Title: Microfinance institutions and the bank lending channel in Asia and Latin America

Authors: Sergio Sanfilippo-Azofra, Begoña Torre-Olmo, María Cantero-Saiz

PII: S1049-0078(18)30196-9
DOI: https://doi.org/10.1016/j.asieco.2019.06.001
Reference: ASIECO 1125

To appear in: *ASIECO*

Received date: 5 September 2018
Revised date: 12 April 2019
Accepted date: 6 June 2019

Please cite this article as: Sanfilippo-Azofra S, Torre-Olmo B, Cantero-Saiz M, Microfinance institutions and the bank lending channel in Asia and Latin America, *Journal of Asian Economics* (2019), https://doi.org/10.1016/j.asieco.2019.06.001

MICROFINANCE INSTITUTIONS AND THE BANK LENDING CHANNEL IN ASIA AND LATIN AMERICA

Sergio Sanfilippo-Azofra[1]
University of Cantabria, Business Administration Faculty, Spain

Begoña Torre-Olmo
University of Cantabria, Business Administration Faculty, Spain

María Cantero-Saiz
University of Cantabria, Business Administration Faculty, Spain

[1]**Corresponding autor:** Sergio Sanfilippo-Azofra.
E-mail addresses: sanfilis@unican.es (S. Sanfilippo-Azofra), torreb@unican.es (B. Torre-Olmo), maria.cantero@unican.es (M. Cantero-Saiz). **Address:** University of Cantabria, Business Administration Faculty, Avd. Los Castros S/N, Santander 39005, Cantabria, Spain.

Abstract

The objective of this article is to analyse the effect of the bank lending channel of monetary policy on microfinance institutions (MFIs), which play an important role in the financial systems of many developing countries. Using a sample of 262 microfinance institutions from 18 developing countries from Asia and Latin America for the period 2004 to 2014, we find that microfinance institutions in the aggregate do not alter their loan supply after a monetary policy shift. Indeed, MFIs established as non-governmental or not-for-profit organizations respond in a direction contrary to that expected, lending more under a monetary tightening or less under a monetary expansion. Our results also show relevant differences between Asia and Latin America. MFIs in Asia tend to increase lending under a monetary tightening, but MFIs in Latin America show no change in lending.

Key words: monetary policy; bank lending channel; microfinance.

JEL classification: E44, E52, G21.

1. Introduction

A great number of studies have tried to disentangle the role played by financial institutions in the transmission mechanism of monetary policy, as they are a key element in this process. In this regard, the bank lending channel of monetary policy has been a recurrent topic in the recent monetary policy literature.[1] This channel operates through the effect of monetary policy on bank access to loanable funds, a monetary policy tightening restricting acces to funds thereby reducing lending, and vice versa for a policy loosening (Bernanke & Blinder, 1988).

In the widespread literature on the bank lending channel, most studies have analysed conventional banks, but the effects of this channel on other types of financial institutions have been barely considered. In this regard, although microfinance has played an increasingly important role in the financial systems of many developing countries in the last decades, the effect of monetary policy on microfinance institutions (MFIs) has not yet been studied. MFIs focus on providing credit to the poor, who have little or no access to bank financing, in order to reduce poverty and to help them create their own income-generating businesses. The credit granted by MFIs is normally given in small amounts, and borrowers have little or no collateral. The success of microfinance has been impressive. According to Cull et al. (2009), microfinance has broadened access to finance for hundreds of millions of poor people who were excluded from formal financial services.

[1] See, among others, Opiela (2008), Brissimis and Delis (2009), Matousek and Sarantis (2009), Altunbas et al. (2010), Disyatat (2011), Gambacorta and Marques-Ibanez (2011), and Cantero-Saiz et al. (2014).

Many MFIs are largely funded through charitable donations or government subsidies. Thus, in contrast to commercial banks, MFIs do not necessarily have to reduce their lending after a monetary policy contraction because their financing sources are completely different. Moreover, as other financial institutions restrict their lending conditions, more people may turn to MFIs, which may well try to grant more loans, as one of their main objectives is to reach the poor and provide them with credit. Conversely, under an expansionary monetary policy, formal bank loans may be more accessible with borrowers drawn away from MFIs. Therefore, MFIs might offset, to a certain extent, the effects of the bank lending channel on commercial banks.

To our knowledge, this is the first study that analyses the effects of the bank lending channel on MFIs. In this regard, our paper makes three contributions to the literature. First, we analyse the way that monetary policy changes affect the loan supply of MFIs. Second, as several types of institutions with different natures and financing resources are involved in microfinance (non-governmental organizations, banks, cooperatives, credit unions, etc.), we study whether there are differences in the reaction of these types of institutions to monetary policy changes. Finally, we examine the differences in the bank lending channel between microfinance in Asia and Latin America.

Our empirical analysis is based on a sample of 262 MFIs (1,634 observations) from 18 developing countries from Asia and Latin America over the period of 2004 to 2014. The analysis was performed using System Generalized Method of Moments (GMM) estimation for panel data. This methodology deals with both unobservable heterogeneity and the problems of endogeneity in explanatory variables through the use of instruments.

We find that, broadly speaking, the loan supply of MFIs remains unaffected after monetary policy shocks. More narrowly, however, NGOs and not-for-profit MFIs, which are more prone to use donor funds and prioritize outreach, show behavior contrary to that

expected based on the bank lending channel, increasing lending after a monetary tightening or decreasing it after a loosening. Moreover, there are important differences between the two regions analysed. MFIs in Asia tend to exhibit this contrary pattern of lending behavior, but MFIs in Latin America show no change in lending behavior in response to monetary policy shifts.

The remainder of the article is structured as follows: Section 2 reviews the previous literature. Section 3 focuses on the empirical analysis. Section 4 includes a discussion of the results and section 5 presents the conclusions.

2. Literature review

Under the bank lending channel, a restrictive monetary policy leads to a decline in the credit extended by banks due to a reduction in their access to loanable funds through two mechanisms: the deposit mechanism and the interest rate mechanism (Bernanke & Blinder, 1988; Kashyap & Stein, 1995; Bernanke, 2007; Disyatat, 2011). In the case of a monetary tightening, the deposit mechanism works through a decrease in bank deposits as liquidity tightens. The interest rate mechanism, on the other hand, works through an increase in interest rates which reduces the access of banks to funds from the financial markets and increases their financing costs. The deposit mechanism is less effective nowadays because deposits can be replaced with other financing sources. Instead, according to Bernanke (2007) and Disyatat (2011), the interest rate mechanism is more influential due to the increased use of funds from the financial markets.

Most studies have focused their attention on the effect that bank-specific characteristics have on the response of bank lending to shifts in monetary policy. These studies have found that banks with weak balance sheets are most affected by the bank lending

channel because they have more difficulty in raising new deposits and external funds. In this regard, small, illiquid, and less well capitalized banks are in general less able to insulate their loan supply from monetary policy changes (Kashyap & Stein, 1995; Altunbas et al., 2002; Gambacorta, 2005; Kishan & Opiela, 2006). Moreover, high credit-risk banks suffer a greater decrease in lending after a change to a more restrictive monetary policy, because their cost of financing tends to be higher (Altunbas et al., 2010).

Apart from bank-specific characteristics, several studies have analyzed banking market characteristics. In this regard, Olivero et al. (2011) and Adams and Amel (2011) found that banks in more concentrated markets are less sensitive to monetary policy shifts. Amidu and Wolfe (2013) showed that an increase in banking sector competition in developing countries reduces the effectiveness of the bank lending channel. Cantero-Saiz et al. (2014) showed that banks in countries with high sovereign risk are more affected by monetary policy shifts. Moreover, several papers have shown that securitization affects the way monetary policy influences the loan supply (Altunbas et al., 2009; Loutskina & Strahan, 2009; Gambacorta et al., 2011).

