Microfinance Information eXchange

Is Microfinance Growing Too Fast?[1]

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The aggregate number of borrowers served by microfinance institutions (MFIs) reporting to MIX Market (www.mixmarket.org) grew 21 percent per year on average in the 2003-2008 period, while the loan portfolio grew 34 percent per year on average in the same period.[2] For many microfinance practitioners and analysts, this level of growth is a reason for celebration, as it points towards microfinance's success in increasing access to financial services for poor and low-income households and businesses.

During 2008, the global economy experienced a financial crisis and slowdown. Evidence from past years has shown that even though microcredit arrears do rise in periods of economic slowdown, delayed payments do not translate into significant portfolio losses on average.[3] Results on portfolio quality of MFIs for 2008 confirm these findings, although some high-growth markets, like Morocco and Bosnia and Herzegovina, experienced a rise in delinquency during 2008.[4] Consequently, concerns about the impact of high growth on portfolio quality of MFIs have been raised recently.[5]

Many have taken for granted that high levels of growth are associated with a deterioration of the portfolio quality of MFIs, but until now, no attempt has been made to quantify a specific level at which there is too much growth. Recently, it has been suggested that country-wide deterioration of the portfolio of MFIs in Bosnia and Herzegovina, Morocco, Nicaragua and Pakistan is associated with uncontrolled growth in the sector.[6] But how relevant is a strictly growth-centered analysis for understanding MFI portfolio quality? Is growth by itself a valid indication of danger?

This paper quantifies the point at which the level of growth appears to overstretch MFI resources and at which portfolio quality begins to decline for any higher growth level. This issue is important in order for microfinance institutions to understand the trade-offs between growth and portfolio quality. One additional question explored is whether the growth strategy has a significant effect on portfolio quality. In particular, this paper distinguishes between **local growth** (growth in the number of borrowers per branch) versus **expansive growth** (growth in the number of branches per MFI) and tries to measure how much is too much for each case, and whether differences in the growth path chosen by MFIs matter. Finally, the analysis concludes with a review of the market context in which MFIs are building their borrower bases and the extent to which that context impacts portfolio quality.

This analysis yields three important findings to our understanding of growth and portfolio quality. First, the evidence indicates that **there is little relationship between high growth rates and portfolio quality except in extreme situations.** The results place the threshold over 250 percent per year, well above the annual growth rates reached by 95 percent of MFIs in the sample. The sheer pace of growth does little by itself to explain portfolio quality problems. Second, the results suggest that **in terms of deterioration of portfolio quality, MFIs have more room to grow *expansively* (by adding more branches) than to grow *locally* (by adding more borrowers per branch).** This could be related to the existence of a larger pool of high quality borrowers in the

1. The author appreciates valuable comments and suggestions from Scott Gaul, Valentina Hartarska, Emmanuelle Javoy, Marten Leijon, Blaine Stephens, and Richard Rosenberg. All errors and omissions remain my own responsibility.

2. Gonzalez, Adrian (2009), "Microfinance at a Glance – 2008," Microfinance Information Exchange, available at http://www.themix.org/publications/microfinance-glance.

3. Gonzalez, Adrian (2007), "Resilience of Microfinance to National Macroeconomic Events: A Look at MFI Asset Quality", MicroBanking Bulletin, No. 14, Spring, available at http://www.themix.org/publications/resilience-microfinance-national-macroeconomic-events-look-mfi-asset-quality.

4. Stephens, Blaine (2009), "Operating Efficiency: Victim to the Crisis?" MicroBanking Bulletin, No. 19, December, available at http://www.themix.org/sites/default/files/MBB%2019%20-%20Operating%20Efficiency%20-%20Victim%20to%20the%20Crisis.pdf.

5. Chen, Greg, Stephen Rasmussen and Xavier Reille (2010), "Growth and Vulnerabilities in Microfinance," Focus Note No. 61, CGAP, February, available at http://www.cgap.org/gm/document-1.9.42393/FN61.pdf.

6. Chen, *et. al.* (2010).

new markets, compared to a smaller pool for MFIs that can grow only locally. Other explanations may be valid as well, and more research is necessary to measure the particular forces explaining this result. Third, **country context, including high levels of penetration rates (over 10 percent of total population) and high aggregate country growth levels in number of microfinance borrowers (over 63 percent per year), is also associated with deterioration of portfolio quality.** In Appendix 1, a quick how-to-use guide is presented, with real MFI data complemented with information from public ratings.

Methodology

The analysis is based on 3,263 observations from 821 MFIs in 91 countries reporting data for 2000-2008 MIX Market (www.mixmarket.org), with 74 percent of the sample concentrated in the last four years. In order to focus on actual growth, as opposed to the "taking-off" growth observed the first years of operations, the sample removes MFIs under one year in age, under 300 borrowers, or under $4,000 in total assets.[7] In order to focus on microenterprise lending, MFIs with loan sizes over 700 percent of GNI per capita or over $11,000 were removed as well.[8] The results are based on adjusted indicators only.[9]

The analysis focuses on three measures of portfolio quality: write-off ratio (WOR), portfolio at risk over 30 days (PAR30), and total risk, defined as the sum of the first two variables. Different regressions were estimated using the following explanatory variables:[10]

Results suggest that portfolio at risk does have a very small but statistically significant inter-temporal effect on write-off ratio; in other words, the previous year's portfolio at risk has a small impact on the current year's write-off ratio.

- MFI Borrower growth: annual growth in number of borrowers[11]
- MFI Local Growth: annual growth in borrowers per branch
- MFI Expansive Growth: annual growth in number of branches
- MFI Age: Number of years since establishment
- MFI Gross Loan Portfolio: in US dollars
- MFI Productivity: Borrowers per Staff[12]
- Country Borrowers Growth: Weighted country growth of number of borrowers
- Country PAR30 (t-1): Weighted country PAR30 from previous year
- Country Penetration Rate: Country total number of microfinance borrowers as percentage of total population. Total number of microfinance borrowers was complemented with data from Microcredit Summit Campaign and Inter American Development Bank[13]
- Country GDP Growth Rate: Country annual growth in GNI per capita
- Country Inflation Rate: Country inflation rate

Inter-temporal Effects

The timing of growth and portfolio quality deterioration are important to this analysis. One common argument is that a high growth episode may precede the deterioration of portfolio quality. In order to test this hypothesis, many econometric models with different combinations of lagged dependent variables were estimated, but the coefficients for growth

7. In the final dataset, 99 percent of all MFIs were at least 3 years old.

8. The unadjusted dataset used for this analysis is available here: http://www.themix.org/publications/microfinance-growing-too-fast-methodology-data-set. MIX Market confidentiality agreement prevents us from publishing the adjusted dataset.

