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Lending and business cycle: Evidence from microfinance institutions

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Lending and Business Cycle: Evidence from Microfinance Institutions[*]

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Lending and Business Cycle: Evidence from Microfinance Institutions

Abstract

Analyzing a sample of 5996 firm-year observations from 1444 microfinance institutions (MFIs) worldwide over the 2001-2014 period, we find a positive relationship between their lending growth and business cycle. This relationship mainly concerns regulated MFIs (comprising mostly bank-MFIs) due to regulatory pressure and their high exposure to economic uncertainties. Economic cycles affect non-regulated and pro-poor MFIs to a lesser degree, since their less wealthy clients, operating mainly in the informal sector, are less affected by macroeconomic shocks.

1 Introduction

Microfinance institutions (MFIs) are financial intermediaries whose primary business consists in providing financial services,[1] under various institutional forms, to low-income and vulnerable persons and to small and informal businesses that are economically excluded from the conventional banking sector. In most developing countries, these hybrid organizations are now part of the financial system and compete with banks (Cull et al. 2014; Vanroose and D'Espallier 2013). Unlike in developed countries, formal banking systems are less widespread in under-developed economies, and MFIs therefore play an essential role in providing basic financial services to the unbanked (individuals and firms). These institutions are well suited to dealing with the informal structure of these economies, with customers that are predominately poor and unbanked, and operating mainly in the informal sector.

Lending is a core financial intermediation activity common to all MFIs, regardless of their legal status and commercial orientation. The loan portfolio is their primary asset (BCBS 2010)[2],

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[1] Some MFIs also provide nonfinancial services, such as business training, agricultural training, health services, and education.

[2] In our study, we analyze the composition of MFI assets to assess the importance of the gross loan portfolio. Interestingly, loans are the most important part of their portfolios, providing a strong justification for our analysis. The analysis of MFI lending portfolios over the years is summarized in Table 3 (Panel B).

constituting over 70% of their balance sheet on average. Furthermore, MFIs are now an integral part of the financial system of most developing countries, and their activities are correlated to the financial sector (e.g., Brière and Szafarz 2015; Galema et al. 2011), the channel through which crises are likely to affect their business. MFIs are thus prone to macroeconomic shocks.

The objective of our study is to investigate the cyclical behavior of MFI lending with respect to the business cycle. Prior studies point to the resilience of MFIs to macroeconomic shocks due to their activities aimed at poor people with fewer connections to the more volatile financial or capital markets (Chen et al. 2010; Lützenkirchen and Weistroffer 2012). However, since these institutions rely on donations and financing from other formal institutions, funding shortages in periods of recession could affect them on the liability side, and undermine their intermediation activities. Wagner (2012) and Wagner and Winkler (2013) find evidence that, unlike commonly held, MFIs are not immunized against economic uncertainties, and thus their portfolios could be vulnerable to crises. We extend Wagner and Winkler's (2013) study in at least three ways. First, we look more generally at the impact of the business cycle on lending growth in microfinance institutions, and investigate the cyclical behavior of MFI lending using a longer dataset going beyond the last financial crisis. The 2008-2009 crisis period, as analyzed by the aforementioned authors, is a particular case, constituting a worldwide systemic crisis that affected every institution through the global financial markets contagion. Instead, by looking at business cycles by country and over a longer period, we study the specific impact of the business cycle in each country, as these cycles may not occur at the same time, except for special cases of worldwide systemic risk, as in the case of the 2008-2009 financial crisis. Second, we also study how regulation affects the cyclical behavior of MFI lending. We hypothesize that regulated MFIs are more prone to cyclical lending variations due to their minimum capital requirements. In particular, MFIs with a low capital level may significantly reduce their lending to comply with regulations during recessions. Finally, we employ the generalized method of moments (GMM) and other econometric techniques as robustness checks (fixed effects, random effects, and quantile regressions) to analyze the cyclical behavior of lending growth.

Using a sample of 5996 firm-year observations from 1444 MFIs worldwide over the 2001-2014 period, our analysis reveals a significant cyclical behavior in MFI lending. More precisely, one standard deviation (i.e., one percent increase) in GDP growth is associated with a 1.85% increase in MFI gross loans. This cyclical effect is most significant for regulated MFIs and bank-MFIs for which the increase in gross loans is respectively 2.03% and 2.65%. These findings point to two potential interpretations. First, since regulated MFIs are dominated by banks and large MFIs (by asset size), this result could confirm the cyclical lending behavior

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extensively documented for banking institutions. This may also be attributed to regulation, since regulated MFIs need to comply with minimum capital or provision requirements, thereby reducing their loan volume, which may contribute to meeting minimum regulatory capital requirements. The loan portfolios of pro-poor MFIs are less affected by business cycle variations, since their customers are mainly poor and their activities are in the informal sector, thus less affected by the cyclical variations of the formal economy.

