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Are all Banking Crises the Same: Evidence from MFIs

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Abstract

In this manuscript we evaluate if MFIs are able to meet their outreach and sustainability goals when a banking crisis disrupts the banking system of a country. Since our study period includes another major financial and credit market event, we pay a special attention to the effects of banking crises pre- and post-2008, when a much broader financial crisis affected the financial systems of developed and developing countries alike. We analyze dataset of over 2000 annual observation for MFIs from over 60 countries for the period of 2001-2011. Our results indicate that MFIs in countries with a banking crisis served fewer borrowers and had better financial sustainability. Moreover, we find that post-2008, the global financial crisis forced MFIs to cut even more their outreach without effect on financial sustainability. Specifically, MFIs in countries with a banking crisis reached 1.373% fewer borrowers pre-2008 and that outreach decreased to 3 percent fewer borrowers after the 2008 global financial distress. These results support previous finding of a tradeoff between outreach and sustainability in that we find that in the pre-2008 financial crisis a banking crisis was associated with improved financial results. Microfinance banks were the most affected compared to other MFI business types. The results overall are consistent with the view that commercial banks might have curtailed lending to smaller businesses, some of whom might have found credit through microfinance institutions, especially microfinance banks. Thus, while not all banking crisis are the same, a banking crisis combined with additional financial markets distress is clearly associated with fewer borrowers being served by the microfinance industry even it not at the expense of these institutions financial sustainability.

Key words: microfinance institutions, banking crisis, financial crisis, financial system, outreach, sustainability, depth

Are all Banking Crises the Same: Evidence from MFIs

1. Introduction

Microfinance Institutions (MFIs) serve over 200 million clients who are without other access to traditional financial services (Microcredit Summit Campaign, 2015). More than half of these clients are poor borrowers receiving their very first loan. Like banks and other financial institutions, MFIs are vulnerable to banking crises, which typically result in credit crunch and limited access to external financing. Since even in good times, MFIs serve poor borrowers excluded from the formal financial system and banks, it is important to understand what happens in the times of crisis. When banks curtail their lending and credit rationing increases of lower system liquidity, are micro-borrowers most likely to pay a price by being unable to get a loan? We evaluate if MFIs are able to meet their outreach and sustainability goals when a banking crisis disrupts the banking system of a country. Since our study period includes another major financial and credit market event, we pay a special attention to the effects of banking crises pre- and post-2008, when a much broader financial crisis affected the financial systems of developed and developing countries alike.

The existing literature shows that banking crises affect not only banks but also have negative effect on the real economy (Teimouri and Dutta 2016; Ongena, Smith and Michalsen 2003). Banking crises lead to bank distress, low levels of credit and loss of output (Dell'Ariccia, Detragiache and Rajan 2008; Furceri and Zdzienicka, 2012; and Boyd, Kwak and Smith 2005). As liquidity is sucked out of the system, investment decline (Teimouri and Dutta 2016), and bank-dependent borrowers, often smaller firms, suffer (Chava and Purnanandam 2011). Moreover, relatively richer countries with higher level of financial deepening and larger current

account imbalance suffers more. For example, evaluating dynamic adjustments following banking crises for 79 developed and emerging countries from 1973 to 2010, Teimouri and Dutta (2016) find that the banking credit declined significantly and stayed stagnated in the medium run; more importantly, they find that the investment and bank credit ratios declined more in advanced countries after the banking crisis. There is evidence that even in developing countries, where most MFIs operate a banking crisis is associated with contraction in deposit and thus less credits (Chipalkatti, Ramesha and Rishi, 2007). Further, banking crises are in general associated with higher unemployment, as well as lower labor force participation, trade, foreign direct investments, and domestic investment (Chodorow-Reich 2014).

Small and microfirms are especially vulnerable to availability of bank credit because as liquidity is sucked out of the financial system, they are most likely to experience credit rationing. There is evidence of "credit crunch effect," whereby financial/banking crisis results in increased lender risk aversion and reduced or tightened supply to small and medium enterprises or SME (Deyoung et al. 2015; Bonaccorsi di Patti and Sette 2016), as well as decrease in small firms access to credit (Popov and Udell 2012).

The global financial crisis of 2008 had worldwide implications with loss of bank profits (Sufian and Habibullah 2010), loss of profit in firms (Hippler and Hassan 2015), decrease in cross border lending (De Haas and Van Horen 2013) and contraction in deposit (Chipalkatti, Ramesha and Rishi 2007) especially in retail and savings banks (Puri, Rocholl and Steffen (2011). Some researcher argue that the global financial crisis could have had a little to no effect on some firm's welfare even if it affected banks (Ongena et al. 2003). This view is similar to some research on bank crises' suggesting that since during bank crises some banks capital positions strengthen, it improves small banks' probability of survival and capturing market share,

and this extra capital improves the performance of some banks (Berger and Bouwman 2013). In crisis period, banks with high-quality capital improve their competitive strength (De Haas and Van Horen 2013).

In the microfinance literature, the impact of banking crises is unknown while the role of the financial distress of 2008 has been studied. Specifically, Wagner and Winkler (2013) find that MIFs were vulnerable to the 2008-2009 global financial crisis, and that their credit growth drops sharply after 2008. Silva and Chávez (2015) find that, contrary to banks, MFIs in countries with better institutional quality (more advanced financial systems) are more resilient to the effect of the global financial crisis, and suggest that by creating an enabling environment for MFIs, governments play a crucial role in supporting MIFs' outreach and sustainability. Quayes (2015) bring to the attention the potential trade-offs between the two dimensions of MFIs performance - outreach and financial sustainability – especially in environment of financial distress. Wijesiri (2016) finds differences in the reaction of MFI productivity to the shock of the 2008 financial crisis related to MFI ownership type and organizational structure, with NGOs and cooperative least affected, while microfinance banks and microfinance non-bank financial institutions suffering the most during the crisis.

While the separate impact of banking crisis and financial crisis on firms and banks performance have been studied before, there is a lack of knowledge of how banking crisis combined with the global financial crisis affect the real economy and the financial firms, such as traditional bank, MFIs, and so on. An important finding by Wagner (2012) is that MFIs were more resilient to financial distress (crisis) compared to the traditional banks suggesting that there is a need to evaluate how MFIs react to financial distress because in time of distress the smallest firms are most vulnerable if unable to fund their operating and financing needs.