9. The analysis was done for both adjusted and unadjusted information, but econometric results were more robust using the adjusted data. This makes sense as adjustments increase the comparability of portfolio quality data for MFIs with different writing-off policies. For details about adjustments, see Appendix 1 of MicroBanking Bulletin (http://www.themix.org/sites/default/files/MBB percent 2019 percent 20- percent 20December percent 202009_0.pdf).

10. The basic intuition of the econometric models is to estimate a quadratic equation for the growth variables, and test whether the coefficients are statistically significant. If so, for each explanatory variable with a quadratic term it is possible to solve for the value that minimizes the curves. All results reported correspond to the fix effect specification, after confirming specification with Hausman tests. Even though quadratic terms are commonly used to estimate optimal levels in econometrics, we look forward to future testing of the robustness of the results with different model specifications.

11. Specifically, either borrowers' growth or the pair *local-expansive growth* was used on every regression at the time. Regression results are available in Appendix 2.

12. Future versions of this research should consider differences in productivity by lending technology (individual, village banks, and solidarity groups) and between deposit-mobilizing MFIs.

13. See Gonzalez, Adrian (2008), "How Many MFIs and Borrowers Exist?" available at http://www.themix.org/publications/how-many-mfis-and-borrowers-exist-updated-dec-2008.

were statistically insignificant. This means that it is not possible to prove statistically that there is a connection between previous period growth and current portfolio quality levels with the current data sample. However, these findings do not rule out the possibility of this inter-temporal relationship, because most microfinance loans are short-term, whereas only annual data is available to test the hypothesis.

In addition, the regressions included previous year market PAR30 in order to test inter-temporal contagion effects translating into higher WOR the following period. The coefficient was statistically significant, but the magnitude of the contagion is small. In particular, the results suggest that around 1/20 of previous year PAR30 translates into current year WOR. This means that a difference in previous year PAR30 of 20 percentage points (i.e. between a country with aggregate PAR30 of 5 percent and another with 25 percent) will predict a difference in WOR of only one percentage point in the current year.

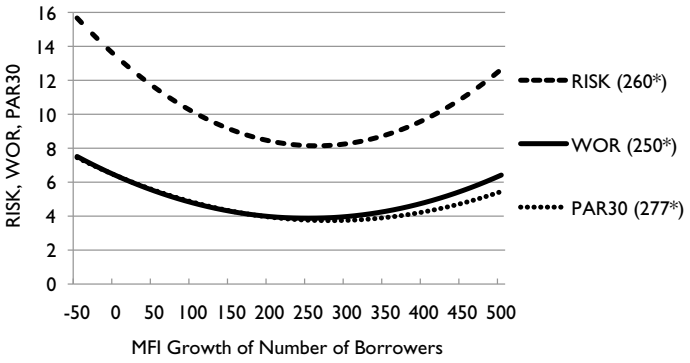
How Much is Too Much Growth?

According to the econometric models estimated, the relationship between portfolio quality and growth in number of borrowers can be simulated by a U-shaped relationship, meaning that higher levels of growth are actually associated with better levels of portfolio quality, until a critical level for growth in number of borrowers is reached. Only growth levels over the critical level are associated with deterioration in the portfolio quality of MFIs, as depicted in **Figure 1**. In particular, those critical levels are 260 percent annual growth in number of borrowers for RISK, 250 percent for WOR, and 277 percent for PAR30.

Only growth levels over the critical level —260% annual growth in number of borrowers, 250% for write-off ratio, and 277% for portfolio at risk—are associated with deterioration of MFI portfolio quality.

Figure 1 is a simulation of the predicted relationship between portfolio quality and growth in number of borrowers, and the absolute levels on the vertical axis are meaningless. A proper interpretation of this graph is that, ceteris paribus, MFIs that are currently growing 250 percent and planning to accelerate growth to 500 percent per year are likely to observe an increase of 2 percentage points in their WOR (with a similar effect for a reduction in growth from 250 percent to 0 percent).[14]

Figure 1
Predicted Relationship between Portfolio Quality and MFI Growth (Number of Borrowers)



*Values that minimize curves

These predictions should not be taken to imply causality or that these are the only factors in question, as there are many other factors that affect the portfolio quality of MFIs. In other words, the results do not necessarily imply that MFIs accelerating their growth over 250 percent per year will certainly experience deterioration in their portfolio quality, but the informed analyst should know these aggressive growth rates increase the risk of portfolio quality deterioration. On the whole, however, growth rates in borrowers have shown very little impact on portfolio risk outside of extreme cases of growth or decline. This suggests that overstretching of MFIs' resources happens only at high rates of growth. In addition, slow-growing MFIs should not push growth closer to the threshold levels as a policy to improve their portfolio quality.

How Many MFIs are at Risk Due to Uncontrolled Growth?

In 2008, less than one percent of the MFIs in the sample are red flagged for high growth, since only 2 out of 689 MFIs grew more than the lowest critical level of 250 percent per year. For illustration purposes, assume a more conservative scenario where the critical level is 200 percent. Under this

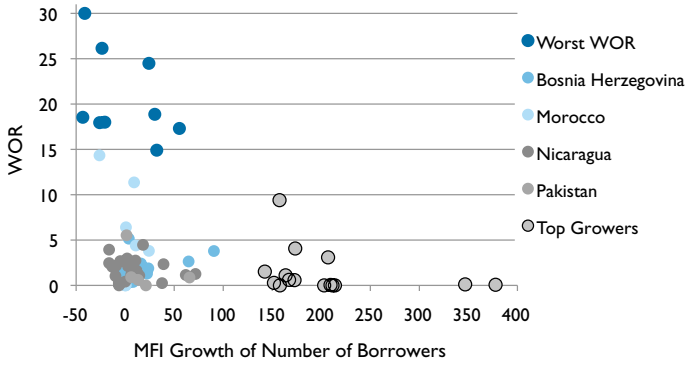
14. All figures showing predicted relationships should be interpreted the same way.

scenario, only 7 MFIs (close to 1 percent of the MFIs in the sample) are red flagged on the grounds of high growth. This means that high growth could be associated with deterioration of portfolio quality only in cases with exceptionally high levels of growth, affecting a small proportion of the MFIs in the sample.[15]

In 2008, the MFIs with the highest write-off ratio exhibited negative, rather than exorbitant, growth rates; this trend runs contrary to suggestions that portfolio quality problems in certain countries were due to uncontrolled growth.

