(0.0533)	(0.365)	(0.453)	(3.96)	(0.345)	(0.553)	(0.524)
Private Credit Median$_{ij}$	0.0102	-0.0248^{aab}	-0.0196^{aaa}	-0.339^{aaa}	-0.252^{aaa}	-0.966	-0.194^{aaa}	-0.0757	-0.0240
	(0.0771)	(0.0093)	(0.0047)	(0.059)	(0.067)	(0.682)	(0.055)	(0.0649)	(0.0470)
Private Credit Deviation$_{ijt}$	-0.057	-0.0190^{-c}	0.0186^{cc-}	-0.128^{bba}	-0.222^{aaa}	-1.48^{bcb}	-0.151^{aaa}	-0.068	0.147^{-c-}
	(0.125)	(0.0132)	(0.0094)	(0.060)	(0.069)	(0.70)	(0.065)	(0.120)	(0.104)
Income$_{j,t-1}$	3.19^{bab}	-0.224^{-c}	0.159	-0.91	-1.21	47.8^{aaa}	-3.61^{aba}	0.36	-1.09^{-bb}
	(1.42)	(0.206)	(0.092)	(1.40)	(1.37)	(13.3)	(1.10)	(1.12)	(0.75)
Income$^2_{j,t-1}$	-0.285^{bbc}	0.0218^{-c}	-0.0146^{cc-}	0.150	0.112	-1.68^{-a-}	0.307^{aba}	-0.0113	0.0927^{-c}
	(0.121)	(0.0179)	(0.0073)	(0.145)	(0.144)	(1.43)	(0.104)	(0.0969)	(0.0691)
Age$_{it}$	2.47^{aaa}	0.107	-0.0318^{-a}	-0.332	-0.661^{bba}	-7.73^{b-}	-1.21^{aaa}	-1.72^{aaa}	-0.533
	(0.51)	(0.063)	(0.0343)	(0.293)	(0.271)	(3.58)	(0.29)	(0.43)	(0.339)
Age$^2_{it}$	-0.0550^{aaa}	0.00122^{-c}	0.00185^{cca}	0.00366	0.00934	0.148	0.0232^{aaa}	0.0336^{aaa}	0.0126
	(0.0139)	(0.00226)	(0.00101)	(0.00727)	(0.00644)	(0.092)	(0.0069)	(0.0118)	(0.0087)
Observations	2278	2104	1795	1918	1918	1911	1911	1882	1882
MFIs	373	371	373	373	373	373	373	373	373

Note: See Note to Table 2. The "Median$_{ij}$" variables are within-MFI medians (calculated from only the observations used in the regression), while the "Deviation$_{ijt}$" variables are deviations from this median in a given year.

workforce participation (manufacturing) is associated with a 0.17 (0.23) percentage point lower extensive growth rate but a 0.21 (0.36) percentage point higher intensive growth rate. Quantitatively, the IQR in workforce participation (manufacturing) explains 7% (5%) of the IQR in extensive growth and 10% (10%) of the IQR in intensive growth. The results are moderately robust across specifications and techniques, and for workforce participation are clearly driven by between-MFI variation (Table 4), not surprisingly given the relative lack of within-MFI variation (Table 1b). There is little significant relationship between either variable and MFI portfolio growth, suggesting the two growth effects roughly offset each other.

One interpretation is that growth in MFI outreach is harder to come by when more people are economically active and manufacturing jobs are more abundant. Of course, the need for financial services – at least for promotion of self-employment – may be lowest precisely in these contexts. At any rate, it appears that microfinance acts to some degree as a substitute for more formal wage-earning opportunities. On the other hand, these contexts also appear conducive to loan-size growth. More broadly based wage employment may create more and deeper niche markets for micro-entrepreneurs to serve, allowing for more robust micro-enterprise growth. This is a picture of complementarity between wage-based employment and microfinance, via demand spillovers. In summary, the results are consistent with the idea that broad-based wage employment substitutes for microfinance on the extensive growth margin – limiting the client base – but complements it on the intensive growth margin – improving clients' growth prospects.[31,32]

Workforce participation has a negative but insignificant relationship with MFI self-sufficiency,[33] while manufacturing's share exhibits a positive and significant relationship (Table 2). The regressions offer some evidence that this higher self-sufficiency is due in part to higher interest markups, mainly via higher interest rates. Quantitatively, the manufacturing IQR accounts for 10% of self-sufficiency's IQR, and 12% and 7%, respectively, of the average interest rate and interest markup IQRs. Perhaps the higher interest rates are related to higher micro-enterprise returns due to complementarities discussed above.

4.1.3. Private Credit

The results give no strong evidence that the size and development of the financial sector affects an MFI's self-sufficiency. This masks interesting correlations with each of the individual components of the ability to cover costs.

Private credit is negatively and significantly associated with both forms of default (Table 2). Its IQR (20 percentage points) accounts for 12% and 8% of the respective IQRs of the loan loss expense rate and the PAR-30. This result does not support the idea that competition in lending generally raises micro-finance default rates by providing temptation to switch lenders. One potential explanation is that a well-developed financial sector complements microfinance by providing incentives to maintain good credit histories and opening up pathways for enterprises to advance beyond microcredit. Another is that a strong financial sector simply reflects the presence of well-functioning credit market institutions that benefit bank recovery rates at all levels. However, this second interpretation is put in some doubt by the robustness of the relationship

[31] There may be one story rather than two. Slower borrower growth could drive faster loan-size growth, if new borrowers tend to start with smaller loans; or, faster loan-size growth could slow expansion of the client base if funds are limited. Indeed, borrower growth and loan-size growth are negatively correlated at about 40%. However, more often than not a variable will significantly predict only one or the other dimension of growth, so finding both effects significant seems at least suggestive of multiple mechanisms at work.

[32] Small loans can be taken as a proxy for outreach to the poor (Cull et al., 2007), in which case loan-size growth could be interpreted as abandonment of social mission. That said, the majority of MFI-years (61%) involve positive growth in real loan size, and this is also true for non-profit/NGOs (57%). Also, micro-credit's effect on development can depend on its ability to enable average micro-borrowers expand operations toward optimal capital intensities (Ahlin and Jiang, 2008).

[33] Previous versions of this paper reported a robustly significant negative relationship between workforce participation and self-sufficiency. The difference in results is due to a major methodological update, including retroactive revisions, to the WDI 2009 workforce participation variable as collected from the ILO. (Specifically, "SL.TLF.CACT.ZS" replaced "SL.TLF.ACTI.ZS".)

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between private credit and default measures when direct measures of credit market institutions are controlled for (see Section 4.3, esp. footnote 46).

Private credit is also significantly associated with lower operating costs, both on a per-dollar loaned and a per-borrower basis (Table 2). Its IQR accounts for 17% and 6% of the respective interquartile ranges of the cost per dollar loaned and cost per borrower. Again, this could reflect the efficiency-enhancing credit market institutions associated with better financial development; but again, inclusion of direct measures of credit market institutions (Section 4.3) does not affect results. Instead, it may be that future financial prospects beyond microfinance affect micro-borrowers' incentives and reduce the MFI's need to screen and/or monitor. There may also be a competition-related story: greater financial competition drives down costs of delivery via selection or incentive effects at the MFI level.