The remainder of the paper is organized as follows. Section 2 presents the data, the research methodology, and the results. Section 3 provides additional multivariate regression results for the robustness check. Our conclusions are presented in Section 4.

2 Data, methodology, and results

2.1 Data and methodology

The data used in this study derived from the Microfinance eXchange (MIX) database[3], a web-based microfinance platform that provides data on individual MFIs. To date, the MIX platform discloses information on the viability and financial and social performance of around 2000 MFIs. Since our objective is to study the cyclical behavior of MFI lending with respect to the business cycle, we required MFI-level data over a relatively long time period. The advantage of the MIX database is that it enables collecting longitudinal data from 2001 to 2014, therefore more appropriate as a data source for our study.

Given that the MIX datasets are of unequal quality[4], we focus only on MFIs with more reliable data (four and five diamonds), namely, those with financial statements certified by chartered accountants. Furthermore, we adjusted the database to limit the influence of outliers. We winsorized MFI lending growth to the first and 99th percentiles, as high lending growth could be a sign of merged or startup MFIs. This process removed 31 MFI-year observations from our database. Our final sample is thus constituted of 1444 worldwide MFIs over a 14-year period (from 2001 to 2014) for a total 5996 MFI-year observations from six main regions of the world as defined by MIX (Table 1B): Africa (873 observations), East Asia and the Pacific (614 observations), Eastern Europe and Central Asia (973 observations), Latin America and Caribbean (2208 observations), Middle East and North Africa (256 observations) and South

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[3] Using the MIX database raises an issue related to the existence of sample selection bias that we do not consider in this study.
[4] MIX uses a five-point ordinal scale (diamond scale) to classify MFIs according to their level of transparency and reliability of information (five diamonds being the highest).

Asia (1072 observations). The distribution of the sample by country and region is presented in Table 1.

(Insert Table 1 about here)

To answer our research question of whether lending growth is pro-cyclical or countercyclical, and whether the effects depend on MFI type and regulation status, we relied on prior literature (e.g., Berger et al. 2008, De Jonghe and Öztekin 2015; Guidara et al. 2013; Hessou and Lai 2018; Kanga et al. 2018; among many others), applying the generalized method of moments (GMM) estimator that Arellano and Bond (1991) developed for dynamic panel data, and then extended by Arellano and Bover (1995) and Blundell and Bond (1998). This estimation method is more suitable for the structure of our dataset as described above, which has a large N (1444 MFIs) and small T (14-year period, from 2001 to 2014). This technique is also designed to address several econometric issues in panel data analyses, such as persistence, endogeneity, and omitted variables. The estimated regression model is as follows:

$$L_{ij,t} = \alpha + \lambda L_{ij,t-1} + X_{ij,t-1}\beta + W_{jt}\gamma^* + \eta_{ij,t}, \tag{1}$$

where in each year t and country j, MFI (indexed by i) lending growth is a function of the lending growth lag $L_{ij,t-1}$. $X_{ij,t-1}$ is a vector of MFI-level characteristics: size, riskiness of the loan portfolio measured by the loan *portfolio at risk at 30 days*, *financial performance* measured by the return on assets (ROA), *capital-to-asset ratio*, *loan officer* measured as the number of borrowers per loan officer, *poverty-focus* measured as the depth of outreach. W_{jt} is the business cycle variable of country j in year t proxied by GDP growth. Uncertainty in lending growth is captured by the error term $\eta_{ij,t}$ that can contain both idiosyncratic and time specific errors. Similarly, we assume that some specific lending growth level or specific time or country effect could drive the constant α in the model. Table 2 summarizes all the variables used in this study with their description and data source.

