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Financial Development and Banks' Loan Supply in Developing Countries

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Abstract

This article analyses how financial development affects the bank lending channel in developing countries. Our analysis is carried out on a sample of 693 commercial banks from 31 developing countries between 2000 and 2012. We find that the loan supply of banks that operate in countries with less

developed financial systems is not affected by monetary policy changes. In countries with more developed financial systems, the bank lending channel is effective, but only after the financial crisis. Moreover, in these countries, the negative effect of monetary policy contractions on bank lending is greater when financial development rises.

Key words: Financial development; Banks' loan supply; Monetary policy; Bank lending channel;

JEL classification: E42, E52, O16.

1. Introduction

Banks play an important role in economic development because they are one of the main sources of firms' financing in many developing countries (Beck, et al, 2000). The access to bank financing allows many firms to carry out investment projects, which prompt economic development. Although there are different factors that influence the level of bank financing, in the last decade, numerous research studies have underlined that monetary policy is a key element in determining banks' loan supply (Kashyap and Stein 1995; Bernanke, 2007; Disyatat, 2011). In this regard, the bank lending channel of monetary policy puts forward that a monetary policy contraction hinders banks' access to loanable funds, which gives rise to a reduction in banks' loan supply (Bernanke and Blinder, 1988). On the contrary, a monetary policy expansion stimulates loans, as it increases the access to banks' loanable funds.

Changes in banks' loan supply might well have enormous consequences for economic growth, as they constraint or facilitate firms' access to financing. Therefore, understanding the way monetary policy affects loan supply is quite relevant to central banks and policymakers that try to stimulate economic development. However, most of the analyses are concentrated in developed countries, especially the United States and Europe, and reveal that the relevance of this channel is limited and depends on the country and the period under estimation[1]. Fewer studies deal with the bank lending channel in developing countries, but, different from industrial economies, they are more conclusive about the existence of the bank lending channel (Archer, 2006; Olivero et al., 2011; Amidu and Wolfe, 2013). However, the intensity of this channel also varies across countries.

The different impact of this channel across countries might be explained by many factors. Previous studies, which have mainly focused on bank specific characteristics, show that weak banks are less able to insulate their lending after monetary policy shocks, so they tend to grant fewer loans (Kashyap and Stein, 1995; Kishan and Opiela, 2006; Altunbas et al., 2010). One relevant explanation of the differences across countries, which has been scarcely explored, is the level of development of the financial systems. Monetary policy changes might affect banks' loan supply to a lesser extent in fairly

[1] See, among others, Isakova (2008), Opiela (2008), Brissimis and Delis (2009), Matousek and Sarantis (2009), Altunbas et al. (2010), Gambacorta and Marques-Ibanez (2011), and Said (2013).

developed financial systems because banks have more financial instruments to insure themselves from shocks and use a wider range of financing sources. On the contrary, in less financially developed countries, the bank lending channel might have a great impact, as financial markets are not very developed and deposits are the main source of bank funding. Although several papers have studied the relationship between financial development and the specific features of the monetary policy (Krause and Rioja, 2006; Carranza et al., 2010), none of them have analyzed the effect of financial development on the banks' loan supply.

To our knowledge, this is the first empirical study that directly analyses financial development as one of the determinants of the banks' loan supply. In this regard, our paper makes two contributions to the literature on financial development and monetary policy. First, we analyze the role that financial development plays in determining the loan supply reaction of banks to monetary policy in emerging economies. In particular, we assess how the marginal effect of monetary policy on the growth of loans varies with the level of financial development. Second, we test for asymmetric effects in the transmission mechanism of monetary policy during periods of contractionary and expansionary monetary regimes.

Our empirical analysis comprises a sample of 693 banks (5,332 observations) from 31 developing countries over the period of 2000 to 2012. The analysis is performed using the System-GMM methodology for panel data. This methodology controls for both unobservable heterogeneity and the problems of endogeneity in explanatory variables through the use of instruments. We find that the bank lending channel is not effective in developing countries with very low developed financial systems. However, the loan supply of countries with more developed financial systems is negatively and significantly affected by monetary policy contractions, but only after the beginning of the financial crisis. Moreover, the negative effect of monetary policy contractions on the banks' loan supply grows as financial development increases. These results are very interesting to central banks in developing countries because suggest that they should consider the level of development of the financial system when they try to stimulate loan supply.

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

2. Literature review

Monetary policy impacts the economy and the price level through various channels (Mishkin, 1995): the interest rate channel, the assets price channel, the exchange rate channel, the expectations channel, the risk-taking channel, the balance sheet channel, the bank lending channel, and so forth. The bank lending channel, which is the main aim of this paper, focuses on the quantity of loans supplied by banks (Bernanke and Blinder, 1988; Bernanke and Gertler, 1995). According to this channel, a restrictive monetary policy gives rise to a decline in the credit extended by banks because it leads to a reduction in their access to loanable funds, such as bank deposits, and it increases the cost of market funding for banks. [2]

Although there is a vast research literature on the bank lending channel, most of the studies focus on developed countries and therefore there are fewer analyses on developing economies. [3] The results of the papers that analyse the former countries are rather inconclusive and generally suggest that this channel is more effective in some countries and less effective in others. However, most of these studies find that banks with weak balance sheets are more adversely affected by monetary policies restrictions because they have more difficulty obtaining alternative sources of financing. In general, small, less liquid, poorly capitalized and high credit-risk banks experience a greater decrease in lending after a restrictive monetary policy. [4] Apart from banks' strength, several studies have focused on banking market characteristics. In this regard, Adams and Amel (2005) found that banks in more concentrated banking markets reduce less their lending supply after monetary shocks. According to Gambacorta el al. (2011), financial innovation

[2] A monetary policy contraction can give rise to a reduction in bank deposits if the central bank increases the level of required reserves or manipulate the multiplier mechanism (Kashyap and Stein, 1995; Walsh, 2010). Besides, a monetary policy contraction also increases the difficulty and cost of attracting deposits and market-based funding (Bernanke, 2007; Disyatat, 2011).

[3] See, among others, Kashyap and Stein (1995), Chiades and Gambacorta (2004), Brissimis and Magginas (2005), Iacoviello and Minetti (2008), Altunbas et al. (2010), Cappiello et al. (2010), Gambacorta et al. (2011), Rondorf (2012), Ciccarelli et al. (2013), Milcheva (2013), and Cantero-Sainz (2014).

[4] See, among others, Kashyap and Stein (1995) Altunbas et al. (2002), Gambacorta (2005), Kishan and Opiela (2006), and Altunbas et al. (2010).

and changes in banks' business models have a great impact in the role of the bank lending channel as a transmission mechanism of the monetary policy. Moreover, Cantero-Saiz, et al., (2014) suggested that banks that operate in countries with high sovereign risk are more affected by monetary policy contractions.

Different from developed countries, empirical evidence from developing economies provides more conclusive results about the existence of the bank lending channel. In these countries, deposits are the main source of bank funding and banks are the primary financial intermediary (Freedman and Click, 2006). Therefore, a contraction in monetary policy is expected to have a significant negative impact on banks' core deposit base, which will lead to a reduction in loan supply. Banks in developing countries are less able to insulate their loan supply from monetary changes, as they have more difficulty raising funds from other sources (Archer, 2006; De Mello and Pisu, 2010; Hou and Wang, 2013).

Although the bank lending channel is more relevant in developing economies, its intensity varies across countries. The studies suggest that the bank lending channel is less effective in banking systems with large, more liquid and more profitable banks (Matousek and Sarantis, 2009; Gunji and Yuan, 2010; Hou and Wang, 2013). The impact of the bank lending channel might also be affected by the characteristics of the banking systems. In this regard, Olivero et al. (2011) found that loan supply is less sensitive to monetary shocks in more concentrated banking markets in Latin American countries. Moreover, Amidu and Wolfe (2013) showed that, in emerging economies, an increase in banking sector competition reduces the effectiveness of monetary policy on bank lending.

Given that the bank lending channel operates through the financial system, the level of financial development might well affect its effectiveness. In very poorly developed financial systems, monetary policy changes might be less effective and take longer to affect the bank's lending supply (Carranza et al., 2010). At the early stage of development, banks' lending might well be constrained because the capital is scarce. A considerable amount of personal savings is never captured by the banking system as many people keep their money at home (Freedman and Click, 2006). Moreover, the majority of people and small and medium firms have limited access to loans because they are not able to offer enough collaterals,

they are less likely to repay their loans and powerful groups try to prevent them from accessing finance (Rajan and Zingales, 2003).

As financial development proceeds, monetary policy might affect banks' lending to a greater extent. At more advanced levels of development, capital is no longer so scarce and the people and firms that did not previously have access to finance might be the main beneficiaries (Oechslin, 2009). During this phase of financial development, banks play a dominant role in the economy and most financial intermediation goes through banks (Rybczinski, 1997). Financial markets are not very developed and bank deposits are the main financial asset hold by households. Moreover, deposits are the main source of bank funding, so a restrictive monetary policy will lead to a big reduction in the loans supply because, according to the bank lending channel, it will have a great impact on bank deposits.