Despite the vast research literature on the bank lending channel, the debate on its existence remains an open question, as its intensity varies across countries. In general, this channel seems to be more effective in developing countries than in developed ones. In developing countries, deposits are the main source of bank funding, so a monetary policy contraction will significantly affect bank deposits. As banks in these countries have more difficulty raising funds from other sources, they will be forced to reduce their loan supply (Archer, 2006; Freedman & Click, 2006; Hou & Wang, 2013). In contrast, monetary policy changes might well affect the loan supply to a lesser extent in developed countries. Banks that operate in these countries tend to have more financial instruments, such as derivatives or securitization, to insure themselves against monetary shocks (Altunbas et al., 2009; Loutskina

& Strahan, 2009), and they use a wider range of financing sources, which reduces the negative effects of deposit restrictions.

The previous literature on the bank lending channel has focused attention on the loan supply of commercial banks, but the effects of this channel on other types of financial institutions, such as microfinance institutions, have not been analysed. However, microfinance institutions play an important role in developing countries, as they grant a considerable volume of loans to the poor. This activity, which mainly started in the 1970s, has become the most rapidly growing segment of the financial systems in these countries, reaching hundreds of millions of people in Latin America, Asia, and Africa. In general, MFIs provide financial services − mainly short-term loans of small amounts − to people who are financially excluded from traditional banking channels. The goal of microfinancing is to provide individuals with funds to support and develop small-scale economic activities or businesses and help them get out of poverty. The importance of this activity was stressed by the 2006 Nobel Peace Prize awarded to Muhammad Yunus and Grameen Bank. Apart from loans, MFIs offer an array of financial services, such as savings, money transfers, insurance, leasing, and migrant remittances. Like conventional banks, MFIs often charge interest on loans, with rates typically higher because credit is granted to high-risk borrowers with little or no collateral (Dehejia et al., 2012). However, in contrast to other lending institutions, MFIs use different lending techniques (solidarity groups, rotating savings and credit associations, village banking, credit unions, individual lending, etc.) to achieve high recovery rates despite the high risk of their borrowers.

MFIs play both a financial and a social role. Thus, many MFIs try to strike a balance between outreach, which means reaching the maximum number of borrowers to reduce poverty, and financial sustainability, which implies generating enough revenue to cover cost. In this regard, previous literature has detected a possible trade-off between outreach and

financial sustainability. The basic assumption behind this trade-off is that small loans are associated with higher operational cost, so the larger the loans granted by an MFI, the more profitable and sustainable it will be. This is the perspective proposed by the so-called 'welfarist' view of microfinance, which stresses the importance of outreach and the risk of focusing too much on sustainability (Hermes et al., 2011). The supporters of this approach advocate that subsidies are necessary to fill the gap between the interest rates that the poor can afford and the high transaction costs implicit in small-scale lending. Without subsidies, MFIs will end up moving to richer customers who require larger loans with lower transaction costs.

One of the studies that more strongly supports the presence of this trade-off is from Hermes et al. (2011). They examined the relationship between efficiency and outreach using data for 435 MFIs from 1997 to 2007. The study reports strong evidence that outreach is negatively related to efficiency, as they found that the MFIs with lower average loan balances were less efficient. Research by Olivares-Polanco (2005) and Makame and Murinde (2006) also supports this trade-off, the former analysing MFIs in Latin America and the latter in East Africa. Moreover, Cull et al. (2007) found evidence, in a correlation analysis of a sample of 124 MFIs in 49 countries, of an outreach-profit trade-off when they disaggregated their sample by lending type.

The presence of this trade-off is still an open debate, as another perspective of microfinance, called the institutionalist view, considers that outreach and sustainability are not mutually exclusive goals (Hermes et al., 2011). According to this view, financial sustainability is essential to serve the poor permanently, without the restrictions of donor funds, which often limit growth of MFIs due to the lack of sufficient financing. More funds means expanding the number of loans to the poor, so this view advocates the use of more traditional sources of financing. Adhikary and Papachristou (2014) empirically supported this view, as they did not find any evidence of a trade-off in the microfinance industry. Similarly,

Zerai and Rani (2011) showed that the correlation between the average loan size of 85 Indian MFIs and their operational sustainability was weak. Moreover, Quayes (2012) even discovered a positive complementary relationship between financial sustainability and depth of outreach in an analysis of 702 MFIs operating in 83 countries. He suggested that the standardization of terms and conditions of small loans had weakened the negative relationship between outreach and sustainability. Louis et al. (2013), in an analysis of 650 MIFs from 88 countries, and Quayes (2015), using a panel of 764 MFIs from 87 countries, also found a positive relationship between outreach and financial performance.

With regard to the bank lending channel, as we mentioned previously, a restrictive monetary policy can lead to a reduction in the loan supply of traditional banks mainly through an increase in interest rates, which reduces the access of banks to funds from the financial markets and increases their financing costs. MFIs can be affected by this channel because they have increasingly used financing from the financial markets in an attempt to become more financially sustainable. In this regard, according to Wagner (2012), since 2000 the microfinance sector has become a lot more integrated into the international financial system. This has enabled MFIs to increase the proportion of funds raised in the international financial markets, but at the same time, it has also increased their vulnerability to international financing conditions and has made them more sensitive to changes in interest rates through the bank lending channel.

However, if we compare MFIs and traditional banks, the former have certain characteristics that can make their loan supply less sensitive to interest rate changes. Firstly, their financing sources are still very different from those of traditional banks. Banks tend to use mainly deposits and funds from the financial markets, whereas many MFIs still resort more to donor funding or subsidized financing than to traditional sources of financing (Cull et al., 2009). Moreover, many types of MFIs are not authorized to receive deposits from the

public or are unable to mobilize large amounts of deposits (Murdoch, 2000; Serrano-Cinca & Gutierrez-Nieto, 2014).

Secondly, one of the main objectives of MFIs is to reach the poor and provide them with credit, so they try to reach the maximum number of borrowers even when financial conditions are less favourable. This social role of MFIs might cause their loan supply to behave differently from the loan supply of commercial banks. In this regard, when traditional banks restrict their lending conditions during monetary policy restrictions, more borrowers will resort to MFIs, which will try to keep granting loans, as their activity becomes more necessary then.

Finally, MFIs seem to be more resilient to crisis than other kinds of financial institutions, which has been mainly credited to their lending techniques, ownership, kind of loans, and type of clients. In this regard, many authors have found that MFIs are much less sensitive to the macroeconomic and financial environment than traditional banks (Ahlin & Lin, 2006; Krauss & Walter, 2008). Moreover, the non-performing loan ratio and the loan growth of MFIs were found to be considerably less affected during crises than those of traditional banks (Patten et al., 2001; Arora & Harper, 2005).

All in all, as many MFIs still use subsidies and donations to a great extent, are more resilient to crises, and play a social role, they might not experience a considerable reduction in their lending after monetary policy tightening. Thus, the effect of the bank lending channel on MFIs might be different from the effect on traditional banks.

3. Empirical analysis

3.1. Selection of the sample

We focus our analysis on two regions where microfinance has grown considerably and MFIs serve a significant proportion of the population: Latin America and South and East

Asia. Moreover, there are enough countries in each of these regions with the macroeconomic data required for the analysis. Besides, in these regions, there are several types of MFIs operating, which was essential for our research.

The data on MFIs were taken from Mix Market[2] for the period 2004–2014. We removed the countries lacking the macroeconomic data necessary to perform the analysis and the MFIs with data available for less than six consecutive years (as we used lagged growth variables). The latter condition was essential to test for second-order serial correlation, which was performed to ensure the robustness of the estimates made by System-GMM (Arellano & Bond, 1991). The final sample comprised an unbalanced panel of 262 MFIs (1,634 observations) from Latin America and the Caribbean, South Asia, East Asia, and the Pacific (18 developing countries) between 2004 and 2014. Table 1 shows the number of MFIs and observations from each country, and the type of MFIs and the temporaral distribution of the sample. The macroeconomic information came from the World Development Indicators database of the World Bank, IMF databases, and the central banks of the countries analysed.