A comparison of the top 15 most rapidly growing institutions versus the 15 MFIs with the highest WOR levels confirms the general result from the econometric model (**Figure 2**). In particular, in 2008, the 15 MFIs with the highest WOR exhibit negative growth rates, while most of the fastest-growing MFIs exhibit low levels of portfolio risk. Therefore, contrary to what has been suggested recently,[16] the portfolio quality problems in Bosnia and Herzegovina, Morocco, Nicaragua, and Pakistan coincided with low rates of growth in number of borrowers in the same period, as opposed to exorbitant growth rates.

Figure 2
Top 15 Growers, Worst MFIs by WOR, and Selected Countries: 2008



15. We tried estimating different critical levels according to MFI size, but found only small differences between MFIs with more than 9,000 borrowers (median) versus smaller MFIs.

16. Chen, *et. al.* (2010).

Expansive versus Local Growth

The main discussion relating high growth levels with deterioration of portfolio quality has focused on the overstretching of MFI resources, with almost no consideration of other elements. However, it could be argued that MFIs that can only grow locally (adding new borrowers within a limited geographic market) are expected to deplete the pool of good borrowers faster than those MFIs that can grow expansively as well (adding new borrowers through the creation of new branches in new markets).[17]

In the most simplistic scenario, local growth signifies MFIs adding more resources (MIS, management, etc.) in a geographically confined market with a limited pool of high quality borrowers. This implies that as MFIs grow, it becomes more difficult for them to find new "good borrowers," and eventually, defaults and arrears will increase as the only option to keep growing is to lend to the subprime borrowers in the market.[18] In contrast, expansive growth is associated with serving new markets that have a fresh pool of "good borrowers" (at least for the MFI itself, even if other MFIs are already operating in the new markets). Therefore, it is expected that in terms of portfolio quality, MFIs have more room to grow expansively than locally.[19]

The results from the econometric models confirm this hypothesis. In particular, the lowest critical value for *local growth* is 168 percent (growth rate of the average number

17. One implicit assumption here is that MFIs are less reluctant to open new branches in markets with high competition where finding good borrowers that fit the socioeconomic profile of the MFI is more challenging.

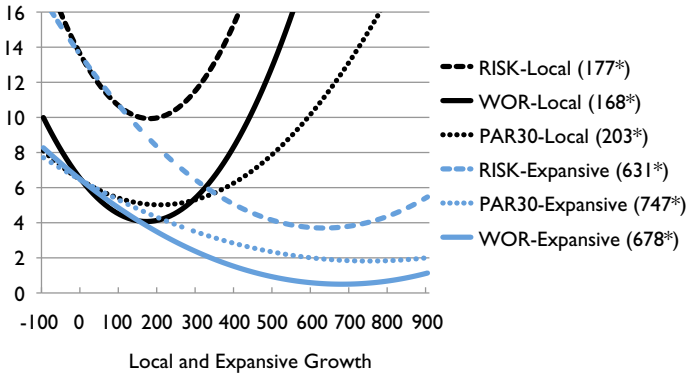
18. In contrast with *local* growth, *expansive* growth makes supervision of new branches more difficult.

19. Differences in the pool size of high quality borrowers has been suggested as the main reason why high levels of *expansive* growth are less risky for the MFIs in comparison with high levels of *local* growth. However, direct proof of this is not available and other explanations may be plausible. For instance, from the point of view of the borrowers in the new markets, there are not many MFIs offering credit, and their cost of losing access to credit is relatively higher than in markets where it is easier to gain access from multiple sources. Therefore, borrowers in new markets will be more prudent and have more incentives to repay loans on time, in order to guarantee future access to the services (including non-financial) offered by the MFI.

Geographic diversification plays an important role in the riskiness of MFI growth; expansion into new markets (expansive growth) is preferable to expansion within existing markets (local growth) for avoiding portfolio quality deterioration.

of borrowers per branch), while the lowest critical value for *expansive growth* is 631 percent (growth rate of the number of branches per MFI), as depicted in **Figure 3**. This suggests that overstretching of MFI resources is not the only reason why high levels of growth can be associated with deterioration in portfolio quality, and that geographic diversification plays an important role in determining the riskiness of the expansion plans of MFIs. This also prescribes extra caution for MFIs that can grow only within limited geographic markets. By extension, MFIs following each other and setting up new branches in the same locations dilute the advantages of *expansive growth* faster.[20]

Figure 3
Predicted relationship bewteen Portfolio Quality versus Local and Expansive Growth[21]



*Values that minimize curves

In 2008, only one MFI was growing *expansively* more than 631 percent. A more conservative threshold of 250 percent was still the 99th percentile for expansive growth in 2008, positioning most MFIs in the sample well below the critical value for *expansive growth*. In comparison, in 2008 six MFIs grew *locally* more than 168 percent. Lowering the threshold to 160 percent flags two additional MFIs, suggesting that more MFIs were at risk of overgrowing *locally* than *expansively* in 2008, although in both cases it represents less than 1 percent of the total sample.

Market Context and Portfolio Quality

Few MFIs operate in markets where they are the only formal microfinance provider. A common concern in microfinance is that multi-indebtedness (imprecisely referred to as over-indebtedness, which carries a negative connotation of repayment problems) is more likely to happen in highly competitive markets, where many MFIs are competing for the same borrowers. Multi-indebtedness has been suggested as one of the main causes of the Bolivian over-indebtedness episode of the period from 1997 to 2001, but statistical evidence supporting this argument is not available, as other factors played an important role during this crisis.[22] In addition, financial markets are highly volatile, and borrowers tend to follow the behavior of other borrowers (herd behavior), especially when there are expectations of debt forgiveness or renegotiation of loans. As such, an analysis of the linkage between MFI growth in outreach and credit portfolio quality must include measures of the market context, in terms of both overall market growth rates and penetration rates, or the extent to which existing MFIs serve local market demand.

One hypothesis suggests that the portfolio quality of low-growth MFIs can deteriorate when the rest of the mar-

While countries that experience an overall growth in microfinance borrowers between 63% and 84% may find an increase in write-off ratio, only countries that grow more than 125% per year will see a notable deterioration in portfolio quality.

20. Critical levels were estimated for small versus large MFIs as well. In the case of local growth, only small differences were found similar to those found for total growth in number of borrowers. In the case of expansive growth, the coefficients were not statistically significant.