Our paper differs from previous work in several aspects. First, we study the impact of any bank crisis and compare those with results from the specific impact of banking crises that started after the global financial turmoil of 2008. In addition, unlike previous work we do not ignore the dual aspect of the MFI's goals – namely the fact that they seek both outreach and sustainability. This is important because the literature provides evidence for a trade-off between the outreach and the sustainability dimensions of MFIs' performance, suggesting that financial success may come at the expense of serving fewer and less poor clients or "mission drift" if MFIs focus on maintaining their financial results at the expense of their outreach to the poor. Several studies confirm the existence of the "mission drift" (Cull et al., 2007 & 2009; Augsburg and Fouillet, 2010; Armendariz and Szafarz, 2011; Hartarska et al., 2013; Quayes, 2015), while some suggest that financial sustainability and social outreach complement and reinforce each other (Gonzalez and Rosenberg, 2006; Schicks, 2007). Thus, we addresses the concern by evaluating how banking crises affect sustainability and outreach. Since there is evidence that a banking crisis may affect different MFI ownership types differently, we specifically focus on such possible

While a few papers have tried to explain various aspects of the post-2008 financial environment for MFIs and the institution' reaction, our contribution to the literature is that we are the first to study the impact of a banking crisis itself on MFIs and if these have been more devastating post the 2008 global financial crisis. We use a global Mixmarket dataset of over 621 MFIs with from over 118 countries for the period 2001-2011, complemented with data from 3 rounds of the World Bank survey of Central Banks. Since the global financial crisis and the banking crises are similar to a natural experiment, it can be considered exogenous to the MFIs, we use simple exogenous dummies in a Difference-in-Difference (DiD)-type. The goal is to

evaluate how breadth and depth of outreach, and financial sustainability were affected by a banking crisis and by a banking crisis after the global financial crisis.

2. Empirical Model

The aim of this paper is to estimate whether financial markets distress, realized as a banking crisis or the global financial crisis in 2008 affect the outreach and sustainability of MFIs. In addition, of interest is if a banking crises combined with consequences post the 2008 global financial crisis have a different effect on MFIs outreach and sustainability. This is a hypothesis because the significantly different post crisis environment is likely to affect the supply of funds available to MFIs to lend, but also the general economic slowdown has likely affected low-income clients' ability to generate income. Thus, it might have affected borrowers their ability to repay and thus bank's profits. Finally, in a financial markets turmoil, borrowers seeking the smallest loans are likely to be affected the most, because banks avoid smaller costlier/riskier borrowers.

While various empirical approaches are useful to evaluate whether a treatment (or an event) effects an outcome of interest, we employ a Difference-in-Differences - inspired framework. A banking crisis is not imposed as a controlled experiment, it occurs randomly from the perspective of an MFI in one country and not in another. Thus, MFIs find themselves randomly in a "treated" (with a banking crisis) or non-treated (without a banking crisis) country. For an MFI operating in a country banking crisis can be considered and exogenous "treatment" event. Similarly, MFIs operate in a country pre or post financial distress caused by the 2008 global financial crisis. There is no endogeneity of MFIs being in a country with a bank crisis or a global financial crisis. We use dummy variables to capture the effect of the two events affecting credit markets for small businesses and since the financial crisis is related to time, the resulting specification has a

Difference-in-Differences features. Specifically it is able to distinguish if banking crises have differential effect alone or if they are enhanced or weakened by the global financial crisis. We assume the treatment and control group have the same trend in the outcome pre- and post-treatment to control for the changes caused by existing different between those two groups.

Since MFIs have the dual objectives to reach poor borrowers while covering costs, we study the effect of the financial distress in credit markets events on the two aspects of performance *outreach* and *sustainability* by using three outcome measures. Outreach itself has two dimensions and we measure the *breadth* of outreach to poor borrowers by the number of active borrowers, and the *depth* of outreach, which is the poverty level of clients, by the average loan size scaled by the country NGI per person. Finally, we capture the impact on financial sustainability by the returns on assets ratio.

The empirical analysis of MFIs performance follows the microfinance literature and specifies the MFIs performance measures as a function of MFI specific, macroeconomic, institutional factors and regulatory framework (Hartarska and Nadolnyak 2007 & 2008; Hartarska 2005; Wagner & Winkler 2013). Since a banking crisis might have different effect pre- or post-financial markets distress (financial distress might have differential effect with and without a banking crisis), we include the interaction term of banking crisis and the global financial distress to estimate whether these is a different effect of a banking crisis combined with the post 2008 global financial crisis. Thus, following previous work we estimate:

$$Outreach_{ijt} = \beta_0 + \beta_1 Banking\ Crisis_{jt} + \beta_2 Financial\ Crisis_t + \beta_3 Banking\ Crisis \quad (1)$$
$$* Financial\ Crisis_t + (\beta_4 time\ since\ 2008) + \alpha' MFI_{ijt} + \beta' C_{jt}$$
$$+ \gamma' FS_{jt} + \varepsilon_i + \varepsilon_j + \varepsilon_t + u_{ijt}$$

$$Sustainability_{ijt} = \beta_0 + \beta_1 Banking\ Crisis_{jt} + \beta_2 Financial\ Crisis_t + \quad (2)$$

$$\beta_3 Banking\ Crisis * Financial\ Crisis_t + (\beta_4 time\ since\ 2008) + \alpha' MFI_{ijt} + \beta' C_{jt}$$

$$+ \gamma' FS_{jt} + \varepsilon_i + \varepsilon_j + \varepsilon_t + u_{ijt}$$

Here $Outreach_{ijt}$ is measured by the breadth of outreach (log of the number of active borrow (NAB)) and the depth of outreach (average loan balance per borrower / GNI per capita), where *i* denotes MFI, *j* stands for the country and *t* for time period. $\text{Sustainability}_{ijt}$ is measured by the Return on asset (ROA), with *i* denoting MFI, *j* denoting country, and *t* denoting time. $Financial\ Crisis_t$ is equal to 0 if time period if 2003 to 2007 (pre-crisis), 1 if MFI after 2008. $Banking\ Crisis_{jt}$[1] here is one if a country *j* had a banking crisis in year *t*. Following Silva and. Chavez (2015), the time since 2008 variable is defined as a non-negative number equals to current year minus 2008 and 0 if negative, and is included to capture the lagged effect of the global financial crisis on the performances of MFIs. The coefficient of particular interest here is $\beta_1 + \beta_3$ ($\beta_2 + \beta_3$) with positive and significant coefficient indicating that during the banking crisis (financial crisis) MFIs had a better performance (positive impact), compared to without banking crisis (financial crisis); and a negative and significant coefficient indicating that worsened MFIs performance, in relative to without banking crisis (financial crisis). MFI_{ijt} is a vector of MFIs institutions specific characteristics; MFIs characteristics (MFI age, ratio of capital to total asset, the total assets, ratio of saving to total assets, ratio of loans outstanding to total assets, portfolio-at-risk > 30 days, the type of MFIs and whether it is regulated by a government regulatory agency). C_{jt} includes macroeconomic country-specific variables (characteristics), such as inflation, the size

[1] A banking crisis is defined as systemic if two conditions are met: 1) Significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations); 2) Significant banking policy intervention measures in response to significant losses in the banking system (Laeven and Valenci, 2012). The financial crisis that originated in Unites Sates subprime mortgage market in 2008, quickly spread to Europe (Brunnermeier, 2009).

of the economy and control of corruption. FS_{jt} are the characteristics of the financial system. Finally, $\varepsilon_i,\ \varepsilon_j$ is the country "fixed effects," used to control for unobservable persistent country specific effects, u_{ijt} is the normally distributed random error term.

