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More inclusive, more stable? The financial inclusion - stability nexus in the global financial crisis

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The financial inclusion - stability nexus in the global financial crisis

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Abstract

Recently, it has been argued that financial inclusion contributes to financial stability. This paper assesses the relationship between inclusion and stability in the global financial crisis based on a sample of 75 countries. We find that a higher level of financial inclusion has a moderating effect on the credit crunch in the crisis. However, financial inclusion itself is subject to a boom-bust cycle as stronger borrower growth in the pre-crisis period is followed by a deeper drop in borrower growth in the crisis. Finally, rising levels of financial inclusion before the crisis do not enhance stability if associated with rapid credit growth. Overall, our results provide only partial support for the hypothesis that financial inclusion contributes to financial stability.

JEL classification: G01, G21, O16

Key words: Financial inclusion, financial stability, financial crisis

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1. Introduction

It may be regarded as one of the greatest paradoxes in modern financial history: a few years after the global financial system had been on the brink of collapse, only saved by massive interventions of governments and central banks (Laeven and Valencia 2012), global leaders have called for action to expand the number of participants in this very system (G20 2010). Raising financial inclusion, i.e. the number of individuals and firms using formal financial sector services (Demirgüc-Kunt 2014) has become a key objective in the post-2015 Development Agenda (GPFI 2016).

The paradox can be solved by arguing that financial inclusion has substantial benefits for agents and the economy as a whole. If these benefits outweigh the costs associated with instability, financial inclusion is a valid policy approach. However, it is also argued that under "well-designed financial policies" (Dema 2015) inclusion will have a direct positive impact on financial stability. Thus, vigorously pursuing the financial inclusion agenda might not involve trade-offs but create a win-win situation: it provides benefits in terms of growth and development but also enhances the stability of the financial system (GPFI 2012, Rahman 2014).

This paper contributes to the emerging literature on the financial inclusion-stability nexus by testing whether and to what extent financial inclusion has mitigated the credit crunch that followed the global financial crisis. In doing so we take into account that financial instability on a systemic level is strongly associated with credit booms in the pre-crisis period (Mendoza and Terrones 2008, Schularick and Taylor 2012, Feldkircher 2014).[1] We measure the level of financial inclusion by the number of borrowers from commercial banks, expressed as a

[1] The destabilizing impact of rapid credit growth has also been observed for individual institutions; see e.g. Foos et al. (2010), Vazquez and Federico (2015).

percentage of the adult population. Progress in financial inclusion is depicted by the borrower growth rate. Our main indicator of financial instability is the severity of the credit crunch following the Lehman collapse, i.e. the difference between real credit growth in the last pre-crisis year, 2007, and real credit growth during the crisis, in 2009. We run OLS regressions based on a sample with a maximum size of 75 countries. Concretely, we test whether a higher level of financial inclusion and/or progress in financial inclusion in the pre-crisis period moderate the 2008/2009 credit crunch, controlling for the size of pre-crisis credit boom, i.e. average real credit growth in 2004-2007. In addition, we analyze whether financial inclusion itself is subject to a boom-bust pattern, i.e. whether the fall in borrower growth observed during the crisis is linked to stronger borrower growth in the pre-crisis period. In addition to pre-crisis credit growth we control for a range of banking, macroeconomic and structural indicators of the respective economies.

We find evidence that a higher level of financial inclusion had a moderating effect on the credit bust in 2009 given the size of the pre-crisis boom. Thus, the destabilizing impact of rapid credit growth was mitigated by a higher level of financial inclusion. However, countries with a more rapid rising level of financial inclusion in the pre-crisis years did not earn an inclusion dividend in the crisis as it had no moderating impact on the depth of the credit crunch in 2008/2009. Thus, results indicate that policymakers should not become complacent about credit booms when they are accompanied by rising levels of financial inclusion. Finally, there is evidence suggesting that financial inclusion itself is subject to boom-bust phenomena. Countries that record strong progress in financial inclusion in the pre-crisis years suffer a larger setback in the crisis years. Overall, our analysis provides some support for the view that banking sectors serving more

borrowers are less prone to financial instability. At the same time, the financial stability risks of credit booms do not decline when accompanied by rising inclusion.

Our results are subject to several caveats. First, the analysis is based on a limited country sample, as the compilation of data on financial inclusion started only in the early 2000s (Demirgüc-Kunt 2014). Second, also due to data limitations, we focus on cross-country OLS regressions. This implies that our results are subject to endogeneity and omitted variable concerns.[2] For example, credit growth in the pre-crisis period might at least partly be driven by progress in financial inclusion. In addition, the stability-enhancing effect of a higher level of financial inclusion might reflect a stronger political will by governments and central banks to address financial instability, given the high degree of inclusion. Thus, more research is needed to disentangle the direct effects of financial inclusion on financial stability from indirect effects that might arise via various transmission channels.

2. Related literature

Financial inclusion ranks high on the global development agenda. Various fora and institutions, such as the Global Partnership of Financial Inclusion (GPFI), the Consultative Group for the Assistance of the Poor (CGAP) or the Alliance for Financial Inclusion (AFI), argue that extending "access to finance is the first building block for people to build a better life." (World Bank 2016). This conclusion is based on evidence demonstrating that the poor make substantial use of finance in managing their daily lives (Collins et al. 2009). However, these financial

[2] These concerns are not uncommon when exploring in more detail the impact of financial variables on growth or stability (Beck et al 2014).

services are largely provided by an unreliable and expensive informal financial sector. Hence, replacing informal with formal financial sector services is likely to raise income and welfare of the poor[3] making inclusive finance an area where the benefits of finance for society are still beyond doubt (Zingales 2015).[4]

However, empirical studies on the impact of financial inclusion provide rather mixed results. While there is evidence of growth-enhancing effects of an expansion of bank branch networks for India and Mexico (Burgess and Pande 2005, Bruhn and Love 2014) and for bank branch outreach in Morocco (Fafchamps and Schündeln 2013), other studies fail to find transformative effects of access to credit – mainly provided by microfinance institutions – on client income and employment (Duvendack et al. 2011, Banerjee et al. 2015).[5] The evidence is also inconclusive on the macro level, i.e. whether country-wide improvements in financial inclusion are associated with higher growth and lower poverty and inequality (Honohan 2008, Mookerjee and Kalipioni 2010, Sahay et al. 2015). Against this background, the policy goal of a higher level of financial inclusion might be questioned if participating in the formal financial sector were to expose the new users of formal financial sector services to financial instability (Aitken 2013).

More recently, however, the policy case for financial inclusion has been made by arguing that a higher level of financial inclusion might deliver financial stability benefits (Hannig and Jansen

[3] Having said this, theory and empirical evidence suggest that the interplay between the formal and the informal financial sector is not only characterized by substitution but also by complementarity (see e.g. Guérin et al. 2011, Madestam 2014, Islam et al. 2015) .

[4] See, however, Guérin et al. 2012, indicating that switching from informal to formal finance might not always be client welfare enhancing. In a similar vein, the long-held consensus view on a positive relationship between finance and growth has recently been qualified, as new empirical evidence suggests that the relationship between finance and growth might be non-linear and/or subject to the concrete form of finance, i.e. household or business finance (Arcand et al. 2012, Beck, R. et al. 2014, Beck, T. et al. 2014, Beck 2015, Cecchetti and Kharroubi 2012, Manganelli and Popov 2013, Rioja and Valev 2004, Rousseau and Wachtel 2011, Sassi and Gasmi 2014).

[5] Positve effects of financial inclusion are more pronounced with regard to consumption smoothing and risk management opportunities.