Competition also comes to mind in the result that private credit is statistically significantly associated with a lower average interest rate, average cost of funds, and interest markup (Table 2). Quantitatively, the IQR of private credit predicts a substantial 4.3 percentage point drop in the interest markup (20% of its IQR), a 5.3 percentage point drop in the average interest rate (25% of its IQR), and a 0.8 percentage point drop in the average cost of funds (13% of its IQR).

The 430 basis point drop in interest markup can be mostly but not entirely accounted for (using Table 2 point estimates) by the drops in default costs and operating costs attributable to the IQR of private credit: 34 and 350 basis points, respectively. Evidently, MFIs operating in the context of deeper financial markets (more than?) pass on cost savings and default reductions in the form of lower interest rates to borrowers – perhaps due to competition. The combination of lower costs and default but lower markups explains why the net effect on financial self-sufficiency is not distinguishable from zero.

The results with MFI size controls (Table 3) are very similar, though muted quantitatively in some cases. With the exception of cost per borrower, the between variables (Table 4) mimic the baseline results with slightly larger quantitative effects. The within variables also confirm the baseline results for interest rate and markup, and operating costs.

Turning to MFI growth, only marginal evidence surfaces for an effect from private credit. Private credit is negatively and significantly associated with MFI portfolio growth in the specifications of Tables 3 and 4 (using MFI-median private credit) in half of the cases. This is consistent with the possibility that financial depth crowds out microfinance to some degree.

4.1.4. Income Level

The (lagged) income level of the country is also significantly related to self-sufficiency, in an inverted-U way with a turning point of $5580 (Table 2). About 28% of observations are beyond the turning point, many from Latin America, Eastern Europe, and Central Asia. The IQR of income explains 14% of self-sufficiency's IQR. However, the estimates turn smaller and insignificant when MFI size controls are included (Table 3); follow-up regressions show this is driven by controlling for average loan size and, especially, non-loan asset share. These results suggest that it is easier to break even in richer countries, in part because loans can be larger, and perhaps also because of better infrastructure (which cuts down on overhead required for the lending operation). However, if true it is only up to a point – breaking even appears harder to do in countries that are too rich, perhaps in part because of greater difficulty in operating solvent micro-funded projects.

If these results are due to differences in market-based constraints faced by MFIs at different income levels, they could underpin a rationale for targeting more generous or longer lasting subsidies toward MFIs working in the poorest economies.[34,35]

4.2. Other Macroeconomic Determinants

Next, a set of additional structural characteristics of the economy that may be thought to matter for microfinancial success are examined. We add each of these variables, one at a time, to both the baseline specification (Table 2) and the one with additional MFI size controls (Table 3). For brevity, Table 5 reports only on regressions involving the key outcome variables – operational self-sufficiency, borrower growth, and loan-size growth – and in which the added macroeconomic variable registers a significant coefficient in at least four out of the six types of regressions: median, robust, and least squares, each with and without MFI size controls. Results are typically similar with and without MFI size controls; we mention notable differences when they arise, and report in Table 5 the specification with greater significance levels (the default being the specification with fewer MFI controls).

Remittances are positively and significantly associated with self-sufficiency (Table 5). The regressions on the three components of sustainability give some hints about the mechanism. Remittances statistically significantly go with lower delinquency (PAR-30). Remittances are also associated with larger loans, which perhaps explains a negative (but statistically insignificant) impact on the cost per dollar loaned.[36]

That prevalence of remittances goes with higher loan size and lower delinquency may reflect the greater ability to take on risk that comes from more households having access to a relatively reliable source of (foreign) wage earnings. If so, this is evidence for synergy rather than rivalry between wage-earning opportunities and microfinance. Further slight evidence for synergy is found in a positive relationship between remittances and MFI extensive growth (though significant only in 2 of 6 cases). Perhaps foreign wage-earning opportunities are seen as temporary and complementary to domestic economic activity by other household members, even though domestic wage-earning opportunities may be seen as potentially long-term and substitutable.

The share of GDP in **services** is positively associated with self-sufficiency, significantly only without MFI size controls. This seems attributable to several statistically significant relationships: higher interest rates and especially interest markups, which more than compensate for higher costs per dollar loaned. More service-oriented economies also see faster MFI borrower growth (Table 5). With MFI size controls included, the IQR of services, 11 percentage points, accounts for 12% of the IQR of borrower growth. These results suggest that a larger service economy is associated with micro-enterprise opportunities of greater number, providing MFI extensive growth opportunities, though not necessarily with greater growth potential (given the lack of evidence for an intensive growth effect – positive

[34] See also Section 5.1.

[35] Though MFI-level error dependence, and MFI data comparability in general, seems more potentially concerning than country-level error dependence, we also run a more conservative approach that clusters standard errors at the country level (74 clusters) rather than the MFI level (370+ clusters). This does not dramatically alter the conclusions of Section 1, though significance levels typically fall a bit. Most saliently in the specifications of Tables 2 and 3, manufacturing loses significance in explaining self-sufficiency, interest rates (except in one case), and the interest markup; and manufacturing and workforce participation become typically insignificant in explaining extensive and intensive growth, with the exception of manufacturing retaining significance against loan-size growth in 3 of 6 cases.

[36] When MFI size controls are included, the effect on self-sufficiency drops by 30% and is significant only in the robust regression . The default result does not change, but it seems that controlling for loan size wipes out some of the savings in operating costs. In fact, the estimated impact on cost per dollar loaned turns positive and significant when loan size is controlled for, and positive and significant effects on the average interest rate and the interest markup surface.

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Table 5
Other Macroeconomic Determinants; Institutional Determinants.

	Self-Sufficiency		Borrower growth				Loan-size growth			
$Growth_{jt}$	1.41^{aaa}	0.682^{ccb}	0.655^{bcc}	0.300	0.135	0.118	0.059	0.233^{-c-}	0.292^{bbc}	0.134^{-c-}
	(0.30)	(0.370)	(0.252)	(0.239)	(0.258)	(0.238)	(0.177)	(0.158)	(0.194)	(0.175)
$Workforce_{jt}$	-0.110	-0.106	-0.168^{cbb}	-0.189^{cba}	-0.162^{-cb}	-0.150^{-b}	0.198^{bbb}	0.179^{cbc}	0.104	0.150^{cbb}
	(0.165)	(0.170)	(0.112)	(0.116)	(0.115)	(0.114)	(0.082)	(0.095)	(0.084)	(0.081)
$Manufacturing_{jt}$	0.415	0.628^{baa}	-0.128^{-c}	-0.241^{-c}	-0.154^{-c}	-0.240^{ccc}	0.290^{baa}	0.344^{aaa}	0.323^{baa}	0.223^{cab}
	(0.224)	(0.259)	(0.154)	(0.155)	(0.185)	(0.165)	(0.131)	(0.149)	(0.139)	(0.130)
$Private\ Credit_{jt}$	-0.0158	-0.0437	-0.0739^{-c}	-0.0477^{-c}	0.0067	-0.0625	-0.0181	0.0005	0.0063	-0.0713
	(0.0635)	(0.0751)	(0.0534)	(0.0574)	(0.0584)	(0.0567)	(0.0417)	(0.0440)	(0.0440)	(0.0448)
$Remittances_{jt}$	0.385^{bab}									
	(0.195)									
$Services_{jt}$			0.331^{bbc}							
			(0.128)							
$Industry_{jt}$				-0.186^{bbb}						
				(0.110)						
FDI_{jt}							0.367^{baa}			
							(0.167)			
$Inflation_{jt}$								-0.514^{aaa}		
								(0.131)		
$Inequality_{jt}$ (Gini)		-0.626^{aaa}							0.207^{bbc}	
		(0.207)							(0.101)	
$Stability_{jt}$					-2.97^{cbb}					4.76^{aaa}
					(1.64)					(1.22)
(Lack of) $Corruption_{jt}$						3.92^{c-c}				
						(2.49)				
MFI Size controls	No	Yes	Yes	No	No	No	Yes	No	No	Yes
Observations	2254	1844	1857	1882	1708	1708	1863	1779	1863	1697
MFIs	370	370	373	373	373	373	373	359	370	373