The variables of MFIs level are used to control analyze the factors affecting MFIs performance from the supply side. By contrast, macroeconomic country-specific variables and of the financial system could influence the MFIs performance from demand side (Igan & Pinheiro 2011; Wagner & Winkler 2013). The MFI leverage is defined by the ratio of capital to total asset. MFI size is measured by the logarithm of total asset, and age is measured a categorical variable defined by three group three categories- Mature, New and Young- according to difference between the inception and the year of data submitted by MFIs (Mix market 2017). We also include the measure of lending, saving, and risk exposure using the ratio of gross loan portfolio to total assets, ratio of deposits to total assets, and ratio of capital to total asset (Hartarska and Nadolnyak, 2008). MFI regulatory status or whether MFI is regulated by a government regulatory agency or not is also controlled for because performance may be affected by entry restrictions and /or some supervision (Hartarska and Nadolnyak 2008). MFI type is defined by 5 dummies - CU, NBFI, NGO, Other, and Rural Bank; and Bank usually serving as the reference group, while regional dummies are Eastern Europe and Central Asia (ECA), where all banking crises occurred or non- ECA as reference group.

Our country characteristics variables are inflation-average consumer price index (Wagner & Winkler 2013; Hartarska and Nadolnyak 2008), economy size (the logarithm of GDP) and control corruption (Hartarska and Nadolnyak 2008). Financial system characteristics variables, are supervisor tenure, independence of supervisory authority, external governance index, return

on assets of bank, and financial statement transparency to reflect the level of regulation of MFIs and its competitors, because these are likely to affect clients.

We cluster standard error at microfinance institutional level to solve the potential heteroscedasticity issues (Wagner & Winkler 2013; Hartarska and Nadolnyak 2007; Hausman Taylor estimates 1981). Since we use unbalanced panel data, there is no within variation difference of banking crisis for the specific MFIs. That is to say, banking crisis is not varying over time given MFI in our sample. Thus, we can only use the random effect model (rather than the fixed effect.

One hypothesis that we want to test is whether a banking crisis forces MFIs to curtail lending and thus serve fewer poor borrowers, or serve less poor borrowers. One the one hand, we expect that if MFIs operate like banks, this will be the case. On the other hand, if banks cut off access to loans for many borrowers some of these borrowers may end up as clients of microfinance institutions, especially microfinance banks therefore leading to a result when banking crises would be associated with higher breadth of outreach but possibly lower depth, that is MFis will have fewer but less poor clients. The results will be determined by the partial with respect to banking crisis or $\frac{\partial Outreach_{it}}{\partial Banking\ Crisis_{jt}} = \beta_1 + \beta_3 Post\ 2008_{ijt}$ and will vary depending on the value of Post 2008 dummy.

The second hypothesis that will be tested is whether MFI sustainability is affected by a banking crisis. Again, if MFIs are more like banks, some drop in ROA is expected. If MFIs clients are dependent on the unique access to loans through MFIs, then these clients are unlikely to change repayment patterns and MFIs' financial sustainability will be unaffected. Moreover, if some less poor borrowers lose access to bank loans and shift to getting microfinance loans, the profitability of MFIs may even improve. Indeed anecdotal evidence for the period prior to the

current study in late1990, it was observed that while lending quality in Russia deteriorated as a result of the 1998 default and crisis, the portfolio of banks that was devoted to microloans actually improved (references).

Finally, the impact of the 2008 financial crisis would be captured by the partial with respect to Post 2008 dummy or $\frac{\partial Outreach_{it}}{\partial Post\ 2008_{ijt}} = \beta_2 + \beta_3 Banking\ Crisis$. The marginal effect of Post 2008=$\beta_2 + \beta_3$ with a banking crisis and to β_2 in the absence of a financial crisis.

4. Data

MFI specific data for this study come from several sources. First, individual MFI data come from MIX MARKET information platform (www.mixmarket.org). The banking crisis data are from Laeven and Valencia (2013) and contain information for a period up to and including 2011. A banking crisis is defined as situation characterizes by banks run, significant losses in the banking system, and/ or bank liquidations. Analysis of the data reveals that all of the banking crisis recorded during the study period were in Eastern Europe and Central Asia, with 2 countries Russia and Kazakhstan in our sample, and two of them had a banking crisis after 2008 (Russia and Kazakhstan). Only Russia has had banking crises before the global financial crisis with 66 annual observations in total. That is to say, there are two countries with fully fledged banking crisis – Russia in both pre and the post-global financial crisis period and Kazakhstan after the global financial crisis. Moreover, unlike previous financial crises, the 2008 US financial crisis and the banking crisis affected mostly advanced economies. However, since our data is unbalanced data, there is no within variation difference of banking crisis for the specific MFIs, that is to say, banking crisis is not varying over time given MFI in our sample.

The rest of the data comes from several rounds of World Bank sponsored survey of central banks (see Barth, Caprio and Levine, 2013). It includes measure of the return-to-assets

for the banking system to measure opportunity costs to microfinance activities as well as an index of the independence of the supervisory body to measure the stringency of banking regulations within a country. Table 1 presents the definitions of dependent and independent variables.

The overall dataset is for the period of 1999-2011 and contains information for 621 MFIs from 118 countries, which result in about 2,192 individual annual MFI observations.[2] Summary statistics by groups of MFIs operating in countries with and without banking crisis are presented in Table 2. There are statistically significant differences in means between pre-global financial crisis and post- global financial crisis in terms of the depth and breadth of outreach (log NAB and depth), but no significant difference for the financial outcome - return on assets.