2010, GFPI 2012). Diversification effects with regard to loans and deposits are identified as the main transmission channel that lead from a higher level of financial inclusion to a more stable financial system (Cull et al. 2012). The theoretical basis for stability-enhancing diversification effects on the asset side is strong, as a diversified loan portfolio provides a key argument in explaining the *raison d'etre* of financial intermediation (Diamond 1984).[6]

The financial inclusion literature provides empirical evidence supporting this proposition. For example, Adasme et al. (2006) find for Chile that the quality of bank loan portfolios consisting of many small loans behaves less cyclically than the quality of portfolios composed of large loans. Running a dynamic panel estimation over the period 2005 – 2011 Morgan and Portines (2014) show that countries with a higher level of financial inclusion, measured as the share of SME loans in the volume of outstanding loans issued by commercial banks, record a higher degree of banking sector stability, with the Z-score and the non-performing loan ratio serving as financial stability indicators. The positive message on the financial inclusion – stability nexus with regard to lending is qualified by results suggesting that the impact of a higher level of financial inclusion on financial stability might be non-linear and moderated by the quality of banking supervision (Sahey et al. 2015). In countries with a low level of supervisory quality a higher level of financial inclusion is associated with lower Z-scores, i.e. more instable banks.

The global financial crisis was mainly triggered by a withdrawal of wholesale deposits, i.e. a run on banks by banks, rather than by a withdrawal of retail deposits (Huang and Ratnovski 2011, Craig and Dinger 2013, Gertler, Kiyotaki and Prestipino 2015, Baselga-Pascual et al. 2015). Against this background, it has been argued that broadening the retail deposit base by raising the

[6] See, however, Battiston et al (2012) for theoretical arguments suggesting that credit risk diversification might not always reduce but could even increase financial stability risks. At least with regard to international diversification of banks the empirical evidence on the diversification-stability nexus is mixed (Gulamhussen et al. 2014).

level of financial inclusion will enhance financial stability (Khan 2011). The argument is reinforced by evidence indicating that the poor show a more stable deposit behavior than richer clients (Abakaeva and Glisovic 2009). However, it remains unclear whether the stability advantage of retail deposits in the global financial crisis reflects an inherently less cyclical behavior among small and poor retail depositors compared to wholesale funders, or whether the relative stability in the retail deposit market has been a result of deposit insurance and lender of last resort activities by central banks (Anginer et al. 2014, Demirgüç-Kunt et al. 2015a).[7] Moreover, the run on *Northern Rock* demonstrates that the stability of retail deposits can be undermined by the instability of wholesale funding (Shin 2009).[8] Thus, foregoing or limiting wholesale funding might represent a more promising avenue in addressing the stability risks of wholesale funding than a broadening of the depositor base via financial inclusion efforts. This also holds for institutions heavily engaged in financial inclusion activities as they often rely to a significant extent on wholesale funding "exposing both lenders and borrowers in the event of market-wide deleveraging." (Basel Committee on Banking Supervision (2015, 26).

Empirically, the stability enhancing view of financial inclusion via the deposit side receives support from Han and Melecky (2013). Based on a sample of 95 countries they provide cross-country evidence showing that the maximum size of deposit withdrawals over the period 2007 – 2010, the proxy for financial instability, is significantly negatively related to the level of financial inclusion.

[7] Gorton (2008) argues that the 2007 panic in US wholesale markets can be explained by the same arguments that explain the 1907 panic in US retail markets. At that time neither deposit insurance nor a lender of last resort existed.
[8] In Germany the Chancellor and the Minister of Finance issued a blanket guarantee for all deposits held at German banks after being confronted with the possible collapse of *Hypo Real Estate* , a bank which almost exclusively relied on wholesale funding, and signs of retail deposit withdrawals two weeks after the default of *Lehman Brothers* (Dietrich and Vollmer 2012, Engineer et al. 2013).

However, theory also suggests that the process of financial inclusion, i.e. reaching a higher level of financial inclusion, might be prone to financial instability. One argument supporting this view refers to a decline in lending standards when banks engage in credit activities related to new, unknown as supposed to existing, known borrowers (Dell'Ariccia and Marquez 2006). Confronted with a large pool of unknown borrowers banks might reduce costly screening activities because the borrower pool includes fewer applicants that were rejected at other banks, thus making adverse selection problems less severe. After the former unknown borrowers have become known customers, screening activities become profitable again. Hence, lending standards increase and the banking sector becomes more stable. Accordingly, the process of making the banking sector more inclusive might raise financial stability risks, while banking sectors which have achieved a higher level of inclusion should be more stable.

Alternatively, the financial stability implications of a rapid rise in financial inclusion can be compared to those of financial innovations (Beck et al. 2015). While bank loans and deposits do not represent new products, a rapid rise in financial inclusion indicates that new service providers such as microfinance banks or mobile money operators as well as new clients have entered the market. These new players might undervalue the risks associated with established products "because of the lack of data on the default and performance records" (Boz and Mendoza 2014) and lack of prior financial experience or financial literacy (Klapper et al. 2013).[9]

The years preceding the global financial crisis provide some anecdotal evidence supporting concerns that a rapid rise in financial inclusion might lead to financial instability. In Eastern Europe the episode involved consumer and business credit (Arcalean et al. 2007, Klapper et al.

[9] Mobile money is an example where financial inclusion and financial innovation go hand in hand (Mehrotra and Yetman 2015) raising questions about the proper response of supervisors and regulators and triggering a debate about financial stability implications (Dittus and Klein 2011, Khiaonarong, T. 2014, GPFI 2016)

2013), in the US the parallel growth in inclusion and credit was related to subprime mortgage financing (Greenspan 1997, Gramlich 2007, Reinhart and Rogoff 2008). Moreover, several crises in microfinance markets such as Bosnia and Herzegovina, Morocco and Nicaragua can be linked to fast borrower growth in the pre-crises years (Chen et al. 2010).[10] This indicates that "promoting credit for all at all cost can lead to greater financial and economic instability" (Demirgüc-Kunt 2014, 349).

Finally, financial instability might undermine the progress in inclusion achieved in the pre-crisis period.[11] In the three countries that recently experienced a crisis in the microfinance sector, the number of borrowers declined substantially in the crisis (Figure 1). Thus, financial inclusion might be subject to similar patterns of booms and busts which the literature has firmly identified for credit.

- Insert Figure 1 about here -

Overall, the review of the literature leads to three hypotheses on the financial inclusion – stability nexus, namely:

H1: Financial inclusion follows similar boom-bust cycles as financial development.

H2: A higher level of financial inclusion enhances financial stability.

[10] Financial history also provides several case studies when a rapid rise in financial inclusion contributed to financial instability; see e.g. Kranton and Swamy (1999).
[11] Similar evidence has been found for the financial development – stability nexus, as episodes of financial instability "leave a substantial and lasting imprint on financial development." (de la Torre et al. 2013, 14).

H3a: A stronger rise in financial inclusion, depicted by the number of borrowers, is associated with a higher degree of financial instability.

H3b: A stronger rise in financial inclusion is associated with a higher degree of financial instability.

We test these hypotheses largely following the methodology employed by Han and Melecky (2013). However, as we define financial instability by the fall in credit growth after an extended period of strong credit growth, our focus is on credit volatility rather than the size of deposit withdrawals. There are three motivations for this approach. First, there is strong evidence for the proposition that credit booms predict financial instability on a systemic level (Mendoza and Terrones 2008, Schularick and Taylor 2012). Booming credit coupled with weakening fundamentals leads to instability and turmoil as uninformed depositors and funders of financial institutions become concerned about the solvency prospects of banks. Thus, they play safe and withdraw (Bagehot 1873, Calomiris and Gorton 1991, Calomiris and Kahn 1991, Shin 2009). The global financial crisis serves as a reminder that this can happen in a way largely unrelated to the actual solvency status of banks or banking sectors.[12] Against this background, we do not adopt bank solvency indicators, like the Z-Score, as financial instability proxies. Rather, we use the Z-score as a control variable, as, arguably, financial stability risks associated with rapid credit growth are larger in weaker banking sectors.

[12] Countries experiencing a banking crisis in 2007-2009 as recorded in the Laeven-Valencia (2012) database show an average Z-score of 12.9 in 2006 while the average Z-score for non-crisis countries is 15.4. Vazquez and Federico (2015) provide mixed evidence on the explanatory power of the Z-score in probit regressions predicting bank failures in the global financial crisis. Results are more favorable in the analysis by Chiaramonte et al. (2015). Finally, in Caprio et al. (2014) the Z-score measure is insignificant in all country- and bank-level probit regressions that aim at explaining crises of banking sectors or individual banks.