Finally, in a fairly developed financial system, banks have more instruments available to protect themselves against monetary shocks, so the effect of the bank lending channel is likely to be more limited. In these financial systems, banks might remain a significant source of external funding for non-financial firms, but financial markets play an increasingly important role (Rybczinski, 1997). As other market participants emerge and new products develop, such as derivatives, which allow for trading risk, the traditional role of banks as collecting deposits to extend credit declines. Financial innovation gives rise to an intermediation model in which banks originate, repackage and then sell their loans to the financial markets. This model, based on securitization, seems to reduce the influence of monetary policy changes on loan supply (Altunbas, et al., 2009; Loutskina and Strahan, 2009). [5] Anyway, we need to bear in mind that the effect of monetary policy on loan supply seems to be also affected by the orientation of the financial system. In general, the bank lending channel tends to be more relevant in countries that have higher dependence on banking financing than those with a market oriented financial system (Brissimis and Magginas, 2005; Brissimis and Delis, 2009). Not only are banks less affected by monetary shock, but also firms can reach some kind of insulation because they use a greater variety of financing sources. In this regard, Lopez-Iturriaga (2000) found that in countries with more market oriented financial systems,

[5] The effect of securitization can be the opposite in a situation of financial distress, as Gambacorta and Marques-Ibanez (2011) found that banks with greater dependence on market funding and non-interest sources of income reduce their loan supply more strongly in crisis.

firms are not so influenced by shifts in monetary policy as those that operate in systems that rely more on bank financing.

The effect that financial development has on the economy has received a great deal of attention, but most of the papers have placed emphasis on the impact of financial systems on economic growth or inequality. [6] Only a few papers study the relationship between financial development and monetary policy, but they do not analyse the effect of financial development on the bank lending channel. Krause and Rioja (2006), using a sample of 37 industrialized and developing countries, found that financial development increases monetary policy efficiency. In a sample of developed and Asian countries, Singh et al. (2008) showed that interest rate pass-through from the policy rate to retail bank deposit and lending rates is higher in the formers. Carranza et al. (2010) concluded that monetary policy has a larger impact in less developed financial system. However, monetary policy takes longer to affect these countries.

To sum up, the bank lending channel tends to be more relevant in developing economies. However, only a few studies compare the situation of different emerging countries and none analyse the effect that financial development has on the bank lending channel. Therefore, in the next section we try to address this gap in the existing literature by conducting an empirical analysis on this issue.

3. Empirical analysis

3.1. Selection of the sample

To select the sample for the analysis, we start with all the commercial banks of low and middle-income economies in the BankScope database. [7] First, we exclude banks with no available data. Then, following Vázquez et al. (2007) and Cantero-Saiz et al. (2014), we remove the banks in the following cases: (1) banks with negative values of assets, loans, deposits, interest income, and expenses; (2) banks with growth rates of loans and/or deposits greater than 300%; and (3) banks with loans 100 times greater than deposits.

[6] See, for instance, Rajan and Zingales (1998), Rousseau and Wachtel (2000), Hermes and Lensink (2003), Beck and Levine (2004), Jalilian and Kirkpatrick (2005), Jeanneney and Kpodar (2011) and Campos et al. (2016).

[7] Following the World Bank classification (July 2013 with 2012 data), low-income economies are defined as those with a gross national income (GNI) per capita (calculated using the World Bank Atlas method) of $1,035 or less and middle-income economies are those with a GNI per capita of more than $1,035 but less than $12,615.

We also remove the banks with data available for less than 6 consecutive years between 2000 and 2012 (as we use lagged growth variables). This condition is essential to test for second-order serial correlation, which is performed to ensure the robustness of the estimates made by System-GMM (Arellano and Bond, 1991). Finally, to avoid bias and spurious correlations between macroeconomic variables and bank level variables, we remove the countries with less than five banks in the sample. [8]

The final sample comprises an unbalanced panel of 693 commercial banks of 31 developing countries between 2000 and 2012. Table 1 shows the number of institutions and observations from each country and year. The financial information on each institution comes from the BankScope database[9]. The macroeconomic information comes from the World Development Indicators database of the World Bank, Global Financial Development Database, IMF databases and the Central Banks of the countries analysed.

[Insert Table 1]

3.2. Econometric model and data

To analyse the relationship between financial development and the bank lending channel, we propose the following model based on the approach of Kashyap and Stein (1995):

$$\Delta \ln(\text{loans})_{i,t} = \beta_0 + \beta_1 \Delta \ln(\text{loans})_{i,t-1} + \beta_2 \Delta \text{i}_{m,t} + \beta_3 \Delta \ln(\text{GDP})_{m,t} + \beta_4 SIZE_{i,t-1} + \beta_5 LIQ_{i,t-1} + \beta_6 CAP_{i,t-1} + \beta_7 FD_{m,t} + \beta_8 (\Delta \text{i}_{m,t} * SIZE_{i,t-1}) + \beta_9 (\Delta \text{i}_{m,t} * LIQ_{i,t-1}) + \beta_{10} (\Delta \text{i}_{m,t} * CAP_{i,t-1}) + \beta_{11} (\Delta \text{i}_{m,t} * FD_{m,t}) + \beta_{12} CONCEN_{m,t} + \beta_{13} ORIENT_{m,t} + \beta_{14} INCOME_{m,t} + \sum_{t=1}^{12} \pi_t \text{Year}_t + \sum_{m=1}^{31} \vartheta_m \text{Country}_m + \varepsilon_{i,t} \quad (1)$$

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

[8] We remove a total of eight banks in five countries (Ghana, Namibia, Papua New Guinea, Saint Kitts and Nevis, and Swaziland). Moreover, to check the effects of this requirement, we repeat the analysis including the banks in these countries and the results are quite similar to those presented in the paper.

[9] The financial information was deflated using the GDP deflator from the World Development Indicators database of the World Bank.

Δi represents the changes in monetary policy. As in many other 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). According to the bank lending channel, an increase in the interest rate leads to a reduction in the growth of bank lending.

$\Delta ln(GDP)$ is the real GDP growth rate. This variable, which controls for the business cycle, tends to influence positively the supply of credit (Jimborean, 2009).

SIZE is the log of total assets. Large banks tend to have higher loan growth rates (Kashyap and Stein, 1995).

LIQ is the ratio of securities, cash and due from banks to total assets. More liquid banks can usually grant more loans (Kashyap and Stein, 2000).

CAP is the ratio of total equity to total assets. Higher capitalized banks tend to have higher loan growth rates (Kishan and Opiela, 2006).

As in most previous studies we introduce the variables SIZE, LIQ and CAP lagged 1 year to avoid endogeneity bias (Kashyap and Stein, 1995; Cantero et al., 2014).

Since there is no widely accepted measure of financial development that captures its multidimensional nature, Levine (2002) and Beck and Levine (2002) propose an analysis of principal component. To capture different features of financial development they use the first principal component of several characteristics of financial systems. Applying this methodology, the variable FD, which is our measure of financial development, is the first principal component of the following financial system characteristics[10]:

i) The value of credits by financial intermediaries to the private sector divided by GDP. This variable is a measure of the financial depth of the banking system.

ii) Stock market capitalization to GDP. This variable is a measure of financial market depth.

[10] We follow Čihák et al. (2013) to select key characteristics of the financial system that capture financial development. This paper constructs measures of four important financial system characteristics: access; efficiency, and stability using the Global Financial Development Database. However, the availability of data for many of these characteristics is limited. Thus, we selected the five characteristics that we include in FD based on their relevance and availability.

iii) Bank net interest margin (%), which is the accounting value of bank's net interest revenue as a share of its average interest-bearing (total earning) assets. This variable captures efficiency of the banking system.

iv) Stock market turnover ratio (%), which is the total value of shares traded during the period divided by the average market capitalization for the period. This variable is a proxy for efficiency in the stock market.

v) The Z-score, which captures the probability of default of a country's commercial banking system. This variable is a measure of financial stability.

The variable FD does not include characteristics of access because the data for this category are particularly limited for the countries analyzed. However, to check the robustness of our results, we repeat the analysis using a financial development variable (FDac) that includes the annual average of the available data (from 2000 to 2012) of a characteristic of access (bank branches per 100,000 adults).

Returning to the variables in Model (1) and following previous studies, we include interaction terms between the change in the short-term money market rate ($\Delta i_{m,t}$) and the bank characteristics (*SIZE, LIQ* and *CAP*) to control for the effect that these variables might have on monetary policy influence on bank lending (Kishan and Opiela, 2000; Gambacorta, 2005; Matousek and Sarantis, 2009; Altunbas et al., 2010). Moreover, to measure how financial development affects loan supply reaction to monetary policy, which is the main objective of this study, we also include in Model (1) the interaction term between these variables ($\Delta i_{m,t} * FD_{m,t}$).

We also include three country level variables that control for differences among countries[11]:

CONCEN, which captures the concentration in the banking industry, is the percentage of assets of the three largest commercial banks as a share of total commercial banking assets. Olivero et al. (2011) showed that loan supply is less sensitive to monetary shocks in more concentrated banking systems in Latin America.

[11] We thank an anonymous reviewer for this suggestion.