5. Empirical Results

Table 3 presents the estimation of impact of banking crises and the global financial crisis on MFIs breadth and depth of outreach (models 1 and 2) and sustainability (model 3). Our variables of interest are β_1, β_2, β_3, $\beta_1 + \beta_3$ and $\beta_2 + \beta_3$, which is a proxy of banking crisis effect pre- and post-global financial distress, and the global financial crisis impact on MFI performance with and without banking crisis, holding ceteris paribus. The chow tests (a joint F test) was used to test for $\beta_1 + \beta_3$ and $\beta_2 + \beta_3$, implying whether banking crisis have significant effect on MFI performance post-2008, and whether the global financial distress have the significant effect with banking crisis, compared to without banking crisis.

The results in Columns 1 show that banking crisis have a negative effect on breadth of outreach with MFIs in countries with banking crises on average reaching 1.4 percent fewer

[2] Only observations with at least three stars for quality of reporting are used.

borrowers *ceteris paribus* during the period of pre-2008. The interaction term of banking crisis and global financial distress show a significant and negative effect and suggest that pst 2008 this effect was about 3 percent fewer borrowers being reached. Thus these results suggest that the global financial crisis is strengthening the impact of financial crisis in that even fewer poor borrowers are being reached by MFIs. At the same time, Columns 2 show banking crisis has no effect on depth of MFIs pre-2008, but that the global financial distress is on average associated with MFIs reaching poorer borrowers after 2008 (coefficient -0.035). Chow tests show confirm that there is no banking crisis effect after post 2008 on depth, neither the global financial distress with banking crisis in relative to banking crisis.

In terms of financial sustainability (ROA), the coefficient on the banking crisis estimate is positive and statistically significant suggesting that MFIs in countries with a banking crisis had on average ROA that was 0.059 points higher. Taken together these results seem to suggest that better clients switched to MFI from Banks. This is consistent with finding by Deyoung et al. (2015), Puri, Rocholl and Steffen (2011), and Montoriol-Garriga and Wang (2011) that small firm are rationed as the liquidity is sucked out of the banking system, and high quality borrowers are excluded from the banking credit market. Such borrowers could have found their way in microfinance institutions.

The direct impact of the financial distress attributable to the 2008 financial crisis is only on MFIs' sustainability. The ROA in MFIs after the global financial is 1.6% -1.8% lower relative to the period of pre-2008. Thus, we can conclude that a banking crisis itself induces MFIs to cut back the number of active borrowers, but does not affect the depth of outreach and financial sustainability of MFIs. Banking crises only affect the breadth of outreach and this negative effect is doubled by the global financial distress (from -1.374 to -1.347+ (-1.672) or over 3 %)

Turning MFI specific characteristics, we first observe that relative to mature MFIs, MFis classified as young and newly established have lower outreach and worse sustainability. This is consistent with previous work by Vanroose and D'Espallier (2013) and Hartarska and Nadolnyak (2007). Sustainability is unaffected by MFI size, but size has a significant and positive effect on the breadth and depth of outreach, which is consistent with Silva and Chavez's (2015). The results also show that more leveraged MFIs have lower breadth of outreach (coefficient is -2.947) and better financial sustainability (coefficient is 0.049). The ratio of saving to assets is negative in the breadth of outreach model, suggesting that savings collecting MFI serve more borrowers, but it does not affect sustainability nor the depth of outreach. The ratio of gross portfolio to total assets measuring MFIs' commitment to lending is positively associated with all three performance indicators. Risk, measured by the portfolio at risk 30 days or longer is associated with lower level of breadth of outreach but as expected, poored borrowers who are as poorer borrowers are typically riskier. Unsurprisingly, regulated MFIs tend to serve less poor borrowers as indicated by the positive and significant coefficient of 0.088. The legal status of MFI matters, because relative to MFIs organized as banks (our comparison group), all other types of MFIs reach fewer but poorer borrowers, while credit unions and NGOs also have significantly lower financial sustainability (coefficients -0.041 and -0.068 respectively.

Regarding the impact of macroeconomic factors, we find that MFIs in larger economies reach more borrowers as indicated by the positive and significant coefficient of 0.058 suggesting that one percent increase in the country GDP is associated with 0.058 percent more borrowers reached. This variable however does not affect depth of outreach nor financial sustainability. Interestingly, MFIs in countries with higher level of inflation reach more borrowers and have better sustainability, possibly because MFI might develop more safeguard in higher inflation

environment. Also interestingly, MFIs in countries with higher level of corruption index seem to reach higher depth of outreach (negative coefficient of 0.093).

In terms of financial system characteristics variables, MFIs in countries with higher returns in the banking sector do not reach more borrowers but have better sustainability and reach less poor borrowers. The transparency of the financial system in a country is unrelated to MFIs breadth of outreach or financial sustainability, but MFIs in more transparent financial system seem to reach poorer borrowers. Because MFIs have different ownership and capital structures, financial service technologies, and different efficiency levels relative to traditional banking, MFIs are more resilient to the banking crisis and less influenced by the financial environment (Wijesiri 2016). Silva and Chavez (2015) also find that a more developed financial system results in a more constrained ability for MFIs to increase their loan size, since credit market development has a negative effect on pertaining self-sufficiency, but there exists no effect of financial transparency on NAB's growth. The depth of the financial system (measured by the ratio of M2 to GDP) is positive in the breadth of outreach equation and negative in the depth of outreach equation thus suggesting better breadth and depth of outreach. It also seems that MFIs and banks have somewhat complementary role since MFIs in countries with more commercial bank branches per 100,000 adults have better breadth of outreach.

6. Robustness Checks

MFIs in various regions of the world regions have different legal status and likely have different outreach and sustainability (Wijesiri 2016). That is why to check the robustness of our results, we estimate models for MFIs operating in the only region with banking crises – ECA, as well as models by MFI type - bank, NBFI, CU and NGO. Table 4 shows the estimates of MFI outreach and financial sustainability in ECA. Tables 5-7 present the estimates of MFI by the samples of MFI type (Bank, CU, NBFI, and NGO) for breadth of outreach (with log of number of active

borrowers as the dependent variable), depth of outreach (with average loan size scaled by the GNI per capita as the dependent variable), and sustainability (with ROA as the dependent variable).