Second, there is evidence suggesting that "loans and mortgages appear to be better drivers for financial inclusion than saving products" (Clamara et al. 2014). Thus, also from a financial inclusion perspective it seems useful to focus on banks' lending activities when deciphering the links between financial inclusion and stability. Third, as already discussed, the incidence and depth of deposit withdrawals is likely to reflect strength and timing of stabilizing instruments related to deposit insurance and central banks acting as lender of last resort. Thus, it is a noisy indicator of financial instability at best, in particular with regard to the global financial crisis which hit many mature economies without triggering massive retail deposit withdrawals. Accordingly, financial instability is better captured by developments in bank lending rather than deposit funding.

3. Data and empirical strategy

Financial inclusion data is scarce. Until recently it has mainly been compiled by special surveys of households and businesses, i.e. the demand side of financial services. These surveys allow the exploration of the distinction between access to and use of finance. This is of high policy relevance in the financial inclusion debate as the non-use of services provided by the formal financial sector might reflect a voluntary decision by agents. It therefore does not necessarily indicate exclusion (de la Torre et al. 2007). The most well-known surveys on financial inclusion have been run by FinScope (http://www.finmark.org.za/finscope/) and the World Bank (the Global Financial Inclusion (Findex) Database, see Demirgüç-Kunt et al. 2015b, http://www.worldbank.org/en/programs/globalfindex).

We refrain from making use of these sources because most of these surveys lack the time dimension.[13] For example, while the Findex Database accounts for a wide range of financial inclusion indicators in more than 140 countries, it was conducted only in 2011 and 2014. . Moreover, both observations relate to the post-crisis period. Thus, the database cannot be used to study the impact of (changes in) the level of financial inclusion on the degree of financial instability experienced by a country in the global financial crisis.

Against this background we base our analysis on the IMF's Financial Access Survey (FAS) database covering 189 economies over the period 2004-2014. Data is compiled from financial institutions, i.e. from the supply side, as the FAS provides information on the use of financial services provided by several types of intermediaries and on the geographical and population density of services offered (Mialou 2015). However, for many countries, information about the number of borrowers from non-bank financial intermediaries is only available for the more recent years. As a result, we focus on data for commercial banks.

However, even for commercial banks, data on financial development, i.e. credit outstanding, is more complete than data on financial inclusion, i.e. the number of people borrowing from banks. Concretely, there are only 63 countries – most of them developing and emerging market economies – with consistent data on the number of bank borrowers for at least three years during the pre-crisis period 2004 to 2007. Thus, our sample is based on 60 countries when studying the impact of the *change* in financial inclusion over the pre-crisis period (Table 1).[14] The sample size increases to 75 countries when analyzing the stability impact of the 2008 *level* of financial inclusion, as the number of countries providing financial inclusion data for commercial banks in

[13] In addition, the FinScope surveys have been carried out done in only about 20 countries.
[14] Three countries drop out due to missing data on some key control variables.

2008 is larger than for the 2004-2007 period. Our restricted sample includes three countries (Italy, Portugal and the UK), the larger sample six countries (Belgium, Italy, Latvia, Nigeria, Portugal and the UK), which Laeven and Valencia (2012) identify as countries which had a banking crisis in the 2008-2010 period. In addition, Ecuador, which had a sovereign debt crisis in 2008, and the Seychelles, which suffered from a currency and sovereign debt crisis in 2008, are represented in our samples.

Insert Table 1 about here

Our main variables (see Table 2 for a description of all variables used) focus on developments in the pre-crisis boom period, 2004-2007, and developments in the crisis. We capture the boom period by the compound annual growth rate of the number of borrowers (INCLUSION0407) and the compound annual growth rate of the volume of outstanding loans in real terms (CREDITGROWTH0407).[15] Developments in the crisis are illustrated by the changes in borrower (DROPBORROWERS0709) and credit (DROPCREDIT0709) growth rates from 2007 to 2009. Higher values indicate a larger drop in credit growth, i.e. higher degree of financial instability. Finally, the level of financial inclusion in the crisis is represented by the share of borrowers in total adult population for the year 2008 (*SHAREBORROWERS2008*).

Insert Table 2 about here

[15] Concretely, we take the nominal values for outstanding loans and deflate them with the CPI. Based on this we calculate the compound annual growth rate for the period 2004 to 2007.

Borrower and credit growth across countries show a high degree of correlation over time (Figure 2) and a pronounced boom-bust pattern. In the pre-crisis period mean credit growth (borrower growth) rates reach 20% (29%) but drop to 5% (15%) in the crisis.[16]

Insert Figure 2 about here

Correlation analysis (Table 3) confirms the co-movement of credit and borrower growth in the pre-crisis (*INCLUSION0407*, *CREDITGROWTH0407*) and the crisis period (*DROPCREDIT0709, DROPBORROWERS0709*). Moreover, higher credit growth and greater progress in financial inclusion in the pre-crisis years are associated with a larger decline in borrower and credit growth during the financial crisis. By contrast, correlation coefficients between the level of financial inclusion (*SHAREBORROWERS08*) on the one hand and inclusion and credit developments before and during the crisis are small and insignificant. Finally, correlation analysis shows that a higher level of financial inclusion is significantly positively linked to the level of GDP per capita, while progress in financial inclusion is negatively associated with per capita income. Moreover, coefficients reinforce the view that the global financial crisis was a mature economy event as the drop in credit and borrower growth is more pronounced in richer countries.

Insert Table 3 about here

[16] Patterns are similar for median growth rates, but they show lower peaks and troughs.

Descriptive statistics (Table 4) reveal that countries on average experienced a 14 percentage point drop in credit growth during the crisis. However, there is substantial cross-country variance: the deepest fall in credit growth amounted to 72 percentage points, while some countries saw even higher credit growth in the crisis period than in the pre-crisis years. The same holds for the change in borrower growth. With regard to the boom, the distribution of pre-crisis borrower growth (INCLUSION0407) is skewed, as mean growth (26%) is substantially above median growth (16%), indicating that few countries recorded a very rapid expansion in the number of borrowers. Examples include the Democratic Republic of Congo, Zambia and Tajikistan with annual growth rates of 158%, 112% and 94%, respectively. By contrast, pre-crisis credit growth (*CREDITGROWTH0407*) has been more homogenous across countries, supporting the view that there is a global financial cycle in credit growth (Rey 2015). Mean and median growth rates are almost identical and the standard deviation is much smaller than for financial inclusion. Finally, descriptive statistics indicate that the average level of financial inclusion in the crisis (*SHAREBORROWERS08)* is substantially above the median, again indicating that some countries in the sample record comparatively high levels of inclusion.

Insert Table 4 about here

Following up on our hypotheses we run three OLS models applying robust standard errors. First, we test whether financial inclusion itself is subject to a boom-bust cycle pattern. Concretely, we run a model with the change in the borrower growth rate during the crisis in country i linked to the rate of borrower growth in the pre-crisis period. The boom-bust hypothesis would receive support with a positive coefficient for the INCLUSION0407_i variable.

(1) $DROPBORROWER0709_i = \beta_1 + \beta_2 INCLUSION0407_i + \beta_3 X_i + \varepsilon_i$

Second, we test whether the level of financial inclusion in the crisis has the expected moderating impact on the change in credit growth during the crisis, which would be reflected in a significantly negative coefficient for SHAREBORROWERS08i,

(2) $DROPCREDIT0709_i = \beta_1 + \beta_2 SHAREBORROWERS08_i + \beta_3 X_i + \varepsilon_i$

Finally, we analyze whether greater *advances* in financial inclusion in the pre-crisis period, measured by borrower growth, have a stabilizing or destabilizing effect on the change in credit growth during the crisis years. Following our hypotheses 3a (3b), we expect a negative (positive) sign for β_2 in model specification (3).

