Drivers of solvency risk

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Are microfinance institutions different?

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Abstract

Based on a dataset covering 3169 banks and 1284 microfinance institutions (MFIs) operating in 106 countries this paper provides evidence on the drivers of MFI solvency risk. Overall, we find that MFIs face greater solvency risks than banks due to a higher volatility of asset returns. However, over time risk developments in banking and microfinance are largely driven by the same factors. A major exception is size as MFIs, mainly due to non-governmental institutions and non-bank financial intermediaries, become less risky when increasing in size, while the opposite holds for banks. Overall, results suggest that the special business model MFIs pursue does not make them special from a financial stability perspective. Thus, given the rising importance of microfinance within financial sectors, in terms of volumes and in terms of number of customers served, MFIs and banks should be subject to the same efforts that aim at raising financial stability.

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1. Introduction

Microfinance institutions (MFIs) are widely regarded as financial institutions pursuing a business model that is different from the one pursued by "normal" commercial banks. They have a peculiar target group, the unbanked poor, to which they offer relatively simple financial services, notably loans and deposits. Thus, MFIs focus on financial inclusion (Brown et al. 2016) based on the belief that access to financial services fosters growth and development of their clients (Morduch 1999) and of the economies they are operating in (Imai et al. 2012, Donou-Adonsou and Sylwester 2016). By performing this mission MFIs contribute to one of the few areas where even after the 2008 crisis finance is still seen as promoting the public good (Zingales 2015).

Microfinance lacks systemic importance as most MFIs are small in terms of asset size. Moreover, until recently outright MFI failures were a rare event. Together with the social mission microfinance is predominantly associated with, this might explain why there are very few studies – one exception is Dorfleitner et al. (2014) – conducting a thorough analysis of factors driving MFI risk and comparing results with what is known from similar studies of the traditional banking sector.

However, in recent years more MFIs have failed in serving their debt (Abrams and Trant 2009) or recorded outright default (Aijazuddin and Iravantchi 2015). Some microfinance sectors have been in crisis with similar features characterizing turmoil in traditional banking sectors (Chen et al. 2010, CGAP 2010). In some countries, e.g. Morocco (IFC 2014) microfinance crises have triggered similar bail-out interventions by the public sector as observed for many crises in the traditional banking sector (Laeven and Valencia 2013). This suggests that financial stability has become a public good (Goodhart 1999) also for the microfinance sector. In line with this MFI risk has become an issue for MFI investors, depositors, and borrowers and a prominent topic in discussions on regulation and supervision

geared at enhancing the stability of the financial system as a whole (Basel Committee on Banking Supervision 2015).

Against this background, we analyze the riskiness of MFIs by comparing MFIs with traditional banks.[2] Concretely, we ask whether MFIs are less or more risky than banks and whether the factors driving solvency risks are different for MFIs compared to banks. Our analysis is based on 3,169 banks and 1,284 MFIs in 106 countries over the period 2003-2014. Measuring risk by the Z-score, we find that on average MFIs are riskier than commercial banks. This is largely due to a substantially higher volatility of asset returns which more than outweighs the stability advantage of MFIs in terms of a higher equity ratio than banks. Moreover, MFI risk responds similarly to the same factors affecting bank risk. Notably, faster asset growth, a rising liquidity ratio and a rising importance of non-deposit funding raise MFI and bank risk, i.e. drive Z-scores down. Finally, MFIs as well as banks become less risky when the macro environment improves, i.e. in periods of rising GDP growth.

A major exception to this result is that larger asset size has a different impact on MFI compared to bank risk. While bank Z-scores fall when total assets rise, MFIs become less risky with increasing size. However, very large increases in size are associated with lower solvency risk for banks while the opposite holds for MFIs. Closer analysis reveals that this difference is largely driven by MFIs operating as Non-governmental institutions (NGOs) and Non-bank financial intermediaries (NBFIs), i.e. by institutions that are very small compared to banks. This indicates that by becoming larger MFIs escape a state of fragility related to very small size and hence record a decline in risk while the opposite holds for banks.

Overall, our results suggest that the special business model MFIs pursue within the financial sector and the special credit technologies MFIs apply do not make them special from a

[2] With the term "bank" we denote all institutions with no explicit microfinance mission. As many institutions with a microfinance mission, i.e. MFIs, formally operate as banks or credit unions, we refer to them as "MFI banks" and "MFI credit unions" respectively.

financial stability perspective with the exception of size. MFIs are exposed to default risk basically in the same way as banks. Thus, while it might be useful to acknowledge the peculiarities of microfinance in the way the standard regulatory and supervisory framework is applied to the industry (Cull et al. 2009a), there is no reason to exclude microfinance from efforts that aim at raising stability for the financial system as a whole.

The paper is organized as follows: after this introduction we relate our paper to the existing literature on microfinance and bank risk and derive our main hypotheses (section 2). Section 3 introduces our datasets and the econometric methodology. Results and robustness checks are presented in sections 4 and 5. This is followed by a discussion (section 6) and a short conclusion (section 7).

2. Solvency risk of microfinance institutions - a literature review

MFIs have established themselves as important players in financial systems of many developing and emerging market economies. This holds most importantly for the number of people served by formal financial sector institutions. At end 2014 MFIs reporting to MixMarket[3] served more than 105 million borrowers and about 83 million depositors. Thus, the microfinance sector accounts for a large share of the growth in financial inclusion observed over the last years (Demirgüc-Kunt et al. 2015). Even with regard to loan and deposit volumes MFIs have gained significant market shares in some countries, making MFIs also important contributors to financial development in the respective economies (Di Bella 2011).

The rise of microfinance largely reflects the success of its commercialization. Originally MFIs operated as small credit-granting NGOs with a rather narrow definition of the target group,

[3] Mix Market is an internet platform run by the Microfinance Information Exchange, Inc. (MIX) and provides a wide array of data on microfinance institutions (http://www.themix.org/mixmarket). MFIs reporting to Mix Market are said to represent a random sample of better and best managed MFIs worldwide (Krauss and Walter 2009) but not a random sample of all MFIs operating worldwide.

i.e. micro firms. Today microfinance today is provided by NGOs, including some very large NGOs mainly operating in Asia, MFI-banks and non-bank financial institutions (NBFIs) (Cull et al. 2009b). Credit unions and rural banks complete the institutional universe of microfinance institutions. Moreover, microfinance has substantially broadened its target group by joining the financial inclusion agenda. While micro businesses remain an important client group, MFIs have set out to reach the unbanked poor at large (Helms 2006). As a result, MFIs have also widened the range of products they provide to their clients: microcredit has been transformed into microfinance by MFIs also engaging in deposit, payment and insurance services.

The microfinance literature has analyzed these developments mainly by addressing the question whether the commercialization of microfinance has been subject to a trade-off between sustainability and outreach, and whether MFIs operating as banks or NBFIs have modified or even abolished their mission. Results have been decidedly mixed (Hartarska and Nadolnyak 2007, Cull et al. 2007, Mersland and Strøm 2009a,b, Cull et al., 2011, D'Espallier et al. 2016). More recently, reflecting the rise of the randomized control trial approach in development economics, research has shifted to the question whether microfinance – irrespective of the institutional form MFIs are operating in – does at all have an impact on client poverty, growth and empowerment. Here the evidence is more clear-cut as most studies fail to detect the transformational impacts advertised by some microfinance advocates (Banerjee et al. 2015).

The successful contribution of microfinance to financial development largely rests on the ability of MFIs to successfully manage the most important risk they have to deal with, namely credit risk. Non-performing loan ratios of MFIs have been found to be largely comparable to those recorded in the traditional banking sector (O'Donohoe et al. 2009). This suggests that

microfinance credit technologies, notably group lending and unconventional individual lending (Armendáriz and Morduch 2010), work well in containing credit risk.

However, over the last years, there has been mounting evidence that MFIs are subject to solvency risk. Individual MFIs have failed (Dorfleitner et al. 2014, Aijazuddin and Iravantchi 2015, Abrams and Trant 2009) and some microfinance markets have become fragile due to rising overindebtedness of clients (Schicks 2014) or pronounced boom-bust lending cycles (Wagner and Winkler 2013). This raises three questions:

1) Are MFIs less or more risky than banks?
2) Is MFI risk driven by the same or by different factors than bank risk?
3) What drives possible differences in MFI and bank risk?

Individual bank risk is usually measured by the Z-score.[4] The Z-score indicates the number of standard deviations an institution's return on assets (RoA) has to drop below its expected value at which its equity is depleted and the MFI is insolvent (Boyd et al. 1993). Thus, a higher Z-score implies that an institution is less fragile and incurs fewer risks. Assuming a normal distribution of ROA it measures the distance to default.

The bank risk literature employs a range of institutional and country variables that are assumed of having an impact on risk. Reviewing this list and applying it to microfinance several arguments suggest that the factors driving risk over time are different for MFIs than for banks. Concretely,

- MFIs are less exposed to risks related to strong credit growth as they operate in still unsaturated markets (Gonzalez 2010).
- MFIs have a strong focus on lending. Thus, MFIs are financial institutions with comparatively low levels of liquid asset which implies that MFI loan officers – in

[4] The non-performing loan ratio is the most widely used alternative for measuring bank risk. We make use of this indicator when checking the robustness of our results,

contrast to their bank colleagues – are less likely to be pushed into excessive lending by a flush of liquidity (Acharya and Naqvi, 2012; Khan et al, 2016).

- MFIs are less integrated into domestic and international capital markets. Even those institutions, like NGOs, that fund a substantial share of their lending by non-deposit funding, do so mainly by borrowing long-term and from investors with a social mission (Cobb et al. 2016, Mersland and Urgeghe 2013, Martins and Winkler 2013); thus, MFIs are less sensitive to changing market conditions and interest rate risk than traditional banks (Huang and Ratnovski 2011).
- MFI clients are less integrated into the national and global economy than clients of traditional banks (Krauss and Walter 2009). Thus, MFIs are less prone to macro risks than banks (Köhler 2015, Buch et al. 2014, Demirgüc-Kunt and Huizinga, 2010).

The list of differences between MFI and bank risk reflects the special business model pursued by MFIs compared to traditional banks. Thus, due to their mission MFIs might constitute a set of institutions with peculiar risk characteristics. This is likely to hold most pronounced for NGOs and NBFIs as the governance structure of these institutions is more strongly linked to the microfinance business model than for MFI banks or MFI credit unions.

Overall this suggests that differences in MFI and bank risk can be analysed in the same way as it is done for any other peculiar business model in banking, i.e.

- credit unions, savings banks or – more general – retail oriented banks vs. commercial, investment or wholesale oriented banks (Mergaerts and Vennet 2016, Köhler 2015, Beck et al. 2009, Hesse and Čihák 2007),
- islamic banks vs. normal commercial banks (Kabir et al. 2015, Čihák and Hesse 2010),
- domestic versus global banks (Vazquez and Federico 2015), or – more general – business models implying a greater reliance on non-deposit funding and fee income

vs. models that focus on deposits and interest as the main sources of funds and revenues (Demirgüç-Kunt and Huizinga 2010),

Against this background, we follow the methodologies employed in this literature in order to test whether MFIs are more risky than banks and whether MFI risk is driven by different factors than bank risk. In doing so we are guided by three hypotheses that reflect the MFI literature reviewed:

H1: MFIs are as risky as banks.

H2: Factors driving bank risk are significantly different from factors driving MFI risk.

H3: Differences in MFI risk are mainly driven by NGOs and NBFIs.

3. Data and methodology

We base our analysis on bank and MFI data from Bankscope and Mix Market in 106 countries over the period 2003 and 2014. Both datasets provide information on variables used in the empirical bank risk literature to assess the institutional characteristics driving solvency risk, namely the Z-score and the non-performing loan ratio, volume and growth of total assets, non-deposit funding and liquidity ratio as well as loans-to-total asset and equity ratio. Studies testing bank risk developments across countries also include country control variables covering macroeconomic and structural characteristics, namely GDP growth, inflation, GDP per capita and bank concentration. Data on GDP and inflation are taken from the World Bank. Bank concentration expressed by the Herfindahl-Hirschman Index (HHI), with a higher index indicating a more concentrated sector, is calculated based on the information provided by Bankscope and Mixmarket (see Table 1 for a detailed list and description of the variables used).

Insert Table 1 about here

Our sample is limited to institutions recording consistent data for at least three consecutive years within the observation period and includes countries with observations for banks and MFIs only. Moreover, we account for double counting, i.e. institutions that are represented in the Mix Market and in the Bankscope datatset, are listed as MFIs only.[5] Finally, we control for outliers by winsorizing all institutional variables at the 1- and 99-percentile level. This leaves us with 3,169 banks (2,839 commercial banks, 43 savings banks, 119 credit unions and 168 investment banks) yielding a total of 22,442 observations, and 1,284 MFIs (123 MFI-banks, 450 NGOs, 423 NBFIs, 196 MFI-credit unions, and 92 other MFIs[6]) with 7,502 observations. Banks are more concentrated in emerging markets as the average bank operates in a country with a per capita income of about 6,800 USD, while MFIs – reflecting their social mission – are more concentrated in low income countries (with a GDP per capita of about 3,400 USD). The bank sample is dominated by institutions from the BRIC countries (Russia (777), China (176), Brazil (127), Ukraine (126) and Poland (93), accounting for 41% of the total number. India (113), Peru (63), the Philippines (61), Ecuador (53) and Mexico (53) account for more than 27% of all institutions in the MFI sample.