[Insert Table 1]

3.2. Econometric model and data

To analyse the effect of the bank lending channel on MFIs, we propose the following model based on the approach of Kashyap and Stein (1995):[3]

[2] Mix Market is a widely used database which provides financial information for a broad range of MFIs.
[3] This approach has been widely used in the literature (e.g., Altunbas et al., 2010; Olivero et al., 2011; Cantero-Saiz et al., 2014).

$$\begin{aligned}\Delta \ln(\text{loans})_{i,t} = {} & \beta_0 + \beta_1 \Delta \ln(\text{loans})_{i,t-1} + \beta_2 \Delta \text{i}_{m,t} + \beta_3 \Delta \ln(\text{GDP})_{m,t} + \beta_4 SIZE_{i,t-1} \\ & + \beta_5 LIQ_{i,t-1} + \beta_6 CAP_{i,t-1} + \beta_7 WOMEN_{i,t-1} + \beta_8 AVLGNI_{i,t-1} \\ & + \beta_9 FINSUF_{i,t-1} + \beta_{10} OPCOSTL_{i,t-1} + \beta_{11}(\Delta \text{i}_{m,t} * SIZE_{i,t-1}) \\ & + \beta_{12}(\Delta \text{i}_{m,t} * LIQ_{i,t-1}) + \beta_{13}(\Delta \text{i}_{m,t} * CAP_{i,t-1}) \\ & + \beta_{14}(\Delta \text{i}_{m,t} * WOMEN_{i,t-1}) + \beta_{15}(\Delta \text{i}_{m,t} * AVLGNI_{i,t-1}) \\ & + \beta_{16}(\Delta \text{i}_{m,t} * FINSUF_{i,t-1}) + \beta_{17}(\Delta \text{i}_{m,t} * OPCOSTL_{i,t-1}) \\ & + \sum_{t=1}^{10} \delta_t \text{Year}_t + \sum_{m=1}^{17} \vartheta_m \text{Country}_m + \varepsilon_{i,t}\end{aligned} \quad (1)$$

The dependent variable, $\Delta ln(Loans)_{i,t}$, measures the growth rate in loan supply from MFI *i* in year *t* relative to year *t-1*. This variable has been widely used in the bank lending channel literature (Jimborean, 2009; Gambacorta & Marques-Ibanez, 2011; Olivero et al., 2011). As in many previous studies, we introduce this variable lagged one year as an independent variable to capture the persistence effects of the dependent variable.

Δi represents changes in monetary policy. As in previous studies, we use the change in the short-term money market rate (Altunbas et al., 2010; Olivero et al., 2011, Cantero-Saiz et al., 2014). Under the bank lending channel, an increase in the interest rate leads to a reduction in the growth of bank lending. We measured changes in monetary policy through the short-term money market rate for several reasons. First, this variable captures the effect of the interest rate mechanism of the bank lending channel, which is the predominant mechanism nowadays due to the increased use of funds from the financial markets (Bernanke, 2007; Disyatat, 2011). Second, the interest rate mechanism is particularly relevant in the case of MFIs, because many of them are not authorized to receive deposits from the public or are unable to mobilize large amounts of deposits (Murdoch, 2000; Serrano-Cinca & Gutierrez-Nieto, 2014). Finally, the microfinance sector has become a lot more integrated into the international financial system, which has enabled MFIs to increase the proportion of funds raised in international financial markets (Wagner, 2012).

$\Delta ln(GDP)$ is the real GDP growth rate. Inclusion of this variable, which controls for the business cycle, is standard practice in the bank lending channel literature to control for changes in loan demand and to isolate the effect of monetary policy changes on the supply side (Ashcraft, 2006; Olivero et al., 2011).

SIZE is the log of total assets. Large banks tend to have higher loan growth rates (Kashyap & Stein, 1995; Altunbas et al., 2010).

LIQ is a liquidity measure given as the ratio of securities, cash, and funds due from banks to total assets. More liquid banks can usually grant more loans (Kashyap & Stein, 2000; Olivero et al., 2011).

CAP is the ratio of total equity to total assets. Better capitalized banks tend to have higher loan growth rates (Kishan & Opiela, 2006; Cantero-Saiz et al., 2014).

WOMEN is the percentage of female borrowers in the total loan portfolio of an MFI. Higher values indicate more depth of outreach because lending to women is associated with lending to poor borrowers (Hermes et al., 2011; Quayes, 2012; Daher & Le Saout, 2013).

AVLGNI is the average loan balance per borrower to gross national income (GNI) per capita (Cull et al., 2009; Tchakoute-Tchuigoua, 2010, Hudon & Traca, 2011; Quayes, 2012). This is a measure of outreach as it is an inverse proxy for the income levels of borrowers that MFIs are serving. Thus, the higher the AVLGNI, the lower the outreach.

FINSUF is a measure of the financial self-sufficiency ratio of an MFI (MicroBanking Bulletin, 2005; Cull et al., 2007). This ratio is calculated as adjusted financial revenue divided by the sum of adjusted financial expenses, adjusted net loan loss provision expenses, and adjusted operating expenses. It indicates the ability to operate without subsidy.

OPCOSTL denotes the ratio of operating expenses to gross loan portfolio and is a measure of the inefficiency of an MFI (Cull et al., 2009). The larger this variable, the more inefficient the MFI.

As in previous studies, we introduce the variables SIZE, LIQ, CAP, WOMEN, AVLGNI, FINSUF, and OPCOSTL lagged one year to avoid endogeneity bias (Kashyap & Stein, 1995; Cantero et al., 2014). Moreover, following previous studies, we include interaction terms between the change in the short-term money market rate ($\Delta i_{m,t}$) and the MFI characteristics to control for the effect that these variables might have on monetary policy influence on bank lending (Gambacorta, 2005; Matousek & Sarantis, 2009; Altunbas et al., 2010).

Finally, country and year effect dummies are included to capture country- and year-specific factors where $i = 1, 2,\ldots, N$ indicates a specific MFI; $m = 1, 2,\ldots, M$ indicates a particular country; and $t = 1, 2,\ldots, T$ indicates a particular year. $\varepsilon_{i,t}$ is the error term.

Table 2 shows the descriptive statistics of the variables used in the analysis, and Table 3 presents correlations between these variables.

[Insert Tables 2 and 3]

To correctly interpret the effect of changes in monetary policy (Δi) on the growth of loans, we need to bear in mind that we are interacting the continuous variable Δi with other continuous variables (SIZE, LIQ, CAP, WOMEN, AVLGNI, FINSUF, and OPCOSTL). Therefore, we took the derivative of Model (1) with respect to Δi to capture the marginal effect of Δi on the growth of loans:

$$\frac{\partial \Delta \ln(\text{loans})_{i,t}}{\partial \Delta \text{i}_{m,t}} = \beta_2 + \beta_{11} SIZE_{i,t-1} + \beta_{12} LIQ_{i,t-1} + \beta_{13} CAP_{i,t-1} + \beta_{14} WOMEN_{i,t-1} + \beta_{15} AVLGNI_{i,t-1} + \beta_{16} FINSUF_{i,t-1} + \beta_{17} OPCOSTL_{i,t-1} \quad (2)$$

To facilitate interpretation, we normalize in Model (1) the MFI characteristic variables (SIZE, LIQ, CAP, WOMEN, AVLGNI, FINSUF, and OPCOSTL) with respect to their means across all MFIs in the sample.[4] Thus, the normalized variables are:[5]

$$NSIZE_{it} = SIZE_{it} - \frac{\sum_{i=1}^{N} SIZE_{it}}{N_t} \quad (3)$$

$$NLIQ_{it} = LIQ_{it} - \frac{\sum_{t=1}^{T}(\sum_{i=1}^{N}(LIQ_{it})/N_t)}{T} \quad (4)$$

$$NCAP_{it} = CAP_{it} - \frac{\sum_{t=1}^{T}(\sum_{i=1}^{N}CAP_{it}/N_t)}{T} \quad (5)$$

$$N\mathrm{WOMEN}_{it} = \mathrm{WOMEN}_{it} - \frac{\sum_{t=1}^{T}(\sum_{i=1}^{N}(\mathrm{WOMEN}_{it})/N_t)}{T} \quad (6)$$

$$NAVLGNI_{it} = AVLGNI_{it} - \frac{\sum_{t=1}^{T}(\sum_{i=1}^{N}(AVLGNI_{it})/N_t)}{T} \quad (7)$$

$$NFINSUF_{it} = FINSUF_{it} - \frac{\sum_{t=1}^{T}(\sum_{i=1}^{N}(FINSUF_{it})/N_t)}{T} \quad (8)$$

$$NOPCOSTL_{it} = OPCOSTL_{it} - \frac{\sum_{t=1}^{T}(\sum_{i=1}^{N}(OPCOSTL_{it})/N_t)}{T} \quad (9)$$

The normalization implies that the mean of the normalized variables is zero, so the marginal effect of Δi on the growth of loans for an average MFI is captured by the coefficient β_2.