21. See footnote 14 for interpretation of the values on the vertical axis.

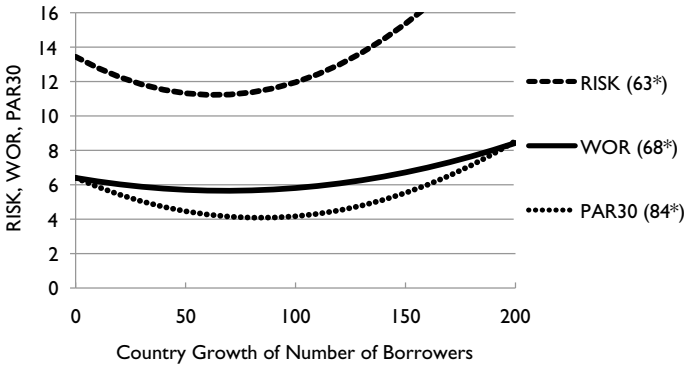
22. Gonzalez, Adrian (2008), "Microfinance, Incentives to Repay, and Overindebtedness: Evidence from a Household Survey in Bolivia," unpublished dissertation, The Ohio State University, available at http://etd.ohiolink.edu/view.cgi?acc_num=osu1211556326.

ket is growing excessively and the overall market becomes over-heated. This could be due to a deterioration of the market portfolio quality of high-growth MFIs, followed by herd behavior when borrowers of low-growth MFIs emulate the behavior of the borrowers of troubled MFIs. The econometric models suggest that the critical level for market growth in number of borrowers is between 63 and 84 percent (**Figure 4**). However, as shown by the relatively flat bottom of the WOR prediction in the 0-125 percent interval, surpassing the 63 percent threshold will not deteriorate WOR notably. On average, only countries growing more than 125 percent per year will observe a steeper deterioration in their portfolio qualities.

In particular, in 2008 only 3 countries out of 91 in the sample experienced aggregate growth over 63 percent per year (**Figure 5**): Nigeria, Madagascar, and India. The rest of the countries are well below the 63 percent critical level.

Another hypothesis is that by growing in markets with low penetration rates (i.e. where most potential borrowers are not served by any MFI), it is easier for MFIs to find "good borrowers" than by growing in markets with high penetration rates, where a larger percentage of the good borrowers are served already and growth is restricted to sub-prime borrowers (or lending more to borrowers of

Figure 4
Predicted relationship bewteen Portfolio Quality and Country Growth in Number of Borrowers[23]



*Values that minimize curves

23. See footnote 14 for interpretation of the values on the vertical axis.

Figure 5
Top Countries by Aggregate Growth of Number of Borrowers in 2008

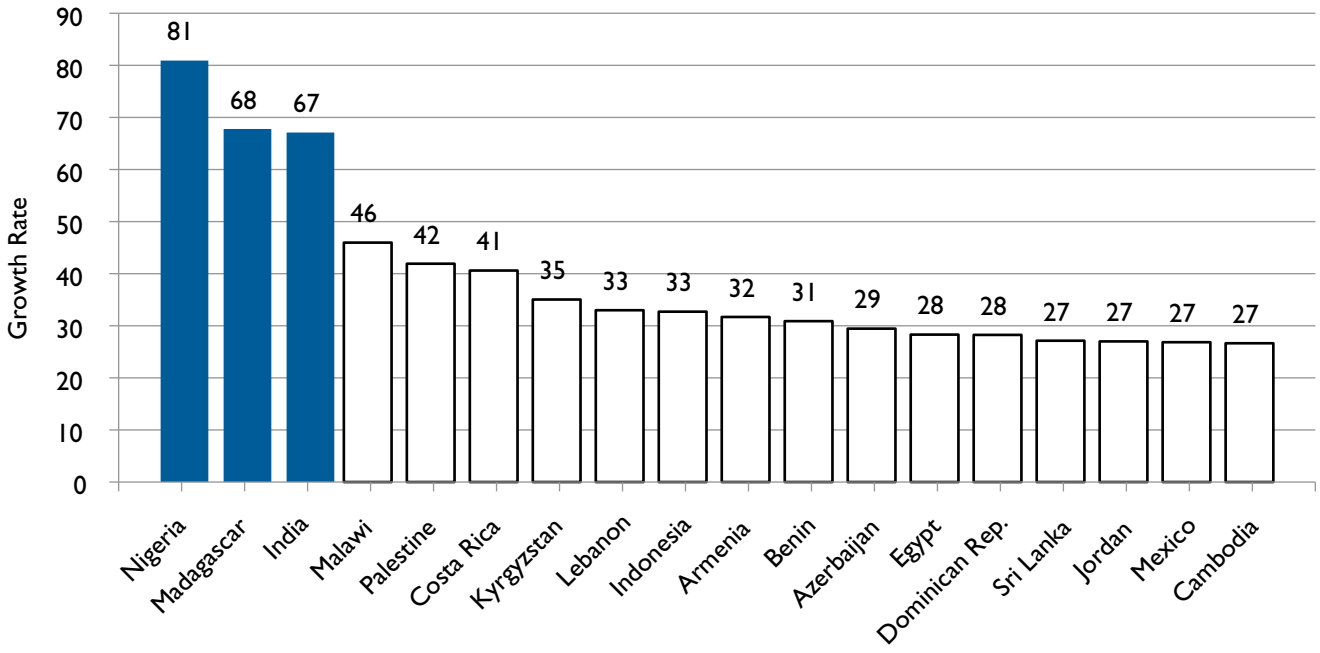
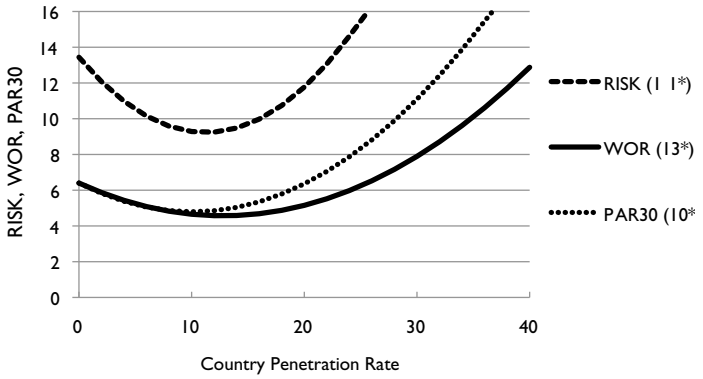


Figure 6
Predicted Relationship bewteen Portfolio Quality and Country Penetration Rate[24]



*Values that minimize curves

other MFIs, thereby increasing the debt burden of borrowers beyond their repayment capacities). The analysis confirms this hypothesis. In particular, the econometric results suggest that pushing penetration rates over 10 percent of the total population may deteriorate the portfolio quality of MFIs, as depicted in **Figure 6**. Most countries have a penetration rate under 15 percent (with the exception of Bangladesh which has a 25 percent penetration rate, see **Figure 7** for details), and the curves depicted in **Figure 6** have a flat bottom in the 10-15 percent penetration rate interval. This implies that even though some countries (Bosnia and Herzegovina, Mongolia, Cambodia, and Nicaragua) have penetration rates over the critical level, they have not compromised portfolio quality considerably.