Descriptive statistics (Table 2) reveal that on average MFIs are riskier than banks. The average MFI has a Z-score of 37.22 compared to 62.12 for banks. This clearly rejects hypothesis 1. Higher MFI risk reflects a much higher standard deviation of returns that – on average – is more than twice as high as for banks (0.033 vs. 0.015). This more than compensates for the much higher equity ratio recorded by MFIs compared to banks (0.30 versus 0.15), suggesting that MFIs need larger equity buffers than banks to cover risk emerging in bad times.

[5] The number of double counts is 71; most of them are MFI banks.
[6] Other institutions are predominantly rural banks.

Results are different when measuring risk by the non-performing loan (NPL) ratio, as on average banks and MFIs record about the same NPL ratio. This is in line with the evidence reported in the literature review, even though the median NPL ratio is somewhat higher for MFIs than for banks. We employ the NPL ratio as an alternative proxy for risk in the robustness checks.

Closer analysis (see Table 5 in the Appendix) shows that the difference in average Z-scores between banks and MFIs is largely driven by NGOs and NBFIs. NGOs (33.01) and NBFIS (32.41) record very low Z-scores on average, while MFI banks (40.88), MFI credit unions (49.01) and other MFIs (58.41) show average Z-scores which are closer to the values recorded for banks (62.12). This result lends support to hypothesis 3: differences between MFI and bank risk seem to reflect the peculiar characteristics of NGOs and NBFIs within the MFI sector.

Insert Table 2 around here

Chart 1 shows the development of the bank and MFI Z-scores over time. It suggests that risk differences between MFIs and banks persist over time as Z-scores largely move in tandem. After a rise in 2004 and 2005, Z-scores fall to a trough in 2009, the year of the Great Recession following the Lehman event. Since then risks have declined and Z-scores recovered strongly.

Insert Chart 1 around here

MFIs, most importantly NGOs, NBFIs and MFI-credit unions, are much smaller than banks. Total assets of the average MFI amount to about USD 12 million, while the balance sheet size of the average bank is about USD 400 million. However, MFIs record higher growth rates (29% vs. 21%) and have a stronger focus on lending. The loan to total asset ratio is significantly higher than for banks (77% vs. 54%). By implication MFIs show a lower liquidity ratio than banks (16% vs. 28%). Somewhat surprisingly MFIs fund a larger share of

their assets by borrowing. The non-deposit funding ratio is significantly higher for MFIs than for banks. Again, this result is driven by MFIs operating as NGOs and NBFIs which face regulatory restrictions in taking deposits (Bogan 2012). MFI banks and MFI credit unions record on average non-deposit funding ratios which are somewhat lower than the ratio for banks (Table 5 in the Appendix).[7]

Tables 3 and 4 show the correlation matrices for the bank and the MFI sample. In general, correlation coefficients are remarkably similar. This holds in particular for the Z-score variable. For example, growth of assets is negatively correlated with the Z-score for banks and MFIs (-0.07 for banks and -0.06 for MFIs. Correlation coefficients differ most pronounced for size, i.e. total assets, and the non-deposit funding ratio. Concretely, negative correlations between size and the non-deposit funding ratio and size and the equity ratio are more pronounced for banks than for MFIs (-0.34 vs. -0.21, -0.49 vs. – 0.33). Moreover, larger size is associated with higher GDP growth for banks (+0.10) while it correlates negatively for MFIs (-0.03). The opposite holds for GDP per capita; the correlation coefficient with size is positive for MFIs (+0.08) but negative for banks (-0.13).

For the non-deposit funding ratio, a comparison of coefficients reveals that a higher ratio is associated with higher liquidity for banks (+0.13), but lower for MFIs (-0.27). This is in line with the view that many MFIs depend on non-deposit funding to expand their lending activities and hence are less inclined than banks to use these funds also as liquidity buffers. Moreover, MFIs with a higher non-deposit funding ratio show higher loan-to-total asset ratios (0.31), indicating that MFIs tap borrowing markets predominantly for expanding their loan portfolio, while there is basically no such effect for banks (0.01). Finally, in countries with higher GDP per capita banks show higher non-deposit funding ratios (0.52). While the

[7] As indicated in Table 1, the definition of some variables, i.e. liquidity or non-deposit funding, differs slightly for the datasets used. Making use of institutions covered in both datasets we test whether these differences have any substantial bearing on variable values, i.e the liquidity ratio or the non-deposit funding ratio. We find that this is not the case.

correlation is also positive for MFIs, it is much smaller (0.12). This suggests that the degree of bank non-deposit borrowing is more tightly linked to overall financial market development which strongly correlates with GDP per capita (Cihák et al. 2012). By contrast, the relative importance of MFI non-deposit funding is rather independent from market development, as NGOs and NBFIs depend on borrowing from investors given regulatory restrictions on deposit funding. Thus, they have to turn to local, foreign, private and public sources to expand their lending activities irrespective of financial market development. In doing so, MFIs largely rely on investors, including private investors, that also pursue social goals.

Insert Tables 3 and 4 around here

Our baseline regression is a fixed effects (FE) panel regression. The FE panel approach does not allow for a direct test on whether MFIs show significantly different risk levels than banks, as time-invariant variables drop out due to the MFI fixed effects. However, the approach addresses endogeneity and omitted variable bias problems any analysis of the determinants of bank risk is exposed to.[8]

The regression (equation 1) explains the development of the Z-score of institution i in country j at time t by a set of institutional control variables (IC), country control variables (CC), interaction terms that link an MFI dummy with the institutional and country control variables ($IAV_{i,j,t}$). Time fixed effects are represented by γ_t and MFI fixed effects by α_i. μ_{ijt} is the error term included.

$$(1) \qquad Z_{i,j,t} = \beta_1 + \beta_2 IC_{i,j,t} + \beta_3 CC_{j,t} + \beta_4 IAV_{i,j,t} + \gamma_t + \alpha_i + u_{ijt}$$

[8] In order to test for a cross-section MFI effect we run a pooled OLS regression as a robustness check.

The Z-Score of MFI i in year t is defined as the sum of the MFI's return on assets (ROA) and its equity-to-total-assets ratio (Eq/TA) divided by the ROA standard deviation (σ).[9] ROA is computed as net operating income after taxes divided by annual average total assets and the standard deviation is calculated based on observations for the period p defined as t to t-2 (Baselga-Pascual et al., 2015).

$$Z - Score_{it} = \frac{ROA_{it} + Eq/TA_{it}}{\sigma(ROA)_{ip}}$$

We follow the empirical bank risk literature in controlling for the following institutional characteristics:

- the growth rate of total assets; we expect that higher growth rates are associated with rising risk, i.e. a lower Z-score, as stronger growth rates signal a more aggressive and hence more risky lending policy by the respective institution (Kraft and Jankov 2005, Foos et al. 2010, Kabir et al, 2015). This line of reasoning is confirmed in most recent studies on drivers of bank risk (Köhler 2015).
- the size of institutions; we expect that rising size over time is associated with a lower Z-score. Larger size might trigger moral hazard behavior as government bail-outs are more likely with larger size. Baselga-Pascual et al. (2015) and Köhler (2015) provide empirical evidence supporting this hypothesis. However, some studies also find that size has no effect on bank risk (Bertay et al. 2013) or even show a significant positive effect of larger size on the Z-score (Khan et al. 2016).
- the non-deposit funding ratio; a rising ratio is expected to lead to rising solvency risk, i.e. lower Z-scores, as institutions which expand their non-deposit funding are likely to pursue a more aggressive and hence more risky lending policy (Laeven et al. 2016, Köhler 2015). Thus, we expect a negative coefficient.

[9] In the regressions we use the natural logarithm of (Z-score +1) in order to account for the skewness of the Z-score distribution and avoid truncating observations at the value of zero (see also Demirgüç-Kunt et al. 2008). For negative Z-scores, we take the negative value of the natural logarithm of (|Z-score| + 1).

- the liquidity ratio; the "free cash flow" hypothesis suggests that a rising liquidity ratio creates incentives for more excessive risk taking in lending (Acharya and Naqvi, 2012). Thus, we expect a negative coefficient.

We neither include the equity ratio nor return on assets as control variables, as both variables are part of the Z-score definition (Khan et al (2016). We only make use of these variables when performing a robustness check that replaces the Z-score as the dependent variable by the non-performing loan ratio. Finally, our baseline regression does not account for changes in the loan-to-total asset ratio, as it shows a strongly negative correlation with the liquidity ratio.

Country controls include GDP growth, inflation, GDP per capita and banking sector concentration. Based on theory and pervious empirical evidence we expect that

- rising GDP growth is linked with a decline in bank risk (Baselga-Pascual 2015, Köhler 2015, Buch et al. 2014, Demirgüc-Kunt and Huizinga, 2010;),
- rising inflation is associated with a rise in bank risk (Baselga-Pascual et al. 2015, Köher 2015)
- rising GDP per capita reduces risk (Klomp and de Haan 2015), and
- rising concentration leads to lower bank risk in the banking sector as measured by the Herfindahl-Hirschman Index (Baselga-Pascual et al. 2015, Bretschger et al. 2012, Tabak et al. 2012).[10]

The institutional and country variables provide us with information about the drivers of bank *and* MFI risk. However, we are interested whether the drivers of MFI risk are significantly different than the drivers of bank risk. To this end, our main focus is on the interaction terms

[10] The effect of bank concentration on bank risk is theoretically ambiguous and the empirical evidence is mixed (Beck et al. 2013). Our expectation of a positive link between concentration and Z-score reflects the results of recently published studies referred to above that provide empirical support for the concentration-stability hypothesis.

that combine an MFI dummy with the various institutional and country variables. Sign and significance level of these terms indicate whether the respective drivers have a different impact on MFI risk compared to bank risk. Given the discussion in the literature review we expect that the impact of the various institutional and country variables are significantly different for MFIs compared to banks, i.e. we expect that most interaction terms are significant with the opposite sign compared to the coefficients of the stand-alone institutional and country variables. Most importantly, we expect that MFIs should be less exposed than banks to the negative risk effects of rising asset growth rates as well as higher non-deposit funding and liquidity ratios. Moreover, MFIs should be less affected by changes in the macroeconomic environment. A possible exception might be concentration as there is some evidence that rising competition undermines MFI stability (Assefa et al. 2013), which is line with the concentration bank stability hypothesis.

4. Results

Baseline

Our baseline regression results show that MFI and bank risk are largely driven by the same factors (Table 5). Only three of the nine MFI interaction terms are significant.[11] Thus, changes in the growth of total assets, the non-deposit funding ratio, the liquidity ratio, GDP growth, inflation and GDP per capita have the same impact on MFI risk as they have on bank risk. Moreover, this impact is in line with expectations for banks, i.e. stronger asset growth as well as higher non-deposit funding and liquidity ratios are associated with rising risk (declining Z-scores), while rising GDP growth lowers risks and hence is associated with a rising Z-score. Finally, changes in inflation and GDP per capita do neither influence bank nor MFI risk.

[11] Signs and significance levels of the interaction terms do not change when employing them one at a time into the regression. Thus, we refrain from reporting those results which are available from the authors on request.

MFI interaction terms are significant for size and show the opposite signs as the respective coefficients for banks. While rising size is associated with a lower Z-score (rising risk) for banks (-1.017), the opposite result holds for MFIs. Here rising size raises the MFI Z-score (reduces risk) as the overall coefficient is positive (-1.017 + 1.752 = 0.735). Moreover, bank Z-scores rise when the rise in size is very large as shown by the significantly positive coefficient of the size-squared variable (+0.0245), while MFI Z-scores decline with very strong increases in size (+ 0.0245 – 0.0387 = -0.0142). This difference in the impact of size on risk is very robust as it can be found in almost any specification of the regression.

Insert Table 5 around here

The second significant difference between banks and MFI relates to concentration, i.e. changes in the Herfindahl-Hirschman index. Stronger concentration is associated with rising Z-scores for banks, in line with recent empricial support for the concentration stabiliuty hypothesis. For MFIs we get the same result. However, the positive impact of rising concentration on the Z-score is significantly weaker as it amounts to 0.111 only (0.791-0.680).

Overall, our baseline result does not support hypothesis 2, with the important exception of size. All reminaing explanatory variables of bank risk apply with the same sinificance level and direction for MFIs, acknowledging that the risk reucing impact of rising concentration is significantly smaller for MFIs than for banks.