3.3. Results for all MFIs

The model in Equation (1) is estimated using a two-step System-GMM technique with robust standard errors, which yields consistent estimates in the presence of any heteroscedasticity or autocorrelation. The relationship between lending and monetary policy can be affected by endogeneity problems because monetary policy affects loan supply, but the situation of the financial sector could also influence monetary policy decisions (Gambacorta & Marques-Ibanez, 2011). The System-GMM method addresses problems of endogeneity

[4] Many previous studies have followed the same approach (e.g. Ehrmann et al., 2003; Gambacorta, 2005; Jimborean, 2009; Cantero et al., 2014).
[5] The normalized variables use the same names as the original ones but with an N added to the beginning.

using lagged independent variables as instruments (Arellano & Bond, 1991). Following Jimborean (2009) and Cantero-Saiz et al. (2014), the MFI characteristic variables and their interactions are considered to be endogenous. For these variables, second lags are used as instruments. Moreover, we factorize the instruments used in our estimation. Mehrhoff (2009) found that factorized instruments condense the informational content of the instrument set into a much lower number of instruments, thus lowering the risk of overfitting endogenous variables but retaining almost all information.

The results of our estimation are shown in Table 4. In the estimation of Column (a), we include all MFIs in the sample. The coefficient associated with the monetary policy indicator (Δi) is not significant, so the loan supply of MFIs is not affected by monetary policy changes, as we proposed. The reason for this lack of response might be the subsidized financing that supports many MFIs and/or their preference for outreach.

[Insert Table 4]

The coefficients associated with the interaction variables between the monetary policy indicator and two other variables − the percentage of women (Δi*NWOMEN) and the average loan size (Δi*NAVLGNI) − are significant, the former interaction with a positive coefficient and the latter with a negative one. Thus, both coefficients indicate that the loan supply of MFIs with higher outreach is negatively affected by a monetary tightening.[6]

The variable NOPCOSTL has a positive and significant coefficient. As this variable was a proxy of inefficiency, we can conclude that efficiency negatively influences the loan supply. This result suggests a trade-off between efficiency and outreach. However, the variable NFINSUF is not significant, so our data do not support a trade-off between financial sufficiency and outreach.

[6] Despite the fact that the coefficients associated with these variables have different signs, they reflect the same result, because NAVLGNI measures the outreach in an inverse way. Thus, the higher the value of NWOMEN, the higher the outreach, but the higher the value of NAVLGNI, the lower the outreach.

With regard to the rest of the significant variables in Column (a), Δln(GDP) has a significant positive coefficient, so better economic conditions promote MFI lending. The variable NSIZE has a significant and positive coefficient, which indicates that bigger MFIs are more likely to expand their loan supply. The interaction term between liquidity (LIQ) and the monetary policy indicator (Δi) is negative and significant. Thus, MFIs with a higher liquidity ratio are more sensitive to changes in monetary policy. Previous studies have found similar results when they analysed these three variables in the banking industry (Kashyap & Stein, 1995; Matousek & Sarantis, 2009; Jimborean, 2009; Cantero-Saiz et al., 2014).

3.4. Differences between Asia and Latin America

MFIs in different regions present different characteristics, so they might not be affected in the same way by monetary policy restrictions. Despite the fact that the practice of microfinance emerged around the same time in Asia and Latin America, MFIs evolved differently in both regions (Miller, 2003; Weiss & Montgomery, 2005; Servin et al., 2012; Janda & Zetek, 2014). MFIs in Latin American countries have made significant progress in financing via markets and deposits, which made them less dependent on donations and subsidies. However, MFIs in Asia are less concerned about financial sustainability and resort less to financial markets and deposits. This means that MFIs in Latin America can be more affected by monetary tightening because they rely more on commercial financing.

MFIs play an important social role, which means that they try to reach borrowers to reduce poverty. However, in Latin America, many MFIs established as NGOs have taken a more commercial orientation with a focus on urban areas. In Asia, NGOs and rural banks are still the dominant types of MFIs and they mainly focus on outreach in rural areas. According to Mix Market (2016; 2018) MFIs in Asia on average serve more borrowers per institution and the average loan per borrower is lower (Weiss & Montgomery, 2005; Mersland & Strøm,

2009). Thus, MFIs in Asia are more prone to continue granting loans when monetary tightening makes banks restrict their loans.

MFIs tend to be more resilient to crisis than other kinds of financial institutions. According to Mix Market (2016; 2018) there are no significant differences between the share of portfolio at risk of MFIs in Asia and in Latin America. Thus, MFIs in both regions might well be less sensitive to monetary tightening than traditional banks.

All in all, we expect that MFIs in Asia will be less affected by the bank lending channel than MFIs in Latin America. However, we also expect that MFIs in Latin America will still be less sensitive to monetary policy restrictions than traditional banks.

In order to examine the possible different effect that monetary policy restrictions can have on microfinance in Asia and Latin America, we divide our sample into two subsamples. Table 4, Column (b) shows the results when we analyse MFIs in Asia. The coefficient associated with the monetary policy indicator (Δi), which was not significant in the analysis of the whole sample, is now significant and positive. Thus, the loan supply of MFIs in Asia is positively and significantly affected by monetary tightening. This result implies that when traditional banks reduce their loan supply during monetary tightening, more people will be excluded from borrowing at traditional banks and will turn to MFIs. Under this situation, the activity of MFIs will become more critical, and due to their social role and their financing based on donations and subsidies, MFIs will try to keep granting loans to alleviate the financial needs of the poor. The positive responsive of MFI lending in Asia to monetary tightening thus reflects the outreach preference and the lower levels of commercial financing of MFIs in Asia, where most are NGOs.

Our results also imply that during an expansionary monetary policy a decrease in interest rates negatively influences the loan supply of MFIs in Asia. This may reflect the fact

that with lower interest rates, traditional banks tend to increase their loan supply and offer loans with better conditions than MFIs. So more people will seek lower interest rate loans in the traditional banking industry and will not resort to MFIs.

Column (c) shows the results when we analyse MFIs in Latin America. Similar to the results for the whole sample, MFI lending in Latin America is not affected by monetary policy restrictions, as the coefficient associated with the monetary policy indicator (Δi) is not statistically significant. The greater use of deposits and financing from financial markets by MFIs in Latin America and their more commercial orientation might well be the reason for these results. They are more similar to traditional banks regarding financing, which is why, unlike MFIs in Asia, they do not increase their loan supply after monetary tightening. However, they still try to serve poor people and their portfolio risk is low, which enables them not reduce their loans after monetary tightening as traditional banks usually do. Regarding the control variables, only NOPCOSTL is significant, with a positive sign, which suggests that less efficient MFIs have slower loan growth.

3.5. Differences between types of MFIs

Our sample includes several types of institutions – NGOs, banks, credit unions-cooperatives, rural banks, and non-bank financial institutions (NBFIs) – with different natures, purposes, and financing resources, so they might not be affected in the same way by monetary tightening. Some, especially those with a not-for-profit orientation, are more prone to use donor funds and prioritize outreach, whereas others with a more for-profit orientation tend to emphasize sustainability and use more traditional financing sources.[7] In this regard, Cull et al. (2009), using a sample of 346 MFIs from 2002 to 2004, showed that around 61% of the funds used by NGOs came from subsidies. However, subsidies only represented 18% of

[7]Quayes (2012), in a study of 702 MFIs operating in 83 countries, found that not-for-profit MFIs have better outreach but poorer financial performance than for-profit MFIs.

the funds used by banks and NBFIs, and 3% of the funds used by credit unions. Moreover, banks lent in much higher volume than other types of MFIs, but NGOs reached more borrowers in total relative to size. Bogan (2012) showed that grants represented, on average, 11.1% of total assets in a sample of 210 MFIs from 2003 to 2006. NGOs were the institutions that received the highest percentage of grants, with 16.4%, and banks the lowest, with 2.4%. Tchuigoua (2014) calculated the percentage of donated equity over total assets in a sample of 1,752 MFIs worldwide from 2004 to 2009. This percentage was 11% on average, but reached a maximum of 60% in some countries.