(3) $DROPCREDIT0709_i = \beta_1 + \beta_2 INCLUSION0407_i + \beta_3 X_i + \varepsilon_i$

In all models X_i is a matrix of control variables reflecting banking sector, macroeconomic and structural characteristics of country i.[17] When employing the set of control variables, we always distinguish between model specifications that include pre-crisis credit growth (*CREDITGROWTH0407*) and specifications that do not control for the pre-crisis boom. In doing so, we aim at testing whether a possible impact of the inclusion variables on crisis developments

[17] Control variables, i.e. other financial stability indicators, macroeconomic and structural indicators, are taken from the IMF (International Financial Statistics), the World Bank (World Development Indicators and Global Financial Development Database) and from Chinn and Ito (2006).

remains significant when controlling for the size of the pre-crisis credit boom. Our third specification of each model includes an interaction term between pre-crisis credit growth and the respective financial inclusion variable to account for potential moderating effects of financial inclusion on the destabilizing impact of credit booms.

Our selection of the remaining control variables largely follows Han and Melecky (2013). The pre-crisis (2007) state of play in banking sectors is depicted by the Z-Score, a bank concentration measure, as well as credit and liquid assets as a share of total deposits[18]. In addition, we control for structural and macroeconomic variables, such as population size, the level of economic development (GNI per capita) and capital account openness as well as pre-crisis GDP growth and inflation.[19]

Z-SCORE07 accounts for the solvency risk of banking sectors, with a higher z-score in 2007 indicating a lower probability of insolvency. Thus, we expect a negative coefficient. Bank concentration (CONCENTRATION07) is defined as the share of total assets in the banking system held by the three largest banks in 2007. The effect of bank concentration on financial stability is theoretically ambiguous (Beck 2008) and the empirical evidence is decidedly mixed. However, a number of recent studies show results that provide more support for the concentration-stability hypothesis (see e.g. Baselga-Pascual et al. 2015, Bretschger et al. 2012, Tabak et al. 2012). Thus, we expect a negative coefficient. We also expect that a larger retail

[18] When there is missing data for the control variables in 2007, we take the year closest to 2007 as reference. This applies to *CONCENTRATION* for Cabo Verde (2008), Lesotho (2004 and 2008), Myanmar (2004), Samoa (2006), Seychelles (2009), Suriname (2008), and Zimbabwe (2009), and to *LIQUIDITY* for Cabo Verde (2008), and Zimbabwe (2009). In a limited number of cases we resort to different sources, such as local central bank reports and IMF or World Bank reports.

[19] For some countries inflation data is taking from the IMF World Economic Outlook database.

deposit base (relative to loans outstanding) and more liquid banking sectors (liquid assets relative to deposits) show a less pronounced boom-bust cycle.[20] Finally, we control for a number of structural and macroeconomic country variables, i.e. log population, log GDP per capita, capital account openness as well as real GDP growth and inflation in pre-crisis period. We expect a larger drop of credit growth in richer and more open countries as the global financial crisis was triggered in advanced economies and spread globally mainly through international financial connections (Dooley and Hutchinson 2009, Claessens et al. 2010). Booming economies in the pre-crisis period, recording stronger GDP growth and inflation, are also expected to suffer a deeper drop in credit growth. By adding population as a control variable we test whether country size has an impact on instability, for example whether small states are different (Easterly and Kraay 2000).

4. Results

We find strong evidence suggesting that the magnitude of the decline in borrower growth during the global financial crisis is significantly linked to pre-crisis borrower growth (Table 5). Thus, financial inclusion itself followed a boom-bust pattern, as a one percentage point higher growth rate in the pre-crisis period is associated with a one percentage point larger drop in borrower growth in the crisis. This result supports hypothesis 1. Moreover, we find that other variables, including pre-crisis credit growth, have no significant influence on financial inclusion dynamics

[20] Several studies have found these effects for different samples, time periods as well as cross-country and bank-level datasets; see for example Caprio et al. (2014), Vazquez and Federico (2015).

in the crisis.[21] Z-score is the only exception, as we find in two specifications that countries with a stronger banking sector in the pre-crisis period record a significantly higher drop in borrower growth than countries with weaker banking sectors.

Insert Table 5 about here

The level of financial inclusion has no direct impact on the size of the credit crunch which countries experienced in the crisis (Table 6). In all specifications the coefficient of the inclusion variable is insignificant. In line with expectations, countries with less concentrated banking sectors, a higher loan to deposit ratio and stronger GDP growth in the pre-crisis period record a more pronounced credit crunch (column 1).[22] However, when adding pre-crisis credit growth as a control variable, the coefficient of which turns out to be highly significant and positive, only the concentration variable remains significant. In addition, countries with a more open capital account suffered a steeper decline in credit growth. Thus, the second specification of the model signals that the credit crunch was more severe in countries with more open and less concentrated financial sectors and with higher pre-crisis credit growth.

Insert Table 6 about here

[21] Testing for multicollinearity among independent variables by calculating the variance inflation factor (VIF) suggests that the coefficients are not poorly estimated due to multicollinearity as all VIFs are lower than 3.25,
[22] In addition, we find that countries with a smaller population show a more severe credit crunch.

This message is qualified in the last specification as the interaction variable between pre-crisis credit growth and the level of financial inclusion is negative and significant. Accordingly, a higher level of financial inclusion had a moderating impact on the drop in credit growth during the crisis. Indeed, the overall impact of stronger pre-crisis credit growth on the credit crunch becomes negative when the share of borrowers in the adult population is larger than 75%. Thus, the last specification provides support for hypothesis 2: financial inclusion contributes to financial stability as it mitigated the 2008/2009 credit crunch.

Insert Table 7 about here

Finally, we find that a more rapid borrower growth in the pre-crisis period has a negative impact on financial stability (Table 7, column 1). However, this result is not robust to the inclusion of the pre-crisis credit growth variable (column 2). Moreover, the interaction term between pre-crisis borrower and credit growth is insignificant (column 3). Overall, the results of this model reject hypotheses 3a and 3b. Strong progress in financial inclusion as such does not pose stability risks if credit growth is accounted for. However, results also suggest that strong credit growth remains a risk to financial stability even if it is accompanied by substantial progress in financial inclusion.

5. Robustness checks

We run a series of checks to test the robustness of our results (Tables 8 – 22 in the appendix). Concretely, we test whether our results are robust to

(1) applying a parsimonious approach, i.e. we simplify our model to the least number of explanatory variables which capture the structural part of the estimation model,

(2) an orthogonalization of pre-crisis borrower and credit growth.[23] Concretely, we orthogonalize pre-crisis borrower growth by regressing pre-crisis borrower growth on pre-crisis credit growth and then use the residuals of this regression (INCLRESIDUALS) as the financial inclusion variable. Similarly, we extract a credit growth variable that is orthogonal to pre-crisis borrower growth by regressing pre-crisis credit growth on pre-crisis borrower growth, and then use the residuals of this regression as the credit growth variable (CREDITGROWTHRESID).-

(3) changes in the sample, namely a) limiting the set of countries to those with a population greater than 1 million, and b) excluding countries with an advanced economy status as defined by the IMF,[24]

(4) changes in the financial inclusion variable and changes in the dependent variable, i.e. the variable depicting financial instability.

These checks are motivated by the following considerations. In pursuing the parsimonious approach (Table 8) and orthogonalizing pre-crisis borrower and credit growth (Tables 9-12) we take into account that pre-crisis credit growth and pre-crisis borrower growth are highly correlated. Thus, we take another step in determining to what extent pre-crisis borrower growth independently of pre-crisis credit growth, has an impact on the drop in borrower and credit

[23] In doing so we are influenced by Bekaert et al. (2014).
[24] The respective countries are Belgium, Estonia, Israel, Italy, Latvia, Portugal, Singapore and the United Kingdom.

growth during the crisis (hypotheses 1 and 3). Our third robustness test is motivated by the fact that 8 of the 60 countries in the restricted sample are very small, raising questions about the representativeness of the sample (Tables 13-15). Estimating the three models and excluding advanced economies provides a test of whether our results are biased by the experience of mature economies which arguably have been most hit by the global financial crisis (Tables 16-18).