Time interactions

During the observation period the financial industry was hit by the global financial crisis which started with the US subprime crisis in 2007. What was the impact of this crisis on bank risk and was this impact different for MFIs? Table 6 shows the coefficients of the time fixed

effects of our baseline regression and the coefficients of interaction terms between time fixed effects and the MFI dummy. We pick 2006 as the base year as it is the last year before any effect of the financial crisis could have had an impact on either bank or MFI risk in emerging markets (Dooley and Hutchinson 2009, Blanchard et al. 2010, Reille et al. 2009, Di Bella 2011).

Insert table 6 around here

Results show that the development of bank Z-scores is not significantly affected in the crisis years 2008-2010 as the fixed effects of the respective years are insignificant. Starting from 2011 fixed effects coefficients are positive indicating that bank risks are lower than in the base year 2006. This contrasts strongly with the MFI experience. The interaction terms are significantly negative for the 2007-2013 period. Thus, in contrast to banks MFI Z-scores decline and risks rise compared to the 2006 base year.[12] Everything else equal this indicates that the financial crisis had a more profound impact on MFIs than on banks.

Insert Table 7 around here

We explore the crisis effect in more depth by dropping the time fixed effects and introducing a crisis dummy that takes the value 1 for the years 2008-2009 (alternatively 2007-2011). There is now a significant negative impact of the crisis on bank Z-scores, i.e. solvency risks of banks rise in the crisis period (Table 7). For MFIs this effect is even more pronounced as the interaction terms are significantly negative. Moreover, the coefficients are larger than for the stand-alone crisis dummy. As a result, bank Z-scores (natural logarithm) drop by about 0.06 (0.04) for banks in the period 2008-2009 (2007-2011), while MFI Z-scores fall by 0.16 (0.2) in 2008-2009 (2007-2011).

Transmisson channels

[12] For 2012 and 2013 the positive time fixed effects for banks are of almost identical size as the negative coefficients for the MFI interaction terms. Thus, the overall impact of the 2012 and 2013 fixed effects for MFI risk – compared to the base – is zero, while it is positive for banks.

Bank risk as reflected by the Z-score originates from two sources: changes in the return on assets and changes in the equity ratio (Köhler 2015). This becomes evident by decomposing the Z-score in the risk-adjusted return on assets (RAROA) which is the ROA divided by the standard deviation of the ROA

$$RAROA_{it} = \frac{ROA_{it}}{\sigma(ROA)_{ip}}$$

and the risk-adjusted equity ratio (RAER) which is the equity ratio divided by the standard deviation of ROA (SDROA)[13]

$$RAER_{it} = \frac{Eq/TA_{it}}{\sigma(ROA)_{ip}}$$

Tables 8 and 9 present the results of our baseline regression but replacing the Z-score by its respective components as alternative measures of risk (Köhler 2015). They reveal that the risk adjusted equity ratio is driven by the same factors for banks and MFIs as in the baseline regression (Table 9). Most interaction terms are insignificant, with the exceptions of size and concentration.

Results are different for the RAROA equation (Table 8). For banks we find that rising asset growth and rising inflation are associated with higher risk adjusted returns, while they show negative (asset growth) and insignificant (inflation) coefficients in the Z-score equation. Moreover, the liquidity ratio loses significance in explaining developments of bank risk adjusted returns on assets.

Insert Tables 8 and 9 around here

More importantly, however, results suggest that developments in the RAROA of MFIs follow a significantly different pattern than developments in the RAROA of banks. Only two of the nine interaction terms are insignificant (down from six in the baseline). In addition to the

[13] As with the Z-score, we use the natural logarithm of both variables in the analysis.

differences in size and concentration rising asset growth reinforces the positive effect found for banks (0.05 + 0.125). By contrast, rising GDP growth has a somewhat smaller positive impact on MFI RAROA than for banks (0.02 - 0.00945). Finally, a rising liquidity ratio and rising GDP per capita have a significant negative impact on MFI RAROA while there are no such effects for banks. Overall, the results for RAROA provide empirical support for some arguments that triggered hypotheses 1 and 2. MFIs benefit more from stronger asset growth as suggested by the unsaturated market argument. Rising liquidity ratios lead to reduction of RAROAs as MFIs are lending machines that hold comparatively few liquid assets. Rising GDP growth has less of an effect on RAROAs as MFI clients are less integrated into the national economy than bank clients. Finally, MFIs have a social mission which becomes less relevant in countries that record a rising GDP per capita. In line with this, rising GDP per capita reduces MFI RAROAs while there is no such effect for banks.

Finally, we test whether there are more pronounced differences between MFI and bank risk for certain institutional forms of MFIs. To this end we replace the MFI dummy interaction terms with interaction terms for MFI credit unions, NGOs, NBFIs, MFI banks and other MFIs (Table 10). Results show that there is no MFI governance form with more differences in explaining risk developments compared to banks than for MFIs as a whole, i.e. as in the baseline regression. However, we find that NGOs and NBFIs are the main source for the differences revealed in the baseline regression, as risk developments of MFI credit unions, MFI banks and other MFIs mimic even closer risk developments of banks than MFIs as a whole. Overall, these results support hypothesis 3: differences between drivers of MFI and bank risk can largely be attributed to NGOs and NBFIs.

5. Robustness checks

We run a series of robustness checks. First, we test whether our results hold when controlling for different explanatory variables, notably those which we do not include in the baseline due to multicollinearity concerns (Appendix, Table 1, columns (2-4)). Concretely, we replace the non-deposit-funding ratio by the borrowings to total asset ratio and the growth rate of the non-deposit funding ratio, respectively, and the liquidity ratio by the gross loan portfolio to total asset ratio. Results are robust as MFI interaction terms do not change sign or significance levels compared to the baseline regression. There is one exception related to the MFI interaction term with the borrowing to total asset ratio which is significantly negative. Hence, a rising borrowing to total asset ratio has a stronger risk enhancing effect on MFIs than it has for banks.

Following other studies (e.g. Khan et al 2016, Hesse and Čihák 2007) we also test whether our results hold when employing lagged values of the institutional and county characteristics in explaining current Z-scores over time. Again, results are robust, as – like in the baseline – we find that most MFI interaction terms are insignificant. Significant differences between banks and MFIs are again limited to the size variables and concentration.[14] Finally, results for the institutional characteristics remain robust when we refrain from controlling for macro variables.

A second set of robustness checks involves changes in the sample. We find that results continue to hold when we do not winsorize outliers (Appendix Table 1, column 7). Moreover, we test whether our results are driven by a few countries that account for the bulk of the bank population in our sample. However, when excluding banks and MFIs from Russia, China, and the five countries with the largest banking populations (Russia, China, India, Brazil and

[14] The liquidity ratio coefficient changes sign from negative to positive, i.e. a rising liquidity ratio in the previous period lowers risk in the current period. However, there is no difference between MFIs and banks in this regard.

Ukraine) results remain robust (Appendix, Table 2). There is one significant change only as in the regressions that exclude Russia a rising GDP per capita reduces bank risk while MFI risk increases slightly.

Our third robustness check involves running a pooled OLS regression (Appendix, Table 3). This allows us to account directly for the time-invariant MFI dummy. Recalling that the estimation is exposed to the omitted variable bias, results confirm the finding discussed when reviewing descriptive statistics: MFIs are per se riskier than banks as the MFI dummy has a significantly negative coefficient. Adding MFI interaction terms the number of variables impacting differently on bank than on MFI risk increases slightly. In addition to differences in size, results of the pooled OLS regression indicate that the non-deposit funding ratio and the liquidity ratio have different impacts on MFI compared to bank risk. Concretely, the non-deposit funding ratio loses significance for banks but is significantly negative for MFI Z-scores, while a higher liquidity ratio has an even stronger negative impact on the Z-score for MFIs than for banks.[15]

Finally, we run the baseline fixed effects panel regression with the non-performing loans ratio as a measure of risk. Moreover, we include h the equity ratio and RoA as additional explanatory variables (Appendix, Table 4). This is the robustness check where results differ substantially from the baseline regression and indicate – in line with hypothesis 2 – that factors driving bank risk do not play the same role when explaining the development of MFI risk. For example, we find that the effects of changes in the equity ratio, the return on assets, GDP growth, inflation and concentration are smaller for MFI than for bank risk. For some variables, notably the macro variables, the MFI effect is close to zero, as the interaction terms have the opposite sign with about the same value as the stand-alone variables. Thus, MFI risk, when measured by the NPL ratio, is basically unrelated to macroeconomic developments.

[15] We also run a regression involving all MFI forms as dummy variables. Results confirm for all MFI types that the link between risk and size is the opposite of what is found for banks.

In stark contrast to the Z-score baseline regression changes in size have no significant effect on NPL developments, neither for banks nor for MFIs. However, asset growth shows the familiar risk mitigating effect. This effect is even more pronounced for MFI than for bank risk as the respective MFI interaction terms shows a significantly negatively coefficient. Hence it reinforces the negative link between asset growth and the NPL ratio found for banks.

6. Discussion

Our results can be summarized as follows: First, MFIs are riskier than banks. Descriptive statistics and the pooled OLS regression show that MFIs are – everything else equal – more risky than banks. Second, over time largely the same factors driving bank risk also drive MFI risk. There is one important exception to this which is size. For size we find that when MFIs become larger their risk declines. The opposite holds for banks. Moreover, this contradiction is repeated for the size squared term which is positive for banks, but negative for MFIs. Third, differences between MFI and bank risk seem to be mainly driven by NGOs and NBFIs, i.e. MFIs which are comparatively small even within the MFI sector and show an institutional form not observed in the traditional banking sector.

Overall, our results clearly reject hypothesis 1, fail to provide support for hypothesis 2 for most explanatory variables, and are in line with hypothesis 3. Results are also fairly robust with two exceptions. First, when replacing the Z-score by the non-performing loan ratio, descriptive statistics indicate that there is on average no significant difference between bank and MFI risk. Moreover, when assessing drivers of the non-performing loan ratio there is a wider range of institutional and country characteristics that show significantly different coefficients for the MFI dummy than it is the case in the baseline regression with the Z-score as the dependent variable. Second, in the regression with the risk adjusted return as a

dependent variable we also find that a larger number of MFI interaction terms show a significant coefficient..

Against the background of the literature reviewed in section 2 our results imply that the arguments listed in favor of a special risk status of MFIs are not valid when focusing on the drivers of risk over time. Most institutional variables and country characteristics do not impact MFI risk differently than bank risk. Thus, MFIs – despite their special mission and target group – seem to be as exposed as banks to risks linked to rising asset growth rates, non-deposit funding and liquidity ratios as well as falling GDP growth rates.

The view that MFIs are different is only supported by the results for the size variable. Size represents a key difference between MFIs and banks as MFIs are much smaller than banks on average. Moreover, size differences directly reflect the different missions and target groups of MFIs and banks, as the term "micro" implies small size. Thus, the contradictory result for the size variable is an important exception to the overall finding that MFI risk is by and large driven by the same factors as bank risk. The result can be explained by recalling that given their small size, many MFIs operate on a rather fragile basis. By becoming larger this fragility declines and hence MFI risk drops. To put it differently: Given their small size stagnation or even a decline in total assets serves as a warning signal for MFIs from a financial stability perspective. This signal does not apply for banks because they are much larger and hence – on average – do not need to grow over time to reap stability gains. Indeed, for banks the opposite relationship holds, possibly reflecting a moral hazard argument according to which banks by becoming larger engage in more risky activities as they believe that larger institutions are more likely to receive government support in case of need (Bhagat et al. 2015, Dam and Koetter 2012).

The MFI size – fragility explanation receives support from the fact that the different impact of changes in size on MFI compared to bank risk is largely driven by NGOs and NBFIs. These

are on average even within the MFI universe very small institutions and – in contrast to credit unions which are very small as well – governed by an institutional form not observed in the traditional banking sector. Thus, NGOs and NBFIs are institutions which by their governance form represent the peculiar microfinance mission.

Having said this, the positive impact of size on MFI Z-scores over time does not imply that MFIs are not subject to the risks of rising asset growth. "Speed kills" for MFIs as much as it does for banks. Thus, our results are consistent with other studies suggesting that good times and over optimism are associated with a less stringent credit analysis performed by loan officers, in traditional banks as well as MFIs (Becker et al. 2016, Brown et al. 2016b).

Finally, our results clearly indicate that statements on risk differences between banks and MFIs have to account explicitly for the risk measure employed in the analysis. Measuring risk by the Z-score, MFIs are more risky than banks and risk developments over time are largely driven by the same factors as in the traditional banking sector. However, when measuring risk by the non-performing loan ratio, i.e. the risk variable that has been most widely in communications by individual MFIs and the industry at large, we find that MFIs are per se not riskier than banks. Moreover, many factors driving developments of the bank-NPL ratio show a significantly different impact for MFI risk. Thus, while there is little evidence indicating that the special business model pursued by MFIs has a bearing on the drivers of risk as measured by the Z-score, things are different when measuring risk by the NPL ratio. For example, over time MFI risk is basically unaffected by macroeconomic and structural variables, supporting the the conventional view that MFI risk is less exposed to macro developments (Krauss and Walter 2009, Gonzalez 2010).