Note: See Note to Table 2. Included in all regressions are MFI institutional-type dummies, age_{it}, age_{it}^2, $income_{j,t-1}$, and $income_{j,t-1}^2$.

but insignificant). At any rate, services appears to be the one component of GDP that goes with faster growth in MFI outreach.

The share of **industry** predicts slower MFI borrower growth (Table 5), like manufacturing (which is already controlled for). Unlike manufacturing, it predicts slower loan-size growth, though significantly only in 2 of 6 cases. Prevalence of the types of industry not included in manufacturing – e.g. mining, petroleum – may reduce MFI extensive growth by providing wage-earning opportunities, as was hypothesized with manufacturing. However, from the perspective of creating positive spillovers for a micro-enterprise sector, these industries may differ from manufacturing in creating enclaves and thus providing limited demand complementarities to spur MFI intensive growth.

Even more similar to manufacturing, **foreign direct investment** is a negative predictor of MFI borrower growth, though not significantly, and is positive and significant in predicting MFI loan-size growth (Table 5). As with a stronger manufacturing sector, greater FDI inflows may raise wage employment, creating demand complementarities for the micro-enterprise sector that spur MFI intensive growth, but at the same time potentially limiting MFI extensive growth.

Agriculture's share is not significantly related to any of the three main indicators. This masks significant relationships with the components of self-sufficiency – all similar to those of private credit. Agriculture is negatively and significantly related to default (loan loss expense rate), interest rates and the interest markup, and cost per dollar loaned. The combination of lower default and operating expenses and lower interest rates helps explain the lack of a measured effect on self-sufficiency.

The magnitudes are remarkable. With MFI size controls included, the IQR of agriculture, 15 percentage points, explains 25% of the loan loss expense rate IQR; 48% and 53% of the IQRs of the interest rate and interest markup, respectively; and 36% of the IQR of the cost per dollar loaned. These magnitudes are significantly larger than those of private credit, typically by a factor of 2–3. (The magnitudes for private credit seem to get, if anything, slightly bigger with agriculture controlled for.)

Percent rural behaves very similarly to agriculture, not surprisingly since they are correlated at about 80%. While insignificantly related to the three main MFI outcomes, it is negatively and significantly related to default (both measures), interest rates and the interest markup, and costs per dollar loaned. Again, the magnitudes are remarkable: the IQR of percent rural, 29 percentage points, explains 42% of the loan loss expense rate IQR; 42% and 35% of the IQRs of the interest rate and interest markup, respectively; and 26% of the IQR of the cost per dollar loaned.[37]

These results suggest that micro-credit operates substantially differently across rural-agricultural and urban contexts. One conjecture is that in rural contexts, social cohesion is more readily harnessed to lower monitoring and collection costs as well as default, for example through group lending. It may also be that rural borrowers benefit more from and are more reliant on MFIs, which gives rise to greater repayment discipline. The result is not higher profits for the MFI, but lower interest rates for borrowers.[38] In summary, micro-lending appears to operate significantly more efficiently in more rural-agricultural contexts.

Theoretically, **inflation** can hinder the MFI lending mission. An unanticipated inflation lowers real rates of return for an MFI, and may cause it to react by building conservatively large inflation premia into interest rates. Similarly, inflation may also impact an MFI's cost of funds. Borrowers' incentives for delay and default can also be affected.

We find evidence for a number of these effects. Using consumer price or GDP deflator inflation, with or without a one-year lag, inflation is consistently strongly associated with a higher average interest rate and higher cost of funds. The interest markup seems also to respond positively, at least belatedly: statistical significance is rare with current inflation, but more likely than not with lagged inflation.

[37] Given the high correlation and similarity of results for percent rural and agriculture, we run specifications with both included. In terms of significance levels, most results either do not change or drop slightly; the main exception is that agriculture no longer significantly predicts lower default. Quantitatively, the magnitudes drop typically 20-30%. The exceptions are that percent rural sees no drop in magnitudes related to default, but sees a 42% drop in interest markup correlation.

[38] An alternative explanation could be that MFIs target a different market segment in more rural contexts, for example, maintaining tighter discipline partly through giving smaller loans. But there is no evidence that, at least in terms of loan size, MFIs in more rural contexts are targeting differently: both agriculture and percent rural predict larger, not smaller, loans (though rarely significantly).

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Higher inflation also leads to slower (real) loan-size growth (Table 5).[39] Inflation's IQR, 6 percentage points, accounts for 12% of the IQR of loan-size growth. Related, current inflation also robustly predicts slower overall MFI growth, though there is no significant relationship with borrower growth. These results may indicate that lenders respond conservatively to inflation, not only with upward price adjustments (more than offsetting higher capital costs) but with downward quantity adjustments. Weakened demand on the intensive margin due to higher interest rates and inflation risk could also help explain the result. A coefficient of -1 on (real) loan-size growth would be consistent with nominal loan growth not responding at all to inflation; judging by the point estimate of −0.51 nominal loan amounts do seem to respond positively to inflation.

In summary, MFIs appear to cope reasonably well with inflation, financially speaking, by raising rates. However, inflation does appear to slow MFI intensive growth. As a caveat, these results capture only relatively contemporaneous effects of inflation levels, and they may reflect the lack of high-inflation episodes in our dataset – the 90th percentile involves just 12-16% inflation and the 99th percentile 22-29%.

Inequality measured by the gini coefficient is a negative predictor of self-sufficiency (Table 5). Quantitatively, the gini's IQR (15 points) accounts for 28% (21% without MFI size controls) of the self-sufficiency IQR – larger than the magnitude of the growth effect in the baseline results (an effect which drops 29% or 37% here, depending on specification). The negative relationship with sustainability seems driven by robustly significant and positive relationships between inequality and all three types of costs: default (both measures), operating costs per dollar loaned, and financial expenses. These higher costs are countered partially by higher average interest rates – 41-47 basis points per gini point – so that the average interest markup is also robustly higher with greater inequality – by 31 basis points per gini point. However, the interest markup does not tend to rise enough to cover the higher costs (operating expenses, especially), so self-sufficiency is lower overall. Quantitatively, gini's IQR typically explains 20-30% of each of these variables' IQRs.

Inequality also predicts faster loan-size growth (Table 5) in a quantitatively significant way – the gini's IQR explains 16% (12% without MFI size controls) of the IQR of loan-size growth. It has no significant relationship with MFI extensive growth or overall MFI growth.