To test whether the bank lending channel has a different effect by type of MFI, we introduce dummy variables into our analysis to classify MFIs by type. The dummy variables are NGO for non-governmental organizations, BANK for banks, CREU-COOP for credit unions-cooperatives, and RBANK for rural banks.[8] Each dummy variable takes a value of 1 if an MFI belongs to a particular type, and 0 otherwise. As we propose that the effect of monetary tightening on loan supply depends on the type of MFI, we interact these dummy variables with the change in the short-term money market rate ($\Delta i_{m,t}$).

The marginal effect on the growth rate in the loan supply for NBFIs is captured by the coefficient associated with the variable Δi_t, as we do not introduce a dummy variable for this type of MFI. To evaluate the significance of the marginal effect for other types of MFIs, we carry out a linear restriction test of the sum of this coefficient and the coefficient for the interaction between Δi_t and the dummy variable for the MFI type of interest (represented in Table 5 by 'LR Test' and the name of the dummy variable).

[Insert Table 5]

[8] Even though we have NBFIs in our sample, we did not create a dummy variable for them because one of the dummy variables must be dropped to avoid collinearity in the data.

The results for the full sample, reported in Table 5, Column (a), show that the loan supply of NGOs is positively affected by monetary tightening, as the linear restriction test of the coefficient associated with this type of MFI is positive and significant. The linear restriction tests for the other types of MFIs are not significant, so the loan supplies of these institutions are not affected by monetary policy shocks. Regarding the dummy variables by themselves (i.e. not interacted with the monetary policy indicator), only NGO has a negative and significant coefficient, which indicates that NGOs grant, in general, fewer new loans than other MFIs. This result is in line with Cull et al. (2009), who found that NGOs lent in lower volumes than other types of institutions like banks, but reached more borrowers as they prioritized outreach. Regarding other variables, Δln(GDP) and NLIQ have significant positive coefficients. As far as the interaction terms are concerned, (Δi_t* NLIQ) and (Δi_t* NWOMEN) have significant negative coefficients, and (Δi_t* NAVLGNI) has a significant positive coefficient.

In summary, the use of subsidized funds seems to hamper, in general, the growth of NGOs, but lets them insulate their loan supply from monetary shocks and gives them the opportunity to keep granting loans when more borrowers resort to MFIs because of tighter financing conditions.

In Column (b) we repeat the analysis only for MFIs in Asia. The results are similar to those shown in Column (a). That is to say, the loan supply of NGOs is positively affected by monetary tightening, whereas lending by other types of MFIs is unaffected. This result reflects the outreach preference and the lower levels of commercial financing of NGOs in Asia. The results for the MFIs in Latin America, shown in Column (c), are completely different. In Latin America, no type of MFI analysed is affected by monetary tightening.[9] The

[9] Our sample does not include any rural banks in Latin America. Thus, we did not include the variables RBANK and (Δi_t* RBANK) in Model (c).

greater use of commercial funds by MFIs in Latin America and their preference for lending to micro-enterprises might well be the reasons for these results.

Many MFIs that are not NGOs adopt a not-for-profit orientation, while some NGOs might follow a more commercial approach. To allow for this behavior, Table 6 shows the results of an analysis in which we classify MFIs only into not-for-profit and for-profit. To do so, we introduce a dummy variable (NOT-PROFIT) that takes a value of 1 if an MFI has a not-for-profit orientation, and 0 otherwise. The marginal effect on the growth rate in the loan supply for for-profit MFIs is captured by the coefficient associated with the variable Δi_t. The marginal effect for not-for-profit MFIs is captured by a linear restriction test of the sum of this coefficient and the coefficient associated with the interaction between Δi_t and the dummy variable NOT-PROFIT (represented in Table 6 by 'LR Test NOT-PROFIT').

[Insert Table 6]

The results in Table 6, Column (a) for the full sample show that the coefficient associated with the monetary policy indicator (Δi) is not significant, so the loan supply of for-profit MFIs is not affected by monetary tightening. The effect on not-for-profit MFIs, captured by the linear restriction test, is positive and significant. Thus, similar to NGOs in the previous analysis, not-for-profit MFIs grant more loans after a monetary tightening. Also similar to NGOs, the dummy variable NOT-PROFIT by itself (i.e. not interacted with the monetary policy indicator) has a negative and significant coefficient.

We obtain similar results for the Asia sample, shown in Column (b), but for the Latin America sample, lending by not-for-profit institutions was unaffected by monetary policy shocks.

4. Discussion

This article analyses the effect of the bank lending channel of monetary policy on MFIs in Asia and Latin America. On the one hand, our results show that MFIs in the aggregate are immune to monetary policy shocks. This result might well be explained by the fact that these institutions tend to be financed by subsidies and donations, are more resilient to crises due to their lending techniques, and try to reach a considerable number of poor borrowers. Moreover, it is possible that this seeming immunity of MFIs to monetary tightening could have been favoured by the expansion of the microfinance sector in the last decades, especially in those countries where the formal financial sector has poor penetration.

Our results also indicate that in Asia, NGOs and other not-for-profit MFIs grant more loans after a monetary tightening, probably because more people turn to them to take advantage of their social orientation. Moreover, they are very efficient, have few financial expenses, and are low risk, which might well enable them to keep granting loans (Mix Market, 2018). However, this result also implies that during monetary policy expansions, these not-for-profit MFIs will grant fewer new loans, probably because more people can be served by other types of financial institutions that can charge lower interest rates when market financing is cheaper. Thus, monetary policy changes generate a transference of borrowers from one type of institution to another.

NGOs and not-for-profit MFIs in Latin America do not seem to follow this pattern. According to Mix Market (2018), in Latin America, NGOs have more financial expenses, are less efficient (have higher cost per borrower) and have a higher portfolio at risk than NGOs in Asia (especially in East Asia & the Pacific). These differences might explain the different behaviour between NGOs in Asia and NGOs in Latin America.

Regarding monetary policy, central banks, especially in Asia, should take into account MFIs when they make monetary policy decisions. MFIs grant a considerable amount of loans in these countries, but their behaviour after monetary tightening is very different form

traditional banks. Actually, NGOs in Asia tend to compensate, to a certain extent, the effects of monetary tightening. Thus, to achieve their objectives in a more efficient way, central banks in Asia should explore the possibility of combining interest rates changes with unconventional monetary policies.

5. Conclusions

Numerous studies have analysed the effect of the bank lending channel in the transmission mechanism of monetary policy. The previous literature has mostly analysed conventional banks, but has paid no attention to MFIs. However, in many developing countries, focusing only on banks is not enough to assess the effects of monetary policy changes on the loan supply, since MFIs play an important role in their financial systems and grant a considerable number of loans. Moreover, as the objectives and financing sources of MFIs are different from commercial banks, their reaction to monetary policy changes might well be different too.

Using a sample of 262 MFIs from 18 developing countries from Asia and Latin America for the period of 2002 to 2014, we find that the loan supply of MFIs in the aggregate is not affected by monetary policy changes, probably because of their use of subsidized financing and/or their preference for outreach. Moreover, when we divided the sample into different types of MFIs, our results indicate that NGOs and not-for-profit MFIs, which tend to be the most subsidized institutions, are capable of insulating their loan supply and therefore grant more loans after a monetary tightening. However, other types of MFIs, such as banking institutions and NBFIs, remain unaffected after monetary policy shocks.

Differences between Asia and Latin America emerged when we divide the sample. The loan supply of MFIs in Asia is positively and significantly affected by a monetary tightening, which might reflect that most MFIs are NGOs in Asia. However, in Latin

America, all types of MFIs are unaffected by monetary policy restrictions, which might indicate the commercial orientation of most MFIs in this region.