The sensitivity of our results on the risk measure employed is likely to reflect that MFIs – as discussed in the literature review – have been adamant in addressing credit risk by making use of microfinance credit technologies, i.e. group lending and unconventional individual lending.

They were successful in doing so and as a result NPL ratios of MFIs do not significantly differ on average from NPL ratios recorded by banks.

However, keeping the NPL ratio low and within a narrow range is costly, as microfinance – by definition – deals with very many, tiny loans (Helms 2006). This holds in particular when loan portfolio quality is subject to a negative shock, for example a deteriorating macro environment. In such a scenario, the NPL ratio of MFIs responds less strongly to the changing environment than the NPL ratio of banks, given the importance MFI attach to the NPL ratio. At the same time, the efforts made to keep loan quality high are reflected in rising operating costs, and this rise is – given the management of many, tiny loans – likely likely to be more pronounced than for banks. As a result, MFI risk – as measured by the NPL ratio – responds less to a change in GDP growth than bank risk, while there is no difference in the impact of changes in GDP growth rates on MFI and bank Z-scores, as the rise in operational costs is reflected in lower asset returns.

For the same reason, larger size has no impact on the NPL-ratio for either banks or MFIs, as the respective credit technologies work well for banks and MFIs irrespective of their size. However, MFIs benefit more from rising economies of scale when becoming larger (Hartarska et al. 2013).[16] Thus, MFI Z-scores improve with rising size, mainly via the impact on the RAROA. The respective MFI interaction term is significant, positive and comparatively large, driving the different impact of rising size on the Z-score for banks and MFIs.

7. Conclusions

We analyze the riskiness of MFIs by comparing MFIs with traditional banks. Based on a sample covering 3,169 banks and 1,284 MFIs in 106 emerging markets over the period 2003-

[16] The evidence on economies of scale effects in traditional banking is mixed; see Bertay et al. 2013, Beccalli et al. 2015.

2014 we find that on average MFIs are riskier than banks, but MFIs and banks respond in the same way to largely the same risk drivers. A major exception is size, as Z-scores fall when banks become larger, while the opposite holds for MFIs. This difference is mainly triggered by MFIs operating as Non-governmental institutions (NGOs) and Non-bank financial intermediaries (NBFIs). The result suggests that by becoming larger MFIs escape a state of fragility related to very small size characterizing many MFIs. Thus by becoming larger MFIs record a decline in risk while the opposite holds for banks as banks might face incentives to pursue more risky transactions when becoming larger due to moral hazard arguments.

Overall, we conclude that the special business model MFIs pursue within the financial sector and the special credit technologies MFIs apply do not make them special from a financial stability perspective. Thus, our results provide empirical support for recent efforts (Basel Committee on Banking Supervision (2015) to integrate MFIs in frameworks geared towards enhancing bank and financial sector stability.

References

Abrams, J., Trant, J., 2009. Zero is Not the Number: The Microfinance Debt Default Rate. New York: IAMFI

Acharya, V., Naqvi, H. (2012), The seeds of a crisis: A theory of bank liquidity and risk taking over the business cycle, Journal of Financial Economics, 106: 349–366

Armendáriz, B., Morduch, J. (2010), The economics of microfinance. MIT press, Cambridge and London.

Assefa, E., Hermes, N., Meesters, A. (2013), Competition and the Performance of Microfinance Institutions, Applied Financial Economics, 23(9): 767- 782.

Auazuddin, M. and S. Iravantchi (2015). Keeping a Stumble from becoming a Fall: Lessons Learned from Global Workouts for Microfinance Institutions, IFC SmartLessons, Washington DC

Banerjee, A., Karlan, D., Zinman, J. (2015), Six Randomized Evaluations of Microcredit: Introduction and Further Steps. American Economic Journal: Applied Economics, 7(1), 1–21

Basel Committee on Banking Supervision (2015). Guidance on the application of the Core principles for effective banking supervision to the regulation and supervision of institutions relevant to financial inclusion - Consultative Document, Basel, http://www.bis.org/bcbs/-publ/d351.pdf, accessed 28 February 2016

Baselga-Pascual, L., Trujillo-Ponce, A., Cardone-Riportella, C., 2015. Factors influencing bank risk in europe: evidence from the financial crisis. North Am. J. Econ. Finance 34, 138–166.

Beccalli, E., Anolli, M., Borello, G. (2015), Are European banks too big? Evidence on economies of scale, Journal of Banking & Finance, 58:232–246

Beck, T., H. Hesse, T. Kick, and N. von Westernhagen (2009), Bank ownership and stability: evidence from Germany," Unpublished manuscript. http://voxeu.org/article/bank-ownership-and-stability-evidence-germany

Beck, T., De Jonghe, O., Schepens, G. (2013), Bank competition and stability: Cross-country heterogeneity, J. of Finan. Intermediation, 22(2): 218-244

Becker, B., Bos, M., Roszbach, K. (2016), Bad times, good credit, Swedish House of Finance Research Paper No. 15-05

Bertay, A.C., Demirgüç-Kunt, A., Huizinga, H. (2013), Do we need big banks? Evidence on performance, strategy and market disciplie, J. Finan. Intermediation, 22:532-558.

Bhagat, S., Bolton, B., Lu, J. (2015), Size, leverage, and risk-taking of financial institutions, Journal of Banking & Finance, 59: 520–537

Blanchard, O.J., Das, M., Faruqee, H., 2010. The Initial Impact of the Crisis on Emerging Market Countries. Brookings Papers on Economic Activity, 263-323

Bogan, V. L. (2012). Capital Structure and Sustainability: An Empirical Study of Microfinance Institutions. The Review of Economics and Statistics. 94:1045-1058

Boyd, J.H., Graham, S.L., Hewitt, R.S., 1993. Bank holding company mergers with nonbank financial firms: Effects on the risk of failure. J. Bank. Finance 17, 43–63.

Bretschger, L., Kappel, V., Werner, T. (2012), Market concentration and the likelihood of financial crises, Journal of Banking & Finance, 36: 3336–3345

Brown, M., Guin, B., Kirschenmann, K. (2016a), Microfinance Banks and Financial Inclusion, Review of Finance, 20(3), 907-946

Brown, M., Kirschenmann, K. , Spycher, T. (2016b), Numeracy and on-the-job decision quality: Evidence from loan officers", mimeo.

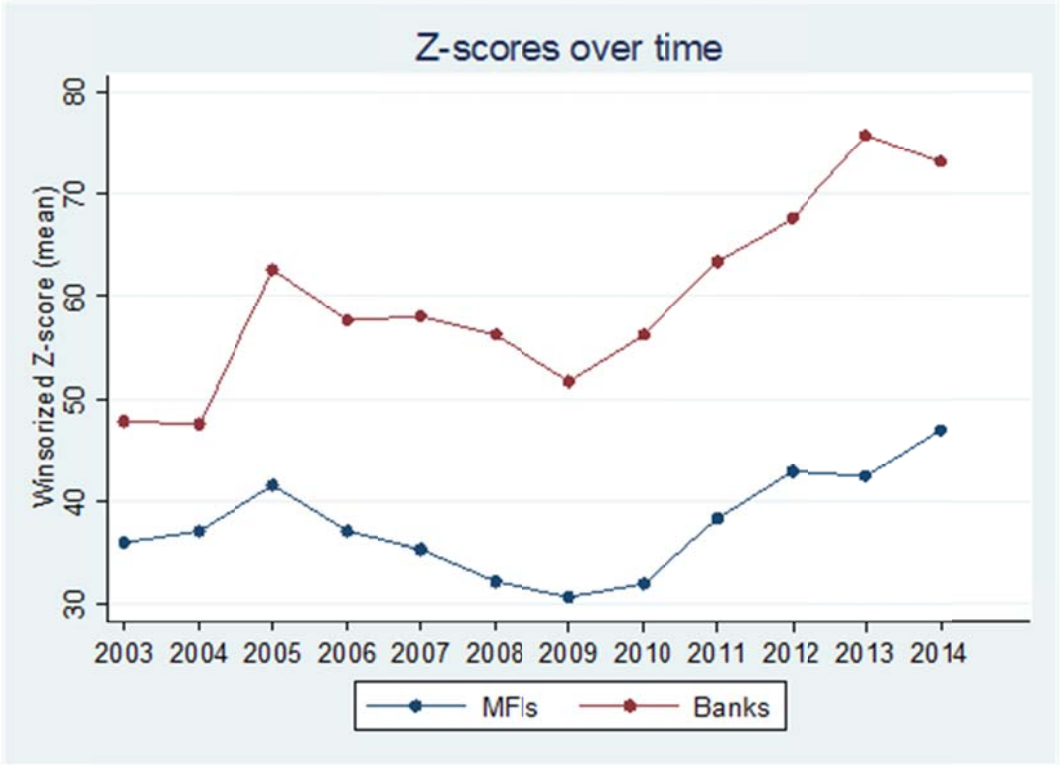
Buch, C.M., Eickmeier, S., Prieto, E. (2014), Macroeocnomic Factors and Microlevel Bank Behavior, Journal of Money Credit and Banking, 46(4): 715: 751.

Chen, G., Rasmussen, S., Reille, X. (2010), Growth and Vulnerabilities in Microfinance. CGAP Focus Note No. 61, Washington D.C.
Čihák, M., Hesse, H., 2010. Islamic banks and financial stability: An empirical analysis. J. Financ. Serv. Res. 38, 95–113.
Čihák M., Demirgüç-Kunt, A., Feyen, E., Levine, R. 2012. Benchmarking Financial Development Around the World", Policy Research Working Paper 6175, World Bank, Washington, DC
Cobb, J.A., Wry, T., Zhao, E.Y. (2016), Funding Financial Inclusion: Institutional Logics and the Contextual Contingency of Funding for Microfinance Organizations, Academy of Management Journal, 59(6):2103-2131.
Cull R., Demirgüç-Kunt A., Morduch, J. (2007), Financial Performance and Outreach: A Global Analysis of Leading Microbanks. The Economic Journal 117(517): F107-F133
Cull R., Demirgüç-Kunt A., Morduch J. (2009a), Microfinance Tradeoffs - Regulation, Competition, and Financing, World Bank Policy Research Paper 5086, Washington DC
Cull R., Demirgüç-Kunt A., Morduch J. (2009b), Microfinance Meets the Market. Journal of Economic Perspectives 23(1): 167-92
Cull, R., Demirgüç-Kunt, A., Morduch, J. (2011). Does regulatory supervision curtail microfinance profitability and outreach? World Development, 39(6), 949-965
Dam, L., Koetter, M. (2012), Bank Bailouts and Moral Hazard: Evidence from Germany, Review of Financial Studies, 25(8): 2343-2380.
Demirgüç-Kunt, A., Detragiache, E., Tressel, T. (2008), Banking on the principles: Compliance with Basel Core Principles and bank soundness, J. Finan. Intermediation, 17:511-542.
Demirgüç-Kunt, A., Huizinga, H. (2010), Bank activity and funding strategies: The impact on risk and returns. J. Financ. Econ. 98, 626–650.
Demirgüç-Kunt, A.; Klapper, L.; Singer, D.; Van Oudheusden, P. (2015). The Global Findex Database 2014: measuring financial inclusion around the world. World Bank Policy Research Working Paper No. 7255. Washington, D.C.
D'Espallier, B., Goedecke, J., Hudon, M., Mersland, R. (2017), From NGOs to banks: Does institutional transformation alter the business model of microfinance institutions? World Development, 89:19-33
Di Bella, G, (2011), The Impact of the Global Financial Crisis on Microfinance and Policy Implications. IMF Working Paper 11/175, Washington DC
Donou-Adonsou, F., Sylwester, K. (2016), Growth effects of banks and microfinance: Evidence from developing countries, The Quarterly Review of Economics and Finance, http://dx.doi.org/10.1016/j.qref.2016.11.001
Dooley, Michael & Hutchison, Michael, 2009. "Transmission of the U.S. subprime crisis to emerging markets: Evidence on the decoupling-recoupling hypothesis," Journal of International Money and Finance, Elsevier, vol. 28(8), pages 1331-1349,
Dorfleitner, G., Leidl, M., Priberny, C. (2014). Explaining Failures of Microfinance Institutions, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2316680
Foos, D., Norden, L., Weber, M. (2010), Loan growth and riskiness of banks. Journal of Banking and Finance, 34(12), 2929-2940.
Goodhart, C.A.E. (1999). Myths about the LOLR. International Finance, 2: 339-360.
Hartarska, V., Nadolnyak, D. (2007), Do Regulated Microfinance Institutions Achieve Better Sustainability and Outreach? Cross-country Evidence. Applied Economics 39: 1207-1222
Hartarska, V., Shen, X., Mersland, R. (2013), Scale economies and input price elasticities in microfinance institutions, Journal of Banking & Finance, 37(1):118–131
Helms, B. (2006), Access for all: building inclusive financial systems, The World Bank.