Finally, we take account of the uncertainty on how best to measure financial inclusion and financial instability by substituting the share of borrowers with the Honohan index of financial inclusion (Table 19, Honohan 2008)[25] and replacing the 2007/2009 credit crunch variable by a variable that captures the largest drop in credit growth over the period 2006-2010, irrespective of when it was observed (Table 20).[26] The latter variable takes into account country specifics with regard to the exact timing of the credit crunch associated with the subprime crisis and the Lehman default. Figure 3 shows that a slight majority of countries in the expanded sample did not record the highest credit growth rate in 2007 but in the remaining years. For the credit slump the evidence confirms the conventional wisdom about the global credit contraction after the Lehman default, as most countries record their lowest credit growth rate in 2009 (Figure 4); however there is still a sizeable number of countries recording the lowest credit growth rate in the other years.

[25] As the Honohan index is not available for some countries of our expanded sample, the size of the sample size shrinks to 68 countries. Alternatively, the sample could be expanded by 17 countries to a total of 85 countries for which the Honohan index and all control variables are available. Results do not change when running the check with 85 countries.

[26] In doing so we follow Han and Melecky (2013) who apply this approach to deposit withdrawals.

Insert Figures 3 and 4 about here

Alternatively, we measure financial instability by a dummy variable (*CRISIS-IMF*) that takes the number 1 if the respective country is identified as a crisis country in the Laeven and Valencia (2012) database or became an IMF program country in the period 2007-2009 (Tables 21-22).[27]

Overall, our results are quite robust to the various modifications. Robustness checks on the boom-bust characteristics of financial inclusion confirm that countries with a more rapid rise in inclusion in the pre-crisis period record a deeper inclusion setback in the crisis (Tables 8 (columns 1 and 2), 9, 10, 13, 16).[28] This clearly supports our finding on the validity of hypothesis 1.

We also find broad support for hypothesis 2 that a higher level of financial inclusion mitigates the fall in credit growth in the crisis period (Tables 8 (columns 3 and 4), 14, 17, 21). In several specifications the mitigating effect is linked to the pre-crisis credit growth experience as it is the interaction term between the level of financial inclusion and pre-crisis credit growth showing a significantly negative coefficient. By contrast, the the level of financial inclusion as a stand-alone variable is insignificant or drops out of the parsimonious model (Table 8, columns 3 and 4). However, when measuring financial inclusion via the Honohan index(Tables 19 and 20) and when identifying financial instability via the CRISIS-IMF dummy (Table 21), we also find a direct mitigating effect of a higher level of financial inclusion on the drop in credit growth.

[27] The sample size shrinks when measuring financial inclusion by depositor growth (38 countries) or the share of depositors in the adult population (50 countries).
[28] The only exception is found when linking the fall in borrower growth during the crisis to rise in depositor growth in the pre-crisis period (Table 20).

With regard to our third hypothesis, robustness checks involving changes in the sample confirm that countries with more rapid advances in financial inclusion in the pre-crisis period record a larger drop in credit growth in the crisis when pre-crisis credit growth is not controlled for (column 1 of Tables 15 and 18). Pre-crisis borrower growth becomes insignificant only when using the *CRISIS-IMF* dummy as the proxy for financial instability (Table 22, column 1). Moreover, we also always find that pre-crisis borrower growth is always insignificant when controlling for pre-crisis credit growth (column 2 of Tables 15, 18 and 22).[29] In the parsimonious model the pre-crisis change in financial inclusion is dropped when imposing pre-crisis credit growth as the main variable. Moreover, the interaction term between pre-crisis borrower and pre-crisis credit is never significant. This indicates that the destabilizing effect of a higher rate of pre-crisis credit growth is neither mitigated nor reinforced by progress in financial inclusion in the pre-crisis years. We also do not find a significant impact of the pre-crisis borrower growth variable on the drop in credit growth in the orthogonalization model when accounting only for that part of pre-crisis borrower growth that is unexplained by pre-crisis credit growth (Table 11). However, if we account only for that part of credit growth that is not explained by borrower growth as a control variable (Table 12), pre-crisis borrower growth is significantly positively linked to the 2009 drop in credit growth (Table 12).[30]

6. Discussion

[2929] The pre-crisis credit growth variable itself fails to be significant in the specification with the *CRISIS-IMF* dummy only, supporting the view that periods of turmoil are linked to strong credit growth, but not all periods of rapid credit growth end in financial turmoil (Dell'Ariccia et al. 2012).

[30] By contrast, pre-crisis credit growth is always significant in our orthogonalization models with the drop in credit growth as the dependent variable. This suggests that the size of credit boom predicts the fall in credit growth irrespective of any change in financial inclusion in the pre-crisis period.

Is a more inclusive financial system more stable? Our results indicate that the answer to this question is yes. Countries that have achieved a higher level of financial inclusion are less subject to credit boom-bust patterns as a higher level of financial inclusion mitigates the destabilizing impact of rapid credit growth. Thus, our analysis based on an approach testing the inclusion-stability nexus by focusing on credit boom-bust patterns as the main indicator of financial instability, confirms what most other empirical studies have found: higher inclusion is associated with more stability.

Having said this, our results also provide some arguments that call for caution when introducing financial inclusion as a policy objective with the goal of reaping potential financial stability benefits from a more inclusive financial sector. First, we find that financial instability is likely to be associated with setbacks in financial inclusion and that the size of these setbacks is positively linked to the progress made in financial inclusion in the pre-crisis period. Thus, as much as a higher level of financial inclusion is conducive to financial stability, financial stability seems to act as an important precondition to actually achieve a higher inclusion level in a sustainable way.

Second, while financial stability risks associated with fast credit growth are not exacerbated when credit growth is accompanied by rising financial inclusion, the latter is also not associated with mitigating the financial stability risks of rapid credit growth. Indeed, if including only that part of pre-crisis credit growth as a control variable that is not driven by pre-crisis borrower growth, stronger borrower growth is significantly associated with a larger drop in credit during the crisis. Overall this suggests that speed, i.e. rapid credit growth, kills (Kraft Jankov, Sahay 2015), with or without progress in financial inclusion. To put it in Reinhart's and Rogoff's (2009) terminology: This time is *not* different, when credit booms are linked with strong

progress in financial inclusion. Thus, our result showing that a higher level of financial inclusion has a positive impact on financial stability is not inconsistent with theoretical considerations suggesting that a rapid expansion of the borrower base might – at least in the short run – raise rather than reduce financial stability risks (Dell'Ariccia and Marquez 2006). In particular, our results provide some support for largely anecdotal evidence of the pre-crisis period that a rapid rise in financial inclusion, if associated with a credit boom, may do more harm than good.

tOur results and their interpretation are subject to several caveats. First, there remains substantial uncertainty about which indicator is most qualified to capture financial inclusion and financial instability. We have partly addressed this uncertainty in our robustness checks, and our results are reassuring. Moreover, our main result, that a higher level of financial inclusion is associated with financial stability benefits, echoes the results of other studies of the inclusion-stability nexus employing different proxies for financial inclusion and instability. Second, as already mentioned, our sample is limited, as data on financial inclusion is scarce. Given the strong focus on financial inclusion and the associated data collection efforts it can be expected that future research on the inclusion-stability nexus, relying on richer datasets, will challenge our results.