These results have implications for the way monetary policy is conducted in developing countries. Central banks should take into account the importance, type and orientation of MFIs that operate in their countries because these institutions might alter or even partially offset the effects of the bank lending channel on standard commercial banks.

Acknowledgements

This work was supported by the Santander Financial Institute (SANFI) from the University of Cantabria Foundation for Education and Research in the Financial Sector (UCEIF Foundation).

The authors would like to thank two anonymous referees for their comments and suggestions, which have contributed to improve the article.

References

Adams, R.M., Amel, D.F., 2011. Market structure and the pass-through of the federal funds rate. *Journal of Banking & Finance 35*(5), 1087-1096.

Adhikary, S., Papachristou, G., 2014. Is there a trade-off between financial performance and outreach in South Asian Microfinance institutions? *The Journal of Developing Areas 48*(4), 381-402.

Ahlin, C., Lin, J., 2006. Luck or skill? MFIs' performance in macroeconomic context. *Working Paper No. 132*. Durham, NC: Bureau for Research and Economic Analysis of Development.

Altunbaş, Y., Fazylov, O., Molyneux, P., 2002. Evidence on the bank lending channel in Europe. *Journal of Banking & Finance 26*(11), 2093-2110.

Altunbas, Y., Gambacorta, L., Marques-Ibanez, D., 2009. Securitisation and the bank lending channel. *European Economic Review 53*(8), 996-1009.

Altunbas, Y., Gambacorta, L., Marques-Ibanez, D., 2010. Bank risk and monetary policy. *Journal of Financial Stability 6*(3), 121-129.

Amidu, M., Wolfe, S., 2013. The effect of banking market structure on the lending channel: Evidence from emerging markets. *Review of Financial Economics 22*(4), 146-157.

Archer, D., 2006. Implications of recent changes in banking for the conduct of monetary policy. *BIS Papers 28*, 123-151.

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies 58*(2), 277-297.

Arora, S., Harper, M., 2005. *Small customers, big market: Commercial banks in microfinance*. Rugby: ITDG Publications.

Ashcraft, A., 2006. New evidence on the lending channel. *Journal of Money, Credit, and Banking 38*(3), 751-775.

Bernanke, B., 2007. The financial accelerator and the credit channel: A speech at a conference on The Credit Channel of Monetary Policy in the Twenty-first Century, Federal Reserve Bank of Atlanta, Atlanta, Georgia, in *Conferencia del Chairman of the Board of Governors of the Federal Reserve System* (Vol. 15, June).

Bernanke B., Blinder A., 1988. Credit, money and aggregate demand. *The American Economic Review* 78(2), 435-439.

Bogan, V.L., 2012. Capital structure and sustainability: An empirical study of microfinance institutions. *Review of Economics and Statistics 94*(4), 1045-1058.

Brissimis, S.N., Delis, M.D., 2009. Identification of a loan supply function: A cross-country test for the existence of a bank lending channel. *Journal of International Financial Markets, Institutions and Money 19*(2), 321-335.

Cantero-Saiz, M., Sanfilippo-Azofra, S., Torre-Olmo, B., López-Gutiérrez, C., 2014. Sovereign risk and the bank lending channel in Europe. *Journal of International Money and Finance 47*, 1-20.

Cull, R., Demirgüç-Kunt, A., Morduch, J., 2009. Microfinance meets the market. *Journal of Economic Perspectives 23*(1), 167-192.

Cull, R., Demirgüç-Kunt, A., Morduch, J., Cull, R., Morduch, J., 2007. Financial performance and outreach: A global analysis of leading microbanks. *The Economic Journal 117*(517), F107-F133.

Daher, L., Le Saout, E., 2013. Microfinance and financial performance. *Strategic Change 22*(1-2), 31-45.

Dehejia, R., Montgomery, H., Morduch, J., 2012. Do interest rates matter? Credit demand in the Dhaka slums. *Journal of Development Economics 97*(2), 437-449.

Disyatat, P., 2011. The bank lending channel revisited. *Journal of money, Credit and Banking 43*(4), 711-734.

Ehrmann, M., Gambacorta, L., Martínez-Pagés, J., Sevestre, P., Worms, A., 2003. Financial systems and the role of banks in monetary policy transmission in the Euro Area, in: Angeloni, I., Kashyap, A., Mojon, B. (Eds.), *Monetary policy transmission in the Euro Area*. Cambridge University Press, Cambridge, pp. 235-269.

Freedman, P.L., Click, R.W., 2006. Banks that don't lend? Unlocking credit to spur growth in developing countries. *Development Policy Review 24*(3), 279-302.

Gambacorta, L., 2005. Inside the bank lending channel. *European Economic Review 49*(7), 1737-1759.

Gambacorta, L., Marques-Ibanez, D., 2011. The bank lending channel: Lessons from the crisis. *Economic Policy 26*(66), 135-182.

Hermes, N., Lensink, R., Meesters, A., 2011. Outreach and efficiency of microfinance institutions. *World Development 39*(6), 938-948.

Hou, X., Wang, Q., 2013. Implications of banking marketization for the lending channel of monetary policy transmission: Evidence from China. *Journal of Macroeconomics 38*, 442-451.

Hudon, M., Traca, D., 2011. On the efficiency effects of subsidies in microfinance: An empirical inquiry. *World Development 39*(6), 966-973.

Janda, K., Zetek, P., 2014. Macroeconomic factors influencing interest rates of microfinance institutions in Latin America and the Caribbean. *Agricultural Economics–Czech 4*(60), 59-173.

Jimborean, R., 2009. The role of banks in the monetary policy transmission in the new EU member states. *Economic Systems 33*(4), 360-375.

Kashyap, A.K., Stein, J.C., 1995. The impact of monetary policy on bank balance sheets, in: *Carnegie-Rochester Conference Series on Public Policy* (Vol. 42, pp. 151-195). North-Holland.

Kashyap, A.K., Stein, J.C., 2000. What do a million observations on banks say about the transmission of monetary policy? *American Economic Review 90(3)*, 407-428.

Kishan, R.P., Opiela, T.P., 2006. Bank capital and loan asymmetry in the transmission of monetary policy. *Journal of Banking & Finance 30*(1), 259-285.

Krauss, N., Walter, I., 2008. Can microfinance reduce portfolio volatility? *Working Paper*. New York: New York University.

Louis, P., Seret, A., Baesens, B., 2013. Financial efficiency and social impact of microfinance institutions using self-organizing maps. *World Development 46*, 197-210.

Loutskina, E., Strahan, P.E., 2009. Securitization and the declining impact of bank finance on loan supply: Evidence from mortgage originations. *The Journal of Finance 64*(2), 861-889.

Makame, A.H., Murinde, V., 2006. Empirical findings on cognitive dissonance around microfinance outreach and sustainability. *Unpublished paper, Birmingham: University of Birmingham*.

Matousek, R., Sarantis, N., 2009. The bank lending channel and monetary transmission in Central and Eastern European countries. *Journal of Comparative Economics 37*(2), 321-334.

Mehrhoff, J., 2009. A solution to the problem of too many instruments in dynamic panel data GMM. *Discussion Paper Series 1: Economic Studies 39*.

Mersland, R., Strøm, R.Ø., 2009. Performance and governance in microfinance institutions. *Journal of Banking & Finance 33*(4), 662-669.

Microbanking Bulletin, 2005. Trend lines, 10(5), March.

Miller, J., 2003. Benchmarking Latin American microfinance: A report from the Microfinance Information Exchange (MIX). *Washington, DC*.

Mix Market, 2016. *Global outreach & financial performance benchmark report* – 2014.

Mix Market, 2018. *Global outreach & financial performance benchmark report* – 2016.

Murdoch J., 2000. The microfinance schism. *World Development* 28, 617-629.

Olivares-Polanco, F., 2005. Commercializing microfinance and deepening outreach: Empirical evidence from Latin America. *Journal of Microfinance* 7(1), 47-69.

Olivero, M.P., Li, Y., Jeon, B.N., 2011. Competition in banking and the lending channel: Evidence from bank-level data in Asia and Latin America. *Journal of Banking & Finance 35*(3), 560-571.