Perhaps these results stem from a relationship between inequality and the degree of dualism in the economy. A dualistic economy arguably makes it harder for micro-enterprises to achieve viability, as they lack helpful linkages to broader markets. This can lead to the higher default rates and monitoring costs that hinder sustainability. But, while dualism raises risk it may also raise potential returns for successful projects, giving rise to faster measured loan-size growth as some funded projects expand and successfully straddle the dual economy while less dynamic ones fold. An alternative explanation has to do with social capture: access to micro-credit is partly restricted in favor of relatively well-off local elites, who quickly increase loan sizes. In this scenario repayment discipline may be lower because borrowers are less dependent on the MFI.

Yet another interpretation is that MFIs in more unequal countries focus more on social goals, aiming to serve a poorer clientele despite the higher operating and default costs entailed, and deliberately not fully passing on the higher costs to their customers. In favor of this interpretation, in a logit specification with or without MFI size controls, inequality does not significantly predict the dummy variable that equals one if operational self-sufficiency is at least 100%; and it is insignificant without (though significant with) MFI size controls in a 25th percentile quantile regression – the 25th percentile of self-sufficiency being about 100%. Hence, inequality may be reducing profits of MFIs that are well beyond breaking even, but not affecting the key 100% sustainability barrier.[40] Also, loan sizes (in levels) are negatively associated with inequality, though statistically insignificantly; one might expect small loan sizes to be associated with serving hard-to-reach populations. Further research is needed to distinguish these stories or pinpoint others.

4.3. Institutional Determinants

It is potentially insightful into the workings of microfinance to see how specific institutions and institutional outcomes affect an MFI's operation. For example, higher corruption may hinder micro-enterprises' ability to operate and grow, much as it has been seen to impact small and medium enterprises throughout the world (e.g. Fisman and Svensson, 2007). On the other hand, if corruption does not hinder micro-enterprises directly, its main effect may be lowering wages (Ahlin, 2005) and pushing more households toward small-scale self-employment, allowing for faster MFI extensive growth. Similarly, rule of law may create the stable environment micro-borrowers need to succeed; but it may also make it harder for micro-enterprises to operate avoiding regulations and tax-free.

We add to the baseline pooled regressions, with and without MFI size controls, the governance indicators of Kaufmann et al. (2009, WGI) and measurements of the business environment by Doing Business.[41] This section and Tables 5 and 6 follow the same reporting strategy as the previous section (see first paragraph of Section 4.2).

Of the six WGI variables – control of corruption, rule of law, regulatory quality, government effectiveness, voice and accountability, and political stability/lack of violence – two significantly impact at least one of the three focal MFI outcomes. Greater **stability** predicts slower extensive growth but faster intensive growth (Table 5), while not predicting any robust net effect on overall MFI growth. Quantitatively, the salient result is that the IQR of stability accounts for 15% of the IQR of loan-size growth. Perhaps in more unstable environments there is widespread demand for access to microfinance as a form of insurance; this could fuel faster extensive growth but limit intensive growth, as borrowers are content with stable credit amounts. Or, stability may enhance outside opportunities that limit the extent of demand for credit, but allow for it to be channeled to higher-growth endeavors.

Lower **corruption** is related to faster extensive MFI growth (Table 5), but has no significant relationship with intensive growth. This is consistent with corruption acting as a barrier to micro-enterprise endeavors, at least to start-up if not to subsequent growth.

A number of the measures are related to subcomponents of self-sufficiency in ways that cancel out. Interestingly, stability, voice/accountability, government effectiveness, and to a lesser degree regulatory quality are all significantly related to higher MFI operating costs. Stability and voice/accountability are quantitatively strong predictors; their respective IQRs account for 16% and 21% of the IQR of cost per dollar loaned. Regulatory quality and voice/accountability also are robustly related with higher default rates (both measures). Regulatory quality also predicts a higher cost of capital. Despite these higher costs, self-sufficiency is never significantly related to these governance measures (except negatively so with voice/accountability when MFI size controls are included). This appears driven by higher interest markups due mainly to significantly higher interest rates. In fact, the respective IQRs of government effectiveness, regulatory quality, and voice/accountability explain up to 28%, 20%, and 18% of the average interest rate IQR.

[39] Table 5 reports the result using current consumer price inflation; the results with current GDP deflator inflation and lagged consumer price inflation are similar.

[40] This kind of issue is discussed more in Section 5.1, which shows that the effect of growth is robust across these specifications.

[41] Unfortunately, the DB dataset covers only since 2003, which significantly reduces sample sizes.

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Table 6
Institutional determinants.

	Self-sufficiency		Borrower growth		Loan-size growth				
$Growth_{jt}$	1.23[abb]	0.891[acc]	0.113	0.213	0.220	0.193	0.251[-c-]	0.296[bc-]	0.249[-c-]
	(0.40)	(0.421)	(0.306)	(0.255)	(0.190)	(0.204)	(0.198)	(0.171)	(0.224)
$Workforce_{jt}$	0.000	−0.100	−0.206[-cb]	−0.169[−b]	0.166	0.172	0.0736	0.148[-c-]	0.165
	(0.181)	(0.170)	(0.132)	(0.116)	(0.088)	(0.097)	(0.0935)	(0.088)	(0.105)
$Manufacturing_{jt}$	0.290	0.307	−0.090	−0.187	0.363[baa]	0.293[cbb]	0.299[bbb]	0.435[aaa]	0.326[cbb]
	(0.261)	(0.252)	(0.182)	(0.157)	(0.146)	(0.151)	(0.132)	(0.128)	(0.153)
$Private\ credit_{jt}$	0.109	0.0586	0.0016	−0.0061	−0.0162	0.0153	−0.0031	−0.0053	−0.0058
	(0.084)	(0.0826)	(0.0664)	(0.0633)	(0.0440)	(0.0513)	(0.0462)	(0.0458)	(0.0495)
Procedures to start $business_{jt}$	−0.819[baa]								
	(0.434)								
Cost to start $business_{jt}$		−0.0378[baa]							
		(0.0185)							
Time to enforce $contract_{jt}$				0.00740[bbb]	−0.00621[bbb]				
				(0.00328)	(0.00286)				
Procedures to register $property_{jt}$			0.637[cb-]						
			(0.433)						
Time to register $property_{jt}$						−0.0138[ccb]			
						(0.0073)			
Credit rights $index_{jt}$							−0.625[bcc]		
							(0.287)		
Credit information $index_{jt}$								−1.51[bcc]	
								(0.46)	
Private credit bureau $coverage_{jt}$									0.0404[ccc]
									(0.0294)
MFI size controls	No	Yes	No	No	Yes	Yes	Yes	No	Yes
Observations	1586	1422	1239	1433	1427	1235	1248	1236	1208
MFIs	372	371	369	372	372	369	369	369	369

Note: See Notes to Tables 2 and 5.

One interpretation of these results is that "good" regulations and government may actually make it more costly for MFIs to operate in a fully compliant way. A similar point may also be made about the micro-enterprises these MFIs fund – greater training may be required, and risk may be higher and returns lower. This would be consistent with arguments in favor of relaxed regulations for MFIs, and/or micro-enterprises.[42] A different interpretation is that better institutions offer opportunities outside the micro-credit sector and reduce dependence on MFI services, weakening borrower discipline and raising monitoring and default costs.