Table 4, presenting the results from ECA region, the only where countries have had a banking crisis during the sample period, shows that a banking crisis pre-2008 had a direct positive effect on breadth of outreach. While this is contrary to the overall results it is consistent with other findings such as Wagner (2012) and Di Bella and Gabriel (2011) who demonstrate that MFIs in ECA recorded the strongest credit growth before the global financial crisis, and were most affected by the 2008 global financial crisis compared with other regions. Indeed, the negative significant coefficient on the interactive dummy (financial crisis time banking crisis) in the breadth of outreach equation confirms this interpretation. Moreover, the finical crisis has a direct negative effect on sustainability of MFIs (coefficient of -0.65). The interaction term of banking crisis and financial crisis results in 1.51 % decrease of the number of active borrower, which is lower than the impact (1.672%) for MFI from all over the world, again confirming that MFIs in ECA were are more resilient to the global financial crisis than other regions (Wagner 2012; Di Bella 2011). In all cases, as the effects of the financial distress post 2008 was decreasing for outreach and sustainability.

The coefficients on the control variables are largely consistent with the previous estimation. Our previous results show that financial statement transparency is associated with improved depth of outreach without affecting the breadth of outreach and financial sustainability while in ECA region, it is associated only with improved breadth of outreach.

Since MFIs with different legal status using different technologies result in different efficiency levels (Wijesiri 2016; Sevin et al. 2012), a banking crisis may affect the NGOs,

NBFIs and Credit Unions differently. Similarly, the financial systems of countries of various regions and level of economic development were affected differentially by the global financial troubles and banking crisis following 2008. Thus, we split the sample data along the lines of MFI legal status, and report the impact of banking crisis and global financial crisis on outreach of MFIs and financial sustainability across Bank, CU, NBFI, and NGO in Tables 5-7. The main results are consistent with our previous results. They show that breadth of outreach in NBFI MFIs and NGOs are most negatively affected by a banking crises, and that that effect is enhanced by the financial distress of 2008 in NBFIs. We find that only NGO MFIs have worse depth of outreach resulting directly by a banking crisis but that effect is somewhat softened after the 2008 financial crisis. We find that banking crises have no direct effect on sustainability by MFI type, while only in MFIs organized as banks, a banking crises post 2008 resulted in an improvement in sustainability.

7. Conclusion

In this manuscript we evaluate if MFIs are able to meet their outreach and sustainability goals when a banking crisis disrupts the banking system of a country. Since our study period includes another major financial and credit market event, we pay a special attention to the effects of banking crises pre- and post-2008, when a much broader financial crisis affected the financial systems of developed and developing countries alike. We analyze dataset of over 2000 annual observation for MFIs from over 60 countries for the period of 2001-2011. Our results indicate that *ceretuis paribus* MFIs in countries with a banking crisis served fewer borrowers, and have better financial sustainability. Moreover, we find that in the post 2008 environment, the global financial crisis has led MFIs to cut even more their outreach without effect on financial sustainability. Specifically, MFIs in countries with a banking crisis reached 1.373% fewer

borrowers pre-2008 and that outreach decrease to 3 percent fewer borrowers after the 2008 global financial distress. These results support previous finding of a tradeoff between outreach and sustainability in that we find that while in the pre-2008 financial crisis a banking crisis was associated with improved financial results. Microfinance banks were the most affected compared to other business types. The results overall are consistent with the view that commercial banks might have curtailed lending to smaller businesses, some of whom might have found credit through microfinance institutions, especially microfinance banks. Thus, while not all banking crisis are the same, a banking crisis combined with additional financial markets distress is clearly associated with fewer borrowers being served by the microfinance industry even it not at the expense of these institutions financial sustainability.

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Table 1. Variable Definitions

Dependent variables	
ret_assets	Return on assets; measures how well the MFI uses its total assets to generate returns
ln_borrow	Logarithm of the number of current borrowers, that is the number of individuals that currently have an outstanding loan balance with the MFI or are responsible for repaying any portion of the gross loan Portfolio.
depth	Average loan balance per borrower / GNI per capita
Independent variables	
MIF characteristics variables	
Banking Crisis*Financial crisis	A dummy that equals one if MFI suffers from the global financial crisis
Banking Crisis	A dummy that equals one if the country suffers banking crisis
Financial crisis	A dummy that equals one if year>2007
Time since 2008	A non-negative number equals current year-2008, 0 if negative
cap_asset	Ratio of capital to total assets
age	categorized by the number of years since inception:
New	A dummy that equals one if MIF is New
Young	A dummy that equals one if MIF is Young
size	The total assets of the MFI ($ 100 million). Total assets include all assets net of contra asset accounts such as the loan loss reserve and accumulated depreciation
dep_totasset	Ratio of saving to total assets
glp_totasset	Ratio of loans outstanding to total assets
port_risk30	Portfolio-at-risk > 30 days
english	Legal origin_English
regulated	A dummy that equals one if MIF is regulated by a government regulatory agency
CU	A dummy that equals one if MIF is CU
NBFI	A dummy that equals one if MIF is NBFI
NGO	A dummy that equals one if MIF is NGO
Other	A dummy that equals one if MIF Other
Rural_Bank	A dummy that equals one if MIF is Rural Bank
EECA	A dummy that equals one if MIF is from Eastern Europe and Central Asia
Country characteristics variables	
acpi	Average annualized consumer price index
gdp	Logarithm of the total GDP ($100 billion)
cc	Control Corruption
Financial system characteristics variables	
roa	Return on assets of bank
financialtransparency	financial statement transparency
Money and quasi money (M2) as % of GDP	M2/GDP
Commercial bank branches e	Commercial bank branches per 100K adults