(Insert Table 2 about here)

To control for the possible endogeneity of the lag of lending growth (*L*) and the MFI-level variables, we used GMM-style instruments composed of lags between the 2nd and 5th of the

lending growth variable (*L*), and instrumental variable-style (IV) instruments composed of the first lags of the exogenous variables, such as profitability (ROA), size (SIZE), and asset portfolio risk (PAR30). We collapsed all the instruments, and tested their performance using the Hansen test, since the Sargan test is less efficient under the two-step GMM. In addition to the System-GMM approach, we estimated the fixed effects and the OLS version of equation (1), as both estimators are, respectively, upward and downward biased estimators of the dynamic equation. In addition, we estimated a quantile regression and its robust version to account for the potential effect of lending growth in the tail of the lending growth distribution.

2.2 Results

We computed MFI loan growth as the year-to-year difference in the log of the MFI gross loan portfolio. The analysis of MFI loan growth given in Table 3 suggests a substantial drop during the 2007-2009 subprime crisis period with the largest effect in 2008, the year of the collapse of Lehman Brothers. The annual average growth in loans dropped from 47.1% to 27.7% in 2008. A similar trend is observed for asset growth. Comparing the loan portfolio with the other non-interest assets suggests that loan portfolios constituted on average 77% of total assets of MFIs. At the peak of the crisis, i.e., 2008, the loan-to-asset ratio even reached 80%, due to the loss in the value of assets, especially non-interest earning securities. There is also evidence of an increase in portfolio risk during the subprime crisis period, which suggests that MFI loan portfolios are affected by macroeconomic conditions.

(Insert Table 3 about here)

In prelude to the econometric analysis, we computed the correlation matrix of the variables used in our study (see Table 3, panel C). The results show a significant and positive correlation between loan growth and its lag value, suggesting a persistent effect of loan growth as well as significant correlations among loan growth, MFI capitalization, and depth of outreach. In addition, high values of factors such as risk (proxied by size and PAR30) and, surprisingly, ROA, seem to be followed by low average loan growth. We also found a positive correlation between loan growth and the cycle variable (GDPGrowth) at the 1% level of confidence. However, overall, we observe very low correlations among our variables, alleviating multicollinearity concerns.

We also plotted graphs to visualize the loan growth dynamic through the business cycle (proxied by GDPGrowth). Graph A of Figure 1 shows a positive co-movement between GDP growth and loan growth for the whole sample. The same behavior is observed for bank-MFIs (Graph B) and regulated MFIs (Graph E). For the other MFI types (non-regulated MFIs, Coop/CU-MFIs, and NGO-MFIs), the co-movement between loan growth and GDP growth is not clear-cut. Our multivariate analysis will shed more light on the dynamics of the two variables.

(Insert Figure 1 about here)

To further analyze the MFI lending and business cycle dynamics, we conducted a multivariate analysis using regression equation (1). In Table 4, we estimate equation (1) using the System-GMM approach and other competing regression methods (OLS, fixed effects (FE), and random effects (RE) regressions). Our results confirm the positive co-movement between MFI lending growth and business cycle. Lending growth would seem to be pro-cyclical in microfinance institutions, since MFIs increase their loans in economic growth and decrease them in recessions. This finding provides support for the work of Ahlin et al. (2011), Hessou and Lai (2018), Wagner (2012), Wagner and Winkler (2013), and Wijesiri (2016), suggesting that, unlike commonly held, MFI lending is not immune to fluctuations in the business cycle.

(Insert Table 4 about here)

We deepened our findings by closely investigating how the cyclical behavior of MFI lending varies with MFI regulation status and type (Tchakoute Tchuigoua 2015). Our most robust GMM estimation results, presented in column (2) of Table 5, suggest that the cyclical behavior observed for the whole sample is essentially driven by the pool of regulated MFIs, with no co-movement between MFI loan growth and economic growth observed for non-regulated MFIs. This could be explained by regulatory pressure, as weakly capitalized MFIs will offset their capital shortfall in recessions by reducing their assets. In our most robust GMM estimation, only regulated MFI lending is cycle-dependent.

Concerning the different types of MFIs, as shown in column (3) of Table 5, bank-MFI lending is more cyclical compared to other types of MFIs (Cooperative/Credit union-MFIs, and NGO-MFIs). Not-for-profit MFIs (Cooperative/Credit union-MFIs, and NGO-MFIs) are presumably less involved in the global market and serve poor people whose economic activities

are less linked to formal economic cycles. Thus, for these pro-poor oriented MFIs, their loan portfolios are less exposed to macroeconomic conditions.