The first set of Doing Business indicators we examine measures difficulty in officially **starting a business**: start-up capital requirements, number of procedures, amount of time needed, amount of money needed as a percent of GDP/capita, and a monetary-plus-time cost. Number of procedures, cost, time plus cost, and to a lesser degree, time to start business are all significantly and negatively related to self-sufficiency (Table 6, reporting on number of procedures and cost).[43] For number of procedures, the auxiliary regressions suggest that this is due to a robust positive effect on operating costs; interest rates and markup also rise, but apparently not commensurately. It is not hard to imagine that a complicated process for starting a business could affect an MFI's operating costs directly, as well as raising its borrower training and/or monitoring costs. For cost of starting a business, the interest rate and markup respond most negatively, consistent with start-up costs lowering micro-borrowers' ability to absorb higher interest rates. Counterintuitively, loan loss expense rates decline with costs of starting a business; borrowers may be more MFI-dependent in these contexts, and repayment discipline stronger.

Capital requirements, on the other hand, are positively related to self-sufficiency, but typically not significantly. Related, capital requirements robustly predict lower default costs and lower cost of capital. Capital requirements also significantly predict smaller loan sizes. It may well be that high capital requirements may push micro-borrowers to start out informal and relatively small – below the capital limits. All effects are small, however, at least for the bottom three quartiles of capital requirements.

The time required for contract enforcement is a positive predictor of MFI borrower growth (Table 6), but a negative predictor of loan-size levels and growth rates (Table 6 for loan-size growth).[44] This is consistent with the idea that barriers to efficient, formal firm operation create a larger pool of customers for MFI services, but limit micro-enterprises' initial size and growth prospects.

Time required for **contract enforcement** is also positively associated with loan delinquency (PAR-30) and negatively associated with interest rates and markup. The magnitudes are significant; the time required IQR (about a year) explains 20%, 10%, and13%, respectively, of the PAR-30, interest rate, and interest markup IQRs. This is consistent with slow contract enforcement imposing costs on micro-enterprises that raise risk of delinquency and lower ability to absorb higher interest rates. The relationship with self-sufficiency is also negative, but significant in only half of the cases. However, there is also some evidence that MFI operating costs are lower with time required; perhaps at the MFI level, there are efficient substitutes for formal contract enforcement.

Number of procedures for contract enforcement turns up similar but typically weaker results for interest rates and markup, loan sizes (levels), and operating costs. However, it is negatively associated with the loan loss expense rate, a result that seems hard to explain.

Obstacles to **property registration** – time required and number of procedures involved – show results similar to contract enforcement (time). In particular, they are positively associated with MFI extensive growth (significantly only in the case of number of procedures; Table 6) and negatively associated with MFI intensive growth (significantly typically only in the case of time required; Table 6). Similar reasons may well be involved.

Taxes – the overall rate, and number of different payments required – are not significantly associated with any of the three key

[42] Our data cannot say whether higher costs due to better institutions are justified by net social benefits.

[43] Number of procedures and cost are significant only in the OLS and, for cost, robust regression in the unreported specification.

[44] When MFI size controls are not included, it is significant only with robust regression.

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Table 7
Breaking Even or Padding Profits?

	Self-sufficiency 25th quantile regression			Sustainability dummy Logit		
$Growth_{jt}$	1.18[a] (0.33)	1.34[a] (0.36)		0.0626[a] (0.0225)	0.0530[c] (0.0280)	
$Workforce_{jt}$	0.085 (0.184)	-0.080 (0.156)		0.0072 (0.0104)	0.0053 (0.0118)	
$Manufacturing_{jt}$	0.419 (0.317)	0.653[b] (0.246)		0.0377[b] (0.0167)	0.0513[a] (0.0178)	
$Private\ Credit_{jt}$	0.108 (0.075)	0.0588 (0.0718)		0.00434 (0.00522)	0.00506 (0.00614)	
$Growth\ Median_{ij}$			0.927[c] (0.502)			0.0555[c] (0.0317)
$Growth\ Deviation_{ijt}$			1.52[a] (0.35)			0.0703[a] (0.0244)
$Workforce\ Median_{ij}$			0.066 (0.183)			0.0081 (0.0106)
$Workforce\ Deviation_{ijt}$			0.280 (0.709)			0.0962[c] (0.0583)
$Manufacturing\ Median_{ij}$			0.420 (0.313)			0.0396[b] (0.0177)
$Manufacturing\ Deviation_{ijt}$			-0.909 (0.830)			-0.0134 (0.0441)
$Private\ Credit\ Median_{ij}$			0.0875 (0.0804)			0.00684 (0.00625)
$Private\ Credit\ Deviation_{ijt}$			0.205 (0.141)			-0.0151 (0.0104)
$Income_{j,t-1}$	4.58[a] (1.47)	0.74 (1.26)	4.76[a] (1.50)	0.459[a] (0.106)	0.214[c] (0.125)	0.459[a] (0.108)
$Income^2_{j,t-1}$	-0.348[a] (0.128)	-0.123 (0.105)	-0.357[a] (0.130)	-0.0357[a] (0.0082)	-0.0198[b] (0.0096)	-0.0354[a] (0.0085)
Age_{it}	3.51[a] (0.76)	1.25[b] (0.52)	3.41[a] (0.76)	0.255[a] (0.033)	0.0853[b] (0.0408)	0.255[a] (0.034)
Age^2_{it}	-0.0802[a] (0.0250)	-0.0296[b] (0.0139)	-0.0784[a] (0.0245)	-0.00570[a] (0.00091)	-0.00225[b] (0.00110)	-0.00573[a] (0.00094)
$\ln(Borrowers_{i,t-1})$		3.84[a] (0.91)			0.390[a] (0.078)	
$\ln(Average\ loan_{i,t-1})$		5.34[a] (1.59)			0.590[a] (0.136)	
$\ln[(Assets/loans)_{i,t-1}]$		-21.9[a] (5.0)			-1.69[a] (0.33)	
Observations	2278	1863	2278	2252	1845	2252
MFIs	373	373	373	369	369	369

Note: Each column corresponds to a separate regression; dependent variable and technique are listed atop the column. Standard errors are in parentheses. Significance at 1%, 5%, and 10% is denoted by a, b, and c, respectively. See Note to Table 4 for a description of the "$Median_{ij}$" and "$Deviation_{ijt}$" variables. Included in all regressions are MFI institutional-type dummies.

MFI outcomes. The one partial exception is a negative relationship between the tax rate and MFI self-sufficiency in the OLS specifications and one robust regression. If anything, this seems mainly because of higher cost of funds (statistically and quantitatively more significant with number of payments than with overall rate), perhaps because higher taxes are passed through to MFIs to some degree.

The **rigidity of employment** index predicts a lower PAR-30 and lower cost of funds. Perhaps a more regulated labor market makes borrowers more dependent on MFIs, and hence more eager to remain in good standing. This index is also robustly related to overall MFI growth, though typically not significantly on either margin separately. This is consistent with a relatively large and dedicated demand for MFI services associated with rigid labor regulation. Once again, the evidence is consistent with MFI-aided occupations arising as a substitute for wage employment.