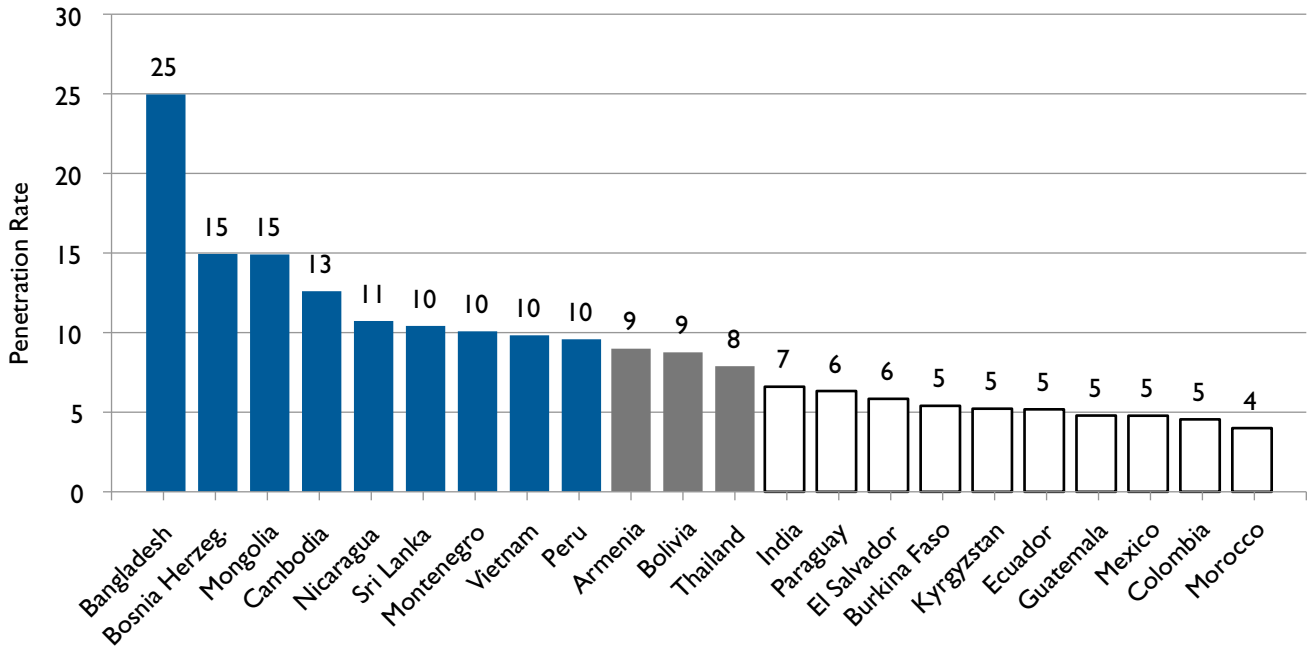
Pushing penetration rates over 10% of the total population in a country may deteriorate portfolio quality.

24. See footnote 14 for interpretation of the values on the vertical axis.

Country Watch List

Two country watch lists (**Figures 5** and **7**) have been suggested on the grounds of both high aggregate country growth and high penetration rates. The lists are mutually exclusive—no country appears in both lists—due to the fact that high

Figure 7
Top Countries by Penetration Rates in 2008



growth is expected to happen for countries with lower penetration rates, where there is more unmet demand.

For 2009, it would not be surprising to see new high-growth countries, while some of the countries in the 2008 high-growth list move under the 63 percent threshold. With respect to high-penetration countries, the most likely scenario is that in upcoming years more countries will move over the 10 percent threshold, with the most likely candidates being Armenia and Bolivia. In addition, the thresholds may shift slightly over time. A list of countries flagged for high aggregate growth or high penetration rates in the 2005-2008 period is presented in **Table 1**. For this list, the thresholds have been lowered to 58 percent for country growth and 8 percent for penetration rates (cells highlighted in blue).

It is worth noting that the results do not automatically imply that an MFI operating in a flagged country or exhibiting excessive *local* growth will experience a deterioration in portfolio quality. There are other factors left out of the cur-

Table 1
Country Watch List by High Penetration or High Growth Rates

	Country Borrowers Growth				Penetration Rates			
Countries	2005	2006	2007	2008	2005	2006	2007	2008
Afghanistan	91	86	26	-1	0.6	1.0	1.2	1.2
Armenia	29	19	36	32	4.2	5.1	6.8	9.0
Azerbaijan	48	61	65	29	1.0	1.5	2.5	3.1
Bosnia and Herzegovina	32	38	57	20	5.5	7.8	12.1	14.9
Bangladesh	26	17	13	4	18.9	21.8	23.7	25.0
Bolivia	22	14	17	10	6.3	7.1	8.1	8.8
Cambodia	17	23	26	27	6.3	7.6	9.9	12.6
Georgia	59	43	14	6	1.8	2.5	2.9	3.1
India	107	62	49	67	3.6	4.6	5.2	6.6
Kazakhstan	82	36	31	-8	0.3	0.4	0.5	0.5
Kenya	45	67	50	13	1.4	2.0	2.8	3.1
Madagascar	9	-4	52	68	0.3	0.3	0.3	0.4
Mongolia	40	28	17	12	9.1	11.5	13.4	14.9
Morocco	39	58	34	-6	2.1	3.3	4.3	4.0
Nicaragua	33	19	13	6	7.5	8.8	9.9	10.7
Nigeria	–	59	37	81		0.9	0.8	0.9
Pakistan	30	43	58	18	0.5	0.7	1.0	1.3
Peru	16	25	26	6	6.1	7.4	9.2	9.6
Romania	60	33	31	8	0.1	0.2	0.3	0.3
SLanka	32	13	-5	27	8.2	9.0	9.2	10.4
Sierra Leone	81	23	44	–	0.7	0.8	1.1	–
Senegal	63	6	9	0	3.2	3.1	3.5	3.4
Serbia	30	66	22	14	1.0	1.6	2.0	2.3
Tajikistan	29	51	83	23	0.6	0.9	1.6	1.9
Uzbekistan	–	-4	76	–	–	0.2	0.3	–
Vietnam	10	14	20	20	6.7	7.4	8.5	9.8

Cells highlighted in blue represent values over 58 percent for country growth and 8 percent for penetration rates, values slightly below the thresholds indentified in the paper.

High growth and high penetration rates do not necessarily imply portfolio deterioration, and inversely low growth and low penetration may not signal portfolio improvement; nevertheless, these indicators can be useful in identifying countries likely to witness changes in portfolio quality.

rent econometric analysis that nevertheless play a critical role in determining the portfolio quality of MFIs, including the quality of the MIS and management, and use of credit bureaus.[25]

In addition, these results do not imply better portfolio quality for MFIs operating in the low-penetration and low-growth countries, or for MFIs growing at moderate levels, since other factors can deteriorate the portfolio quality of MFIs, including political interventions (like in Nicaragua), poor systems or internal controls, and country-wide systemic shocks such as natural disasters.