Hesse, H., Čihák, M., 2007. Cooperative banks and financial stability, IMF Working Paper 07/2, Washington DC.
Huang, R., Ratnovski, L. (2011), The dark side of bank wholesale funding. Journal of Financial Intermediation, 20(2): 248–263.
IFC (2014), Ending the Microfinance Crisis in Morocco: Acting early, acting right, Washington DC.
Imai, K.S., Gaiha, R., Thapa, G. and S.K. Annim (2012), Microfinance and Poverty—A Macro Perspective, World Development, 40(8): 1675–1689
Khan, M.S., Scheule, H., Wu, E., 2016. Funding liquidity and bank risk taking. J. Bank. Finance, http://dx.doi.org/10.1016/j.jbankfin.2016.09.005
Köhler, M., 2015. Which banks are more risky? The impact of business models on bank stability. J. Financ. Stab. 16, 195–212.
Kraft, E., Jankov, L. (2005), Does speed kill? Lending booms and their consequences in Croatia, Journal of Banking & Finance, 29(1): 105–121
Krauss, N., Walter, I. (2009), Can Microfinance Reduce Portfolio Volatility? Economic Development and Cultural Change, 58 (1), 85-110.
Laeven, L., Valencia, F. (2013), Systemic Banking Crises Database, IMF Economic Review, 61(2): 225-270
Laeven, L., Ratnovski, L. Tong, H. (2016), Bank size, capital, and systemic risk: Some international evidence, Journal of Banking & Finance 69: S25–S34
Martins, F., Winkler, A. (2013), Foreign ownership in Latin American microfinance institutions: evidence and impact, Journal of Business Economics, 83(6): 665–702
Mergaerts, F., Vander Vennet, R., 2016. Business models and bank performance: A long-term perspective. J. Financ. Stab. 22, 57–75.
Mersland R., Strøm, R.Ø. (2009a), Performance and Governance in Microfinance Institutions. Journal of Banking and Finance 33(4): 662-669
Mersland R., Strøm, R.Ø. (2009b), Microfinance Mission Drift? World Development 38(1): 28-36
Mersland, R., Urgeghe, L. (2013), International Debt Financing and Performance of Microfinance Institutions, Strat. Change 22:17–29
Morduch, J. (1999), The Microfinance Promise. Journal of Economic Literature 37: 1569–1614
O'Donohoe, N.P., de Martz, F.R., Littlefield, E., Reille, X. and C. Kneiding (2009), Shedding Light on Microfinance Equity Valuation: Past and Present, CGAP Occasional Paper No. 14, CGAP and J.P. Morgan, Washington DC.
Reille, X., Kneiding, C., Martinez, M., 2009. The Impact of the Financial Crisis on Microfinance Institutions and Their Clients-Results from CGAPs 2009 Opinion Survey. CGAP Brief May.
Schicks, J. (2014), Over-Indebtedness in Microfinance – An Empirical Analysis of Related Factors on the Borrower Level, World Development, 54: 301–324
Tabak, B.M., Fazio, D.M., Cajueiro, D.C. (2012). The relationship between banking market competition and risk-taking: Do size and capitalization matter? Journal of Banking & Finance 36:3366–3381
Vazquez, F., Federico, P. (2015), Bank funding structures and risk: Evidence from the global financial crisis, Journal of Banking & Finance, 61:1–14
Wagner, C., Winkler, A., 2013. The vulnerability of microfinance to financial turmoil–evidence from the global financial crisis. World Dev. 51, 71–90.
Zingales, L. (2015), Presidential Address: Does Finance Benefit Society? The Journal of Finance, 70(4):1327- 1363.

Charts

Chart 1: Average Z-score developments over time, 2003-2014



Source: authors' calculations based on Bankscope and MixMarket sample

Table 1: Variable definitions

Variable	Definition	Source
Z-score	Equity ratio plus return on assets (ROA) divided by the standard deviation of return on assets (SDROA), winsorized at 1- and 99-percentile level	Mix Market, Bankscope and own calculations
Growth	Annual growth of total assets, winsorized at 1- and 99- percentile level	Mix Market, Bankscope and own calculations
Size	Natural log of total assets, winsorized at 1- and 99- percentile level	Mix Market, Bankscope and own calculations
Non-deposit funding	Borrowings divided by the sum of borrowings and deposit liabilities	Mix Market, Bankscope and own calculations
Liquidity	MFIs: Non-earning liquid assets divided by total assets. Banks: Cash, trading securities and interbank lending of maturities less than three months divided by total assets. Winsorized at 1- and 99- percentile level.	Mix Market, Bankscope and own calculations
GDP growth	Annual percentage growth rate of GDP at market prices based on constant local currency (based on constant 2010 USD)	World Bank - World Development Indicators
GDP per capita	GDP per capita (in current USD)	World Bank - World Development Indicators
Inflation	Inflation, consumer prices (annual %)	World Bank - World Development Indicators
HHI	Herfindahl-Hirschman Index: sum of the squares of all institutions' percentage market share within the country in terms of total assets. Calculations based on all available MFI and Bank observations in the datasets	Mix Market, Bankscope and own calculations
RAER	Risk-adjusted Equity Ratio. Equity ratio / standard deviation of return on assets, winsorized at 1- and 99-percentile level	Mix Market, Bankscope and own calculations
RAROA	Risk-adjusted Return on Assets. Return on assets divided by standard deviation of return on assets, winsorized at 1- and 99-percentile level	Mix Market, Bankscope and own calculations
SDROA	Standard deviation of return on assets	Mix Market, Bankscope and own calculations
ROA	Return on assets. Annual average total assets divided by net income, winsorized at 1- and 99-percentile level	Mix Market, Bankscope and own calculations
Equity	Equity divided by total assets, winsorized at 1- and 99- percentile level	Mix Market, Bankscope and own calculations
Borrowings/TA	Borrowings divided by total assets, winsorized at 1- and 99- percentile level	Mix Market, Bankscope and own calculations
Non-deposit funding growth	Annual growth of non-deposit funding volume, winsorized at 1- and 99- percentile level	Mix Market, Bankscope and own calculations
GLP/TA	Gross loan portfolio divided by total assets, winsorized at 1- and 99- percentile level	Mix Market, Bankscope and own calculations
Non-Performing-Loans	MFIs: Loans overdue for more than 30 days divided by gross loan portfolio. Banks: Impaired loans divided by gross loan portfolio. Winsorized at 1- and 99- percentile level	Mix Market, Bankscope and own calculations
MFI dummy	Dummy variable taking the value 1 if the particular institution is an MFIs from Mix Market dataset and 0 for banks from Bankscope dataset	Mix Market, Bankscope
MFI bank dummy	Dummy variable taking the value 1 if the MFI from the Mix Market dataset is classified as "MFI Bank" and zero otherwise	Mix Market
Credit Union dummy	Dummy variable taking the value 1 if the MFI from the Mix Market dataset is classified as credit union / cooperative and zero otherwise	Mix Market
NBFI dummy	Dummy variable taking the value 1 if the MFI from the Mix Market dataset is classified as NBFI (Non-Bank Financial Institution) and zero otherwise	Mix Market
NGO dummy	Dummy variable taking the value 1 if the MFI from the Mix Market dataset is classified as NGO (Non-Governmental Organisation) and zero otherwise	Mix Market
Other dummy	Dummy variable taking the value 1 if the MFI from the Mix Market dataset is classified as other institution and zero otherwise	Mix Market
Bank	Dummy variable taking the value 1 if the institution from the Bankscope dataset is classified as commercial bank, credit union, investment bank or savings bank and zero otherwise	Bankscope

This table shows the list of variables used in the regression analysis.

Table 2: Descriptive statistics

	MFIs						Banks					
	Obs.	Mean	Median	SD	Min.	Max.	Obs.	Mean	Median	SD	Min.	Max.
Z-score	7502	37.22	17.31	71.44	-1.44	635.87	22442	62.12	30.71	98.51	-1.44	635.87
Growth	7502	0.29	0.22	0.41	-0.52	2.28	22442	0.21	0.14	0.41	-0.52	2.28
Size	7502	16.32	16.15	1.83	13.18	24.47	22442	19.86	19.73	2.20	13.18	25.05
Non-deposit funding	7502	0.67	0.88	0.38	-0.05	1.00	22442	0.42	0.30	0.33	-0.05	1.00
Liquidity	7502	0.16	0.12	0.13	0.01	0.84	22442	0.28	0.24	0.18	0.01	0.84
GDP growth	7434	5.23	5.20	3.68	-15.09	34.50	22163	4.43	4.60	4.14	-36.05	54.16
Inflation	7215	6.79	5.79	4.87	-8.97	51.46	21830	7.50	6.78	5.69	-35.84	98.22
GDP per capita	7439	3346.7	2138.4	3089.7	119.1	21188.1	22278	6773.9	6142.9	4643.1	106.0	21323.8
HHI	7502	0.19	0.16	0.15	0.01	1.00	22442	0.12	0.10	0.11	0.01	1.00
RAER	7502	33.90	15.33	65.75	0.13	590.49	22442	56.51	27.28	91.20	0.13	590.49
RAROA	7502	3.31	1.65	7.00	-3.50	54.21	22442	5.41	2.84	8.55	-3.50	54.21
SDROA	7492	0.033	0.026	0.027	0.000	0.174	22297	0.015	0.009	0.017	0.000	0.160
ROA	7502	0.017	0.021	0.064	-0.196	0.143	22442	0.014	0.013	0.029	-0.196	0.143
Equity	7502	0.30	0.23	0.21	0.01	0.86	22442	0.17	0.13	0.14	0.01	0.86
Borrowings/TA	7457	0.40	0.39	0.27	0.00	0.93	22442	0.33	0.25	0.26	0.00	0.93
Non-deposit funding growth	6835	0.56	0.20	1.48	-0.88	9.65	22398	0.42	0.13	1.30	-0.88	9.65
GLP/TA	7502	0.77	0.80	0.16	0.02	1.02	22442	0.54	0.57	0.21	0.02	1.02
Non-Performing-Loans	6866	0.061	0.037	0.085	0.000	0.584	17070	0.063	0.029	0.097	0.000	0.584
MFI bank	7502	0.12	0.00	0.33	0.00	1.00	22442	0.00	0.00	0.00	0.00	0.00
Credit union	7502	0.13	0.00	0.33	0.00	1.00	22442	0.00	0.00	0.00	0.00	0.00
NGO	7502	0.35	0.00	0.48	0.00	1.00	22442	0.00	0.00	0.00	0.00	0.00
NBFI	7502	0.35	0.00	0.48	0.00	1.00	22442	0.00	0.00	0.00	0.00	0.00
Other	7502	0.05	0.00	0.23	0.00	1.00	22442	0.00	0.00	0.00	0.00	0.00
Bank	7502	0.00	0.00	0.00	0.00	0.00	22442	1.00	1.00	0.00	1.00	1.00

Note that minimum and maximum statistics often show the same values in both subsamples due to winsorizing effect.

Table 3: Pairwise correlations Bank subsample

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Z-score	1	1															
Growth	2	-0.0741 *	1														
Size	3	0.0094	-0.0229 *	1													
Non-deposit funding	4	0.0035	0.0241 *	-0.3463 *	1												
Liquidity	5	-0.0526 *	0.127 *	-0.237 *	0.129 *	1											
GDP growth	6	-0.0066	0.21 *	0.1053 *	-0.1722 *	-0.0087	1										
Inflation	7	-0.0679 *	0.046 *	-0.151 *	0.0827 *	0.0905 *	-0.0683 *	1									
GDP per capita	8	0.021 *	-0.1016 *	-0.1281 *	0.522 *	0.0747 *	-0.2723 *	-0.0589 *	1								
HHI	9	-0.0525 *	0.0614 *	-0.0276 *	-0.3236 *	0.0803 *	0.1264 *	0.0179 *	-0.4157 *	1							
GLP / TA	10	0.0508 *	-0.1064 *	0.0204 *	0.0058	-0.6318 *	-0.0552 *	-0.0769 *	0.0703 *	-0.081 *	1						
Equity ratio	11	0.1045 *	-0.0656 *	-0.4847 *	0.305 *	0.124 *	-0.0952 *	0.0454 *	0.1523 *	-0.0819 *	-0.0565 *	1					
NPL ratio	12	-0.0836 *	-0.1387 *	-0.0469 *	-0.0996 *	0.0018	-0.0941 *	-0.0575 *	-0.1143 *	0.1566 *	-0.0204 *	0.0893 *	1				
RAER	13	0.9979 *	-0.0771 *	-0.0088	0.0155 *	-0.0487 *	-0.0157 *	-0.0703 *	0.031 *	-0.0589 *	0.0516 *	0.1212 *	-0.0755 *	1			
RAROA	14	0.7371 *	-0.0262 *	0.2027 *	-0.124 *	-0.0812 *	0.0992 *	-0.0354 *	-0.0889 *	0.0278 *	0.0307 *	-0.1006 *	-0.1502 *	0.6973 *	1		
SDROA	15	-0.1992 *	0.0691 *	-0.2882 *	0.1562 *	0.0845 *	-0.0526 *	0.1006 *	0.0636 *	0.0132 *	-0.0539 *	0.3288 *	0.2465 *	-0.1916 *	-0.24 *	1	
ROA	16	0.0184 *	0.1001 *	-0.0087	0.0474 *	0.0529 *	0.0832 *	0.1003 *	-0.0003	0.0302 *	-0.0637 *	0.1666 *	-0.2168 *	0.0015	0.1924 *	-0.1019 *	1

Source: authors' compilations.