(Insert Table 5 about here)

These findings call for differentiating regulation depending on the type of MFI. For profit-oriented MFIs (regulated or bank-MFIs), the current Basel III counter-cyclical capital buffer for banks can be applied. For pro-poor MFIs, however, capital ratio increases need to be carefully considered, as these may endanger their lending activities toward the poor and the most vulnerable segments of the population. Since lending is the most important component of the MFI portfolio, and there is no evidence of substitution between loans and other assets, our results call for caution with regard to the "*one size fits all*" orthodoxy.

3 Robustness check

We tested the robustness of the pro-cyclical lending effect found for regulated and bank-MFIs. More specifically, we ran the regressions on the separate samples of MFI types and regulation status. The regression results given in Table 6 confirm the significant pro-cyclical lending effect documented above for regulated MFIs and bank-MFIs. We found no significant coefficients for the Coop/CU-MFI, NGO-MFI, and non-regulated MFI samples. This finding supports our above conclusion.

(Insert Table 6 about here)

In addition, we ran a quantile-based regression to account for potential differences in the cyclical behavior depending on the loan growth distribution quantile. We estimated the regression with 5%, 25%, 75%, and 95%. Our main result of the effect of the business cycle on loan growth is stable whatever the quantile (Table 7). This suggests that our result is not sensitive to the loan growth distribution. The effect of the business cycle is higher for higher quantiles.

(Insert Table 7 about here)

4 Conclusion

Microfinance institutions (MFIs) are prevalent in the financial system of many emerging and developing countries. They provide financial intermediary services to low-income and vulnerable segments of the population that would otherwise be excluded from the formal financial system. As such, their lending activities are crucial to generating sustainable economic development. Due to their commercial orientation and integration with the formal financial system, the activities of MFIs are likely to be affected by macroeconomic shocks.

This paper studies the cyclical behavior of MFI lending activities with respect to the business cycle. It thereby extends prior studies, such as those of Ahlin et al. (2011), Hessou and Lai (2018), Wagner (2012), Wagner and Winkler (2013), and Wijesiri (2016), by not only expanding the dataset period beyond the 2006-2010 subprime crisis, but also by extending the analysis to different types of MFIs and regulation status.

We analyzed the cyclical behavior of MFI lending using a sample of 5996 firm-year observations from 1444 MFIs worldwide over the 2001-2014 period obtained from the Microfinance eXchange (MIX) database, and applied the System-GMM estimator. We find a positive relationship between loan growth and business cycle for regulated MFIs, comprised mostly of bank-MFIs, due to regulatory pressure and the link between their activities and the real economy. Non-regulated and pro-poor MFIs, however, appear to not be affected by the cyclical variations of the economy. This is due to the fact that their customers are mainly in the informal sector, and their economic activities are thus less affected by macroeconomic shocks.

In terms of policy recommendations, our findings caution policy makers against applying the "*one size fits all*" orthodoxy to all MFIs. For instance, for regulated MFIs, the current Basel III counter-cyclical capital buffer for banks can be applied. For pro-poor MFIs, however, capital ratio increases must be undertaken cautiously, as this may endanger their lending activities toward the unbanked and vulnerable.

A future extension of the current work is the categorization of MFI loan portfolios to analyze the cyclical behavior of each category based on the credit methodology (individual versus joint liability contracts - solidarity and village bank lending), geographic localization (urban versus rural), type of loans (household versus enterprise loans), and so forth.

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Table 1 Distribution of the sample