ORIENT is the value of credits by financial intermediaries to the private sector divided by stock market capitalization. This variable captures the size of financial institutions relative to the size of financial markets (Beck and Levine, 2002).

INCOME is a dummy variable that takes value 1 for commercial banks of upper-middle-income-economies[12]. This variable controls for the effects different country's income levels can have on monetary policy (Ashan, 2011).

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

Table 2 presents the descriptive statistics of the variables used in the analysis, Table 3 presents the correlations between these variables and Table 4 shows the statistics of FD and FDac by country.

[Insert Tables 2-4]

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

$$\frac{\partial \Delta \ln(\text{loans})_{i,t}}{\partial \Delta \text{i}_{m,t}} = \beta_2 + \beta_8 SIZE_{i,t-1} + \beta_9 LIQ_{i,t-1} + \beta_{10} CAP_{i,t-1} + \beta_{11} FD_{m,t} \quad (2)$$

To facilitate de interpretation, we normalize, in Model (1) the banks' variables (*SIZE*, *LIQ*, and CAP) with respect to their mean across all banks in the sample. [13]

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

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

[12] Following the World Bank classification (July 2013 with 2012 data) upper-middle-income-economies are defined as those with a gross national income (GNI) per capita of more than $4,085 but less than $12,615.

[13] Many previous studies have followed the same approach (Ehrmann et al., 2003; Gambacorta, 2005; Jimborean, 2009).

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

A_{it} is total assets, L_{it} is securities, cash and due from banks, E_{it} is total equity and N_t is the number of banks.

The normalization implies the mean of the normalized variables is zero, so the marginal effect of Δi on the growth of loans for an average bank is:

$$\frac{\partial \Delta \ln(\text{loans})_{i,t}}{\partial \Delta \text{i}_{m,t}} = \beta_2 + \beta_{11} FD_{m,t} \quad (6)$$

The marginal effect of the changes in monetary policy (Δi) on the growth of loans, shown in equation (6), depends on the level of financial development. Thus, the effectiveness of the bank lending channel will vary for different values of financial development. β_2 captures the marginal effect when the variable $FD_{m,t}$ is zero, while β_{11} captures the effect of financial development on the marginal effect. In order to interpret the results properly, we will have to calculate the marginal effect and evaluate its significance for different values of $FD_{m,t}$. We will use plots to facilitate the interpretations of the results.

3.3. Results

The model in Equation (1) is estimated using a two-step System-GMM with robust errors, which is consistent in the presence of any pattern of heteroskedasticity and autocorrelation. This method controls for the problems of endogeneity using lagged independent variables as instruments (Arellano and Bond, 1991). Regarding the instruments used in our estimation, following Jimborean (2009) and Cantero-Saiz et al. (2014), the monetary policy indicator and the macroeconomic variables are considered to be exogenous and the bank characteristics and their interactions are endogenous. For the endogenous variables, first lags have been used as instruments[14]. The exogenous variables are instrumented by themselves. Moreover, we collapsed and factorized the instruments used in our estimation. Mehrhoff (2009) found that the factorization of limited and collapsed instruments using GMM produces the lowest

[14] Based on the difference-in-Hansen tests of exogeneity of instrument subsets, second lags have been used as instruments for the interaction between LIQ and the monetary policy variable to avoid over-identification problems.

bias and the lowest root mean squared error. The 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. Moreover, he also recommended collapsing the instrument set before factorization.

Table 5 shows the results. In models (a) and (b), we do not introduce the country level variables CONCEN, ORIENT and INCOME. In model (a), we use the variable FD, which does not include characteristics of access. In model (b), we perform a robustness analysis using the measure of financial development that includes characteristics of access (FDac). As we are interacting continuous variables, the marginal effect of monetary policy on the growth of loans will depend on the value of financial development, as we have shown in Equation (6). Thus, the coefficient associated with Δi_t, which is significant and negative in both models, indicates the presence of the bank lending channel when the variable that captures the financial development is zero. However, the presence and intensity of the bank lending channel, which is measured by the marginal effect of monetary policy on the growth of loans, will vary for different values of financial development. Thus, in order to calculate this marginal effect and its significance for different values of financial development, we carry out a linear restriction tests of the sum of the coefficients β_2 and β_{11} in equation (6) for different values of financial development and we use plots to facilitate the interpretation of the results. Figures 1 and 2 (based on models (a) and (b) respectively) reports the marginal effect of monetary policy on the growth of loans in relation to financial development. As we expected, our results show that monetary policy contractions do not affect bank lending in developing countries with very low developed financial systems (FD below -1.7 or FDac below -1.07), probably because these systems are characterized by a low number of banks and a limited lending supply. However, the loan supply of countries with more developed financial systems is negatively and significantly affected by monetary policy contractions and positively affected by monetary policy expansions. Moreover, when financial development increases the negative effect of monetary policy contractions is greater. Thus, banks operating in developing countries with more developed financial systems are more sensitive to monetary policy changes. In these countries deposits are the main source of bank funding and financial markets are not well developed, so a monetary policy contraction

has an important impact on banks' access to loanable funds and their loan supply. Moreover, our results also suggest that the financial development level of these countries is not high enough to better protect themselves against monetary policy restrictions.

[Insert Table 5]

[Insert Figures 1 and 2]

With regard to the significant variables, the first lag of the dependent variable is positive and significant, which reflects the persistence in the growth of loans. The response of bank lending to a monetary policy shock (Δi) has the expected negative and significant sign. Thus, an increase in the short-term money market rate leads to a reduction of credit supply. Δln(GDP) has also a significant positive coefficient, so GDP growth positively influences the loan supply. The variables FD and FDac have significant and negative coefficients. However, the size of the coefficients is very small, which indicates that banks operating in more developed financial systems are slightly less likely to expand their loan supply. This might reflect that, as financial development proceeds, financial markets play a slightly more important role in developing counties. The interaction term between SIZE and monetary policy is positive and significant only in model (a), which indicates that larger banks are less sensitive to changes in monetary policy. Finally, the interaction term between liquidity and monetary policy is negative and significant. Thus, banks with a higher liquidity ratio are more sensitive to changes in monetary policy[15].

In models (c) and (d), we introduce the country level variables CONCEN, ORIENT and INCOME. In model (c), we use the variable FD, which does not include characteristics of access. In model (d), we perform a robustness analysis using the measure of financial development that includes characteristics of access (FDac). All the significant variables in model (a) remain significant and with the same signs in models (c) and (d). Moreover, the variable CONCEN has a positive and significant coefficient and the variable ORIENT has a negative and significant coefficient. Figures 3 and 4 show the marginal effect of monetary policy on the growth of loans in relation to financial development. The results are quite similar to those reported in Figures 1 and 2.

[15] Several previous studies have found a similar result (Jimborean, 2009; Matousek and Sarantis, 2009; Cantero-Saiz et al., 2014).

[Insert Figures 3 and 4]

Carranza et al. (2010) suggested that financial development could have asymmetric effects in the monetary policy transmission (monetary contractions may be more effective than monetary expansions in less developed countries). Therefore, to control for these asymmetric effects, in the models in table 6, we add in Model (1) the square of the interaction variables between the monetary policy indicator and the measures of financial development $(\Delta i*FD)^2$. If the asymmetric effect exists, these squared variables will have a positive coefficient. When the interest rate increases, the decrease in lending associated with a monetary policy contraction will be more intense in countries with poorly developed financial systems. However, when interest rate decreases, the growth in loans associated with a monetary policy expansion will be lower in these countries. [16]

By adding the square of the interaction variable, Model (1) can be rewritten as follow:

$$\Delta \ln(\text{loans})_{i,t} = \beta_0 + \beta_1 \Delta \ln(\text{loans})_{i,t-1} + \beta_2 \Delta \text{i}_{m,t} + \beta_3 \Delta \ln(\text{GDP})_{m,t} + \beta_4 SIZE_{i,t-1} + \beta_5 LIQ_{i,t-1} + \beta_6 CAP_{i,t-1} + \beta_7 FD_{m,t} + \beta_8 (\Delta \text{i}_{m,t} * SIZE_{i,t-1}) + \beta_9 (\Delta \text{i}_{m,t} * LIQ_{i,t-1}) + \beta_{10} (\Delta \text{i}_{m,t} * CAP_{i,t-1}) + \beta_{11} (\Delta \text{i}_{m,t} * FD_{m,t}) + \beta_{12} (\Delta \text{i}_{m,t} * FD_{m,t})^2 + \beta_{13} CONCEN_{m,t} + \beta_{14} ORIENT_{m,t} + \beta_{15} INCOME_{m,t} + \sum_{t=1}^{12} \pi_t \text{Year}_t + \sum_{m=1}^{31} \vartheta_m \text{Country}_m + \varepsilon_{i,t} \quad (7)$$

The results in the models in table 6 are quite similar to those in the previous models and all the significant variables remain significant and with the same signs. However, as we have introduced a new interaction variable, the marginal effect of monetary policy on the growth of loans is now estimated by the following equation:

$$\frac{\partial \Delta \ln(\text{loans})_{i,t}}{\partial \Delta \text{i}_{m,t}} = \beta_2 + \beta_8 SIZE_{i,t-1} + \beta_9 LIQ_{i,t-1} + \beta_{10} CAP_{i,t-1} + \beta_{11} FD_{m,t} + 2\beta_{12} \Delta \text{i}_{m,t} (FD_{m,t})^2 \quad (8)$$

As variables *SIZE*, *LIQ*, and *CAP* are normalized with respect to their means, the marginal effect for an average bank is:

$$\frac{\partial \Delta \ln(\text{loans})_{i,t}}{\partial \Delta \text{i}_{m,t}} = \beta_3 + \beta_{11} FD_{m,t} + 2\beta_{12} \Delta \text{i}_{m,t} (FD_{m,t})^2 \quad (9)$$

[16] Cantero-Saiz et al. (2014) introduced a similar squared interaction variable to capture asymmetric effects of the bank lending channel caused by sovereign risk.