Conclusions

This is the first paper that tries to measure whether high growth levels are associated with portfolio deterioration and if so, how much is too much growth in microfinance. This is a relevant question given the recent focus on "uncontrolled growth" and portfolio quality problems in countries like Bosnia and Herzegovina, Morocco, Nicaragua, and Pakistan. The econometric results suggest portfolio deterioration happens only at very high growth levels, specifically at more than 250 percent growth in number of borrowers per year. The existence of this relationship suggests that overstretching of MFI resources is an important concern when considering the expansion of microfinance. However, very few MFIs actually reached the critical growth levels during 2008.

The results also illustrate that some growth paths offer MFIs more room for expansion than others while simultaneously allowing MFIs to keep portfolio quality in check. In particular, the results show that in terms of portfolio quality deterioration, MFIs have more room to grow *expansively* (by adding more branches) than *locally* (by adding more borrowers to the same branches). One plausible explanation for this is that MFIs growing expansively have access to a larger pool of high quality borrowers in the new markets, while MFIs limited to local growth have to settle for sub-prime borrowers in their confined markets. These elements have not received much attention in previous research exploring links between growth and portfolio quality.

This paper shows that the country context in which MFIs operate is relevant to the portfolio quality of MFIs. However, the red flags suggested in this paper do not automatically imply bad portfolio quality, as there are other elements that affect the portfolio quality of MFIs: MIS, management, credit bureaus, political intervention, and systemic shocks. However, these results are still an important guide when evaluating portfolio quality risk for different countries and MFIs.

25. Chen, et. al. (2010). We are currently exploring options to incorporate MIS information in future analysis of growth and portfolio quality. For a great discussion on the critical role played by MIS in Morocco see the discussion by Normand Arsenault posted on DevFinance on March 17 2010, available at http://ag.ohio-state.edu/Lists/devfinance/Message/6314.html?altLanguage, referred to as Arsenault (2010) hereafter.

Appendix 1:
How-to-Use Guide

The thresholds suggested by this paper should be complemented with additional information in order to have a more comprehensive analysis of the portfolio quality of an MFI. In order to illustrate some of the information to be considered, examples from four different countries are presented in Tables 2-5 for Bosnia and Herzegovina, Morocco, Nicaragua, and Pakistan. The MFIs presented were selected solely on the availability of public ratings or summaries of their ratings.[26] For comparability of the results, we focus on ratings from three rating agencies: Japan Credit Rating Agency (JCR-VIS), Micro Rate (MR), and Planet Rating (PR).

In Bosnia and Herzegovina, both LOK Microcredit Foundation and PRIZMA experienced an important deterioration of their portfolio quality in 2008 compared to previous years, and the main high risk marker for this deterioration appears to be the high levels of penetration attained since 2007. In particular, Bosnia and Herzegovina's microfinance sector has experienced strong growth in outreach in the 2005-2008 period, surpassing the threshold for penetration rates by 2007. On the other hand, based on the ratings available, one MFI appeared to have stronger MIS and governance than the other.

26. Credit bureau usage and personal communication with Emmanuelle Javoy from Planet Rating was considered as well.

Table 2
Selected MFIs from Bosnia and Herzegovina

	Bosnia and Herzegovina							
	LOK Microcredit Foundation				PRIZMA			
Year	Dec-05	Dec-06	Dec-07	Dec-08	Dec-05	Dec-06	Dec-07	Dec-08
PAR 1/	1.7	0.9	1.3	**4.6**	1.4	1.7	2.4	**3.4**
WOR 1/	0.7	1.5	1.2	**2.6**	2.9	2.5	1.7	**3.8**
High-Risk Markers								
MFI Growth Borrowers (250)	32	71	134	65	25	32	40	91
MFI Expansive Growth (631)	25	50	120	33	10	18	5	5
MFI Local Growth (168)	6	14	7	24	14	12	34	82
Country Borrowers Growth (63)	32	38	57	20	32	38	57	20
Country Penetration Rate (10)	6	8	12	15	6	8	12	15
Date of Rating (Rating Agency)		Nov-05 (PR)	Mar-07 (PR)	Jul-08 (PR)	Apr-05 (PR)			
Grade		B+	A-	A-	A-			
Information		b	b	a	a			
Governance		b	a	b	a			
Risks		a	b	b	a			

1/ From MIX Market.
2/ Light blue cells represent cases close to the threshold levels and dark blue cells represent cases over the threshold levels.

In Morocco, two of the MFIs selected had portfolio quality issues since 2007, and all three exhibit problems in 2008 as well. Zakoura is the only MFI with very high growth levels in 2006, the same year that the country was close to the threshold for aggregate growth. In addition, for all three MFIs the ratings reveal weaknesses regarding their MIS.

Table 3
Selected MFIs from Morocco

	Morocco											
	Al Amana				Association Marocaine Societe Sans Frontieres				Fondation Zakoura			
Year	Dec-05	Dec-06	Dec-07	Dec-08	Dec-05	Dec-06	Dec-07	Dec-08	Dec-05	Dec-06	Dec-07	Dec-08
PAR 1/	0.2	0.5	1.3	**3.7**	0.6	1.0	1.6	**3.7**	0.3	0.3	**2.9**	**11.1**
WOR 1/	0.4	0.5	0.6	0.0	1.1	2.2	**4.1**	**6.4**	0.0	0.5	0.6	**14.3**
High-Risk Markers												
MFI Growth Borrowers (250)	56	63	17	0	39	30	14	1	15	59	40	-26
MFI Expansive Growth (631)	34	15	4	1	59	33	11	10	26	428	18	14
MFI Local Growth (168)	16	42	12	-1	-12	-3	2	-8	-9	-70	19	-35
Country Borrowers Growth (63)	39	58	34	-6	39	58	34	-6	39	58	34	-6
Country Penetration Rate (10)	2	3	4	4	2	3	4	4	2	3	4	4
Date of Rating (Rating Agency)	Feb-05 (PR)	Dec-06 (MR)		Oct-08 (PR)	Aug-04 (PR)		Jun-06 (MR)		Dec-04 (PR)			
Grade	A	AAA (alfa-)		B++	B		Beta		B+			
Information	b			b	c				c			
Governance	a			b	b				b			
Risks	a			b	b				A			
Other from Ratings												
Negative/Weaknesses	-Feb-05: Risk of cross-indebtedness in the sector -Feb-05: MIS is ok for now but cannot adapt to fast growth and diversification of products -Feb-05: Audit and governance should improve to reach standard best practices -Dec-06: **Weak MIS** -Oct-08: MIS transition was long and painful; now ok but not perfect -Oct-08: Difficult in HRM (low salaries and decreased bonuses linked to lower performance) -Oct-08: PAR rising due to cross-indebtedness and fall of the major competitor -Oct-08: Governance still to be improved				-Jun-06: **Competition intensifies**				-Dec-04: Risk of cross-indebtedness in the sector -Dec-04: Weak MIS including a lot of manual reconciliations -Dec-04: Audit and controls need to be reinforced			
Positive/Strengths	-Feb-05: Very good lending practices -Feb-05: Good training of loan officers -Dec-06: Good lending practices -Dec-06: Strong management and staff -Oct-08: Good procedures and process -Oct-08: Pretty strong management team (despite key person risk)				-Jun-06: Despite a slight decline, the quality of the portfolio remains good				-Dec-04: Good procedures and processes; good lending practices			