A - Sample distribution by country

Country	Frequency	Percentage	Country	Frequency	Percentage
India	482	8.04	Afghanistan	26	0.43
Ecuador	422	7.04	Democratic Republic of the Congo	26	0.43
Philippines	301	5.02	Haiti	25	0.42
Peru	289	4.82	Palestine	25	0.42
Bangladesh	230	3.84	Uzbekistan	25	0.42
Bolivia	185	3.09	South Africa	24	0.4
Nicaragua	184	3.07	Chile	23	0.38
Nepal	168	2.8	Malawi	23	0.38
Colombia	165	2.75	Lebanon	21	0.35
Mexico	137	2.28	Rwanda	21	0.35
Honduras	128	2.13	People's Republic of China	18	0.3
Guatemala	120	2	Moldova	18	0.3
Cambodia	119	1.98	Yemen	16	0.27
El Salvador	117	1.95	Zambia	15	0.25
Pakistan	115	1.92	Burkina Faso	14	0.23
Azerbaijan	106	1.77	Laos	13	0.22
Brazil	106	1.77	Poland	13	0.22
Tajikistan	93	1.55	Tunisia	13	0.22
Bosnia and Herzegovina	90	1.5	Ukraine	13	0.22
Costa Rica	86	1.43	Iraq	12	0.2
Ethiopia	83	1.38	Niger	11	0.18
Kenya	76	1.27	Sierra Leone	11	0.18
Armenia	75	1.25	East Timor	10	0.17
Kyrgyzstan	75	1.25	Montenegro	10	0.17
Indonesia	73	1.22	Venezuela	9	0.15
Ghana	72	1.2	Republic of the Congo	8	0.13
Uganda	70	1.17	Cote d'Ivoire (Ivory Coast)	7	0.12
Georgia	65	1.08	Croatia	7	0.12
Kosovo	62	1.03	Thailand	7	0.12
Egypt	60	1	Zimbabwe	7	0.12
Dominican Republic	59	0.98	Burundi	6	0.1
Kazakhstan	59	0.98	Syria	6	0.1
Benin	56	0.93	Tonga	6	0.1
Russia	56	0.93	Angola	5	0.08
Vietnam	55	0.92	Chad	5	0.08
Paraguay	54	0.9	Guinea	5	0.08
Jordan	53	0.88	Papua New Guinea	5	0.08
Argentina	52	0.87	Suriname	5	0.08
Morocco	48	0.8	Uruguay	5	0.08
Sri Lanka	48	0.8	Samoa	4	0.07
Tanzania	47	0.78	Turkey	4	0.07
Nigeria	46	0.77	Bhutan	3	0.05

Senegal	46	0.77	Gambia, The	3	0.05
Mali	41	0.68	Hungary	3	0.05
Mongolia	41	0.68	Trinidad and Tobago	3	0.05
Mozambique	37	0.62	Belize	2	0.03
Albania	36	0.6	Malaysia	2	0.03
Cameroon	36	0.6	Sudan	2	0.03
Madagascar	35	0.58	Central African Republic	1	0.02
Togo	34	0.57	Grenada	1	0.02
Bulgaria	32	0.53	Guyana	1	0.02
Macedonia	32	0.53	Jamaica	1	0.02
Romania	30	0.5	Myanmar (Burma)	1	0.02
Panama	29	0.48	Namibia	1	0.02
Serbia	28	0.47	Swaziland	1	0.02
			Total	**5996**	**100%**

B - Sample distribution by region

Region	Frequency	Percentage
Africa	873	14.56
East Asia and the Pacific	614	10.24
Eastern Europe and Central Asia	973	16.23
Latin America and The Caribbean	2208	36.8
Middle East and North Africa	256	4.27
South Asia	1072	17.9
Total	5996	100%

Table 2 Variables and definition

	Variable	Description
Loan growth	LOANG	Loan growth is measured as the year-to-year difference in the log of the MFI gross loan portfolio. Source: authors own based on MIX
Economic growth	GDPG	Real Gross Domestic Product (GDP) Growth Source: GFD & WDI
Loan portfolio risk	Portfolio at risk at 30 days (PAR30)	(Outstanding balance on arrears over 30 days + total gross outstanding refinanced (restructured) Portfolio)/total gross portfolio measurement of portfolio quality. This shows the part of the portfolio affected by outstanding payments when there is a risk that they might not be repaid. The threshold is < 10% given that financial guarantees in microfinance are not always sufficient. Source: MIX
Size of the MFI	SIZE	Log of total number of active borrowers Source: MIX
Profitability	ROA	Return on Assets = Net Operating Income/Average Assets Source: MIX
Loan Officer - Labor intensity	LO	Log of the number of borrowers per loan officer Source: MIX
Depth of outreach	DEPTH	Average loan size per borrower scaled by the per capita gross national income (GNI) Source: MIX
Regulation	REG	Regulation dummy: value 1 if the MFI is subject to prudential regulation, 0 otherwise Source: MIX
Ownership type	NGO	Binary variable: 1 if the MFI is a non-governmental organization; 0 otherwise. Source: MIX
	Coop/CU	Binary variable: 1 if the MFI is a cooperative or a credit union; 0 otherwise. Source: MIX
	Shareholder based	Binary variable: 1 if the MFI is a shareholder MFI; 0 otherwise. Source: MIX

Notes: MIX = Microfinance Information eXchange database; GFD = Global Financial Development database and WDI = World Development Indicators of the World Bank; BIS = Bank for International Settlements.