Finally, our results might be driven by an omitted variable bias. For example, a higher level of financial inclusion is likely to trigger stronger policy efforts to maintain financial stability or to restore financial stability as quickly as possible when a crisis hits. In a highly inclusive financial system, stability becomes a public good (Goodhart 1999) as a crisis has an impact on the vast majority of the population, either directly, or indirectly via negative output and employment effects (IMF 2009). Thus, stabilization efforts by governments and central banks are likely to be

endogenous to the level of financial inclusion.[31] More research is needed to disentangle the direct, causal effects of financial inclusion on financial stability from the indirect effects that might arise from better ability and stronger political will of governments and central banks to address instabilities in countries featuring more inclusive financial systems.[32]

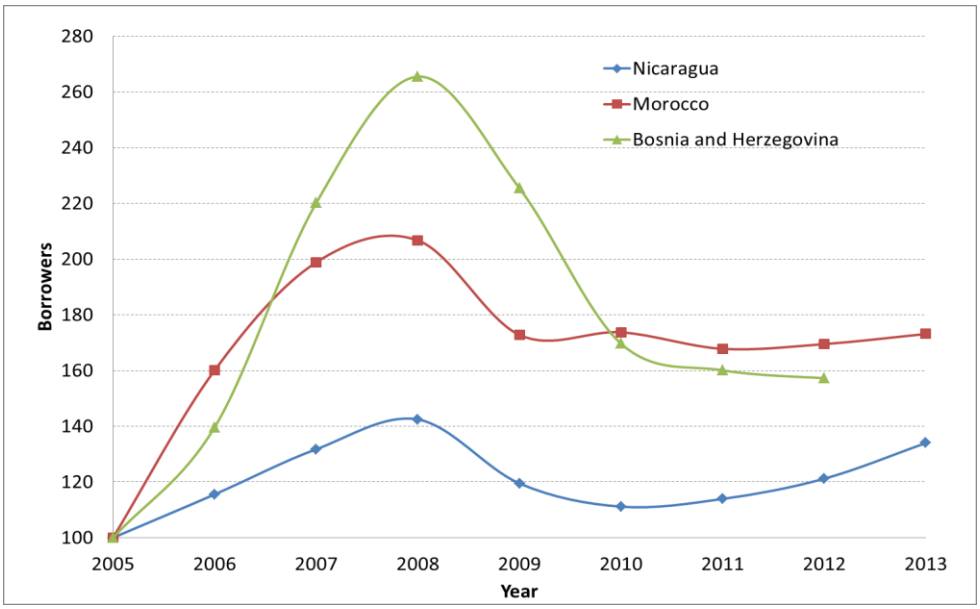
Overall, our analysis provides support for the view that banking sectors serving a larger number of borrowers are less prone to financial instability. At the same time, the finding that financial stability risks of credit booms do not decline when accompanied by rising inclusion serves as a reminder that financial inclusion is not an instrument for fostering financial stability when financial imbalances arise.

[31] In a CGAP blog the former Governor of the Bank of Kenya refers to this endogeneity issue by making the following statement on the impact of a rising level of financial inclusion on the efforts of the government and the central bank to safeguard financial stability: "With enhanced financial inclusion comes the need to step up existing frameworks on consumer protection and deposit protection, while exploring emerging issues on competition and interoperability." (Ndungu 2012).

[32] This will be a difficult undertaking as illustrated by the finance-growth literature where the causality issue remains open after decades of research activities (Beck 2008).

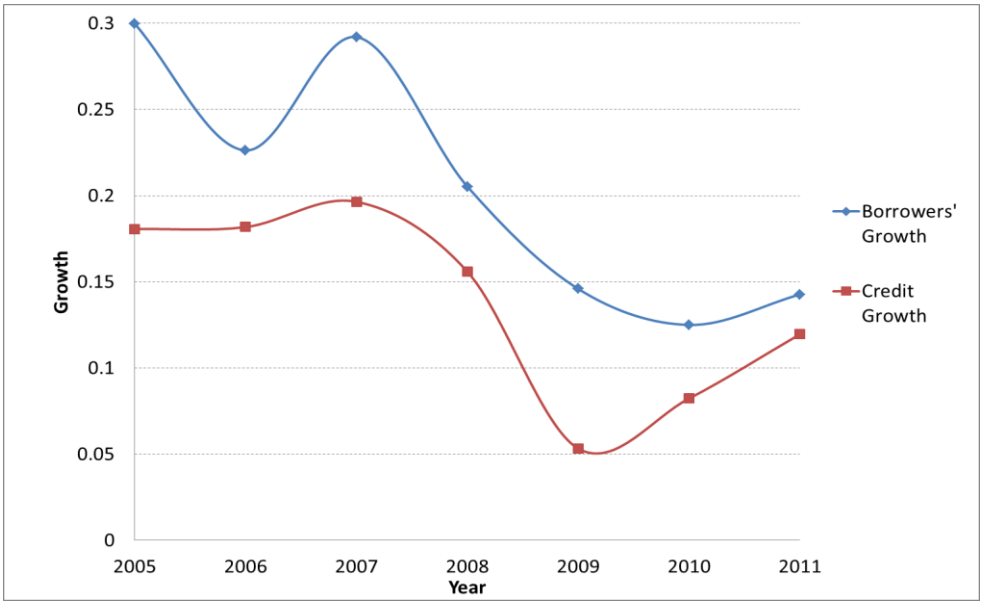
Figure 1: Number of microfinance borrowers – crisis countries, 2005-2013

2005 = 100



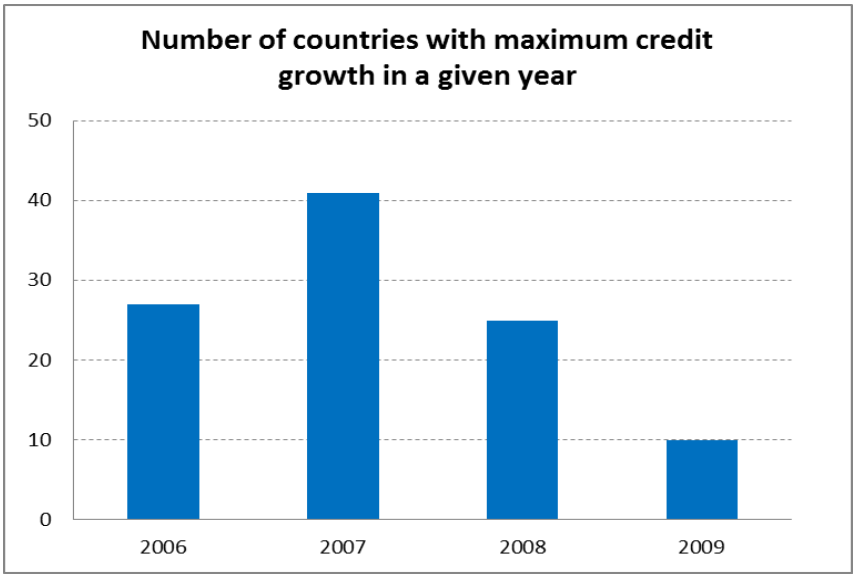
Source: Mixmarket, authors' calculations.

Figure 2: Growth of credit and number of borrowers, 2005-2011



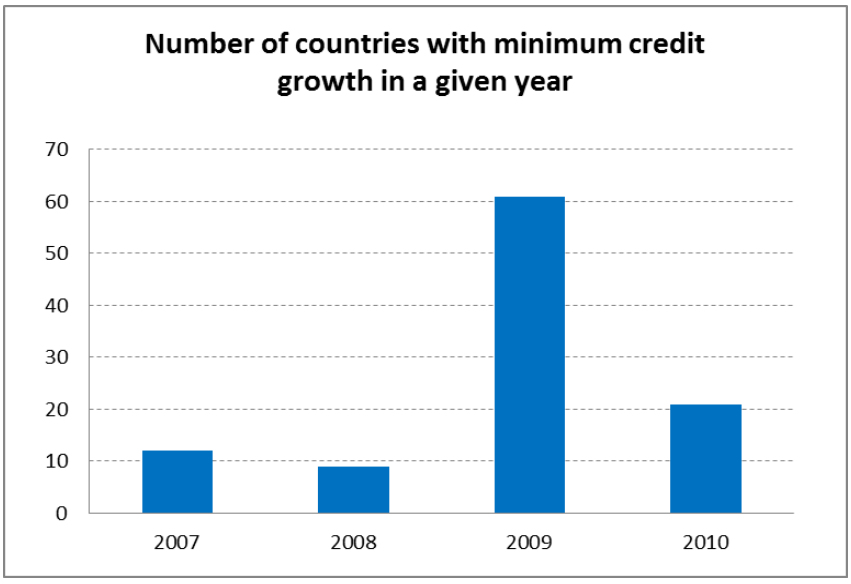
Source: IMF FAS, authors' calculations based on our sample of 60 countries plus Comoros, Timor-Leste, and Kosovo.