The marginal effect in Equation (9) depends on the value of the monetary policy variable (Δi), so, to check the asymmetric effect between monetary policy contractions and expansions, we have estimated the marginal effects for an average bank in two representative scenarios. In the first scenario the variable Δi takes the value of 1.78%, which is the mean annual increase in Δi in our sample. In the second scenario the variable Δi takes the value of -2.76%, which is the mean decrease in Δi in our sample.[17] The results show that the marginal effects of monetary policy on the growth of loans in relation to financial development are similar to those reported previously (see Figures 5-12). [18] Monetary policy shocks do not seem to affect bank lending in developing countries with poorly developed financial systems. Countries with more developed financial systems are negatively and significantly affected by monetary policy contractions (and positively affected by monetary expansions). Moreover, when financial development rises the negative effects of monetary policy contractions increase again. However, our results do not support asymmetric effects in the monetary policy transmission, as countries with more developed financial systems are more affected by both monetary policy expansions and contractions.

[Insert Table 6]

[Insert Figures 5-12]

Finally, to determine the impact of the global financial crisis on how financial development affects the bank lending channel in developing countries, we estimate the models in table 5 adding two variables: 1) the interaction between the dummy variable CRISIS and the variable Δi, and 2) the interaction between the dummy variable CRISIS and the variable $(\Delta i_{m,t} * FD_{m,t})$. The variable CRISIS takes the value of 1 for the years 2008– 2012 and of 0 otherwise. Therefore, it represents the years after the outbreak of the financial crisis. By adding these two variables, Model (1) can be rewritten as follow:

[17] We have also estimated the marginal effect using different increases/decreases in the short-term money market rate (percentiles 10%, 25%, 50%, 75%, and 90% in our sample) and the results are similar.

[18] Figures 4 and 6 show the marginal effect of monetary policy on the growth of loans when the interest rate decreases. Therefore, as the marginal effect is negative, a decrease in the short-term money market rate will have a positive sign.

$$\Delta \ln(\text{loans})_{i,t} = \beta_0 + \beta_1 \Delta \ln(\text{loans})_{i,t-1} + \beta_2 \Delta \text{i}_{m,t} + \beta_3 (\Delta \text{i}_{m,t} * CRISIS_t)$$
$$* \beta_4 \Delta \ln(\text{GDP})_{m,t} + \beta_5 SIZE_{i,t-1} + \beta_6 LIQ_{i,t-1} + \beta_7 CAP_{i,t-1}$$
$$+ \beta_8 FD_{m,t} + \beta_9 (\Delta \text{i}_{m,t} * SIZE_{i,t-1}) + \beta_{10} (\Delta \text{i}_{m,t} * LIQ_{i,t-1})$$
$$+ \beta_{11} (\Delta \text{i}_{m,t} * CAP_{i,t-1}) + \beta_{12} (\Delta \text{i}_{m,t} * FD_{m,t})$$
$$+ \beta_{13} (\Delta \text{i}_{m,t} * FD_{m,t} * CRISIS_t) + \beta_{14} CONCEN_{m,t} + \beta_{15} ORIENT_{m,t}$$
$$+ \beta_{16} INCOME_{m,t} + \sum_{t=1}^{12} \pi_t \text{Year}_t + \sum_{m=1}^{31} \vartheta_m \text{Country}_m + \varepsilon_{i,t} \quad (10)$$

The marginal effect of monetary policy on the growth of loans prior to the crisis is estimated by the following equation:

$$\frac{\partial \Delta \ln(\text{loans})_{i,t}}{\partial \Delta \text{i}_{m,t}} = \beta_2 + \beta_{12} FD_{m,t} \quad (11)$$

The marginal effect of monetary policy on the growth of loans after the crisis is estimated by the following equation:

$$\frac{\partial \Delta \ln(\text{loans})_{i,t}}{\partial \Delta \text{i}_{m,t}} = \beta_2 + \beta_3 CRISIS_{i,t} + \beta_{12} FD_{m,t} + \beta_{13} (FD_{m,t} * CRISIS_{i,t}) \quad (12)$$

The results, which are reported in Table 7, and Figures 13 to 20, show important differences before and after the financial crisis. Before the crisis, monetary policy changes do not affect banks' loan supply in any country analysed (see Figures 13, 15, 17 and 19). After the crisis, monetary policy changes continue not to affect banks' loan supply in countries with poorly developed financial systems (see Figures 14, 16, 18 and 20). However, the loan supply of countries with more developed financial systems is negatively and significantly affected by monetary policy contractions (and positively affected by monetary policy expansions), which is similar to the results in Table 5 and Figures 1 to 4. Once again, in these countries, the effect of monetary policy changes increases when financial development rises. The difference between the effect before and after the crisis could result from the fact that until the onset of

the financial crisis, banks had easy access to funding, which limited the effectiveness of the bank lending channel[19]. However, after the crisis, banks' access to funding has been more expensive and limited.

[Insert Table 7]

[Insert Figures 13-20]

4. Conclusions

Bank financing plays a pivotal role in promoting economic growth in developing countries. Monetary policy is a key element in determining the banks' loans supply. However, according to the previous literature, the effects that monetary policy changes have on the loan supply depend on the country analysed. Empirical evidence for developing economies tends to support the bank lending channel. As the bank lending channel operates through the financial system, the objective of this paper is to analyse whether the effectiveness of this channel depends on the development of the financial system.

Using a sample of 693 banks from 31 developing countries over the period of 2000 to 2012, we find the loan supply of developing countries with more developed financial systems is negatively and significantly affected by monetary policy contractions (positively affected by monetary policy expansions) only after the financial crisis. These results could indicate that, in these countries, bank deposits are the main financial asset held by households and the main source of bank funding, which increases the effectiveness of the bank lending channel. However, prior to the crisis, monetary policy changes do not affect banks' loan supply in these countries, probably because banks had easy access to funding. Moreover, the loan supply of banks that operate in emerging economies with low developed financial systems is not affected by monetary policy changes either before or after the financial crisis. This might well reflect that, in these countries, bank lending is often constrained and the majority of people and small and medium firms have limited access to bank loans.

Our findings are very interesting for the way monetary policy is conducted. They suggest that central banks in developing countries should take into account the development of the financial systems

[19] According to Romer and Romer (1990), the effect of the bank lending channel is weak when banks can easily use non-deposit sources of funding, such as certificates of deposit or bonds.

when they conduct their monetary policy to stimulate loan supply. Anyway, a further analysis is needed to fully understand the effects of financial development on the transmission mechanism of the monetary policy.

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Table 1. Sample

	Number of observations	Number of banks
ARGENTINA	201	28
ARMENIA	35	5
BOLIVIA	67	10
BRAZIL	622	77
BULGARIA	161	17
CHINA	388	62
COLOMBIA	138	18
EGYPT	167	19
EL SALVADOR	46	8
GEORGIA	77	8
HUNGARY	70	17
INDIA	536	59
INDONESIA	438	50
JORDAN	109	10
MALAYSIA	267	24
MAURITIUS	24	6
MEXICO	209	22
MOROCCO	58	8
PAKISTAN	145	19
PANAMA	173	25
PARAGUAY	55	11
PERU	135	16
PHILIPPINES	117	18
ROMANIA	162	19
SERBIA	145	20
SOUTH AFRICA	63	11
THAILAND	196	20
TUNISIA	36	9
TURKEY	108	22
UKRAINE	254	33
VENEZUELA	130	22
TOTAL	**5,332**	**693**

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	**Total**
N. of banks	158	254	310	367	431	439	463	460	504	538	511	453	444	**5,332**

Table 2. Sample statistics

Variable	Mean	Std. Dev.	Min	Max
$\Delta\ln(loans)_t$	0.2399	0.2975	-2.4125	1.3574
Δi_t	-0.0070	0.0395	-0.3761	0.1554
$\Delta\ln(GDP)_t$	0.0490	0.0390	-0.1602	0.1679
$SIZE_{t-1}$	14.4489	2.0595	8.0311	21.9410
LIQ_{t-1}	0.2938	0.1597	0.0002	0.9250
CAP_{t-1}	0.1256	0.0847	0.0035	0.8881
FD_t	0.0000	1.5218	-4.9640	4.5473
$FDac_t$	0.0000	1.5427	-4.8814	4.5442
$CONCEN_t$	52.0136	14.5507	26.6600	98.9900
$ORIENT_t$	1.7460	1.9018	0.3953	26.0769