1/ From MIX Market.
2/ Light blue cells represent cases close to the threshold levels and dark blue cells represent cases over the threshold levels.

In Nicaragua, both FUNDESER and Pro Mujer experienced portfolio quality problems in 2008, and no MFI is in the high risk category based on their individual growth levels. However, Nicaraguan microfinance neared the threshold for penetration in 2006, surpassing it by 2007. In addition, in recent years the ratings suggest a highly competitive market and volatile context.

Table 4
Selected MFIs from Nicaragua

	Nicaragua							
	Fundeser—Nicaragua				**ProMujer Nicaragua**			
Year	Dec-05	Dec-06	Dec-07	Dec-08	Dec-05	Dec-06	Dec-07	Dec-08
PAR 1/	3.8	3.3	2.9	4.3	0.3	0.2	0.8	5.8
WOR 1/	3.6	0.6	1.2	1.2	0.4	0.8	1.0	1.6
High-Risk Markers								
MFI Growth Borrowers (250)	35	72	60	62	-13	39	37	12
MFI Expansive Growth (631)	15	0	20	22	0	20	0	0
MFI Local Growth (168)	17	72	34	32	-13	16	37	12
Country Borrowers Growth (63)	33	19	13	6	33	19	13	6
Country Penetration Rate (10)	8	9	10	11	8	9	10	11
Date of Rating (Rating Agency)		Dec-05 (MR)	Dec-06 (MR)	Dec-07 (MR)	Aug-05 (MR)			Dec-07 (MR)
Grade		Beta	Beta+	Alfa-	Beta+			Beta+
Other from Ratings								
Negative/Weaknesses	-Dec-05: **Competitive market** -Dec-05: Weak lending methodology, but improving -Dec-08: Urban credit methodology				-Dec-05: **Limited information system, but currently being replaced** -Dec-08: **Volatile context** -Dec-08: High client desertion			
Positive/Strengths	-Dec-05: Portfolio quality improving, after considerable write-offs -Dec-06: Strong growth of portfolio -Dec-06: Excellent portfolio quality -Dec-07: Quality of loan portfolio in rural areas -Dec-07: Improvements in financial controls				-Dec-05: High portfolio quality -Dec-05: Weak competition -Dec-08: Improvements on internal controls -Dec-08: Good portfolio quality			

1/ From MIX Market.
2/ Light blue cells represent cases close to the threshold levels and dark blue cells represent cases over the threshold levels.

In Pakistan, Kashf Foundation exhibited portfolio quality problems in 2008 with the exception of First Microfinance Bank, which surpassed the threshold levels of growth in 2006, but experienced no deterioration of portfolio quality. As a whole, Pakistan approached threshold levels of growth only in 2007 and penetration rates remain under 2 percent. Furthermore, ratings do not indicate problems in Pakistani MFIs' MIS or weakness associated with portfolio quality. On the contrary, ratings actually emphasize the strengths of the MFIs in terms of their MIS readiness for future growth.

Table 5
Selected MFIs from Pakistan

High-Risk Markers	Pakistan					
	First Microfinance Bank			**Kashf Foundation**		
Year	Dec-06	Dec-07	Dec-08	Dec-06	Dec-07	Dec-08
PAR 1/	0.8	2.1	1.3	0.1	0.7	4.1
WOR 1/	0.6	0.6	0.9	0.2		0.9
High-Risk Markers						
MFI Growth Borrowers (250)	209	94	66	77	121	6
MFI Expansive Growth (631)	56	74	11	107	87	0
MFI Local Growth (168)	98	12	49	-15	18	6
Country Borrowers Growth (63)	43	58	18	43	58	18
Country Penetration Rate (10)	0.7	1.0	1.3	0.7	1.0	1.3
Date of Rating (Rating Agency)	Apr-06 (JCR-VIS)	Apr-07 (JCR-VIS)	May-07 (JCR-VIS)	Oct-05 (JCR-VIS)	Feb-07 (JCR-VIS)	Jun-08 (JCR-VIS)
Grade	A+/A-1+	A+/A-1+	A+/A-1+	BBB/A-3	BBB+/A-3	BBB+/A-3
Other from Ratings						
Negative/Weaknesses	-May-07: Portfolio quality weaken in some market segments, on account of inclement weather and crop crisis in certain rural centers and political turmoil in urban centers. -May-07: The bank has implemented software in all branches, however on-line connectivity is expected to be achieved during the on-going year which will futher enhance controls.					
Positive/Strengths	-Apr-06: The management is now poised for rapid growth in the next couple of years as the bank has the required infrastructrue in place. -Apr-06: The Bank has maintained the quality of the portfolio…. and is reducing concentration levels gradually -Apr-07: Despite registering significant growth the bank has been able to maintain asset quality. -May-07: Bank adopted aggressive growth during 2007. -May-07: Quality of controls and strategic input of members of the board remain strong.			-Oct-05: The portfolio quality is even lower than the general provision maintained by Kashf as loss reserves. -Feb-07: Controls have been strengthened through the complete implementation of an in-house developed integrated management information system at all branches. -Feb-07 The management can now monitor the performance of each branch on a daily baisis while portfolio tracking, client management and report generation capabilities have also been singnificantly enchanced. -Feb-07: The deployed IT system is likely to substantially facilitate this growth planned for the coming years. -Jun-08: While maintaining controls and asset quality against the backdrop of rapid growth is critical, Kashf is considered to be well poised to take upon this challenge in view of its tested lending methodology and tailor-made software which ensures effective monitoring. -Jun-08: The accuracy and timeliness of information generated by the MIS is considered sound.		

1/ From MIX Market.
2/ Light blue cells represent cases close to the threshold levels and dark blue cells represent cases over the threshold levels.