Table 2. Statistics summary

VARIABLES	N	mean	N	mean	N	mean	diff
	Total	Total	No global fin. crisi		Global fin.l crisis		
Borrow (10 million)	2,192	1.97	2,147	2	45	0.648	1.35**
		(5.84)		(5.90)		(1.33)	(0.880)
ret_assets (%)	2,269	1.096	2,206	1.09	63	1.309	-0.219
		(11.256)		(11.350)		(7.279)	(1.439)
depth	2,442	0.362	2,379	0.356	63	0.59	-0.234***
		(0.519)		(0.503)		(0.890)	(0.066)
dcrisis	2,192	0.0506	2,147	0.0307	45	1	-0.969***
		(0.219)		(0.173)		(0)	(0.026)
cap_asset	2,192	0.305	2,147	0.306	45	0.286	0.020
		(0.255)		(0.255)		(0.222)	(-0.038)
age					45	1.512	-0.377***
						(0.808)	(0.121)
new	2,192	0.101	2,147	0.102	45	0.067	NA
		(0.302)		(0.303)		(0.252)	
young	2,192	0.198	2,147	0.194	45	0.4	NA
		(0.399)		(0.396)		(0.495)	
size	2,192	0.506	2,147	0.513	45	0.15	0.363*
		(1.524)		(1.539)		(0.26)	(0.230)
dep_totasset	2,192	0.164	2,147	0.162	45	0.249	-0.087**
		(0.259)		(0.257)		(0.335)	(0.039)
glp_totasset	2,192	0.775	2,147	0.776	45	0.767	0.009
		(0.162)		(0.162)		(0.138)	(0.024)
port_risk30	2,192	6.689	2,147	6.661	45	8.024	-0.014
		(13.252)		(13.183)		(16.338)	(0.020)
english	2,192	0.3	2,147	0.306	45	0	0.306***
		(0.458)		(0.461)		(0)	(0.069)
regulated	2,192	56.2%	2,147	55.5%	45	88.9%	-0.334***
		(0.496)		(0.497)		(0.318)	(0.074)
legal status							
CU	2,192	9.4%	2,147	8.8%	45	40%	-0.312***
		(0.292)		(0.283)		(0.495)	(0.044)
NBFI	2,192	44.6%	2,148	44.5%	45	51.1%	-0.0663
		(0.497)		(0.497)		(0.506)	(0.075)
NGO	2,192	36.8%	2,149	37.4%	45	4.4%	0.330***
		(0.482)		(0.484)		(0.208)	(0.072)
Other	2,192	0.3%	2,150	0.3%	-	-	0.003
		(0.056)		(0.057)			(0.009)

Rural_Bank	2,192	3.9%	2,151	4%	-	-	0.040*
		(0.193)		(0.195)			(0.029)
EECA	2,192	15.3%	2,147	13.6%	45	1	-0.864***
		(0.36)		(0.342)		(0)	(0.051)
acpi	2,192	122.7	2,147	121.9	45	160.6	-38.777***
		(22.05)		(21.49)		(13.41)	(3.217)
gdp	2,192	5.373	2,147	5.265	45	10.52	-5.259***
		(6.594)		(6.516)		(8.167)	(0.987)
cc	2,192	-0.415	2,147	-0.403	45	-1.013	0.610
		(0.285)		(0.274)		(0.092)	(.041***)
Banking roa	2,192	1.386	2,147	1.664	45	-11.91	13.574***
		(3.897)		(0.991)		(22.89)	(0.510)
financialtransparency	2,192	4.879	2,147	4.885	45	4.578	0.308**
		(1.057)		(1.06)		(0.499)	(0.159)

Note: Std. Dev. in parentheses

Table 3. Estimates of MFI outreach and financial sustainability

VARIABLES	(1) Breadth of outreach	(2) Depth of outreach	(3) Sustainability
Banking_crisis	-1.374**	-0.066	0.059*
	(0.619)	(0.345)	(0.030)
Financial_crisis	0.025	-0.035**	-0.018***
	(0.068)	(0.017)	(0.007)
Banking_crisis*Financial_crisis	-1.672***	-0.108	-0.014
	(0.277)	(0.194)	(0.017)
t_since_2008	-0.151***	0.021	-0.005
	(0.037)	(0.014)	(0.004)
MIF characteristics variables			
cap_asset	-2.947***	0.078	0.049*
	(0.507)	(0.067)	(0.028)
l_size	0.193***	0.024***	0.000
	(0.043)	(0.008)	(0.001)
New	-0.925***	0.068	-0.046***
	(0.127)	(0.044)	(0.016)
Young	-0.213**	0.007	0.003
	(0.086)	(0.018)	(0.006)
dep_totasset	-2.864***	0.050	0.001
	(0.300)	(0.102)	(0.017)
glp_totasset	0.762***	0.090*	0.138***
	(0.252)	(0.053)	(0.024)
english	-4.383***	0.585***	0.070
	(0.616)	(0.220)	(0.071)
port_risk30	-0.405**	-0.025*	-0.026
	(0.159)	(0.015)	(0.018)
regulated	0.251	0.088*	-0.011
	(0.176)	(0.047)	(0.009)
Credit Union / Cooperative	-3.108***	-0.493***	-0.041*
	(0.398)	(0.184)	(0.023)
NBFI	-1.953***	-0.373**	-0.040
	(0.323)	(0.158)	(0.025)
NGO	-3.384***	-0.531***	-0.069**
	(0.371)	(0.163)	(0.028)
Other	-3.314***	-0.345*	-0.042
	(0.584)	(0.179)	(0.035)
Rural Bank	-2.650***	-0.373**	-0.013
	(0.458)	(0.182)	(0.028)
EECA	0.533	1.162***	0.033
	(0.563)	(0.280)	(0.035)
Country characteristics variables			
Average Consumer Price Index	0.017***	-0.000	0.001*
	(0.004)	(0.001)	(0.000)
l_gdp	0.058***	-0.000	-0.000
	(0.019)	(0.005)	(0.002)
Control Corruption	-0.093	-0.093*	0.043

	(0.258)	(0.055)	(0.027)
Return on Assets	0.007	0.004**	0.001**
	(0.006)	(0.002)	(0.001)
Financial Statement Transparency	-0.016	-0.027**	0.002
	(0.048)	(0.013)	(0.003)
Money and quasi money (M2) as % of GDP	0.035***	-0.003*	-0.000
	(0.006)	(0.002)	(0.001)
Commercial bank branches per 100K adults	0.011***	0.001	-0.000
	(0.004)	(0.001)	(0.000)
Constant	13.722***	0.137	-0.174***
	(0.628)	(0.121)	(0.049)
Observations	2,053	2,272	2,131
Number of id	617	684	652
country fixed effect	Yes	Yes	Yes
r2_o	0.546	0.362	0.266

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, mature s the reference for age, bank as the reference group for legal status.