Figure 3: Histogram of the Timing of the Peak in Credit Growth by Number of Countries



Source: IMF FAS, authors' calculations based on the expanded sample of 75 countries excluding countries for which there is no Honohan inclusion index available (Democratic Republic of Congo, Equatorial Guinea, Israel, Kuwait, Maldives, Qatar and San Marino)

Figure 4: Histogram of the Timing of the Trough in Credit Growth by Number of Countries



Source: IMF FAS, authors' calculations based on the expanded sample of 75 countries excluding countries for which there is no Honohan inclusion index available (Democratic Republic of Congo, Equatorial Guinea, Israel, Kuwait, Maldives, Qatar and San Marino)

Table 1: List of Variables

VARIABLE	DESCRIPTION	SOURCE
Financial Stability Indicators (crisis)		
DROPCREDITGROWTH 0709	The difference between real credit annual growth rate in the post crisis period (2009) and its value in the pre-crisis period (2007)	IMF Financial Access Survey (FAS), authors' calculations
DROP BORROWERS 0709	The difference between number of borrowers annual growth rate in the post crisis period (2009) and its value in the pre-crisis period (2007)	IMF Financial Access Survey (FAS), authors' calculations
H-M CREDIT DROP	Maximum annual credit growth minus minimum annual credit growth between 2006 and 2010, considering that maximum growth occurred before the minimum growth.	IMF Financial Access Survey (FAS), authors' calculations
Financial Inclusion Variables		
INCLUSION0407	Borrowers compound annual growth rate between 2004 and 2007.	IMF Financial Access Survey (FAS), authors' calculations
SHARE BORROWERS 08	Number of borrowers from commercial banks divided by adult population in 2008	IMF Financial Access Survey (FAS), authors' calculations
HONOHAN	Percent of people with access to financial services	Honohan, P. (2008)
Financial Stability Indicators (pre-crisis)		
CREDIT GROWTH 0407	Real outstanding loans compound annual growth rate between 2004 and 2007.	IMF Financial Access Survey (FAS), authors' calculations
ZSCORE07	ZSCORE07	Global Financial Development Database
LIQUIDITY07	The ratio of liquid assets to total deposits plus short term funding in 2007	Global Financial Development Database
CONCENTRATION07	Assets of three largest commercial banks as a share of total commercial banking assets in 2007	Global Financial Development Database
LOANSTODEPTS07	The financial resources provided to the private sector by domestic money banks as a share of total deposits in 2007	Global Financial Development Database
Macroeconomic Variables		
GDPGROWTH0407	Average GDP growth between 2004 and 2007	World Development Indicators
INFLATION0407	Average consumer prices index annual percent change between 2004 and 2007	World Development Indicators
Structural Variables		
POPULATION07	Log Population in number of people in 2007	World Development Indicators
GDPPERCAPITA07	Log gross domestic product per capita in 2007, current prices (U.S. dollars)	IMF WEO Database
KAOPEN	Chinn-Ito country index measuring a country's degree of capital account openness updated to 2013	Chinn and Ito (2006)
Interaction Terms		
INTERCREDITBORRW0407	Interaction between CREDIT GROWTH0407 and INCLUSION0407	Authors' calculation
INTERSHARE 08CREDIT GRW	Interaction between SHARE BORROWERS 08 and CREDIT GROWTH 0407	Authors' calculation
INTHONOHANCREDIT	Interaction between HONOHAN and CREDIT GROWTH 0407	Authors' calculation

Source: authors' compilation

Table 2: List of Countries

	AFRICA
1	Botswana
2	Burundi
3	Cabo Verde
4	Democratic Republic of Congo
5	Equatorial Guinea
6	*Ethiopia*
7	Gabon
8	Ghana
9	Guinea
10	Kenya
11	Lesotho
12	Madagascar
13	*Malawi*
14	*Mauritania*
15	Mozambique
16	Namibia
17	*Nigeria*
18	Rwanda
19	Seychelles
20	Sierra Leone
21	Swaziland
22	Tanzania
23	Zambia
24	Zimbabwe*

	LATIN AMERICA AND CARIBBEAN
25	Argentina
26	Belize
27	Bolivia
28	*Brazil*
29	Chile
30	Colombia
31	*Costa Rica*
32	*Dominican Republic*
33	*Ecuador*
34	Guatemala
35	Haiti
36	Honduras
37	Paraguay
38	Peru
39	Suriname
40	Uruguay
41	Venezuela

	CENTRAL, SOUTH ASIA AND PACIFIC
42	Bangladesh
43	*Indonesia*
44	Kuwait
45	Malaysia
46	Maldives
47	Myanmar
48	*Pakistan*
49	Singapore
50	Tajikistan
51	Thailand

	MIDDLE EAST AND NORTH AFRICA
52	Algeria
53	Egypt
54	Israel
55	Lebanon
56	Libya
57	Qatar
58	Saudi Arabia
59	Syrian Arab Republic
60	Tunisia

	EASTERN EUROPE AND CENTRAL ASIA
61	*Albania*
62	Azerbaijan, Republic of
63	*Estonia*
64	Georgia
65	Poland
66	Turkey
67	Moldova
68	Macedonia, FYR
69	*Latvia*
70	*Romania*

	WESTERN EUROPE
71	Italy
72	Portugal
73	San Marino
74	United Kingdom
75	Belgium

	OCEANIA
76	Samoa

	Low-income economies ($1,045 or less)
1	Burundi
2	Democratic Republic of Congo
3	*Ethiopia*
4	Guinea
5	Haiti
6	Madagascar
7	*Malawi*
8	Mozambique
9	Rwanda
10	Sierra Leone
11	Tanzania
12	Zimbabwe*

	Lower-middle-income economies ($1,046 to $4,125)
13	Bangladesh
14	Bolivia
15	Cabo Verde
16	Egypt
17	Georgia
18	Ghana
19	Guatemala
20	Honduras
21	Kenya
22	*Indonesia*
23	Lesotho
24	*Mauritania*
25	Moldova
26	Myanmar
27	*Nigeria*
28	*Pakistan*
29	Samoa
30	Swaziland
31	Syrian Arab Republic
32	Tajikistan
33	Zambia

	Upper-middle-income economies ($4,126 to $12,735)
34	*Albania*
35	Algeria
36	Azerbaijan, Republic of
37	Belize
38	Botswana
39	*Brazil*
40	Colombia
41	*Costa Rica*
42	*Dominican Republic*
43	*Ecuador*
44	Gabon
45	Lebanon
46	Libya
47	Malaysia
48	Maldives
49	Macedonia, FYR
50	Namibia
51	Paraguay
52	Peru
53	*Romania*
54	Suriname
55	Thailand
56	Tunisia
57	Turkey

	High-income economies ($12,736 or more)
58	Argentina
59	*Belgium*
60	Chile
61	Equatorial Guinea
62	*Estonia*
63	Israel
64	Italy
65	Kuwait
66	*Latvia*
67	Poland
68	Portugal
69	Qatar
70	San Marino
71	Saudi Arabia
72	Seychelles
73	Singapore
74	United Kingdom
75	Uruguay
76	Venezuela

** Zimbabwe is only included in regressions that do not include orted credit growth as an independent variable.*

Italics represent countries included in the enlarged sample only.