Appendix 2:
Regression Results

Main Results

Dependent Variable	WOR				PAR30				RISK (PAR30+WOR)			
	coef	p-value	coef	p-value	coef	p-value	coef	p-value	coef	p-value	coef	p-value
Borrowers Growth	-0.020***	0.000			-0.019***	0.000			-0.041***	0.000		
Borrowers Growth ^2	0.000***	0.000			0.000***	0.002			0.000***	0.000		
Expansive Growth			-0.017***	0.000			-0.012***	0.001			-0.031***	0.000
Expansive Growth ^2			0.000***	0.000			0.000	0.150			0.000***	0.001
Local Growth			-0.028***	0.000			-0.014***	0.005			-0.040***	0.000
Local Growth ^2			0.000***	0.000			0.000	0.161			0.000***	0.000
Age (log)	1.356***	0.005	1.708*	0.086	-0.206	0.747	1.197	0.315	1.502*	0.072	3.187**	0.040
Loan Portfolio (mill.$)	-0.004*	0.090	-0.004	0.147	-0.002	0.472	-0.008**	0.019	-0.006*	0.084	-0.013***	0.004
MF Borrowers Growth	-0.022***	0.001	-0.016	0.177	-0.027***	0.003	-0.055***	0.000	-0.050***	0.000	-0.070***	0.000
MF Borrowers Growth ^2	0.000**	0.012	0.000*	0.094	0.000	0.265	0.000*	0.058	0.000**	0.025	0.001**	0.015
MF PAR (t-1)	0.050**	0.016	0.077**	0.010	0.031	0.257	-0.038	0.290	0.061*	0.091	0.040	0.399
MF Penetration Rate	-0.287**	0.010	-0.417**	0.030	-0.099	0.501	-0.319	0.164	-0.450**	0.019	-0.748**	0.012
MF Penetration Rate ^2	0.011***	0.006	0.017**	0.034	-0.001	0.854	0.016	0.104	0.012*	0.088	0.033***	0.009
GDP Growth Rate	0.093*	0.060	0.049	0.482	-0.178***	0.006	-0.203**	0.015	-0.109	0.198	-0.175	0.103
GDP Growth Rate ^2	-0.002	0.188	-0.002	0.422	0.005*	0.062	0.001	0.766	0.003	0.383	-0.000	0.912
Inflation Rate	-0.021*	0.093	-0.022	0.316	0.014	0.406	-0.033	0.200	-0.007	0.725	-0.054	0.114
_cons	0.477	0.637	0.146	0.947	7.425***	0.000	5.774**	0.027	7.529***	0.000	5.399	0.113
Number of observations		3,243		2,053		3,348		2,062		3,188		2,027
Number of MFIs		821.000		704.000		825.000		708.000		816.000		701.000
Overall R2		5%		5%		7%		5%		11%		8%

note: *** p<0.01, ** p<0.05, * p<0.1

Values that minimize equation

Dependent Variable	WOR		PAR30		RISK (PAR30+WOR)	
Borrowers Growth	250		277		260	
Expansive Growth		678		747		631
Local Growth		168		203		177
MF Borrowers Growth	68	33	141	84	101	63
MF Penetration Rate	13	12	-52	10	19	11

With Productivity

Dependent Variable	WOR				PAR30				PAR30+WOR			
	coef	p-value	coef	p-value	coef	p-value	coef	p-value	coef	p-value	coef	p-value
Borrowers Growth	-0.019***	0.000			-0.019***	0.000			-0.039***	0.000		
Borrowers Growth ^2	0.000***	0.000			0.000***	0.002			0.000***	0.000		
Expansive Growth			-0.016***	0.000			-0.011***	0.004			-0.027***	0.000
Expansive Growth ^2			0.000***	0.005			0.000	0.205			0.000***	0.005
Local Growth			-0.022***	0.000			-0.012**	0.024			-0.032***	0.000
Local Growth ^2			0.000***	0.001			0.000	0.262			0.000***	0.005
Age (log)	1.779***	0.000	1.750*	0.077	-0.302	0.640	1.223	0.304	1.829**	0.029	3.299**	0.033
Loan Portfolio (mill.$)	-0.004*	0.064	-0.004	0.139	-0.003	0.241	-0.008**	0.018	-0.007*	0.061	-0.013***	0.004
Productivity	-0.002	0.188	-0.020***	0.000	0.001	0.595	-0.007	0.188	-0.002	0.553	-0.027***	0.000
Productivity ^2	-0.000***	0.000	0.000***	0.001	-0.000	0.105	0.000	0.379	-0.000***	0.000	0.000***	0.006
MF Borrowers Growth	-0.019***	0.006	-0.012	0.296	-0.027***	0.003	-0.054***	0.000	-0.045***	0.000	-0.066***	0.000
MF Borrowers Growth ^2	0.000**	0.031	0.000	0.175	0.000	0.260	0.000*	0.072	0.000*	0.053	0.000**	0.031
MF PAR (t-1)	0.042**	0.043	0.079***	0.008	0.032	0.245	-0.038	0.287	0.061*	0.089	0.040	0.398
MF Penetration Rate	-0.295***	0.008	-0.362*	0.058	-0.080	0.590	-0.300	0.192	-0.428**	0.026	-0.672**	0.024
MF Penetration Rate ^2	0.011***	0.006	0.015*	0.069	-0.001	0.822	0.015	0.125	0.011	0.114	0.030**	0.018
GDP Growth Rate	0.078	0.107	0.043	0.539	-0.170***	0.010	-0.205**	0.014	-0.118	0.158	-0.183*	0.087
GDP Growth Rate ^2	-0.002	0.227	-0.002	0.374	0.004*	0.074	0.001	0.789	0.003	0.353	-0.001	0.847
Inflation Rate	-0.022*	0.076	-0.024	0.259	0.015	0.378	-0.034	0.189	-0.007	0.725	-0.057*	0.092
_cons	-0.011	0.991	2.193	0.322	7.466***	0.000	6.468**	0.015	7.061***	0.000	8.066**	0.019
Number of observations		3,223		2,052		3,321		2,062		3,171		2,027
Number of MFIs		819.000		704.000		823.000		708.000		814.000		701.000
Overall R2		0.15%		11.64%		4.29%		7.43%		2.56%		14.23%

note: *** p<0.01, ** p<0.05, * p<0.1

Values that minimize equation

Dependent Variable	WOR		PAR30		PAR30+WOR	
Borrowers Growth	240		277		255	
Expansive Growth		585		769		639
Local Growth		171		211		180
Productivity	-340	710	518	749	-198	728
MF Borrowers Growth	68	31	142	86	107	67
MF Penetration Rate	13	12	-34	10	19	11