Table 3. Correlations

	Δi_t	$\Delta\ln(GDP)_t$	$SIZE_t$	LIQ_t	CAP_t	FD_t	$FDac_t$	CONCEN	ORIENT
Δi_t	1								
$\Delta\ln(GDP)_t$	0.0686	1							
$SIZE_t$	0.0591	0.1117	1						
LIQ_t	0.0008	0.0062	0.1372	1					
CAP_t	-0.0873	-0.1263	-0.4651	-0.0688	1				
FD_t	0.1534	0.2787	0.3885	0.0227	-0.2594	1			
$FDac_t$	0.1521	0.2886	0.4033	0.0277	-0.2733	0.9903	1		
$CONCEN_t$	-0.0589	-0.0627	-0.0404	-0.0392	0.0376	0.1650	0.1689	1	
$ORIENT_t$	-0.0540	-0.0824	-0.2169	-0.1376	0.0581	-0.1849	-0.2223	0.0590	1

Table 4. Financial development statistics by country

	FD (without access)				FDac (with access)			
	Mean	Std. Desv.	Min	Max	Mean	Std. Desv.	Min	Max
ARGENTINA	-1.2668	0.2684	-1.6446	-0.8134	-1.1966	0.2648	-1.5687	-0.7460
ARMENIA	-1.9821	0.2819	-2.3398	-1.4292	-1.9515	0.2763	-2.3029	-1.4142
BOLIVIA	-0.6959	0.0631	-0.8005	-0.6365	-0.5656	0.0603	-0.6644	-0.5081
BRAZIL	-0.4796	0.5353	-1.3423	0.4784	-0.5102	0.5261	-1.3577	0.4265
BULGARIA	-0.6966	0.4523	-1.5113	-0.2278	-1.6486	0.4379	-2.4511	-1.1978
CHINA	2.5765	0.5388	1.4909	3.3273	2.6420	0.5413	1.5631	3.4083
COLOMBIA	-0.9324	0.2924	-1.287	-0.4712	-1.2619	0.2858	-1.6100	-0.8135
EGYPT	0.4776	0.5179	-0.4244	1.168	0.6335	0.5117	-0.2560	1.3143
EL SALVADOR	-0.6477	0.2006	-0.9737	-0.4306	-0.6002	0.1929	-0.9135	-0.3848
GEORGIA	-2.6121	0.7503	-4.964	-2.0713	-2.5812	0.7328	-4.8814	-2.0560
HUNGARY	-0.5412	0.3193	-0.8524	0.174	-0.5190	0.3145	-0.8254	0.1921
INDIA	0.586	0.3589	0.0722	1.1289	0.6871	0.3456	0.1872	1.2164
INDONESIA	-1.0949	0.1139	-1.2479	-0.8764	-0.9272	0.1115	-1.0775	-0.7204
JORDAN	2.3784	0.9859	1.0573	3.8852	2.2581	0.9664	0.9728	3.7302
MALAYSIA	2.467	0.2359	2.0918	3.0341	2.4563	0.2313	2.0924	3.0081
MAURITIUS	1.1036	0.148	0.861	1.2206	0.9935	0.1414	0.7615	1.1067
MEXICO	-0.9678	0.3203	-1.514	-0.5124	-0.9153	0.3118	-1.4423	-0.4705
MOROCCO	1.1182	0.5757	0.195	1.643	1.0347	0.5633	0.1333	1.5397
PAKISTAN	0.2633	0.8251	-1.7027	1.536	0.4208	0.8489	-1.5557	1.7502
PANAMA	1.169	0.1005	0.9692	1.3104	0.9736	0.0952	0.7835	1.1072
PARAGUAY	-2.1296	0.1784	-2.443	-1.9611	-1.9556	0.1770	-2.2667	-1.7898
PERU	-1.0334	0.1885	-1.3547	-0.6198	-0.8769	0.1837	-1.1896	-0.4744
PHILIPPINES	-0.0117	0.2547	-0.3114	0.4354	0.0960	0.2473	-0.1952	0.5297
ROMANIA	-1.4988	0.5347	-2.4108	-0.8972	-1.7492	0.5228	-2.6398	-1.1604
SERBIA	-0.9668	0.3171	-1.6502	-0.5817	-1.2812	0.3061	-1.9403	-0.9090
SOUTH AFRICA	4.0488	0.2684	3.8166	4.5473	4.0553	0.2634	3.8265	4.5443
THAILAND	1.3314	0.3543	0.9059	2.0895	1.4001	0.3445	0.9843	2.1323
TUNISIA	0.3676	0.1131	0.1824	0.4811	0.3619	0.1102	0.1810	0.4709
TURKEY	0.1226	0.2774	-0.307	0.463	0.1491	0.2713	-0.2798	0.4826
UKRAINE	-1.1783	0.6364	-2.5647	-0.1889	-0.9709	0.6187	-2.3155	-0.0097
VENEZUELA	-2.9618	0.7291	-3.8422	-1.8956	-2.9171	0.7099	-3.7777	-1.8795

Table 5. Results

	(a)	(b)	(c)	(d)
	FD (without access)	FDac (with access)	FD (without access)	FDac (with access)
$\Delta ln(loans)_{t-1}$	0.2757 ***	0.2742 ***	0.2695 ***	0.2672 ***
	(5.95)	(5.97)	(6.02)	(6.05)
Δi_t	-2.1754 **	-1.9867 **	-1.9934 **	-1.7991 **
	(-2.09)	(-2.10)	(-2.09)	(-2.07)
$\Delta ln(GDP)_t$	1.4536 ***	1.4608 ***	1.4242 ***	1.4369 ***
	(4.94)	(4.99)	(4.94)	(5.00)
$SIZE_{t-1}$	-0.0295	-0.0274	-0.0297	-0.0263
	(-0.70)	(-0.66)	(-0.67)	(-0.60)
LIQ_{t-1}	-0.3758	-0.3729	-0.4126	-0.4055
	(-1.31)	(-1.31)	(-1.49)	(-1.48)
CAP_{t-1}	-0.3438	-0.3655	-0.2459	-0.264
	(-0.49)	(-0.53)	(-0.36)	(-0.39)
FD_t	-0.0425 **		-0.0459 **	
	(-2.45)		(-2.31)	
$FDac_t$		-0.0429 **		-0.0477 **
		(-2.40)		(-2.33)
$\Delta i_t * SIZE_{t-1}$	1.894 *	1.7979	1.7534 *	1.6488 *
	(1.66)	(1.64)	(1.68)	(1.65)
$\Delta i_t * LIQ_{t-1}$	-17.8939 *	-17.8932 *	-17.7836 *	-17.6832 *
	(-1.93)	(-1.93)	(-1.95)	(-1.95)
$\Delta i_t * CAP_{t-1}$	53.4065	51.1666	48.446	45.831
	(1.28)	(1.24)	(1.27)	(1.22)
$\Delta i_t * FD_t$	-0.6268		-0.5815	
	(-1.46)		(-1.47)	
$\Delta i_t * FDac_t$		-0.5093		-0.4654
		(-1.29)		(-1.28)
$CONCEN_t$			0.0018 *	0.0019 *
			(1.83)	(1.89)
$ORIENT_t$			-0.0234 ***	-0.0235 ***
			(-2.82)	(-2.99)
$INCOME_t$			0.0618	0.0525
			(1.36)	(1.14)
Cons	0.1414 *	0.1387 *	0.0574	0.0563
	(1.70)	(1.70)	(0.56)	(0.56)
Country	85.03 ***	85.78 ***	99.14 ***	101.26 ***
Year	105.73 ***	105.98 ***	104.64 ***	105.39 ***
m2	-0.44	-0.41	-0.35	-0.31
	[0.66]	[0.68]	[0.73]	[0.75]
Hansen	8.18	8.07	8.66	8.54
	[0.22]	[0.23]	[0.19]	[0.20]

Coefficients associated with each variable. In brackets, T-student; *** indicates a level of significance of 0.01, ** indicates a level of significance of 0.05, * indicates a level of significance of 0.1; Country: Wald's test of the joint significance of the country's dummy variables. Year: the Wald's test of the joint significance of the year's dummy variables; m2 is a serial correlation test of second order (in square brackets, p-value). Hansen is a test of the over-identifying restrictions (in square brackets, p-value).