**Indicate significance at 5% level*

Table 4: Pairwise correlations MFI subsample

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Z-Score	1	1															
Growth	2	-0.0595 *	1														
Size	3	0.0365 *	0.0077	1													
Non-deposit funding	4	-0.0329 *	0.0483 *	-0.2106 *	1												
Liquidity	5	-0.0165	0.0173	0.0741 *	-0.2705 *	1											
GDP growth	6	0.0122	0.208 *	-0.0302 *	0.0017	0.0041	1										
Inflation	7	-0.0289 *	0.0514 *	-0.1183 *	0.0317 *	0.0723 *	0.1178 *	1									
GDP per capita	8	0.03 *	-0.1031 *	0.0803 *	0.1249 *	-0.2039 *	-0.1963 *	-0.211 *	1								
HHI	9	-0.0407 *	0.0621 *	-0.1094 *	-0.0874 *	0.1439 *	0.0733 *	0.0675 *	-0.2015 *	1							
GLP / TA	10	0.0196	0.0108	-0.0164	0.3086 *	-0.6973 *	0.0444 *	-0.0504 *	0.1691 *	-0.1544 *	1						
Equity ratio	11	0.1618 *	-0.0876 *	-0.3337 *	0.2467 *	-0.0692 *	-0.0051	-0.0047	0.109 *	0.1191 *	0.0384 *	1					
NPL ratio	12	-0.023	-0.2681 *	-0.078 *	-0.0952 *	0.1141 *	-0.1081 *	-0.0237	-0.0062	0.0353 *	-0.1244 *	-0.0197	1				
RAER	13	0.9963 *	-0.0683 *	0.0247 *	-0.0284 *	-0.0107	0.008	-0.0311 *	0.0323 *	-0.0367 *	0.009	0.173 *	-0.0122	1			
RAROA	14	0.7499 *	0.0315 *	0.136 *	-0.0598 *	-0.0571 *	0.0464 *	-0.012	0.0089	-0.0618 *	0.1064 *	0.0349 *	-0.1237 *	0.7006 *	1		
SDROA	15	-0.1922 *	0.0197	-0.2203 *	0.2148 *	0.0048	-0.0229 *	0.0869 *	-0.0192	0.1345 *	-0.0175	0.1549 *	0.105 *	-0.185 *	-0.2131 *	1	
ROA	16	0.1558 *	0.0936 *	0.137 *	0.0379 *	-0.1909 *	0.0715 *	-0.0212	0.036 *	-0.0589 *	0.2513 *	0.1656 *	-0.2822 *	0.1227 *	0.3962 *	-0.2532 *	1

Source: authors' compilations.

**Indicate significance at 5% level*

Table 5: Baseline results

	(1)
Growth	-0.128***
	(-5.21)
Size	-1.017***
	(-6.44)
Size squared	0.0245***
	(5.95)
Non-deposit funding	-0.273***
	(-3.29)
Liquidity	-0.254***
	(-2.93)
GDP growth	0.0153***
	(5.49)
Inflation	0.000462
	(0.20)
GDP per capita	-0.00000348
	(-0.41)
HHI	0.791***
	(3.03)
MFI dummy * Growth	0.0246
	(0.46)
MFI dummy * Size	1.752***
	(5.49)
MFI dummy * Size squared	-0.0387***
	(-4.33)
MFI dummy * non-deposit funding	-0.0894
	(-0.59)
MFI dummy * Liquidity	-0.152
	(-0.70)
MFI dummy * GDP growth	-0.00295
	(-0.53)
MFI dummy * inflation	0.00501
	(1.08)
MFI dummy * GDP per capita	-0.0000200
	(-0.71)
MFI dummy * HHI	-0.680*
	(-1.85)
Constant	9.142***
	(6.99)
Observations	28790
R-squared	0.034

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. *t*-statistics are reported in parentheses. Standard errors are clustered at institutional level.

This table reports the estimated coefficients of the panel regression estimated with bank-specific fixed effects as presented in equation (1). The dependent variable is the natural logarithm of the *Z-score*. The regression includes year fixed effects and MFI dummy * year interaction terms which are not reported. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers.

Table 6: Baseline time interactions

	(1)
2003	-0.247***
	(-4.82)
2004	-0.191***
	(-4.20)
2005	-0.0287
	(-0.92)
2006	base
2007	0.0756***
	(2.59)
2008	0.0105
	(0.24)
2009	0.0592
	(1.28)
2010	0.0530
	(1.17)
2011	0.185***
	(3.54)
2012	0.289***
	(5.15)
2013	0.281***
	(4.59)
2014	0.133**
	(2.19)
MFI dummy * 2003	0.513***
	(3.33)
MFI dummy * 2004	0.364***
	(3.34)
MFI dummy * 2005	0.173**
	(2.55)
MFI dummy * 2006	base
MFI dummy * 2007	-0.161***
	(-2.79)
MFI dummy * 2008	-0.232***
	(-2.86)
MFI dummy * 2009	-0.265***
	(-2.94)
MFI dummy * 2010	-0.290***
	(-3.01)
MFI dummy * 2011	-0.317***
	(-2.83)
MFI dummy * 2012	-0.291**
	(-2.33)
MFI dummy * 2013	-0.282**
	(-2.09)
MFI dummy * 2014	-0.131
	(-0.93)
Constant	9.142***
	(6.99)
Observations	28790
R-squared	0.034

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. t-statistics are reported in parentheses. Standard errors are clustered at institutional level.
This table reports the estimated coefficients of the panel regression estimated with bank-specific fixed effects as presented in equation (1). The dependent variable is the natural logarithm of the Z-score. The regression includes the variables from the baseline regression which are not reported. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers.

Table 7: Crisis

	(1) 08-09 crisis	(2) 07-11 crisis
Crisis dummy 08-09	-0.0571**	
	(-2.55)	
MFI dummy * Crisis dummy 08-09	-0.0995**	
	(-2.35)	
Crisis dummy 07-11		-0.0375**
		(-2.15)
MFI dummy * Crisis dummy 07-11		-0.169***
		(-4.62)
Observations	28790	28790
R-squared	0.024	0.026

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. *t*-statistics are reported in parentheses. Standard errors are clustered at institutional level.

This table reports the estimated coefficients of the panel regression estimated with bank-specific fixed effects as presented in equation (1). The dependent variable is the natural logarithm of the *Z-score*. *Crisis dummy 08-09* is a time dummy variable that is 1 in 2008 and 2009. *Crisis dummy 07-11* is a time dummy variable that is 1 in 2007 until 2011. The regression includes the variables from the baseline regression which are not reported. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers.

Table 8: Transmission channel RAROA

	(1) RAROA
Growth	0.0494**
	(2.50)
Size	-0.487***
	(-3.61)
Size squared	0.0165***
	(4.64)
Non-deposit funding	-0.144**
	(-2.06)
Liquidity	-0.0599
	(-0.83)
GDP growth	0.0220***
	(8.84)
Inflation	0.00823***
	(4.08)
GDP per capita	-0.00000774
	(-1.04)
HHI	0.722***
	(3.18)
MFI dummy * Growth	0.125***
	(3.08)
MFI dummy * Size	1.436***
	(5.37)
MFI dummy * Size squared	-0.0345***
	(-4.48)
MFI dummy * non-deposit funding	-0.197
	(-1.51)
MFI dummy * Liquidity	-0.789***
	(-4.53)
MFI dummy * GDP growth	-0.00945*
	(-1.95)
MFI dummy * inflation	-0.00148
	(-0.37)
MFI dummy * GDP per capita	-0.0000460*
	(-1.93)
MFI dummy * HHI	-1.007***
	(-2.96)
Constant	0.943
	(0.87)
Observations	28790
R-squared	0.046

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. *t*-statistics are reported in parentheses. Standard errors are clustered at institutional level.

This table reports the estimated coefficients of the panel regression estimated with bank-specific fixed effects as presented in equation (1). The dependent variable is the natural logarithm of the risk-adjusted return on assets (*RAROA*). The regression includes year fixed effects and MFI dummy * year interaction terms which are not reported. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers.

Table 9: Transmission channel RAER

	(1) RAER
Growth	-0.171***
	(-7.34)
Size	-1.024***
	(-6.49)
Size squared	0.0237***
	(5.79)
Non-deposit funding	-0.221***
	(-2.82)
Liquidity	-0.241***
	(-2.88)
GDP growth	0.0131***
	(5.08)
Inflation	-0.000944
	(-0.43)
GDP per capita	-0.00000391
	(-0.49)
HHI	0.681***
	(2.76)
MFI dummy * Growth	0.00152
	(0.03)
MFI dummy * Size	1.288***
	(4.34)
MFI dummy * Size squared	-0.0268***
	(-3.22)
MFI dummy * non-deposit funding	-0.0843
	(-0.59)
MFI dummy * Liquidity	-0.00348
	(-0.02)
MFI dummy * GDP growth	-0.00352
	(-0.70)
MFI dummy * inflation	0.00545
	(1.28)
MFI dummy * GDP per capita	-0.0000176
	(-0.67)
MFI dummy * HHI	-0.568*
	(-1.70)
Constant	10.56***
	(8.24)
Observations	28790
R-squared	0.036

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. *t*-statistics are reported in parentheses. Standard errors are clustered at institutional level.

This table reports the estimated coefficients of the panel regression estimated with bank-specific fixed effects as presented in equation (1). The dependent variable is the natural logarithm of the risk-adjusted equity ratio (*RAER*). The regression includes year fixed effects and MFI dummy * year interaction terms which are not reported. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers.

Table 10: Baseline regression by MFI types

	(1)
Growth	-0.128***
	(-5.21)
Size	-1.017***
	(-6.44)
Size squared	0.0245***
	(5.95)
Non-deposit funding	-0.273***
	(-3.29)
Liquidity	-0.254***
	(-2.93)
GDP growth	0.0153***
	(5.48)
Inflation	0.000462
	(0.20)
GDP per capita	-0.00000348
	(-0.41)
HHI	0.791***
	(3.02)
CU dummy * Growth	-0.0294
	(-0.24)
CU dummy * Size	0.853
	(0.79)
CU dummy * Size squared	-0.0144
	(-0.46)
CU dummy * non-deposit funding	0.236
	(0.47)
CU dummy * Liquidity	-0.716
	(-1.16)
CU dummy * GDP growth	-0.00977
	(-0.94)
CU dummy * Inflation	0.0242**
	(2.26)
CU dummy * GDP per capita	0.0000722
	(1.38)
CU dummy * HHI	0.750
	(0.71)
NGO dummy * Growth	-0.0188
	(-0.24)
NGO dummy * Size	2.519***
	(4.05)
NGO dummy * Size squared	-0.0638***
	(-3.43)
NGO dummy * non-deposit funding	-0.149
	(-0.65)
NGO dummy * Liquidity	-0.504
	(-1.37)
NGO dummy * GDP growth	-0.00621
	(-0.70)
NGO dummy * Inflation	0.00712
	(0.94)
NGO dummy * GDP per capita	-0.0000312
	(-0.72)
NGO dummy * HHI	-0.862*
	(-1.87)

NBFI dummy * Growth	0.115
	(1.48)
NBFI dummy * Size	1.935***
	(3.88)
NBFI dummy * Size squared	-0.0421***
	(-2.92)
NBFI dummy * non-deposit funding	-0.106
	(-0.46)
NBFI dummy * Liquidity	-0.0888
	(-0.32)
NBFI dummy * GDP growth	-0.00720
	(-0.95)
NBFI dummy * Inflation	0.00219
	(0.41)
NBFI dummy * GDP per capita	-0.0000561
	(-1.22)
NBFI dummy * HHI	-0.321
	(-0.60)
MFI bank dummy * Growth	0.0385
	(0.30)
MFI bank dummy * Size	1.374*
	(1.92)
MFI bank dummy * Size squared	-0.0303
	(-1.55)
MFI bank dummy * non-deposit funding	-0.191
	(-0.76)
MFI bank dummy * Liquidity	0.866
	(1.33)
MFI bank dummy * GDP growth	0.00956
	(1.01)
MFI bank dummy * Inflation	0.00394
	(0.44)
MFI bank dummy * GDP per capita	0.0000282
	(0.52)
MFI bank dummy * HHI	-1.033*
	(-1.81)
other dummy * Growth	-0.361*
	(-1.74)
other dummy * Size	-1.090
	(-0.62)
other dummy * Size squared	0.0458
	(0.88)
other dummy * non-deposit funding	1.115
	(1.60)
other dummy * Liquidity	-0.580
	(-1.05)
other dummy * GDP growth	-0.00559
	(-0.26)
other dummy * Inflation	-0.0274
	(-1.39)
other dummy * GDP per capita	-0.000283
	(-1.61)
other dummy * HHI	-0.815
	(-0.71)
Constant	9.174***
	(6.79)
Observations	28790
R-squared	0.037

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. *t*-statistics are reported in parentheses. Standard errors are clustered at institutional level.