Table 3 Descriptive analysis results

Panel A: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Loan growth (LOANG)	3.642	0.27	0.25	-0.84	1
Size (SIZE)	3.596	9.81	1.77	3.56	15.75
Portfolio at risk at 30 days (PAR30)	3.452	0.05	0.13	0	5.48
Return on assets (ROA)	3.592	0.03	0.08	-2.41	0.39
Capital-to-asset ratio (CAR)	3.623	0.3	0.22	-1.28	1.01
Loan officer (LO)	3.165	324.14	290.09	0.33	7551
Depth of outreach (DEPH)	3.589	0.73	1.85	0.01	41.87
GDP growth (GDPGrowth)	3.435	0.05	0.04	-0.16	0.34

Panel B: Descriptive statistics by year

Year	Loan growth	Asset growth	Loan-to-assets	Portfolio at risk at 30 days
2001			0.699	0.046
2002	0.463	0.372	0.704	0.043
2003	0.409	0.363	0.726	0.060
2004	0.440	0.413	0.757	0.052
2005	0.377	0.355	0.751	0.048
2006	0.409	0.391	0.745	0.047
2007	0.471	0.440	0.761	0.039
2008	0.277	0.240	0.807	0.051
2009	0.201	0.217	0.760	0.072
2010	0.266	0.237	0.781	0.058
2011	0.188	0.170	0.792	0.065
2012	0.202	0.214	0.785	0.041
2013	0.210	0.201	0.803	0.048
2014	0.113	0.111	0.815	0.053
Total	0.300	0.281	0.770	0.053

Panel C: Correlation matrix.

	LOANG	L.LOANG	L.SIZE	L.PAR30	L.ROA	L.CAR	LO	DEPTH	GDP Growth
LOANG	1.0000								
L.LOANG	0.3851*	1.0000							
L.SIZE	-0.0899*	-0.0127	1.0000						
L.PAR30	-0.0830*	-0.1189*	-0.0367	1.0000					
L.ROA	-0.0523*	-0.0064	0.0881*	-0.0279	1.0000				
L.CAR	0.0739*	-0.0209	-0.2630*	-0.0191	0.0729*	1.0000			
LO	-0.0424	-0.0532	0.2269*	-0.0042	0.0491*	-0.0768*	1.0000		
DEPTH	0.0645*	0.0476	-0.1479*	-0.0055	-0.0141	-0.0771*	-0.1542*	1.0000	
GDPGrowth	0.2059*	0.1325*	0.0575*	-0.0242	0.0263	0.0392	0.0226	0.0498*	1.0000

Notes: *correlation coefficients are significant at 5%.

Table 4 Regression results

This table presents the regression of the loan growth (LOANG) on the business cycle variable (GDPGrowth) using the System-GMM approach, the OLS approach, the fixed effects (FE), and random effects (RE) approaches. We proxied the business cycle by GDPGrowth. MFI characteristics include their size measured by the logarithm of their number of active borrowers, the riskiness of the loan portfolio measured by the loan portfolio at risk at 30 days, financial performance measured by the return on assets (ROA), capital-to-asset ratio (CAR), loan officer (LO) measured by the number of borrowers per loan officer, poverty-focus measured by the depth of outreach (DEPTH). The prefix "L" before a variable designates the lag of the variable. Windmeijer robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Syst-GMM-Whole	(2) OLS-Whole	(3) FE-Whole	(4) RE-Whole
L.LOANG	0.447***	0.372***	0.0659**	0.311***
	(0.123)	(0.0264)	(0.0318)	(0.0285)
L.SIZE	-0.0371	-0.00816***	-0.184***	-0.0166***
	(0.0985)	(0.00310)	(0.0147)	(0.00357)
L.PAR30	0.317	-0.281***	-0.617***	-0.315***
	(0.562)	(0.0823)	(0.217)	(0.0911)
L.ROA	-0.0842	-0.198***	-0.513**	-0.245***
	(0.209)	(0.0690)	(0.224)	(0.0826)
L.CAR	-0.319	0.0608**	0.125*	0.0928***
	(0.362)	(0.0271)	(0.0676)	(0.0329)
LO	-0.00168	9.89e-06	0.000163***	2.20e-05
	(0.00192)	(2.66e-05)	(5.67e-05)	(2.96e-05)
DEPTH	-0.634	0.0102**	0.0540**	0.0140***
	(0.509)	(0.00464)	(0.0221)	(0.00495)
GDPGrowth	**1.856***	**1.495***	**1.184***	**1.511***
	(0.597)	(0.154)	(0.165)	(0.137)
Constant	1.418	0.148***	1.942***	0.233***
	(0.963)	(0.0370)	(0.161)	(0.0417)
Observations	2,079	2,079	2,079	2,079
R-squared		0.263	0.305	
Number of MFIs	623		623	623
AR(1)	0.05			
AR(2)	0,55			
Hansen Test	0,49			
Country FE	YES	YES	YES	YES