Our final set of Doing Business variables captures two aspects of **credit market institutions**, the legal backdrop and information flows. Perhaps counterintuitively, both the **credit rights index** and **the credit information index** robustly predict slower loan-size growth (Table 6). Quantitatively, the effect is much bigger for the information index – its IQR explains 24% of the IQR of loan-size growth. A favorable interpretation is that better credit rights and information extend the reach of the formal, commercial credit sector downward, so that customers graduate from the MFI sector earlier. Indeed, the rights index is also negatively associated with borrower growth, though significant only in two of six cases, and robustly negatively associated with overall MFI growth. This evidence is consistent with the idea that microfinance flourishes as a substitute where institutions are weak.

However, **private credit bureau coverage** is associated with faster loan-size growth (Table 6).[45] It is clear that private bureau coverage reflects breadth of information while the information index tilts toward depth/quality; this may help explain the difference in results. Further, the effect is small when compared with the IQR of private bureau coverage.

Paradoxically, all four indices (including the **public credit registry coverage**) are associated with higher default, using at least one of the default measures. The magnitudes are quite large in the case of the two indices, especially the information index: its IQR explains 23% and 28%, respectively, of the IQRs of PAR-30 and the loan loss expense rate. Except for some aspects of the rights index, in particular measuring the broadness (lenience?) of collateralizability, it is hard to see how greater credit rights or information would lead to higher default. There is a potential reverse causality story, though it seems far-fetched that these credit market institutions are driven by any MFI or even, in most cases, the MF sector. A favorable interpretation is that a better legal and information framework facilitates funding of more risky ventures, raising the default rate from suboptimally low levels as lenders substitute away from screening and/or monitoring and toward higher default rates. There is a bit of evidence for this in that the information index is typically significantly associated with lower costs per borrower when MFI size controls are included. However, this interpretation is somewhat confounded by the fact that private bureau coverage is associated with higher cost per dollar loaned, when MFI size controls are included.

Again counterintuitively, both private bureau coverage and the information index are associated with higher cost of funds for MFIs. The magnitude with the information index is quite high: its IQR explains 35% of the IQR of the cost of funds. A favorable interpretation is that in credit markets with less severe informational problems, MFIs rely more on (cheaper) market funding and less on subsidies.[46]

5. Further Tests and Robustness

5.1. Padding Profits or Breaking Even?

One might wonder if high macroeconomic growth helps sustainable MFIs to pad their profit margins, but does not enable MFIs to break the key 100% sustainability barrier. Note that the median self-sufficiency ratio in the data is 115%, which is well above 100% – thus the median

[45] This is so even though the three credit information variables are correlated among themselves at 56-66% (but basically uncorrelated with the credit rights index).

[46] One might wonder whether some of the counterintuitive results involving the credit market institution variables reflect an odd partial effect since they condition on the size and general development of the financial sector (private credit). However, results on these four variables run without private credit essentially do not differ. Conversely, the results for private credit discussed in Section 4.1 are robust to the inclusion of the credit institutions variables discussed here.

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regressions are focused on a part of the distribution significantly above the break-even point.[47]

To address this, we first estimate the conditional quantile function at the quantile of self-sufficiency corresponding to the key 100% mark, which is roughly the 25th percentile (columns 1-3 of Table 7).[48] Growth remains significant, typically at the 1% level. The coefficient decreases without MFI size controls (1.18 from 1.38), but increases with MFI size controls (1.34 instead of 1.08). The relative importance of between vs. within growth seems to switch: within-MFI growth variation has a greater significance and point estimate.

Next, we collapse the self-sufficiency measure into sustainable, a dummy variable that equals 1 if and only if the revenue/cost ratio is at least 100%. About 75% of observations have sustainable = 1. We then run a logit specification, withstandard errors clustered at the institution level (columns 4-6 of Table 7). Again, growth is a significant predictor of breaking even in all specifications. Using the baseline, the growth IQR (4.1 percentage points) is associated with a 4.7 percentage point increase in the probability of breaking even.[49] Put differently, the growth IQR adds to the logit index 19% of the amount that age's IQR (9 years) does.

The country income level quadratic remains significant and hump-shaped in all specifications without MFI size controls. Peaks range from $6400-$6700 (compared to $5600 in the baseline median regression), leaving 18-21% of the data beyond the peak. Interestingly, the income hump remains significant even with MFI size controls, at least in the logit (peaking at $5400). This suggests that there are reasons beyond lower loan sizes and perhaps worse infrastructure that make it harder to break even in poorer countries; among them may well be weaker market opportunities, or lower ability to take advantage of them. The quantitative effect of income appears larger than in the baseline results. In the baseline 25th quantile regression (column 1), the IQR of income explains 27% of the IQR of self-sufficiency. In the baseline logit specification, an MFI where income is at the 75th percentile ($5890) has a 15.9 percentage point higher probability of breaking even than an MFI where income is at the 25th percentile ($1400) – more than triple the effect of the growth IQR. The income IQR adds to the logit index more than 2/3 the amount that age's IQR does.

Even more strongly than the baseline evidence, these results suggest some justification for subsidizing MFIs that work in poorer economies, more generously or for longer. We cannot rule out, however, that they reflect differing priority given to breaking even at different local income levels; this could be due to different MFI objective functions or differing (potential) availability of subsidies. However, this interpretation is made somewhat less likely by the fact that institutional type is controlled for.

Overall, the evidence is strong that the relationship between MFI financial performance and macroeconomic growth is not isolated at the upper end of the MFI distribution. Rather, both year-to-year fluctuations in growth and growth trends are strongly related to an MFI's ability to achieve financial sustainability.

5.2. Causality and Growth

Should the strong relationship between macroeconomic growth and an MFI's ability to cover costs be interpreted as a causal effect of growth? Non-causal interpretations can be given.

For example, reverse causation: good financial performance of the MFIs in our data could be fueling macroeconomic growth directly. This seems far-fetched, given the small size relative to each economy of most MFIs in our dataset. Few MFIs would claim to have substantial macroeconomic impacts.

Still, since reverse causality is especially implausible with small institutions, we rerun the baseline results on operational self-sufficiency (Tables 2 and 3), alternately dropping the observations in which a) the number of borrowers is not missing and exceeds 1% of the country's population and b) the value of the loan portfolio is not missing and exceeds 1% of private credit in the economy. These drops reduce sample sizes by 3-4% and 15-16%, respectively, but growth remains a significant predictor of self-sufficiency at the 1% level in all cases. Changes in the growth coefficient range from a 3% drop to a 27% increase (in case b with MFI size controls). Thus, the results hold at least as strongly when large institution-years are excluded.

A second interpretation is omitted variable bias at an aggregate level: it may not be growth per se, but something correlated with growth that is causing better MFI performance. For example, the informal sector as a whole may be doing well for some unobserved reason that is both causing higher growth and better performance of the MFI sector.