Table 6. Results- Asymmetric effects

	(a)		(b)		(c)		(d)	
	FD (without access)		FDac (with access)		FD (without access)		FDac (with access)	
$\Delta ln(loans)_{t-1}$	0.2761	***	0.2746	***	0.2697	***	0.2674	***
	(5.91)		(5.92)		(5.99)		(6.01)	
Δi_t	-2.2405	**	-2.0433	**	-2.0473	**	-1.847	**
	(-2.13)		(-2.13)		(-2.12)		(-2.1)	
$\Delta ln(GDP)_t$	1.6534	***	1.6502	***	1.6005	***	1.6081	***
	(5.80)		(5.89)		(5.66)		(5.77)	
$SIZE_{t-1}$	-0.0302		-0.0282		-0.0312		-0.028	
	(-0.71)		(-0.67)		(-0.71)		(-0.64)	
LIQ_{t-1}	-0.3995		-0.3956		-0.4321		-0.4243	
	(-1.35)		(-1.33)		(-1.51)		(-1.49)	
CAP_{t-1}	-0.3106		-0.3338		-0.2199		-0.2374	
	(-0.44)		(-0.48)		(-0.32)		(-0.35)	
FD_t	-0.0351	*			-0.0387	*		
	(-1.92)				(-1.92)			
$FDac_t$			-0.0358	*			-0.0407	**
			(-1.93)				(-1.99)	
$\Delta i_t * SIZE_{t-1}$	1.8882	*	1.8008	*	1.7466	*	1.6516	*
	(1.69)		(1.67)		(1.70)		(1.68)	
$\Delta i_t * LIQ_{t-1}$	-18.5027	*	-18.5295	*	-18.2737	*	-18.1738	*
	(-1.93)		(-1.92)		(-1.95)		(-1.93)	
$\Delta i_t * CAP_{t-1}$	55.8927		53.5337		50.6424		48.0329	
	(1.35)		(1.32)		(1.34)		(1.30)	
$\Delta i_t * FD_t$	-0.7574				-0.6956			
	(-1.57)				(-1.58)			
$\Delta i_t * FDac_t$			-0.641				-0.5837	
			(-1.45)				(-1.43)	
$(\Delta i_t * FD_t)^2$	0.795				0.7153			
	(1.21)				(1.14)			
$(\Delta i_t * FDac_t)^2$			0.7816				0.7196	
			(1.19)				(1.16)	
$CONCEN_t$					0.0016	*	0.0017	*
					(1.66)		(1.74)	
$ORIENT_t$					-0.0239	***	-0.0243	***
					(-2.93)		(-3.19)	
$INCOME_t$					0.0578		0.0489	
					(1.26)		(1.04)	
Cons	0.1146		0.1122		0.0476		0.0468	
	(1.41)		(1.38)		(0.47)		(0.47)	
Country	77.62	***	76.29	***	101.8	***	93.49	***
Year	102.49	***	102.78	***	93.61	***	102.51	***
m2	-0.4		-0.39		-0.32		-0.3	
	[0.69]		[0.698]		[0.74]		[0.761]	
Hansen	7.8		7.7		8.41		8.3	
	[0.25]		[0.261]		[0.21]		[0.217]	

Coefficients associated with each variable. In brackets, T-student; *** indicates a level of significance of 0.01, ** indicates a level of significance of 0.05, * indicates a level of significance of 0.1; Country: Wald's test of the joint significance of the country's dummy variables. Year: the Wald's test of the joint significance of the year's dummy variables; m2 is a serial correlation test of second order (in square brackets, p-value). Hansen is a test of the over-identifying restrictions (in square brackets, p-value).

Table 7. Results – Crisis

	(a)	(b)	(c)	(d)
	FD (without access)	FDac (with access)	FD (without access)	FDac (with access)
$\Delta ln(loans)_{t-1}$	0.2737 ***	0.2745 ***	0.2688 ***	0.2688 ***
	(5.76)	(5.86)	(5.87)	(5.99)
Δi_t	-1.7271	-1.5017	-1.4923	-1.2594
	(-0.94)	(-0.90)	(-0.90)	(-0.84)
$\Delta i_t * CRISIS_t$	-0.1576	-0.3523	-0.3138	-0.5098
	(-0.08)	(-0.19)	(-0.17)	(-0.30)
$\Delta ln(GDP)_t$	1.4834 ***	1.4986 ***	1.4668 ***	1.4862 ***
	(5.18)	(5.54)	(5.25)	(5.60)
$SIZE_{t-1}$	-0.0247	-0.0224	-0.0228	-0.0191
	(-0.59)	(-0.55)	(-0.52)	(-0.44)
LIQ_{t-1}	-0.3684	-0.3619	-0.3909	-0.3816
	(-1.35)	(-1.35)	(-1.49)	(-1.48)
CAP_{t-1}	-0.4661	-0.4724	-0.3619	-0.3634
	(-0.68)	(-0.69)	(-0.54)	(-0.55)
FD_t	-0.0465 ***		-0.051 ***	
	(-2.78)		(-2.71)	
$FDac_t$		-0.0468 ***		-0.0529 ***
		(-2.82)		(-2.82)
$\Delta i_t * SIZE_{t-1}$	1.5225	1.4551	1.4046	1.3300
	(1.38)	(1.41)	(1.41)	(1.42)
$\Delta i_t * LIQ_{t-1}$	-18.3338 **	-18.2882 **	-18.0175 **	-17.8959 **
	(-2.05)	(-2.05)	(-2.05)	(-2.05)
$\Delta i_t * CAP_{t-1}$	39.9532	38.4803	35.9179	34.1235
	(0.99)	(0.98)	(0.98)	(0.96)
$\Delta i_t * FD_t$	-0.4813		-0.4182	
	(-0.69)		(-0.67)	
$\Delta i_t * FDac_t$		-0.3592		-0.2950
		(-0.58)		(-0.53)
$\Delta i_t * FD_t * CRISIS_t$	-0.0971		-0.1122	
	(-0.11)		(-0.14)	
$\Delta i_t * FDac_t * CRISIS_t$		-0.1083		-0.1328
		(-0.12)		(-0.17)
$CONCEN_t$			0.0021 **	0.0022 **
			(2.26)	(2.42)
$ORIENT_t$			-0.021 **	-0.0214 ***
			(-2.58)	(-2.82)
$INCOME_t$			0.0512	0.0411
			(1.13)	(0.90)
Cons	0.1331 *	0.1344 *	0.039	0.0426
	(1.68)	(1.71)	(0.44)	(0.50)
Country	73.67 ***	76.25 ***	90.85 ***	94.89 ***
Year	135.4 ***	142.71 ***	136.5 ***	143.27 ***
m2	-0.09	-0.09	-0.01	0.00
	[0.93]	[0.92]	[0.99]	[0.99]
Hansen	8.78	8.58	9.19	8.96
	[0.18]	[0.19]	[0.16]	[0.17]

Coefficients associated with each variable. In brackets, T-student; *** indicates a level of significance of 0.01, ** indicates a level of significance of 0.05, * indicates a level of significance of 0.1; Country: Wald's test of the joint significance of the country's dummy variables. Year: the Wald's test of the joint significance of the year's dummy variables; m2 is a serial correlation test of second order (in square brackets, p-value). Hansen is a test of the over-identifying restrictions (in square brackets, p-value).

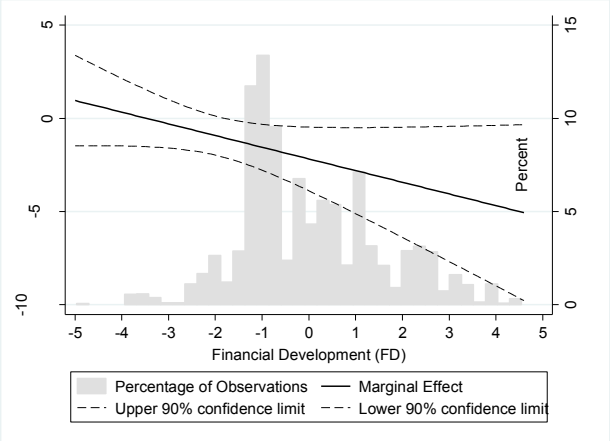

Fig. 1. Marginal effect of monetary policy on the growth of loans in relation to financial development. Based on model (a), Table 5.

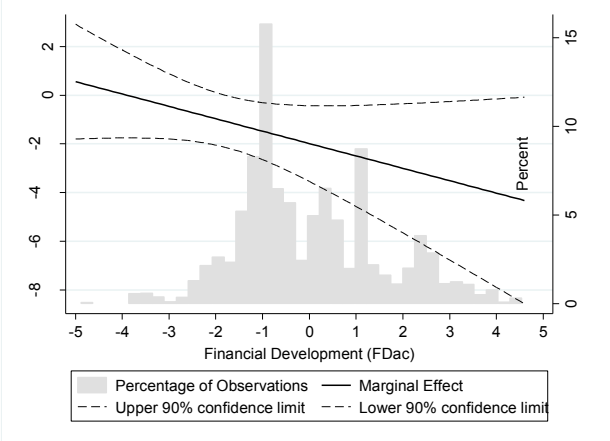

Fig. 2. Marginal effect of monetary policy on the growth of loans in relation to financial development. Based on model (b), Table 5.

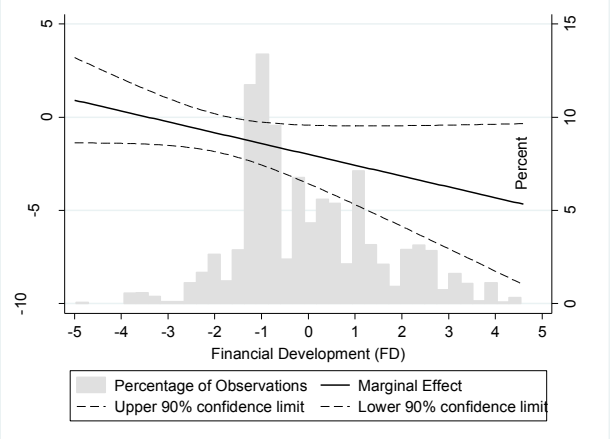

Fig. 3. Marginal effect of monetary policy on the growth of loans in relation to financial development. Based on model (c), Table 5.