Standard errors in parentheses

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

Table 5 Regression results by crossing economic growth and regulation status and type

This table presents the regression of the loan growth (LOANG) on the business cycle variable (GDPGrowth) using the System-GMM approach. We proxied the business cycle by GDPGrowth, which we crossed with the MFI-Regulation status (regulated vs. non-regulated) and MFI types (Bank-MFIs, Coop/CU-MFIs, and NGO-MFIs), to obtain the results in columns 2 and 3 respectively. MFI characteristics include their size measured by the logarithm of their number of active borrowers, the riskiness of the loan portfolio measured by the loan portfolio at risk at 30 days, financial performance measured by the return on assets (ROA), capital-to-asset ratio (CAR), loan officer (LO) measured by the number of borrowers per loan officer, poverty-focus measured by the depth of outreach (DEPTH). The prefix "L" before a variable designates the lag of the variable. Windmeijer robust standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

VARIABLES	(1) Whole	(2) Regulation status	(3) MFI_Type
L.LOANG	0.447***	0.447***	0.410***
	-0.123	-0.126	-0.125
L.SIZE	-0.0371	-0.0129	-0.0504
	-0.0985	-0.0867	-0.0916
L.PAR30	0.317	0.18	0.198
	-0.562	-0.416	-0.462
L.ROA	-0.0842	-0.0918	-0.117
	-0.209	-0.185	-0.188
L.CAR	-0.319	-0.139	-0.252
	-0.362	-0.241	-0.271
LO	-0.00168	-0.00177	-0.00113
	-0.00192	-0.00187	-0.00188
DEPTH	-0.634	-0.421	-0.594
	-0.509	-0.376	-0.377
GDPGrowth	**1.856***		
	-0.597		
GDPGrowth x REG Dummy		**2.037**	
		-0.871	
GDPGrowth x Non-REG Dummy		0.0619	
		-1.552	
GDPGrowth x BANK Dummy			**2.658**
			-1.231
GDPGrowth x COOP/CU Dummy			1.646
			-1.975
GDPGrowth x NGO Dummy			-0.437
			-1.114
Constant	1.418	1.051	1.362*
	-0.963	-0.744	-0.769
Observations	2,079	2,079	2,079
Number of MFIs	623	623	623
AR(1)	0.05	0.03	0.03
AR(2)	0,55	0,61	0.27
Hansen Test	0,49	0,39	0.51
Country FE	YES	YES	YES

Table 6 Regression results by type and regulation status

This table presents the regression of the loan growth (LOANG) on the business cycle variable (GDPGrowth) using the System-GMM approach. We ran the regression on separate samples of MFI types (Bank-MFIs, Coop/CU-MFIs, and NGO-MFIs), and regulation status (regulated MFIs and non-regulated MFIs). As in the previous regressions, we proxied the business cycle by GDPGrowth. MFI characteristics include their size measured by the logarithm of their number of active borrowers, the riskiness of the loan portfolio measured by the loan portfolio at risk at 30 days, financial performance measured by the return on assets (ROA), capital-to-asset ratio (CAR), loan officer (LO) measured by the number of borrowers per loan officer, poverty-focus measured by the depth of outreach (DEPTH). The prefix "L" before a variable designates the lag of the variable. Windmeijer robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The model rejects the presence of autocorrelation of order 1, certainly due to data length.