Table 4. Estimates of MFI outreach and financial sustainability in ECA

VARIABLES	(1) Breadth of outreach	(2) Depth of outreach	(3) Sustainability
Banking_crisis	3.940*	1.215	-0.071
	(2.240)	(1.539)	(0.302)
Financial_crisis	0.192	-0.178	-0.065***
	(0.225)	(0.139)	(0.016)
Banking_crisis*Financial_crisis	-1.510***	-0.203	-0.068
	(0.455)	(0.461)	(0.044)
t_since_2008	-0.326***	0.000	-0.024***
	(0.065)	(0.058)	(0.009)
MIF characteristics variables			
cap_asset	-3.462***	0.485	0.025
	(0.319)	(0.378)	(0.021)
l_size	0.135**	0.049*	0.002
	(0.062)	(0.028)	(0.002)
New	-0.712***	0.413	-0.025
	(0.210)	(0.271)	(0.017)
Young	-0.237*	0.019	0.007
	(0.129)	(0.063)	(0.008)
dep_totasset	-2.537***	-0.477	-0.021
	(0.317)	(0.387)	(0.014)
glp_totasset	-0.093	0.338	0.026
	(0.695)	(0.341)	(0.029)
port_risk30	-0.260	-0.596	-0.170**
	(0.747)	(0.709)	(0.070)
regulated	0.716***	0.157	-0.003
	(0.277)	(0.161)	(0.017)
Credit Union / Cooperative	-4.332***	-0.854*	0.039**
	(0.532)	(0.500)	(0.017)
NBFI	-2.546***	-0.832*	0.005
	(0.466)	(0.435)	(0.017)
NGO	-2.625***	-1.256***	0.034
	(0.565)	(0.469)	(0.032)
Country characteristics variables			
Average Consumer Price Index	0.017	0.005	0.005***
	(0.011)	(0.010)	(0.001)
l_gdp	0.027	0.018	-0.007*
	(0.064)	(0.018)	(0.004)
Control Corruption	2.194***	0.580	0.143
	(0.726)	(0.600)	(0.092)
Financial system characteristics variables			
Return on Assets	0.001	0.004	0.001
	(0.006)	(0.002)	(0.000)
financialtransparency	0.245**	0.004	0.010
	(0.105)	(0.041)	(0.007)

Money and quasi money (M2) as % of GDP	0.046**	-0.009	-0.002
	(0.023)	(0.015)	(0.001)
Commercial bank branches per 100K adults	0.015	0.020	-0.004
	(0.034)	(0.020)	(0.005)
Constant	11.313***	-0.431	-0.085
	(2.556)	(1.644)	(0.337)
Observations	321	388	373
Number of id	117	138	133
country fixed effect	Yes	Yes	Yes
r2_overall	0.782	0.317	0.278

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, mature s the reference for age, bank as the reference group for legal status.

Table 5. Estimates of MFI NAB across different legal status

VARIABLES	(2) Bank	(4) CU	(6) NBFI	(8) NGO
	NAB	NAB	NAB	NAB
Banking_crisis	-0.320	-2.253	-1.384*	-1.969**
	(1.193)	(1.780)	(0.797)	(0.776)
Financial_crisis	0.268	-0.037	0.105	-0.187**
	(0.296)	(0.360)	(0.088)	(0.095)
Banking_crisis*Financial_crisis	-0.512	-0.898	-1.163***	0.572
	(0.771)	(0.615)	(0.353)	(0.786)
t_since_2008	-0.171	-0.151	-0.157***	-0.211***
	(0.131)	(0.146)	(0.055)	(0.061)
MIF characteristics variables				
cap_asset	-4.304**	-3.038***	-3.661***	-1.904**
	(1.865)	(0.599)	(0.534)	(0.745)
l_size	0.236***	0.533***	0.309***	0.697***
	(0.037)	(0.169)	(0.046)	(0.243)
New	-1.011***	-0.832*	-1.076***	-0.768***
	(0.332)	(0.436)	(0.149)	(0.274)
Young	-0.350	-0.092	-0.449***	0.043
	(0.827)	(0.343)	(0.091)	(0.154)
dep_totasset	-4.274***	-2.933***	-2.786***	-2.143**
	(0.885)	(0.433)	(0.650)	(0.859)
glp_totasset	0.669	0.158	1.023***	0.399
	(0.992)	(0.796)	(0.389)	(0.351)
english	-2.862***		-2.781***	1.347**
	(0.868)		(0.599)	(0.603)
port_risk30	4.325*	-0.724*	-0.360**	-0.587*
	(2.219)	(0.438)	(0.171)	(0.307)
regulated		0.127	0.804***	-0.413
		(0.353)	(0.310)	(0.280)
EECA	0.615	14.666***	1.572	4.082***
	(0.988)	(2.572)	(1.038)	(1.260)
Country characteristics variables				
Average Consumer Price Index	0.006	0.011	0.011*	0.024***
	(0.010)	(0.028)	(0.006)	(0.005)
l_gdp	-0.012	-0.027	0.144***	0.017
	(0.057)	(0.090)	(0.029)	(0.028)
Control Corruption	0.547	-0.344	0.587	-0.369
	(1.061)	(1.489)	(0.398)	(0.368)
Financial system characteristics variables				
Return on Assets	-0.148	0.112	0.003	0.015**
	(0.150)	(0.181)	(0.007)	(0.007)
Financial Statement Transparency	0.229	0.027	-0.029	-0.113
	(0.169)	(0.157)	(0.066)	(0.072)
Money and quasi money (M2) as % of GDP	0.026	0.006	0.023***	0.040***
	(0.032)	(0.025)	(0.008)	(0.010)

Commercial bank branches per 100K adults	-0.047**	0.016	0.004	0.029***
	(0.019)	(0.014)	(0.005)	(0.007)
Constant	18.011***		11.472***	7.943***
	(1.930)		(1.189)	(2.010)
Observations	96	196	926	749
Number of id	28	84	253	210
country fixed effect	Yes	Yes	Yes	Yes
r2_overall	0.890	0.654	0.599	0.449

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, mature s the reference for age, bank as the reference group for legal status.