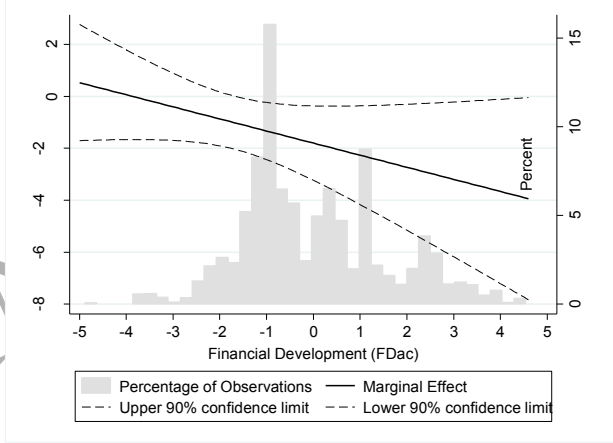

Fig. 4. Marginal effect of monetary policy on the growth of loans in relation to financial development. Based on model (d), Table 5.

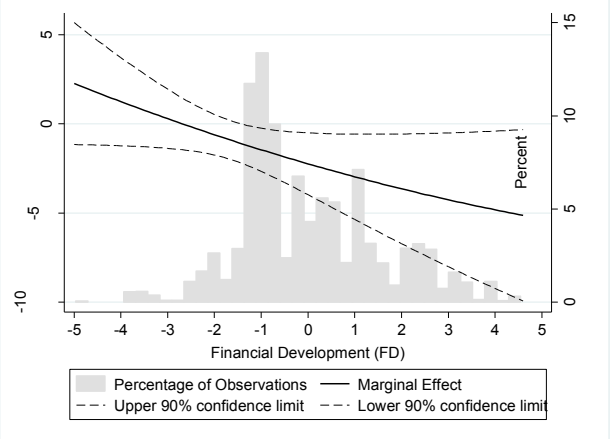

Fig. 5. Marginal effect of monetary policy on the growth of loans in relation to financial development when short-term money market rate increases by 1.78%. Based on model (a), Table 6.

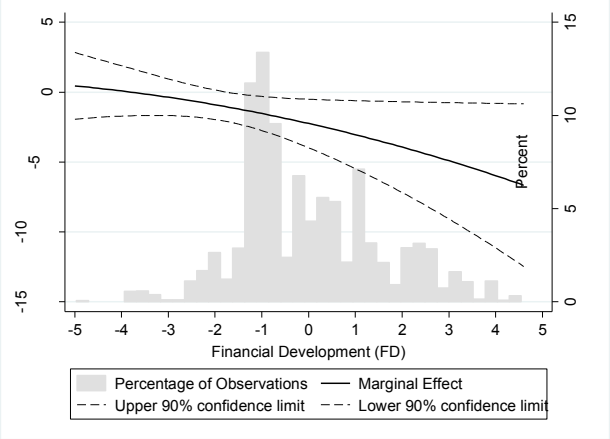

Fig. 6. Marginal effect of monetary policy on the growth of loans in relation to financial development when short-term money market rate decreases by 2.76%. Based on model (a), Table 6.

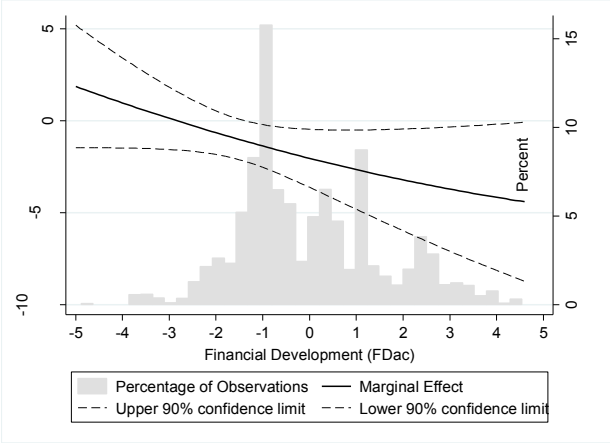

Fig. 7. Marginal effect of monetary policy on the growth of loans in relation to financial development when short-term money market rate increases by 1.78%. Based on model (b), Table 6.

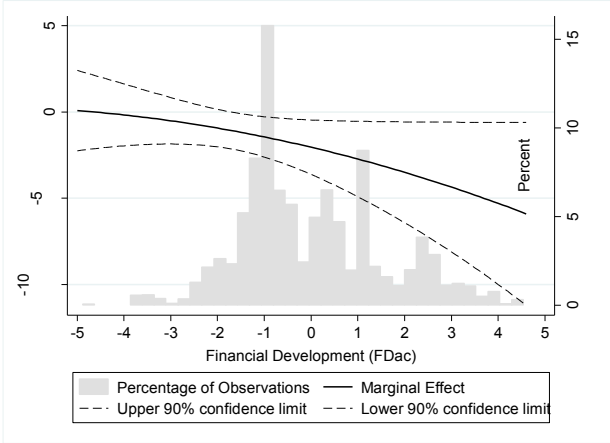

Fig. 8. Marginal effect of monetary policy on the growth of loans in relation to financial development when short-term money market rate decreases by 2.76%. Based on model (b), Table 6.

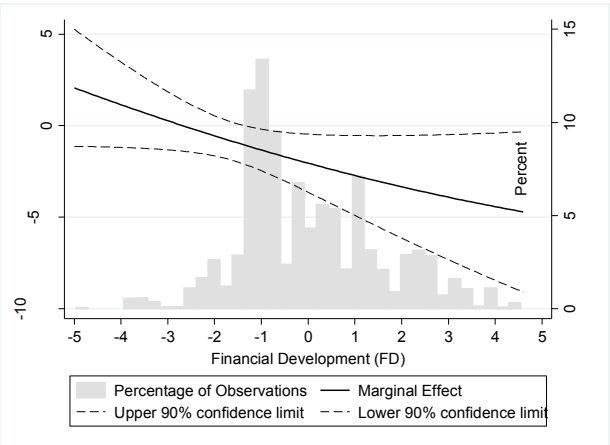

Fig. 9. Marginal effect of monetary policy on the growth of loans in relation to financial development when short-term money market rate increases by 1.78%. Based on model (c), Table 6.

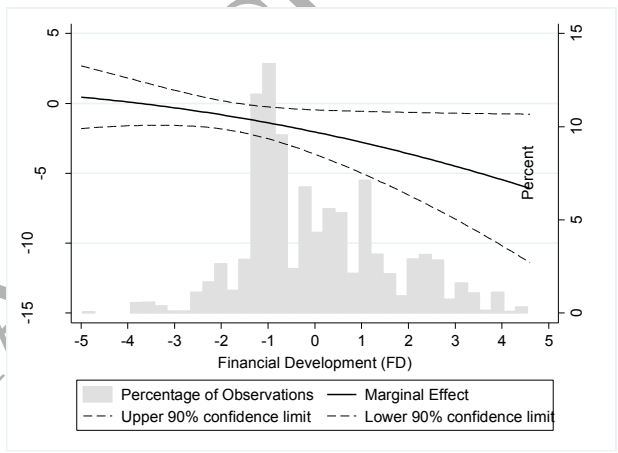

Fig. 10. Marginal effect of monetary policy on the growth of loans in relation to financial development when short-term money market rate decreases by 2.76%. Based on model (c), Table 6.

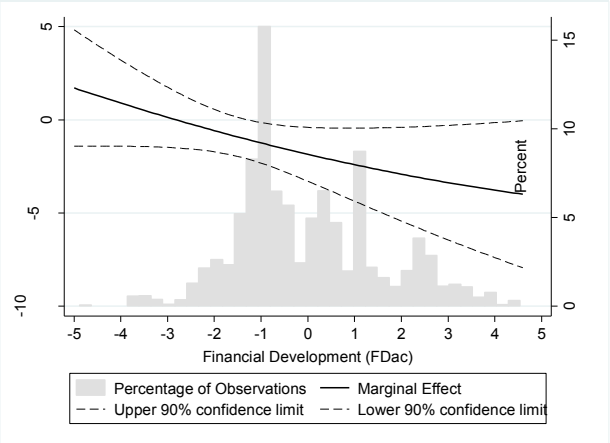

Fig. 11. Marginal effect of monetary policy on the growth of loans in relation to financial development when short-term money market rate increases by 1.78%. Based on model (d), Table 6.