This table reports the estimated coefficients of the panel regression estimated with bank-specific fixed effects as presented in equation (1). The dependent variable is the natural logarithm of the *Z-score*. The regression includes year fixed effects and MFI dummy * year interaction terms which are not reported. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers.

Appendix

Table 1A: Different explanatory variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Growth	-0.128***	-0.115***	-0.0645**	-0.124***	-0.139***	-0.112***	-0.00186***
	(-5.21)	(-4.70)	(-2.40)	(-5.07)	(-5.33)	(-4.54)	(-3.00)
Size	-1.017***	-0.913***	-0.997***	-1.007***	-0.276*	-1.070***	-1.093***
	(-6.44)	(-5.77)	(-6.24)	(-6.38)	(-1.74)	(-4.54)	(-6.94)
Size squared	0.0245***	0.0231***	0.0237***	0.0243***	0.00695*	0.0260***	0.0261***
	(5.95)	(5.64)	(5.70)	(5.90)	(1.68)	(-4.54)	(6.33)
Non-deposit funding	-0.273***			-0.264***	-0.169**	-0.292***	-0.281***
	(-3.29)			(-3.20)	(-2.11)	(-4.54)	(-3.39)
Liquidity	-0.254***	-0.250***	-0.268***		0.176**	-0.275***	-0.312***
	(-2.93)	(-2.90)	(-3.09)		(2.06)	(-4.54)	(-3.66)
GDP growth	0.0153***	0.0150***	0.0153***	0.0153***	0.0101***		0.0135***
	(5.49)	(5.44)	(5.45)	(5.48)	(3.73)		(4.89)
Inflation	0.000462	0.000247	0.000412	0.000225	-0.00401*		0.000173
	(0.20)	(0.11)	(0.18)	(0.10)	(-1.94)		(0.08)
GDP per capita	-0.00000348	-0.00000114	-0.00000433	-0.00000481	-0.0000251***		-0.000000815
	(-0.41)	(-0.14)	(-0.52)	(-0.58)	(-3.12)		(-0.10)
HHI	0.791***	0.828***	0.816***	0.772***	0.798***		0.755***
	(3.03)	(3.18)	(3.11)	(2.95)	(3.17)		(2.88)
MFI dummy * Growth	0.0246	0.0309	0.00873	0.0259	0.0410	0.0422	-0.0940**
	(0.46)	(0.59)	(0.15)	(0.48)	(0.78)	(-4.54)	(-1.98)
MFI dummy * Size	1.752***	2.214***	1.521***	1.729***	1.227***	1.847***	1.834***
	(5.49)	(6.84)	(4.39)	(5.43)	(3.83)	(-4.54)	(5.75)
MFI dummy * Size squared	-0.0387***	-0.0518***	-0.0322***	-0.0383***	-0.0294***	-0.0413***	-0.0403***
	(-4.33)	(-5.76)	(-3.31)	(-4.30)	(-3.29)	(-4.54)	(-4.50)
MFI dummy * non-deposit funding	-0.0894			-0.0976	-0.00285	-0.0329	-0.0787
	(-0.59)			(-0.65)	(-0.02)	(-4.54)	(-0.52)
MFI dummy * Liquidity	-0.152	-0.155	-0.323		-0.256	-0.299	-0.0905
	(-0.70)	(-0.73)	(-1.48)		(-1.12)	(-4.54)	(-0.42)
MFI dummy * GDP growth	-0.00295	-0.00325	-0.00309	-0.00279	-0.00520		-0.00158
	(-0.53)	(-0.58)	(-0.53)	(-0.50)	(-0.96)		(-0.29)
MFI dummy * inflation	0.00501	0.00611	0.00295	0.00540	0.00457		0.00509
	(1.08)	(1.34)	(0.59)	(1.17)	(0.86)		(1.10)
MFI dummy * GDP per capita	-0.0000200	-0.0000226	-0.0000214	-0.0000179	0.0000102		-0.0000227
	(-0.71)	(-0.84)	(-0.70)	(-0.64)	(0.34)		(-0.81)
MFI dummy * HHI	-0.680*	-0.718**	-0.819**	-0.665*	-0.708**		-0.659*
	(-1.85)	(-2.02)	(-2.16)	(-1.80)	(-2.03)		(-1.78)
2003	-0.247***	-0.227***	-0.258***	-0.240***		-0.242***	-0.240***
	(-4.82)	(-4.45)	(-4.99)	(-4.66)		(-4.54)	(-4.65)
2004	-0.191***	-0.178***	-0.192***	-0.184***	-0.164***	-0.174***	-0.177***
	(-4.20)	(-3.93)	(-4.18)	(-4.04)	(-3.62)	(-4.54)	(-3.92)
2005	-0.0287	-0.0232	-0.0224	-0.0244	-0.0686**	-0.0259	-0.0166
	(-0.92)	(-0.75)	(-0.71)	(-0.79)	(-1.97)	(-4.54)	(-0.53)
2006							
2007	0.0756***	0.0625**	0.0786***	0.0735**	0.120***	0.0597**	0.0713**
	(2.59)	(2.14)	(2.71)	(2.51)	(3.87)	(-4.54)	(2.43)
2008	0.0105	-0.00160	0.0215	0.0127	0.137***	-0.0443	0.0467
	(0.24)	(-0.04)	(0.50)	(0.29)	(3.15)	(-4.54)	(1.10)
2009	0.0592	0.0215	0.0676	0.0626	0.0910*	-0.0997***	0.0734
	(1.28)	(0.46)	(1.46)	(1.35)	(1.82)	(-4.54)	(1.60)
2010	0.0530	0.0130	0.0659	0.0607	0.199***	-0.0108	0.0756*
	(1.17)	(0.28)	(1.47)	(1.35)	(3.79)	(-4.54)	(1.70)
2007	0.185***	0.141***	0.202***	0.194***	0.309***	0.0979**	0.210***
	(3.54)	(2.67)	(3.89)	(3.73)	(5.71)	(-4.54)	(4.06)
2012	0.289***	0.240***	0.305***	0.298***	0.435***	0.175***	0.311***
	(5.15)	(4.22)	(5.47)	(5.31)	(7.03)	(-4.54)	(5.60)
2013	0.281***	0.228***	0.300***	0.291***	0.459***	0.164***	0.312***
	(4.59)	(3.70)	(4.92)	(4.78)	(6.79)	(-4.54)	(5.19)
2014	0.133**	0.0876	0.156**	0.147**	0.402***	0.0244	0.184***
	(2.19)	(1.43)	(2.56)	(2.42)	(5.63)	(-4.54)	(3.12)
Borrowings / TA		-0.836***					
		(-8.55)					
MFI dummy * (Borrowings / TA)		-0.836***					
		(-4.65)					
Non-deposit funding growth			-0.0318***				
			(-5.70)				
MFI dummy * Non-deposit funding growth			0.0263				
			(1.30)				
GLP / TA				0.304***			
				(3.35)			
MFI dummy * (GLP / TA)				0.0125			
				(0.06)			
Constant	9.142***	6.932***	9.720***	8.830***	3.038**	9.555***	9.744***
	(6.99)	(5.24)	(7.15)	(6.74)	(2.31)	(-4.54)	(7.46)
Observations	28790	28745	28018	28790	24130	29944	28790
R-squared	0.034	0.051	0.032	0.034	0.033	0.031	0.032

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. *t*-statistics are reported in parentheses. Standard errors are clustered at institutional level.

This table reports the estimated coefficients of the panel regression estimated with bank-specific fixed effects as presented in equation (1). The dependent variable is the natural logarithm of the *Z-score*. The regression includes year fixed effects and MFI dummy * year interaction terms which are not reported. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers unless stated otherwise. Regression (1) displays the baseline results. In regressions (2), (3) and (4) we replace different explanatory variables and their interaction terms with alternative variables. In regression (5) we use explanatory variables lagged by 1 year. Regression (6) is estimated without macroeconomic and market variables. Regression (7) is estimated without winsorizing outliers.

Table 2A: Exclusion of major countries

	(1) excluding Russia	(2) excluding China	(3) excluding 5 largest countries
Growth	-0.0967***	-0.127***	-0.137***
	(-2.83)	(-5.11)	(-3.53)
Size	-0.501**	-0.963***	-0.633**
	(-2.20)	(-5.73)	(-2.25)
Size squared	0.0130**	0.0230***	0.0163**
	(2.27)	(5.19)	(2.26)
Non-deposit funding	-0.249**	-0.302***	-0.231**
	(-2.42)	(-3.59)	(-2.14)
Liquidity	-0.323***	-0.252***	-0.305**
	(-2.85)	(-2.87)	(-2.51)
GDP growth	0.0128***	0.0158***	0.0108***
	(3.79)	(5.60)	(3.03)
Inflation	-0.0000191	0.000726	0.00265
	(-0.01)	(0.32)	(1.10)
GDP per capita	0.0000317***	-0.00000686	0.0000448***
	(2.73)	(-0.81)	(3.46)
HHI	0.656**	0.802***	0.553**
	(2.36)	(3.06)	(2.00)
MFI dummy * Growth	-0.0204	0.0181	0.0202
	(-0.35)	(0.34)	(0.32)
MFI dummy * Size	1.255***	1.690***	1.358***
	(3.47)	(5.19)	(3.34)
MFI dummy * Size squared	-0.0278***	-0.0368***	-0.0330***
	(-2.82)	(-4.03)	(-2.97)
MFI dummy * non-deposit funding	-0.118	-0.0689	-0.145
	(-0.72)	(-0.45)	(-0.87)
MFI dummy * Liquidity	-0.0940	-0.152	-0.123
	(-0.41)	(-0.70)	(-0.50)
MFI dummy * GDP growth	-0.000894	-0.00359	-0.0000230
	(-0.15)	(-0.64)	(-0.00)
MFI dummy * inflation	0.00586	0.00484	0.00161
	(1.25)	(1.04)	(0.35)
MFI dummy * GDP per capita	-0.0000572*	-0.0000164	-0.0000637*
	(-1.78)	(-0.58)	(-1.79)
MFI dummy * HHI	-0.564	-0.689*	-0.548
	(-1.48)	(-1.87)	(-1.46)
Constant	3.826**	8.675***	4.665**
	(2.17)	(6.37)	(2.29)
Observations	22262	27838	18568
R-squared	0.037	0.034	0.042

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. *t*-statistics are reported in parentheses. Standard errors are clustered at institutional level.

This table reports the estimated coefficients of the panel regression estimated with bank-specific fixed effects as presented in equation (1). The dependent variable is the natural logarithm of the *Z-score*. The regression includes year fixed effects and MFI dummy * year interaction terms which are not reported. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers. In regression (1) observations from Russia are excluded. In regression (2) observations from China are excluded. In regression (3) observations from Brazil, Russia, India, China and Ukraine are excluded.

Table 3A: Pooled OLS regression

	(1)	(2)	(3)	(4)	(5)
Growth	-0.285***	-0.283***	-0.282***	-0.284***	-0.282***
	(-9.21)	(-8.21)	(-8.28)	(-8.22)	(-8.11)
Size	0.144***	0.143***	0.141***	-0.477***	-0.468***
	(2.87)	(2.81)	(2.75)	(-5.89)	(-5.79)
Size squared	-0.00297**	-0.00291**	-0.00285**	0.0120***	0.0118***
	(-2.30)	(-2.24)	(-2.20)	(6.35)	(6.22)
Non-deposit funding	-0.152**	-0.153**	-0.154**	-0.0736	-0.0876
	(-2.42)	(-2.41)	(-2.43)	(-1.02)	(-1.26)
Liquidity	-0.105**	-0.131**	-0.131**	-0.125**	-0.124**
	(-2.01)	(-2.29)	(-2.31)	(-2.43)	(-2.40)
GDP growth	0.0134***	0.0109**	0.0113**	0.0122**	0.0117**
	(3.40)	(2.28)	(2.47)	(2.43)	(2.42)
Inflation	0.000534	-0.00129	-0.00127	0.000880	-0.000155
	(0.17)	(-0.42)	(-0.42)	(0.25)	(-0.04)
GDP per capita	-0.00000161	0.0000184*	0.0000188*	0.00000124	-0.000000549
	(-0.14)	(1.69)	(1.73)	(0.11)	(-0.05)
HHI	-0.0480	-0.349**	-0.345**	-0.0218	0.0717
	(-0.27)	(-1.98)	(-1.97)	(-0.10)	(0.35)
MFI dummy	-0.398***	-0.391***	-0.373***	-13.52***	
	(-4.80)	(-4.80)	(-4.74)	(-9.32)	
CU dummy					-15.39***
					(-4.17)
NGO dummy					-19.72***
					(-7.22)
NBFI dummy					-8.284***
					(-3.82)
MFI bank dummy					-14.07***
					(-3.63)
Other dummy					-17.58***
					(-2.94)
Crisis 08-09		-0.119***	-0.0918*		
		(-3.48)	(-1.95)		
MFI dummy * Crisis 08-09			-0.0897		
			(-1.16)		
MFI dummy * Growth				0.0160	
				(0.24)	
MFI dummy * Size				1.396***	
				(8.92)	
MFI dummy * Size squared				-0.0364***	
				(-8.26)	
MFI dummy * non-deposit funding				-0.223***	
				(-2.82)	
MFI dummy * Liquidity				-0.447***	
				(-2.65)	
MFI dummy * GDP growth				0.00425	
				(0.44)	
MFI dummy * inflation				-0.00307	
				(-0.53)	
MFI dummy * GDP per capita				0.0000115	
				(1.04)	
MFI dummy * HHI				0.128	
				(0.58)	
CU dummy * Growth					-0.152
					(-1.01)
CU dummy * Size					1.573***
					(3.57)
CU dummy * Size squared					-0.0404***
					(-3.03)
CU dummy * non-deposit funding					0.469***
					(2.61)
CU dummy * Liquidity					-0.559
					(-1.23)
CU dummy * GDP growth					0.00476
					(0.22)
CU dummy * Inflation					0.00652
					(0.44)
CU dummy * GDP per capita					-0.0000329
					(-1.63)
CU dummy * HHI					1.038*
					(1.86)