Opiela, T.P., 2008. Differential deposit guarantees and the effect of monetary policy on bank lending. *Economic Inquiry 46*(4), 610-623.

Patten, R., Rosengard, J., Johnston, D., 2001. Microfinance success amidst macroeconomic failure: The experience of Bank Rakyat Indonesia during the East Asian Crisis. *World Development* 29(6), 1057-1069.

Quayes, S., 2012. Depth of outreach and financial sustainability of microfinance institutions. *Applied Economics 44*(26), 3421-3433.

Quayes, S., 2015. Outreach and performance of microfinance institutions: A panel analysis. *Applied Economics 47*(18), 1909-1925.

Serrano-Cinca, C., & Gutiérrez-Nieto, B., 2014. Microfinance, the long tail and mission drift. *International Business Review*, 23(1), 181-194.

Servin, R., Lensink, R., Van den Berg, M., 2012. Ownership and technical efficiency of microfinance institutions: Empirical evidence from Latin America. *Journal of Banking & Finance 36*(7), 2136-2144.

Tchakoute-Tchuigoua, H., 2010. Is there a difference in performance by the legal status of microfinance institutions? *The Quarterly Review of Economics and Finance 50*(4), 436-442.

Tchuigoua, H.T., 2014. Institutional framework and capital structure of microfinance institutions. *Journal of Business Research 67*(10), 2185-2197.

Wagner, C., 2012. From boom to bust: How different has microfinance been from traditional banking? *Development Policy Review*, 30(2), 187-210.

Weiss, J., Montgomery, H., 2005. Great expectations: Microfinance and poverty reduction in Asia and Latin America. *Oxford Development Studies 33*(3-4), 391-416.

Zerai, B., Rani, L., 2011. Is there a trade-off between outreach and sustainability of microfinance institutions? Evidence from Indian microfinance institutions. *Research Journal of Finance and Accounting* 2(11), 2222-2847.

Table 1. Sample Distribution

Panel A: Number of banks per country		
Country	Number of observations	Number of MFIs
ASIA		
Bangladesh	115	19
China	22	4
India	366	59
Indonesia	37	7
Pakistan	99	15
Philippines	79	15
LATIN AMERICA		
Argentina	45	8
Bolivia	169	22
Brazil	64	11
Chile	21	3
Colombia	127	19
Dominican Republic	29	5
El Salvador	21	5
Mexico	189	32
Panama	26	3
Paraguay	47	6
Total	**1,632**	**262**
Panel B: Type of MFI		
	Number of observations	Number of MFIs
NGOs	688	112
BANKS	206	27
CREDIT UNIONS-COOPERATIVES	78	15
RURAL BANKS	39	8
NBFIs	621	100
Total	**1,632**	**262**
Panel C: For-Profit/ Not-For-Profit Status		
	Number of observations	Number of MFIs
FOR-PROFIT	824	129
NOT-FOR-PROFIT	808	133
Total	**1,632**	**262**

Panel D: Temporaral distribution of the sample												
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	**Total**
Number of MFIs	38	77	120	161	182	215	221	220	174	130	94	**1,632**

Table 2. Sample statistics

Variable	Mean	Std. Dev.	Min	Max
$\Delta\ln(loans)_t$	0.2541	0.3711	-1.5896	6.9868
Δi_t	-0.0014	0.0257	-0.2419	0.1798
$\Delta\ln(GDP)_t$	0.0522	0.0280	-0.0486	0.1327
$SIZE_{t-1}$	16.5388	1.7880	10.4505	21.2617
LIQ_{t-1}	0.1550	0.1181	0.0000	0.8905
CAP_{t-1}	0.2945	0.2156	0.0003	0.9940
$WOMEN_{t-1}$	0.7442	0.2444	0.0000	1.0000
$AVLGNI_{t-1}$	0.3066	0.6076	0.0121	7.7333
$FINSUF_{t-1}$	1.1662	0.4239	0.0970	11.2252
$OPCOSTL_{t-1}$	0.2746	0.2873	0.0085	4.3266

Table 3. Correlations

	Δi_t	$\Delta\ln(GDP)_t$	$SIZE_{t-1}$	LIQ_{t-1}	CAP_{t-1}	$WOMEN_{t-1}$	$AVLGNI_{t-1}$	$FINSUF_{t-1}$	$OPCOSTL_{t-1}$
Δi_t	1.0000								
$\Delta\ln(GDP)_t$	0.2116	1.0000							
$SIZE_{t-1}$	-0.0011	0.0246	1.0000						
LIQ_{t-1}	-0.0081	-0.0175	-0.0188	1.0000					
CAP_{t-1}	-0.0428	-0.1173	-0.3632	0.0554	1.0000				
$WOMEN_{t-1}$	0.0274	0.1409	-0.1576	0.0535	-0.0137	1.0000			
$AVLGNI_{t-1}$	0.0091	0.0127	0.2513	0.0019	-0.1172	-0.3983	1.0000		
$FINSUF_{t-1}$	0.0183	0.0772	0.1740	-0.1265	0.1586	-0.0531	0.2358	1.0000	
$OPCOSTL_{t-1}$	-0.0242	-0.2234	-0.4256	0.2101	0.3332	0.0097	-0.2005	-0.3224	1.0000

Table 4. Results for all MFIs & by region

	(a) Full Sample		(b) Asia		(c) Latin America	
$\Delta\ln(loans)_{t-1}$	0.1179		0.2190	**	-0.0165	
	(1.42)		(2.31)		(-0.13)	
Δi_t	0.7873		3.2162	**	-0.5608	
	(1.61)		(2.10)		(-0.58)	
$\Delta\ln(GDP)_t$	1.4418	***	2.9551	**	0.7903	
	(2.76)		(2.49)		(1.49)	
$NSIZE_{t-1}$	0.0215	*	0.0168		-0.0527	
	(1.72)		(0.89)		(-0.97)	
$NLIQ_{t-1}$	0.4154		0.3234		0.1325	
	(1.48)		(1.15)		(0.46)	
$NCAP_{t-1}$	0.0000		0.2097		-0.4284	
	(0.00)		(0.79)		(-1.39)	
$NWOMEN_{t-1}$	0.1803		0.5650	***	-0.3621	
	(1.2)		(2.97)		(-1.58)	
$NAVLGNI_{t-1}$	-0.0248		0.1259		-0.0615	
	(-0.67)		(1.56)		(-1.43)	
$NFINSUF_{t-1}$	0.0326		-0.0938		0.0801	
	(0.55)		(-0.85)		(0.69)	
$NOPCOSTL_{t-1}$	0.2311	*	0.3846		0.3229	**
	(1.77)		(1.23)		(2.13)	
$(\Delta i_t * NSIZE_{t-1})$	0.2489		0.2736		0.2619	
	(0.82)		(0.43)		(0.53)	
$(\Delta i_t * NLIQ_{t-1})$	-15.9918	*	-10.7453		-10.5333	
	(-1.93)		(-0.79)		(-0.97)	
$(\Delta i_t * NCAP_{t-1})$	6.3597		6.3639		4.7444	
	(1.44)		(0.57)		(0.68)	
$(\Delta i_t * NWOMEN_{t-1})$	-6.3405	**	0.1541		-3.1087	
	(-2.09)		(0.04)		(-0.61)	
$(\Delta i_t * NAVLGNI_{t-1})$	1.0456	**	9.5471	**	1.0035	
	(1.97)		(2.40)		(1.56)	
$(\Delta i_t * NFINSUF_{t-1})$	0.0188		-2.7148		0.8543	
	(0.01)		(-0.61)		(0.14)	
$(\Delta i_t * NOPCOSTL_{t-1})$	6.0747		12.6255		1.4198	
	(1.30)		(0.71)		(0.18)	
CONS	0.2419	***	0.0222		0.2755	***
	(3.52)		(0.15)		(3.00)	
M2	0.872		0.435		0.664	
Hansen	0.148		0.929		0.832	

t-statistics are in parentheses. *** indicates significance at 0.01; ** at 0.05; * at 0.1. M2 is the p-value of the 2nd order serial correlation statistic. Hansen is the p-value of the over-identifying restriction test.