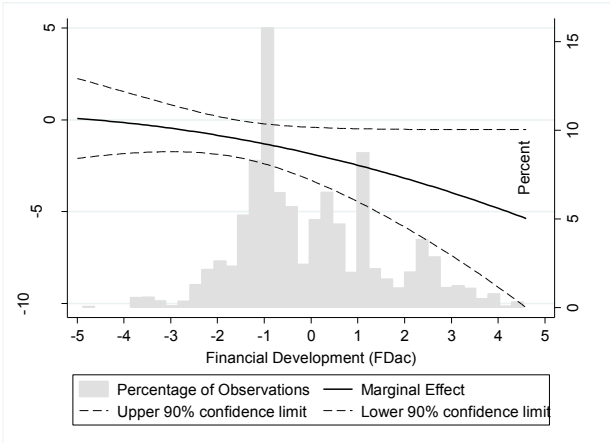

Fig. 12. Marginal effect of monetary policy on the growth of loans in relation to financial development when short-term money market rate decreases by 2.76%. Based on model (d), Table 6.

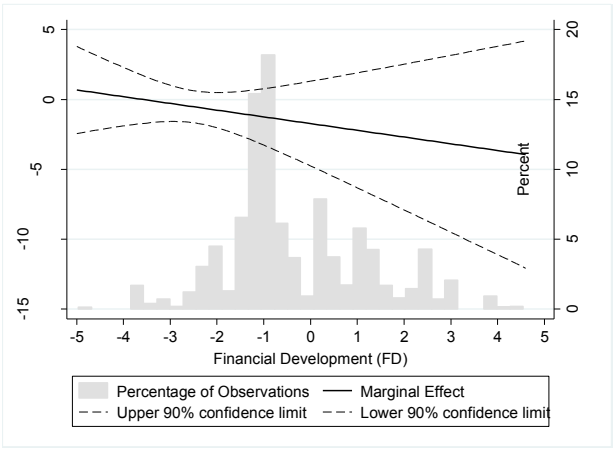

Fig. 13. Marginal effect of monetary policy on the growth of loans in relation to financial development. Percentage of observations before the crisis. Based on model (a), Table 7 (Before the crisis).

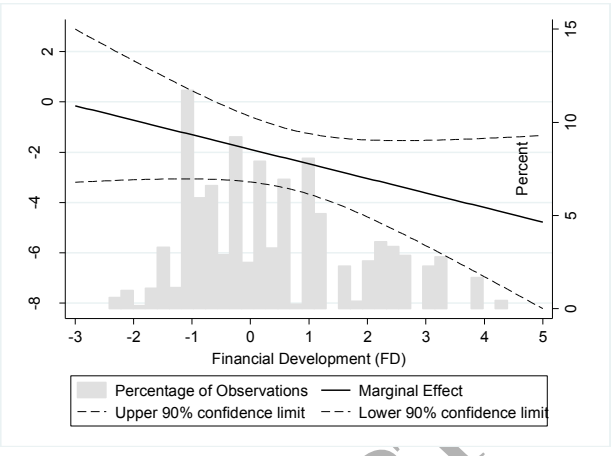

Fig. 14. Marginal effect of monetary policy on the growth of loans in relation to financial development. Percentage of observations after the crisis. Based on model (a), Table 7 (After the crisis).

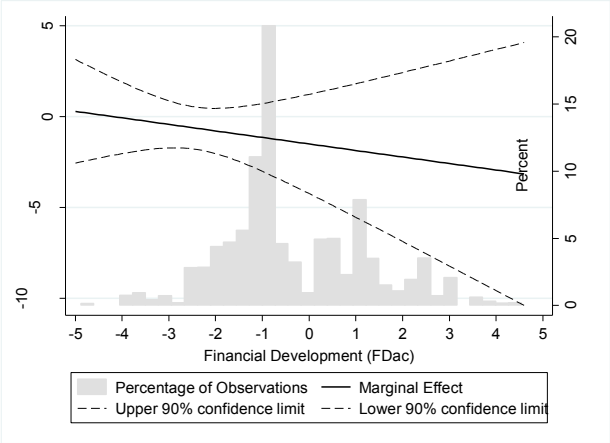

Fig. 15. Marginal effect of monetary policy on the growth of loans in relation to financial development. Percentage of observations before the crisis. Based on model (b), Table 7 (Before the crisis).

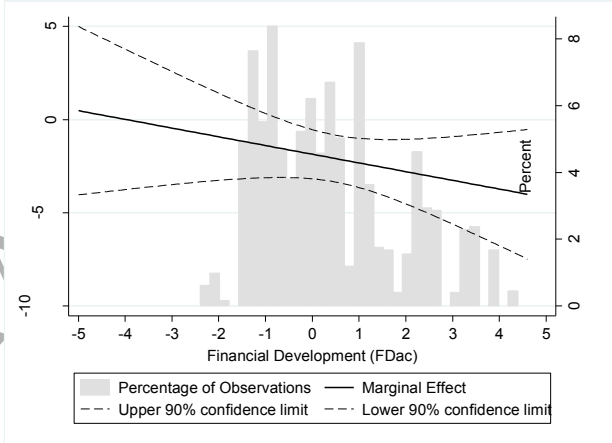

Fig. 16. Marginal effect of monetary policy on the growth of loans in relation to financial development. Percentage of observations after the crisis. Based on model (b), Table 7 (After the crisis).

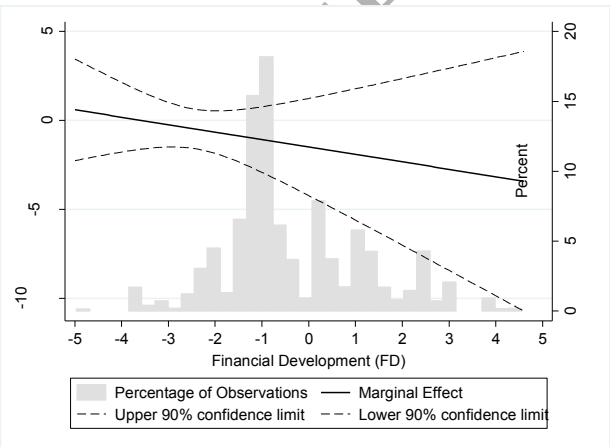

Fig. 17. Marginal effect of monetary policy on the growth of loans in relation to financial development. Percentage of observations before the crisis. Based on model (c), Table 7 (Before the crisis).

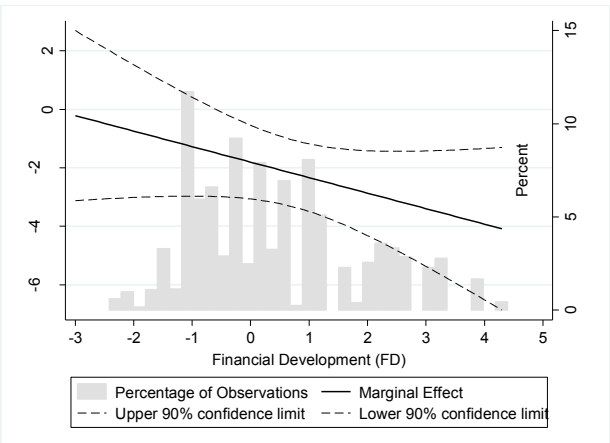

Fig. 18. Marginal effect of monetary policy on the growth of loans in relation to financial development. Percentage of observations after the crisis. Based on model (c), Table 7 (After the crisis).

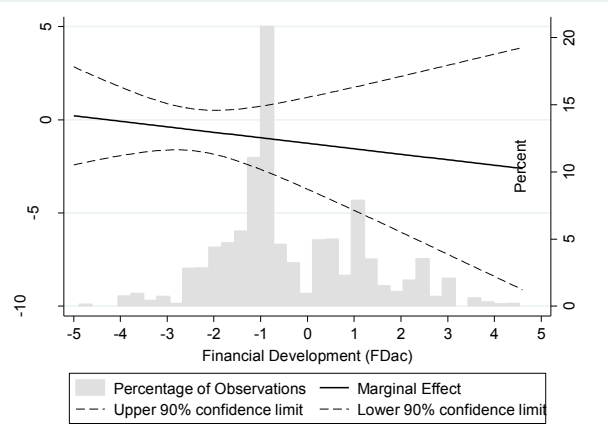

Fig. 19. Marginal effect of monetary policy on the growth of loans in relation to financial development. Percentage of observations before the crisis. Based on model (d), Table 7 (Before the crisis).

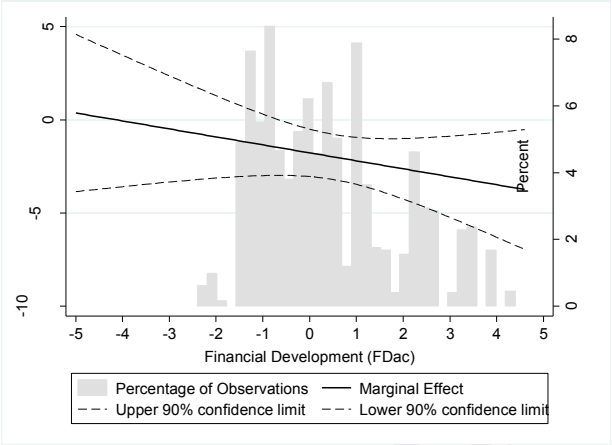

Fig. 20. Marginal effect of monetary policy on the growth of loans in relation to financial development. Percentage of observations after the crisis. Based on model (d), Table 7 (After the crisis).