	(1)	(2)	(3)	(4)	(5)
NGO dummy * Growth					-0.0466
					(-0.44)
NGO dummy * Size					2.190***
					(6.69)
NGO dummy * Size squared					-0.0607***
					(-6.05)
NGO dummy * non-deposit funding					-0.471***
					(-3.43)
NGO dummy * Liquidity					-0.791***
					(-2.98)
NGO dummy * GDP growth					-0.00751
					(-0.54)
NGO dummy * Inflation					0.000582
					(0.06)
NGO dummy * GDP per capita					0.0000505***
					(3.20)
NGO dummy * HHI					-0.0908
					(-0.33)
NBFI dummy * Growth					0.146
					(1.58)
NBFI dummy * Size					0.728***
					(2.90)
NBFI dummy * Size squared					-0.0171**
					(-2.30)
NBFI dummy * non-deposit funding					0.155
					(1.27)
NBFI dummy * Liquidity					-0.989***
					(-3.67)
NBFI dummy * GDP growth					0.000756
					(0.09)
NBFI dummy * Inflation					-0.000312
					(-0.05)
NBFI dummy * GDP per capita					0.0000241**
					(2.11)
NBFI dummy * HHI					0.724**
					(2.39)
MFI bank dummy * Growth					-0.156
					(-1.34)
MFI bank dummy * Size					1.306***
					(3.18)
MFI bank dummy * Size squared					-0.0312***
					(-2.87)
MFI bank dummy * non-deposit funding					0.175
					(1.14)
MFI bank dummy * Liquidity					1.540***
					(4.29)
MFI bank dummy * GDP growth					0.0202*
					(1.75)
MFI bank dummy * Inflation					0.00485
					(0.73)
MFI bank dummy * GDP per capita					-0.0000265
					(-1.47)
MFI bank dummy * HHI					-0.209
					(-0.66)
other dummy * Growth					0.00289
					(0.01)
other dummy * Size					2.034***
					(2.74)
other dummy * Size squared					-0.0567**
					(-2.48)
other dummy * non-deposit funding					-1.029***
					(-3.46)
other dummy * Liquidity					-1.318**
					(-2.31)
other dummy * GDP growth					0.0244
					(0.86)
other dummy * Inflation					-0.0202
					(-1.08)
other dummy * GDP per capita					0.0000683
					(1.11)
other dummy * HHI					-0.781
					(-1.14)
Constant	0.0396	0.416	0.434	6.462***	6.370***
	(0.07)	(0.75)	(0.78)	(7.27)	(7.16)
Observations	28790	28790	28790	28790	28790
R-squared	0.158	0.155	0.155	0.167	0.176

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. *t*-statistics are reported in parentheses. Standard errors are clustered at year-country level.

This table reports the estimated coefficients of a pooled OLS regression. The dependent variable is the natural logarithm of the *Z-score*. All regressions include country dummies which are not reported. Regressions (1), (4) and (5) include year dummies which are not reported. *Bank* is the baseline institution type in all regressions. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers.

Table 4A: Non-performing loans

	(1)
Growth	-0.0233***
	(-11.17)
Size	-0.0128
	(-1.00)
Size squared	0.000160
	(0.49)
Non-deposit funding	-0.00503
	(-0.46)
Liquidity	0.0509***
	(4.49)
Equity ratio	0.0554**
	(2.49)
ROA	-0.462***
	(-8.02)
GDP growth	-0.00233***
	(-8.35)
Inflation	-0.00151***
	(-5.27)
GDP per capita	-0.00000103
	(-1.15)
HHI	-0.147***
	(-4.80)
MFI dummy * Growth	-0.0129***
	(-2.90)
MFI dummy * Size	0.00559
	(0.27)
MFI dummy * Size squared	-0.000208
	(-0.36)
MFI dummy * non-deposit funding	0.00526
	(0.38)
MFI dummy * Liquidity	-0.00187
	(-0.10)
MFI dummy * equity ratio	-0.0699***
	(-2.67)
MFI dummy * ROA	0.155**
	(2.21)
MFI dummy * GDP growth	0.00191***
	(4.54)
MFI dummy * inflation	0.00156***
	(3.57)
MFI dummy * GDP per capita	0.00000102
	(0.55)
MFI dummy * HHI	0.165***
	(4.92)
Constant	0.266***
	(2.63)
Observations	23056
R-squared	0.112

***, ** and * indicate significance, respectively, at the 1%, 5% and 10% levels. *t*-statistics are reported in parentheses. Standard errors are clustered at institutional level.

This table reports the estimated coefficients of the panel regression estimated with bank-specific fixed effects as presented in equation (1). The dependent variable is the *non-performing loans ratio*. The regression includes year fixed effects and MFI dummy * year interaction terms which are not reported. Note that institution specific variables are winsorized at the 1- and 99-percentile level to mitigate the impact of outliers.

Table 5A: Descriptive statistics by MFI type

MFI banks

	Obs.	Mean	Median	SD	Min.	Max.
Z-score	901	40.88	20.00	76.49	-1.44	635.87
Growth	901	0.32	0.26	0.36	-0.45	2.28
Size	901	18.65	18.65	1.57	13.91	24.47
Non-deposit funding	901	0.39	0.30	0.33	0.00	1.00
Liquidity	901	0.21	0.18	0.14	0.01	0.80
GDP growth	897	5.11	5.02	3.88	-14.80	34.50
Inflation	866	7.42	6.25	5.33	-8.28	51.46
GDP per capita	897	3331	2473	2916	237	15742
HHI	901	0.21	0.16	0.14	0.02	1.00
RAER	901	36.53	17.30	70.27	0.13	590.49
RAROA	901	4.40	2.27	8.08	-3.50	54.21
SDROA	901	0.023	0.015	0.021	0.000	0.097
ROA	901	0.018	0.016	0.049	-0.196	0.143
Equity	901	0.20	0.15	0.15	0.01	0.86
Borrowings/TA	892	0.27	0.22	0.22	0.00	0.88
Non-deposit funding growth	802	0.62	0.18	1.70	-0.88	9.65
GLP/TA	901	0.70	0.73	0.18	0.02	1.02
Non-Performing-Loans	786	0.048	0.030	0.063	0.000	0.584

CU

	count	mean	P50	sd	min	max
Z-score	963	49.01529	20.14	91.04	-1.44	635.87
Growth	963	0.2672471	0.21	0.35	-0.52	2.28
Size	963	15.99343	15.86	1.69	13.18	21.24
Non-deposit funding	963	0.3114007	0.17	0.34	-0.05	1.00
Liquidity	963	0.1504834	0.12	0.12	0.01	0.66
GDP growth	963	4.435076	4.55	3.53	-7.82	34.50
Inflation	959	5.172684	4.22	4.16	-8.97	34.70
GDP per capita	963	4160.89	3717	3477	183	14487
HHI	963	0.1878992	0.17	0.11	0.02	0.96
RAER	963	45.48779	18.57	84.31	0.13	590.49
RAROA	963	3.310774	1.52	7.29	-3.50	54.21
SDROA	962	0.0240164	0.014	0.025	0.000	0.163
ROA	963	0.012664	0.013	0.045	-0.196	0.143
Equity	963	0.2386727	0.19	0.16	0.01	0.86
Borrowings/TA	950	0.2006172	0.12	0.22	0.00	0.92
Non-deposit funding growth	800	0.5367487	0.13	1.58	-0.88	9.65
GLP/TA	963	0.7519458	0.79	0.16	0.02	1.02
Non-Performing-Loans	834	0.0729688	0.048	0.081	0.000	0.584

NGO

	count	mean	P50	sd	min	max
Z-score	2606	33.00962	15.63	60.87	-1.44	635.87
Growth	2606	0.2477642	0.18	0.37	-0.52	2.28
Size	2606	15.59819	15.48	1.51	13.18	21.11
Non-deposit funding	2606	0.8170067	1.00	0.29	0.00	1.00
Liquidity	2606	0.1426494	0.11	0.13	0.01	0.84
GDP growth	2586	5.108586	5.12	2.80	-15.09	21.02
Inflation	2540	6.875076	6.22	4.35	-8.28	39.28
GDP per capita	2586	3018.94	1963	2834	212	16530
HHI	2606	0.1935058	0.16	0.16	0.01	1.00
RAER	2606	30.44217	13.94	56.50	0.13	590.49
RAROA	2606	2.695631	1.37	6.00	-3.50	54.21
SDROA	2601	0.0370066	0.030	0.027	0.000	0.143
ROA	2606	0.0148384	0.024	0.075	-0.196	0.143
Equity	2606	0.3562294	0.31	0.24	0.01	0.86
Borrowings/TA	2602	0.4589673	0.47	0.26	0.00	0.93
Non-deposit funding growth	2440	0.4905797	0.18	1.35	-0.88	9.65
GLP/TA	2606	0.7811529	0.81	0.16	0.02	1.02
Non-Performing-Loans	2408	0.0594272	0.035	0.086	0.000	0.584

NBFI

	count	mean	P50	sd	min	max
Z-score	2621	32.48326	15.64	64.01	-1.44	635.87
Growth	2621	0.3483286	0.26	0.48	-0.52	2.28
Size	2621	16.4402	16.37	1.65	13.18	21.28
Non-deposit funding	2621	0.7945412	1.00	0.33	0.00	1.00
Liquidity	2621	0.1454327	0.12	0.12	0.01	0.79
GDP growth	2581	5.60953	5.90	4.37	-15.09	34.50
Inflation	2443	7.093702	6.13	5.47	-8.28	44.39
GDP per capita	2586	3620.213	2308	3309	119	21188
HHI	2621	0.192545	0.16	0.15	0.01	1.00
RAER	2621	29.49292	13.80	58.76	0.13	590.49
RAROA	2621	2.963455	1.55	6.53	-3.50	54.21
SDROA	2617	0.0383193	0.031	0.028	0.000	0.174
ROA	2621	0.0193661	0.024	0.066	-0.196	0.143
Equity	2621	0.318581	0.26	0.21	0.01	0.86
Borrowings/TA	2608	0.4700563	0.52	0.27	0.00	0.93
Non-deposit funding growth	2452	0.6167536	0.28	1.47	-0.88	9.65
GLP/TA	2621	0.7934153	0.82	0.14	0.02	1.02
Non-Performing-Loans	2474	0.0581046	0.033	0.087	0.000	0.584

other

	count	mean	P50	sd	min	max
Z-score	411	58.41289	26.50	101.45	-1.44	635.87
Growth	411	0.2562693	0.19	0.37	-0.52	2.28
Size	411	15.81536	15.87	1.25	13.18	18.83
Non-deposit funding	411	0.3664483	0.26	0.34	0.00	1.00
Liquidity	411	0.2158187	0.20	0.14	0.01	0.83
GDP growth	407	5.669318	5.50	3.30	-3.78	34.50
Inflation	407	6.881535	6.41	3.64	-8.28	23.12
GDP per capita	407	1797.521	1679	1205	280	14167
HHI	411	0.1476798	0.11	0.14	0.03	0.99
RAER	411	51.05436	22.63	91.70	0.13	590.49
RAROA	411	6.982396	3.81	10.34	-3.50	54.21
SDROA	411	0.0172442	0.008	0.025	0.000	0.169
ROA	411	0.0257287	0.026	0.047	-0.196	0.143
Equity	411	0.192092	0.15	0.16	0.01	0.86
Borrowings/TA	405	0.2680675	0.20	0.25	0.00	0.93
Non-deposit funding growth	341	0.526323	0.19	1.58	-0.88	9.65
GLP/TA	411	0.694585	0.71	0.16	0.14	1.02
Non-Performing-Loans	364	0.097286	0.068	0.108	0.000	0.584