Table 5. Results by organizational type

	(a) Full Sample		(b) Asia		(c) Latin America	
$\Delta\ln(loans)_{t-1}$	0.0620		0.1428		0.0024	
	(0.75)		(1.45)		(0.02)	
Δi_t	-0.6051		0.2790		-1.4770	
	(-0.69)		(0.19)		(-0.7)	
$\Delta\ln(GDP)_t$	1.8007	***	4.4483	***	0.9261	*
	(3.25)		(3.70)		(1.67)	
$NSIZE_{t-1}$	0.0090		0.0322	*	-0.0447	
	(0.54)		(1.87)		(-0.91)	
$NLIQ_{t-1}$	0.4785	*	0.3146		0.1172	
	(1.89)		(0.97)		(0.40)	
$NCAP_{t-1}$	-0.0976		0.0088		-0.3994	*
	(-0.74)		(0.04)		(-1.65)	
$NWOMEN_{t-1}$	0.1292		0.2308		-0.2904	
	(0.76)		(1.06)		(-1.11)	
$NAVLGNI_{t-1}$	-0.0409		0.0770		-0.0486	*
	(-1.22)		(1.04)		(-1.93)	
$NFINSUF_{t-1}$	0.0587		-0.0715		0.0571	
	(0.98)		(-0.71)		(0.55)	
$NOPCOSTL_{t-1}$	0.2498	**	0.5661	**	0.3265	**
	(1.97)		(2.00)		(2.45)	
NGO	-0.0163	***	-0.0197	**	-0.0081	
	(-2.81)		(-2.53)		(-0.87)	
BANK	-0.0102		-0.0270		0.0080	
	(-1.18)		(-1.26)		(0.63)	
CREUCOOP	-0.0036		-0.0139		-0.0041	
	(-0.37)		(-0.82)		(-0.39)	
RBANK	-0.0113		0.0046			
	(-0.78)		(0.21)			
$(\Delta i_t * NSIZE_{t-1})$	0.1512		0.5631		0.2618	
	(0.39)		(0.99)		(0.37)	
$(\Delta i_t * NLIQ_{t-1})$	-14.5317	*	-15.8765		-12.4896	
	(-1.81)		(-1.09)		(-1.26)	
$(\Delta i_t * NCAP_{t-1})$	4.0775		0.6897		3.4869	
	(0.94)		(0.07)		(0.45)	
$(\Delta i_t * NWOMEN_{t-1})$	-6.1553	*	-5.8925		-4.9244	
	(-1.67)		(-1.17)		(-0.78)	
$(\Delta i_t * NAVLGNI_{t-1})$	0.7261		10.8123	***	0.9758	
	(1.62)		(2.85)		(1.44)	
$(\Delta i_t * NFINSUF_{t-1})$	0.0584		-3.2271		0.2123	
	(0.02)		(-0.71)		(0.04)	
$(\Delta i_t * NOPCOSTL_{t-1})$	5.4800		11.2092		1.6357	
	(1.16)		(0.77)		(0.21)	
$(\Delta i_t * NGO)$	2.3114	**	4.5551	***	0.8584	
	(1.97)		(3.50)		(0.32)	
$(\Delta i_t * BANK)$	1.5845		4.2607		0.7993	
	(1.32)		(1.05)		(0.72)	
$(\Delta i_t * CREU\text{-}COOP)$	1.3476		5.9209		-0.8473	
	(0.61)		(1.24)		(-0.31)	
$(\Delta i_t * RBANK)$	-2.1310		-5.0665			
	(-1.36)		(-0.81)			
CONS	0.2277	***	0.0111		0.2685	***
	(3.18)		(0.08)		(3.37)	
LR Test.NGO	1.7063	**	4.8341	***	-0.6185	
	(2.27)		(3.67)		(-0.43)	
LR Test.BANK	0.9795		4.5396		-0.6777	
	(0.76)		(1.12)		(-0.32)	
LR Test.CREU-COOP	0.7426		6.1998		-2.3243	
	(0.35)		(1.39)		(-1.11)	
LR Test.RBANK	-2.7360		-4.7876			
	(-1.56)		(-0.79)			
M2	0.986		0.387		0.628	

Hansen	0.106	0.974	0.868

t-statistics are in parentheses. *** indicates significance at 0.01; ** at 0.05; * at 0.1. M2 is the p-value of the 2nd order serial correlation statistic. Hansen is the p-value of the over-identifying restriction test. Letting X_j represent instituional type where j={NGO, BANK, CREU-COOP, RBANK}, LR Test.X_j is the linear restriction test of the sum of the coefficients associated with Δi and (Δi_t*X_j).

Table 6. Results by profit orientation

	(a) Full Sample		(b) Asia		(c) Latin America	
$\Delta ln(loans)_{t-1}$	0.0731		0.1784	*	-0.0023	
	(0.91)		(1.81)		(-0.02)	
Δi_t	-0.0212		0.1388		-0.3649	
	(-0.03)		(0.10)		(-0.25)	
$\Delta ln(GDP)_t$	1.5437	***	3.5362	***	0.6826	
	(2.84)		(2.96)		(1.37)	
$NSIZE_{t-1}$	0.0114		0.0174		-0.0660	
	(0.78)		(1.07)		(-0.92)	
$NLIQ_{t-1}$	0.3701		0.1317		0.0576	
	(1.36)		(0.43)		(0.19)	
$NCAP_{t-1}$	-0.0414		0.0904		-0.4415	
	(-0.31)		(0.34)		(-1.34)	
$NWOMEN_{t-1}$	0.2204		0.3970	***	-0.3043	
	(1.28)		(2.73)		(-1.49)	
$NAVLGNI_{t-1}$	-0.0251		0.0742		-0.0478	
	(-0.60)		(0.74)		(-1.61)	
$NFINSUF_{t-1}$	0.0393		-0.0483		0.0762	
	(0.61)		(-0.37)		(0.61)	
$NOPCOSTL_{t-1}$	0.2223		0.5052	*	0.3281	**
	(1.63)		(1.89)		(2.38)	
NOT-PROFIT	-0.0102	**	-0.0146	*	-0.0142	
	(-2.22)		(-1.82)		(-1.35)	
$(\Delta i_t * NSIZE_{t-1})$	0.3298		0.5257		0.3488	
	(1.04)		(0.87)		(0.62)	
$(\Delta i_t * NLIQ_{t-1})$	-14.5745		-5.9142		-13.1638	
	(-1.62)		(-0.44)		(-1.31)	
$(\Delta i_t * NCAP_{t-1})$	5.9573		3.7107		3.4238	
	(1.36)		(0.35)		(0.47)	
$(\Delta i_t * NWOMEN_{t-1})$	-5.8852	*	-1.9973		-2.3850	
	(-1.79)		(-0.55)		(-0.44)	
$(\Delta i_t * NAVLGNI_{t-1})$	1.0259	*	11.9566	***	0.9320	
	(1.65)		(3.17)		(1.54)	
$(\Delta i_t * NFINSUF_{t-1})$	-0.3790		-4.3241		0.8727	
	(-0.14)		(-1.08)		(0.18)	
$(\Delta i_t * NOPCOSTL_{t-1})$	5.6912		10.7118		1.7783	
	(1.34)		(0.76)		(0.20)	
$(\Delta i_t *$ NOT-PROFIT)	1.4171		4.1547	***	-0.0389	
	(1.34)		(3.57)		(-0.02)	
CONS	0.2591	***	0.0166		0.2631	***
	(3.55)		(0.11)		(2.81)	
LRest Test.NOT-PROFIT	1.3959	**	4.2936	***	-0.4037	
	(2.33)		(3.77)		(-0.36)	
M2	0.991		0.297		0.691	
Hansen	0.105		0.929		0.873	

t-statistics are in parentheses. *** indicates significance at 0.01; ** at 0.05; * at 0.1. M2 is the p-value of the 2nd order serial correlation statistic. Hansen is the p-value of the over-identifying restriction test. LR Test.NOT-PROFIT is the linear restriction test of the sum of the coefficients associated with Δi and (Δi_t* NOT-PROFIT).