VARIABLES	MFI_Type			Regulation	
	Bank	Coop/CU	NGO	REG	NON_REG
L.LOANG	0.276	0.497*	0.330**	0.432***	0.0210
	(0.191)	(0.263)	(0.132)	(0.144)	(0.312)
L.SIZE	-0.146	-0.0234	-0.0721	0.0106	-0.275
	(0.123)	(0.0431)	(0.107)	(0.0968)	(0.266)
L.PAR30	-0.0570	0.497	0.130	0.148	1.024
	(0.922)	(0.929)	(0.472)	(0.411)	(2.284)
L.ROA	-0.921	-1.378	0.0620	-0.342	-0.459
	(0.670)	(0.920)	(0.169)	(0.391)	(0.454)
LO	0.00105	-0.00165	-0.000868	-0.00248	0.00132
	(0.00260)	(0.00197)	(0.00172)	(0.00220)	(0.00370)
DEPTH	-0.588**	-0.673	-0.989	-0.209	-2.258
	(0.294)	(0.567)	(1.004)	(0.494)	(3.371)
GDPGrowth	**2.251***	0.490	0.712	**1.453**	1.168
	(0.428)	(0.676)	(0.579)	(0.565)	(1.291)
Constant	1.721***	1.434	1.433	0.918	3.018
	(0.661)	(0.924)	(0.996)	(0.857)	(4.035)
Observations	1,107	230	727	1,426	653
Number of MFIs	328	72	216	412	211
AR(1)	0.056	0.045	0.427*	0.08	0.677*
AR(2)	0.842	0.634	0.379	0.782	0.53
Hansen Test	0.674	0.231	0.839	0.501	0.286
Country FE	YES	YES	YES	YES	YES

Standard errors in parentheses.

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

Table 7 Distribution-based regression: Quantile approach

This table presents the regression of loan growth (LOANG) on the business cycle variable (GDPGrowth) using the quantile regression approach. We ran the regression on the whole sample using both simple and bootstrapped quantile regressions. We also allowed for different quantiles (0.05, 0.25, 0.75, and 0.95) to account for potential heterogeneity in the loan growth distribution. We proxied the business cycle by GDPGrowth. MFI characteristics include their size measured by the logarithm of their number of active borrowers, the riskiness of the loan portfolio measured by the loan portfolio at risk at 30 days, financial performance measured by the return on assets (ROA), capital-to-asset ratio (CAR), loan officer (LO) measured by the number of borrowers per loan officer, poverty-focus measured by the depth of outreach (DEPTH). The prefix "L" before a variable designates the lag of the variable. Windmeijer robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Quantile Whole	(2) Quantile Bootstrap	(3) Quantile 5%	(4) Quantile 25%	(5) Quantile 75%	(6) Quantile 95%
L.LOANG	0.387***	0.387***	0.210***	0.309***	0.458***	0.454***
	(0.0180)	(0.0261)	(0.0489)	(0.0210)	(0.0233)	(0.0550)
L.SIZE	0.000320	0.000320	-0.0123	-0.00436	-0.0102**	-0.0189**
	(0.00312)	(0.00245)	(0.00845)	(0.00362)	(0.00403)	(0.00950)
L.PAR30	-0.256***	-0.256***	-0.248	-0.236***	-0.338***	-0.347
	(0.0773)	(0.0663)	(0.209)	(0.0897)	(0.0998)	(0.235)
L.ROA	-0.159**	-0.159	0.131	-0.0505	-0.288***	-0.385**
	(0.0620)	(0.0976)	(0.168)	(0.0720)	(0.0801)	(0.189)
L.CAR	0.0554**	0.0554**	0.00714	-0.00830	0.0998***	0.150*
	(0.0257)	(0.0278)	(0.0696)	(0.0298)	(0.0332)	(0.0782)
LO	1.40e-05	1.40e-05	2.63e-05	-1.29e-05	3.08e-05	8.12e-05
	(2.35e-05)	(2.77e-05)	(6.36e-05)	(2.73e-05)	(3.03e-05)	(7.15e-05)
DEPTH	0.00580	0.00580	0.0198	0.00935	0.00531	-0.000396
	(0.00503)	(0.00668)	(0.0136)	(0.00584)	(0.00649)	(0.0153)
GDPGrowth	**1.214***	**1.214***	**1.314***	**1.306***	**1.672***	**2.785***
	(0.128)	(0.150)	(0.345)	(0.148)	(0.165)	(0.388)
Constant	0.0637*	0.0637**	-0.105	0.0326	0.239***	0.498***
	(0.0356)	(0.0262)	(0.0963)	(0.0413)	(0.0460)	(0.108)
Observations	2,079	2,079	2,079	2,079	2,079	2,079

Figure 1 Dynamics of loan growth and GDP growth (2001-2014)

These graphs plot the average loan growth (Mloang) dynamics jointly with the business cycle variable (GDP growth).

A. Whole sample

B. Bank-MFI

C. Coop/CU-MFIs

D. NGO-MFI

E. Regulated MFIs

F. Non-regulated MFIs