We cannot completely rule out omitted variable bias. Several points can be made though. First, given that within-MFI growth differences are significant predictors of self-sufficiency (see Table 4 and discussion in Section 4.1), omitted variable bias due to time-invariant MFI-level or country-level factors does not seem to be behind the positive growth effect, at least most of it. Second, the large number and variety of additional macro-structural and institutional variables that are controlled for without growth losing its explanatory power for self-sufficiency[50] gives greater confidence that obvious omitted variables are not lurking. Finally, we do not need to rule out this interpretation to answer our main question, namely, whether MFI performance is significantly dependent on the surrounding macro-economic context. Whatever the aggregate factors that are omitted may be, it is implausible that the particular MFI in our dataset is responsible for them. Hence, the results do establish that a non-negligible part of an MFI's success is due to its context.

A third interpretation involves a selection story: it may be that more sustainable MFIs choose to locate in high-growth economies, while MFIs that are content to be dependent on subsidies locate in low-growth economies. This story, however, is called into question by the within results, which show that even within MFIs over time, growth is significantly related with self-sufficiency.

A fourth interpretation involves a different selection story. It may be that MFIs shift between goals depending on the health of the aggregate economy – an issue that does not arise with purely profit-maximizing firms. For example, MFIs may prioritize their social mission during recessions, letting loans be delinquent and taking losses; but may prioritize financial goals during expansions, returning to strictness and profitability. They may do this even though operational self-sufficiency is equally attainable in both contexts, simply because their various goals take on different urgency depending on the state of the economy. We are not able to rule this kind of story out. In fact, to do so would require even more than indisputably exogenous growth variation. Disentangling the effect of

[47] However, after making various adjustments to similar data with the goal of a more accurate, market-based measure of self-sufficiency (e.g. repricing grants and subsidized loans at market rates), Cull et al. (2007) correct operational self-sufficiency downward by 13 percentage points on average. This suggests that our median self-sufficiency of 115% may not be far from a market-based break-even point.

[48] In principle, quantile regression can be used to estimate the conditional quantile function for any quantile. See Koenker (2005).

[49] Quantitative logit calculations are made by setting the total contribution of non-focal variables so that the 25th and 75th percentiles of the focal variable give probabilities equidistant from sustainable's mean.

[50] Growth is always significant at the 1% level using all three techniques (median, robust, and least squares) with or without MFI size controls when the additional variables of Sections 2 and 3 are included, with a few exceptions. When inequality (voice/accountability) and MFI size indicators are included, it drops to "ccb" ("bab"); and with DB indicators it typically drops, but never below significance at 10% except against private credit registry coverage and public credit bureau coverage, and then only under robust regression with MFI size controls. (Note that the Doing Business indicator regressions typically involve subsamples 1/2-2/3 the size of the baseline samples, since the data begin in 2003.) Further, the *maximum* drop in the self-sufficiency growth coefficient from the median regressions, relative to Tables 2 and 3, across all added variables except inequality is 26%; for inequality it is 37%.

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shifting objectives due to macroeconomic factors seems to require some way of getting at the propensity of an MFI to shift weights between different components of its mission. This is left for future research.

With these caveats in mind, then, we interpret the results fairly confidently as causal effects of growth on MFI performance.

6. Relation to the Literature

There is a significant literature evaluating MFI success and failure, much of it with a view toward arriving at sound practices. See, for example, Yaron (1994), Chaves and Gonzalez-Vega (1996), Kaboski and Townsend (2005), Armendariz de Aghion and Morduch(2005), and most similarly, Cull et al. (2007), who pioneered the use of cross-country, cross-MFI data in this area. Our study differs from these in focusing on the macroeconomic and macro-institutional, rather than micro-institutional, determinants of MFI success.

There is also work examining determinants of the performance of standard commercial banks or the financial sector as a whole. Boyd et al. (2001) examine the impact of inflation on the aggregate financial sector and find inflation hinders financial development. Demirguc-Kunt and Huizinga (1999) and Demirguc-Kunt et al. (2004) are most comparable to our study in that they use panel datasets of banks across countries to examine macroeconomic and institutional determinants of bank interest markups and (in the former case) profitability. Demirguc-Kunt and Huizinga do not find an effect of growth on bank profitability, and they find that lower corruption and better contract enforcement lower profitability.[51]

Our study's main difference from these is its exclusive focus on MFIs. It is far from clear that what holds true for commercial banks or the banking sector as a whole will also hold true for MFIs. There are significant differences. First, a number of MFIs are subsidized, indefinitely or at least during an initial start-up phase. Thus it is not a foregone conclusion that MFIs failing to break even for a number of years will cease to exist. In other words, there appears to be much more significant and persistent variation on the financial sustainability margin in the MFI sector than in the formal banking sector. Second, MFIs tend to serve a more economically marginal clientele and finance relatively small, informal projects. The MFI technologies of service delivery, screening, and monitoring may significantly differ from those in the formal banking sector, and clients' projects also may face different determinants of viability. In short, the relationship between microfinance and the macroeconomy cannot likely be extrapolated from results on the broader banking sector.[52]

A few papers do focus on the relationship between the macroeconomy and MFI performance. The Patten et al. (2001) case study of BRI in the wake of the late-1990's Indonesian financial crisis finds that repayment rates for BRI's micro-loans were basically unchanged. However, they also note that BRI's nominal interest rates on micro-loans increased little, rising about thirteen percentage points for just one year; this compares with a spike in annual inflation of more than fifty percentage points. Apparently, BRI charged significantly lower real interest rates, and hence had lower real revenue per dollar loaned, as a result of the crisis. Henley (2009) studies Indonesian finance over the past century and argues based on historical evidence that robust macroeconomic growth contributed significantly to the recent success of Indonesian microfinance. Our paper makes a point related to Henley's, but differs from both Henley and Patten et al. mainly in its more quantitative methodology.

Several independent studies more closely related to ours appeared since our first draft (Ahlin and Lin, 2006). Krauss and Walter (2006, 2008) examine correlations between MFI performance and stock market indices as well as domestic income levels, using MFI fixed effects. They find that MFI performance is less correlated with stock market indices than comparison groups of emerging market firms and emerging market banks, but more correlated with GDP levels. Gonzalez (2007) examines measures of portfolio at risk and default using similar data to ours in an MFI fixed effect specification. He finds that only the PAR-30 measure is significantly related to growth, while other measures of default, including the loan loss expense rate, are not.

There are a number of differences between our approaches. We aim to test a broader set of macroeconomic and macro-institutional determinants, and we examine both broad indicators of MFI sustainability and growth as well as their components; we focus on solving outlier and data quality issues as well as endogeneity issues; and, related, we use and isolate both within- and between-MFI variation. Krauss and Walter (2008), on the other hand, include correlation with stock indices and also compare to emerging market firms and banks; Gonzales (2007) uses a richer set of MFI controls and default measures. We view the results as complementary and in agreement where they overlap.[53]

Finally, there is a large literature that tries to establish a reverse proposition: that finance affects growth (see Levine, 2005, for an introduction). However, the measures of finance used tend to be country-level indicators, such as the private credit measure used here. It is much less believable that a single microfinance institution, or even the microfinance sector in a country, is driving a significant portion of growth in the short run. At any rate, the issue of reverse causation is addressed in Section 5.2.

7. Conclusion

This study places microfinance institutions in national context by examining country-level determinants of success of 373 MFIs from around the world.

There is evidence for complementarity between overall economic performance and MFI performance. Growth appears to improve MFI financial performance, in part due to its effect on default. Breaking even appears easier to do in richer countries – at least up to a point. Also, a deeper financial sector is associated with lower operating costs, lower default, and lower interest rates, suggesting that broad financial competition does benefit micro-borrowers.