Table 6. Estimates of MFI depth across different legal status

VARIABLES	(2) Bank	(4) CU	(6) NBFI	(8) NGO
	Depth	Depth	Depth	Depth
Banking_crisis	0.168	-0.079	0.229	0.752**
	(0.744)	(0.414)	(0.787)	(0.338)
Financial_crisis	0.170	-0.036	-0.027	-0.026**
	(0.206)	(0.036)	(0.039)	(0.012)
Banking_crisis#1.Financial_crisis	-0.140	0.088	-0.534	-0.113*
	(0.557)	(0.108)	(0.866)	(0.061)
t_since_2008	0.226***	0.009	0.006	0.008
	(0.087)	(0.022)	(0.028)	(0.006)
MIF characteristics variables				
cap_asset	-1.134**	0.053	0.214*	0.031
	(0.548)	(0.142)	(0.118)	(0.029)
l_size	0.096***	0.071***	0.009*	0.041***
	(0.023)	(0.019)	(0.005)	(0.008)
New	1.730***	0.068	0.088	-0.013
	(0.432)	(0.094)	(0.066)	(0.016)
Young	1.241***	0.037	-0.015	-0.007
	(0.428)	(0.060)	(0.043)	(0.014)
dep_totasset	0.522	-0.002	0.401***	0.011
	(0.493)	(0.084)	(0.153)	(0.072)
glp_totasset	2.416***	0.156	0.047	0.030
	(0.675)	(0.137)	(0.086)	(0.037)
english	0.183	-0.220	1.159**	-0.367***
	(0.407)	(0.330)	(0.512)	(0.052)
port_risk30	1.497	0.005	-0.042	-0.000
	(1.220)	(0.150)	(0.037)	(0.043)
regulated	1.246	0.174	0.150	0.034**
	(1.033)	(0.121)	(0.122)	(0.017)
EECA	1.311**	-0.454*	1.433***	-0.447***
	(0.590)	(0.255)	(0.441)	(0.074)
Country characteristics variables				
Average Consumer Price Index	-0.011*	-0.002	-0.002	-0.000
	(0.006)	(0.002)	(0.002)	(0.001)
l_gdp	0.002	0.016	0.027**	-0.004
	(0.052)	(0.011)	(0.012)	(0.002)
Control Corruption	-0.255	-0.089	-0.081	-0.067*
	(0.580)	(0.172)	(0.146)	(0.035)
Return on Assets	-0.038	0.065*	0.004	0.001
	(0.098)	(0.038)	(0.002)	(0.001)
Financial Statement Transparency	-0.247*	-0.013	-0.057*	-0.004
	(0.136)	(0.020)	(0.034)	(0.007)
Money and quasi money (M2) % GDP	-0.023*	-0.003	-0.008**	0.001
	(0.012)	(0.004)	(0.004)	(0.001)
bank branches per 100K adults	-0.034***	0.004	0.004	0.001
	(0.011)	(0.003)	(0.002)	(0.001)

Constant		0.777*		0.572***
		(0.465)		(0.141)
Observations	101	266	971	815
Number of id	29	108	271	221
country fixed effect		Yes		Yes
r2_overall	0.885	0.194	0.398	0.404

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, mature s the reference for age, bank as the reference group for legal status.

Table 7. Estimates of MFI financial sustainability across different legal status

VARIABLES	(2) Bank	(4) CU	(6) NBFI	(8) NGO
	ROA	ROA	ROA	ROA
Banking_crisis	0.046	-0.043	0.060	0.013
	(0.086)	(0.108)	(0.061)	(0.048)
Financial_crisis	-0.028*	0.021	-0.021**	-0.029**
	(0.016)	(0.014)	(0.010)	(0.015)
Banking_crisis*Financial_crisis	0.148***	-0.000	0.016	0.037
	(0.046)	(0.034)	(0.029)	(0.030)
t_since_2008	-0.009	-0.001	-0.004	-0.007
	(0.008)	(0.010)	(0.003)	(0.011)
MIF characteristics variables				
cap_asset	0.262**	-0.021	0.082	0.060**
	(0.124)	(0.039)	(0.050)	(0.029)
l_size	0.006***	-0.009	0.004	-0.000
	(0.002)	(0.006)	(0.003)	(0.007)
New	-0.093***	0.011	-0.040**	-0.085
	(0.020)	(0.020)	(0.018)	(0.052)
Young	0.026	-0.007	0.011	-0.013
	(0.025)	(0.011)	(0.007)	(0.012)
dep_totasset	-0.003	0.001	0.020	-0.080
	(0.064)	(0.018)	(0.031)	(0.064)
glp_totasset	0.207***	0.009	0.169***	0.142***
	(0.071)	(0.033)	(0.047)	(0.029)
english	0.047		0.114**	0.027
	(0.050)		(0.055)	(0.115)
port_risk30	0.180	-0.052**	-0.066	-0.104***
	(0.139)	(0.023)	(0.051)	(0.029)
regulated		0.010	-0.012	-0.013
		(0.018)	(0.014)	(0.013)
EECA	-0.096*		0.249**	-0.220***
	(0.056)		(0.112)	(0.083)
Country characteristics variables				
Average Consumer Price Index	0.000	-0.001	0.001	0.001
	(0.000)	(0.001)	(0.000)	(0.001)
l_gdp	-0.003	0.006*	-0.004	0.003
	(0.003)	(0.004)	(0.003)	(0.002)
Control Corruption	0.129**	-0.011	0.056	-0.010
	(0.058)	(0.091)	(0.049)	(0.034)
Financial system characteristics variables				
Return on Assets	-0.014	0.022	0.001*	0.005
	(0.010)	(0.015)	(0.001)	(0.005)
Financial Statement Transparency	-0.011	0.009	0.000	0.006
	(0.015)	(0.006)	(0.004)	(0.007)
Money and quasi money (M2) as % of GDP	0.001	0.001	0.002**	-0.001*
	(0.002)	(0.001)	(0.001)	(0.001)

Commercial bank branches per 100K adults	-0.001	0.000	-0.001**	0.000
	(0.001)	(0.001)	(0.000)	(0.001)
Constant	-0.029		-0.493***	
	(0.089)		(0.160)	
Observations	99	242	924	773
Number of id	27	98	260	218
country fixed effect	Yes	Yes	Yes	Yes
r2_o	0.812	0.143	0.205	0.493

Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, mature s the reference for age, bank as the reference group for legal status.

Table 11. F test

	without NAB	with time since NAB	without Depth	with time since Depth	without ROA	with time since ROA	without	with time since
b1+b3=0	-2.626***	-3.047***	-0.235	-0.174	0.056	0.045		
b2+b3=0	-1.536***	-1.648***	-0.159	-0.143	-0.029*	-0.032*		
EECA								
b1+b3=0	-3.115**	2.430	-1.678***	1.012	0.229	-0.139		
b2+b3=0	-0.940*	-1.318***	-0.381	-0.382	-0.105***	-0.132***		
NAB	Bank	Bank	CU	CU	NBFI	NBFI	NGO	NGO
b1+b3=0	-1.146	-0.832	-2.995*	-3.151**	-2.151**	-2.547***	-0.030	-1.398
b2+b3=0	-0.181	-0.244	-0.819	-0.935	-0.913**	-1.058***	0.471	0.385
Depth	Bank	Bank	CU	CU	NBFI	NBFI	NGO	NGO
b1+b3=0	0.372	0.029	-2.830***	0.008	-0.323	-0.306	0.627**	0.639**
b2+b3=0	-0.050	0.031	0.047	0.052	-0.567	-0.561	-0.144**	-0.139**
ROA	Bank	Bank	CU	CU	NBFI	NBFI	NGO	NGO
b1+b3=0	0.180*	0.193**	-0.058	-0.087	0.086	0.076	0.063	0.050
b2+b3=0	0.122***	0.120***	0.021	0.021	-0.003	-0.005	0.015	0.008