But, there are also signs of rivalry between microfinance and industry-led growth. Workforce participation and manufacturing's share of GDP predict slower growth in outreach of MFIs. Also, MFIs don't always do better, and sometimes seem to do substantially worse, where institutions are more advanced.

The broad conclusion that emerges is that MFI success – at least in terms of financial sustainability and its components, and extensive and intensive growth – is significantly affected by the macroeconomic and macro-institutional environment in which an MFI is situated. While national context is not the whole story, its effects are non-negligible and systematic enough to be factored into rigorous MFI evaluation. MFI evaluation ought to "handicap" for the country environment.

References

Ahlin, Christian, 2005. Effects and (in) tractability of decentralized corruption. Working paper. December.
Ahlin, Christian, Jiang, Neville, 2008. Can micro-credit bring development? Journal of Development Economics 86 (1), 1–21 April.
Ahlin, Christian, Lin, Jocelyn, 2006. Luck or skill? MFI performance in macroeconomic context. BREAD Working Paper No. 132. October.
de Aghion, Beatriz Armendariz, Morduch, Jonathan J., 2005. The Economics of Microfinance. MIT Press, Cambridge MA.

[51] Research has also attempted to understand causes of systemic banking crises, e.g. Demirguc-Kunt and Detragiache (1998, 2000, 2005), Kaminsky and Reinhart (1999), and Eichengreen and Rose (2001).

[52] There are similarities between this question and another that has received much attention, the relationship between growth and poverty.

[53] The exception would be in the emphasis of Gonzales (2007) on the macroeconomic resilience of MFIs. One difference is in estimation techniques; however, our results are still significant, though quantitatively muted in some cases, when we use only within-MFI growth variation to explain default.

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Bellman, Eric, 2006. Invisible hand: Entrepreneur gets big banks to back very small loans. Wall Street Journal A1 May 15.
Botero, Juan C., Djankov, Simeon, Porta, Rafael La., de Silanes, Florencio Lopez, Shleifer, Andrei, 2004. The regulation of labor. Quarterly Journal of Economics 119 (4), 1339–1382 November.
Boyd, John H., Levine, Ross, Smith, Bruce D., 2001. The impact of inflation on financial sector performance. Journal of Monetary Economics 47 (2), 221–248 April.
Chaves, Rodrigo A., Gonzalez-Vega, Claudio, 1996. The design of successful rural financial intermediaries: Evidence from Indonesia. World Development 24 (1), 65–78 January.
Cull, Robert, Demirguc-Kunt, Asli, Morduch, Jonathan, 2007. Financial performance and outreach: A global analysis of leading microbanks. Economic Journal 117 (517), F107–F133 February.
de Soto, Hernando, 1989. The Other Path. Harper and Row, New York.
Demirguc-Kunt, Asli, Detragiache, Enrica, 1998. The determinants of banking crises in developing and developed countries. International Monetary Fund Staff Papers 45 (1), 81–109 March.
Demirguc-Kunt, Asli, Detragiache, Enrica, 2000. Monitoring banking sector fragility: A multivariate logit approach. World Bank Economic Review 14 (2), 287–307 May.
Demirguc-Kunt, Asli, Detragiache, Enrica, 2005. Cross-country empirical studies of systemic bank distress: A survey. National Institute Economic Review 0 (192), 68–83 April.
Demirguc-Kunt, Asli, Huizinga, Harry, 1999. Determinants of commercial bank interest margins and profitability: Some international evidence. World Bank Economic Review 13 (2), 379–408 May.
Demirguc-Kunt, Asli, Laeven, Luc, Levine, Ross, 2004. Regulations, market structure, institutions, and the cost of financial intermediation. Journal of Money, Credit and Banking 36 (3), 593–622 June.
Djankov, Simeon, Porta, Rafael La., de Silanes, Florencio Lopez, Shleifer, Andrei, 2002. The regulation of entry. Quarterly Journal of Economics 117 (1), 1–37 February.
Eichengreen, Barry, Rose, Andrew K., 2001. Staying afloat when the wind shifts: External factors and emerging-market banking crises. In: Calvo, Guillermo A., Dornbusch, Rudi, Obstfeld, Maurice (Eds.), Money, Capital Mobility, and Trade: Essays in honor of Robert A. Mundell. MIT Press.
Fisman, Raymond, Svensson, Jakob, 2007. Are corruption and taxation really harmful to growth? Firm-level evidence. Journal of Development Economics 83 (1), 63–75 May.
Gonzalez, Adrian, 2007. Resilience of microfinance institutions to national macroeconomic events: An econometric analysis of MFI asset quality. MIX Discussion Paper No. 1. July.
Henley, David, 2009. Microfinance in Indonesia: Evolution and revolution, 1900-2000. In: Goenka, Aditya, Henley, David (Eds.), Southeast Asia's Credit Revolution: From Moneylenders to Microfinance. Routledge.
Kaboski, Joseph P., Townsend, Robert M., 2005. Policies and impact: An analysis of village-level microfinance institutions. Journal of the European Economic Association 3 (1), 1–50 March.
Kaminsky, Graciela L., Reinhart, Carmen M., 1999. The twin crises: The causes of banking and balance-of-payments problems. American Economic Review 89 (3), 473–500 June.
Kaufmann, Daniel, Kraay, Aart, Mastruzzi, Massimo, 2009. Governance matters VIII: Aggregate and individual governance indicators 1996-2008. World Bank Policy Research Working Paper 4978. June.
Koenker, Roger, 2005. Quantile Regression. Econometric Society Monographs, no. 38. Cambridge University Press.
Krauss, Nicolas, Walter, Ingo, 2006. Can microfinance reduce portfolio volatility? Working Paper, NYU. November 9.
Krauss, Nicolas, Walter, Ingo, 2008. Can microfinance reduce portfolio volatility? Working Paper, NYU. February 18.
Levine, Ross, 2005. In: Aghion, Philippe, Durlauf, Steven N. (Eds.), Handbook of Economic Growth. Finance and growth, volume 1A. Elsevier Press.
Morduch, Jonathan, 1999. The role of subsidies in microfinance: Evidence from the Grameen Bank. Journal of Development Economics 60 (1), 229–248 October.
Patel, Urjit R., Srivastava, Pradeep, 1996. Macroeconomic policy and output comovement: The formal and informal sectors in India. World Development 24 (12), 1915–1923 December.
Patten, Richard H., Rosengard, Jay K., Johnston Jr., Don E., 2001. Microfinance success amidst macroeconomic failure: The experience of Bank Rakyat Indonesia during the East Asian crisis. World Development 29 (6), 1057–1069.
Silverman, Rachel Emma, 2006. A new way to do well by doing good. Wall Street Journal D1 January 5.
World Bank, 2008. Doing Business 2009. World Bank, Washington, D.C.
Yaron, Jacob, 1994. What makes rural finance institutions successful? World Bank Economic Review 9 (1), 49–70 January.

Please cite this article as: Ahlin, C., et al., Where does microfinance flourish? Microfinance institution performance in macroeconomic context, J. Dev. Econ. (2010), doi:10.1016/j.jdeveco.2010.04.004