Source: authors' compilations

Table 3: Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	DROP CREDIT 0709	1															
2	DROP BORROWERS 0709	0.4229*	1														
3	H-M CREDIT DROP	0.4495*	0.3574*	1													
4	INCLUSION 0407	0.3218*	0.5374*	0.6250*	1												
5	SHARE BORROWERS 08	0.1021	-0.0091	-0.0063	-0.2307	1											
6	HONOHAN	-0.028	-0.1601	-0.3373*	-0.4095*	0.6414*	1										
7	CREDIT GROWTH0 407	0.5951*	0.5203*	0.6680*	0.6078*	-0.0184	-0.3358*	1									
8	ZSCORE07	-0.0011	0.0883	-0.2946*	-0.196	0.2643*	0.2924*	-0.2407	1								
9	LIQUIDITY07	-0.1506	0.0219	0.3725*	0.2256	-0.1824	-0.2367	0.1311	0.0257	1							
10	CONCENTRATION07	-0.1669	-0.0338	0.1307	-0.0662	-0.0573	-0.1801	0.0198	0.0528	0.3509*	1						
11	LOANSTODEPTS07	0.3682*	0.1764	0.0503	0.0572	0.2396	0.3042*	0.2824*	-0.0645	-0.4870*	-0.1375	1					
12	GDPGROWTH0407	0.2725*	0.3668*	0.2221	0.2482	-0.0132	-0.2121	0.5264*	0.0194	0.0482	-0.0511	0.0502	1				
13	INFLATION0407	-0.2412	0.0328	0.1197	0.2518	-0.3863*	-0.5546*	0.0677	-0.3464*	0.2299	-0.0922	-0.3367*	0.1236	1			
14	LGPOPULATION 07	-0.1672	-0.0183	-0.2823*	0.0094	-0.1617	0.104	-0.1995	-0.2194	-0.1363	-0.6004*	0.0268	-0.0517	0.2381	1		
15	LOG GDPPERCAPITA07	0.2415	-0.0022	0.0131	-0.3233*	0.6626*	0.7799*	0.0642	0.3288*	-0.1478	-0.0591	0.3473*	0.1428	-0.5973*	-0.2915*	1	
16	KAOPEN	0.195	0.1858	-0.038	-0.0566	0.3861*	0.4510*	-0.1103	0.2990*	-0.196	-0.1206	0.2767*	-0.0427	-0.2891*	0.0208	0.4747*	1

Source: authors' compilations.

**Indicate significance at 5% level*

Table 4: Descriptive Statistics

VARIABLE	Obs	Mean	Median	Std. Dev.	Min	Max
DROP CREDIT 0709	59	0.16	0.16	0.28	(0.88)	0.72
DROP BORROWERS 0709	60	0.15	0.09	0.62	(3.56)	1.59
H-M CREDIT DROP	59	0.33	0.24	0.32	0.01	1.69
Inclusion Variables						
INCLUSION 0407	60	0.27	0.17	0.29	(0.02)	1.58
SHARE BORROWERS 08	60	0.18	0.12	0.21	0.00	0.92
HONOHAN	53	35.47	30.00	21.85	5.00	98.00
Financial Stability Indicators (pre-crisis)						
CREDIT GROWTH0 407	59	0.18	0.15	0.16	(0.04)	0.59
ZSCORE07	60	13.80	12.42	8.70	0.75	45.04
LIQUIDITY07	60	40.65	38.13	19.56	10.79	89.00
CONCENTRATION07	60	72.85	75.56	20.15	35.20	100.00
LOANSTODEPTS07	60	86.16	80.44	40.60	25.98	187.76
Macroeconomic Variables						
GDPGROWTH0407	60	6.39	5.94	4.10	(4.66)	24.04
INFLATION0407	60	7.10	6.44	5.28	0.88	29.64
Structural Variables						
POPULATION 2007	60	6.85	6.98	0.79	4.48	8.17
GDPPERCAPITA07	60	3.53	3.58	0.66	2.24	4.91
KAOPEN	60	0.11	(0.37)	1.58	(1.89)	2.39

Source: authors' compilations.

Table 5: Borrower growth in the financial crisis

	DROP IN BORROWER GROWTH 0709		
INCLUSION0407	1.129***	0.970***	1.035*
	(4.69)	(3.21)	(1.86)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		0.4590	0.5240
		(1.55)	(1.11)
INTERCREDITBORRW0407			-0.1980
			(-0.13)
ZSCORE07	0.0115	0.00578*	0.00596*
	(1.56)	(1.81)	(1.97)
LIQUIDITY07	-0.0023	-0.0019	-0.0019
	(-0.92)	(-1.17)	(-1.09)
CONCENTRATION07	0.0032	0.0000	0.0001
	(0.77)	(-0.00)	(0.07)
LOANSTODEPTS07	0.0012	0.0002	0.0003
	(0.85)	(0.21)	(0.25)
Macroeconomic Variables			
GDPGROWTH0407	0.0373	-0.0103	-0.0104
	(0.97)	(-1.02)	(-1.05)
INFLATION0407	0.0006	0.0044	0.0046
	(0.04)	(0.76)	(0.81)
Structural Variables			
POPULATION07	0.0557	0.0183	0.0224
	(0.65)	(0.28)	(0.40)
GDPPERCAPITA07	0.0005	-0.0133	-0.0124
	0.00	(-0.15)	(-0.14)
KAOPEN	0.0610	0.0286	0.0279
	(1.44)	(1.36)	(1.39)
_cons	-1.1880	-0.2030	-0.2710
	(-0.92)	(-0.26)	(-0.42)
N	***60***	***59***	***59***
R-square	***0.4276***	***0.6685***	***0.6688***

t statistics in parentheses
** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (1). The dependent variable is the drop in the borrower growth rate from 2007 to 2009. Our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 6: Credit growth drop in the financial crisis and the level of financial inclusion

	DROPCREDITGROWTH 0709		
SHARE BORROWERS 08	-0.0766	-0.1100	0.1350
	(-0.67)	(-1.03)	(1.23)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		0.977***	1.197***
		(6.10)	(6.87)
INTERSHARE 08CREDIT GRW			-1.603***
			(-2.99)
ZSCORE07	-0.0034	0.0014	0.0008
	(-1.12)	(0.48)	(0.26)
LIQUIDITY07	0.0021	-0.0001	-0.0001
	(1.40)	(-0.05)	(-0.04)
CONCENTRATION07	-0.00477**	-0.00345**	-0.00346**
	(-2.47)	(-2.19)	(-2.34)
LOANSTODEPTS07	0.00153*	0.0003	0.0005
	(1.78)	(0.47)	(0.77)
Macroeconomic Variables			
GDPGROWTH0407	0.0194**	0.00	0.00
	(2.30)	(0.53)	(0.42)
INFLATION0407	-0.0136	-0.0122	-0.0091
	(-1.08)	(-1.39)	(-1.01)
Structural Variables			
POPULATION07	-0.102**	(0.04)	(0.05)
	(-2.39)	(-0.81)	(-1.18)
GDPPERCAPITA07	-0.0537	-0.0262	-0.0060
	(-0.69)	(-0.44)	(-0.10)
KAOPEN	0.0231	0.0277**	0.0280**
	(1.33)	(2.21)	(2.26)
_cons	1.210**	0.6150	0.5940
	(2.49)	(1.34)	(1.42)
N	***75***	***75***	***75***
R-square	***0.2943***	***0.518***	***0.5455***

t statistics in parentheses
** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (2). The dependent variable is the drop in credit growth from 2007 to 2009. Our main variable of interest is the level of financial inclusion expressed as the share of borrowers in the adult population in 2008. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 7: Credit growth drop in the financial crisis and pre-crisis borrower growth

	DROPCREDITGROWTH 0709		
INCLUSION0407	0.247**	-0.048	-0.242
	(2.40)	(-0.41)	(-0.59)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		1.121***	0.929**
		(3.69)	(2.05)
INTERCREDITBORRW0407			0.582
			(0.57)
ZSCORE07	-0.002	0.001	0.000
	(-0.66)	(0.17)	(0.06)
LIQUIDITY07	0.000	-0.001	-0.001
	(0.25)	(-0.45)	(-0.62)
CONCENTRATION07	-0.00433*	-0.00408**	-0.00454*
	(-1.91)	(-2.07)	(-1.81)
LOANSTODEPTS07	0.002	0.000	0.000
	(1.45)	(0.46)	(0.28)
Macroeconomic Variables			
GDPGROWTH0407	0.0163**	0.001	0.001
	(2.22)	(0.09)	(0.16)
INFLATION0407	-0.014	-0.014	-0.014
	(-1.11)	(-1.46)	(-1.48)
Structural Variables			
POPULATION07	-0.117**	-0.077	-0.089
	(-2.20)	(-1.28)	(-1.25)
GDPPERCAPITA07	-0.031	-0.079	-0.082
	(-0.44)	(-1.37)	(-1.38)
KAOPEN	0.024	0.0374**	0.0397**
	(1.39)	(2.39)	(2.45)
_cons	1.186**	1.137*	1.337*
	(2.08)	(1.97)	(1.79)
N	***59***	***59***	***59***
R-square	***0.407***	***0.536***	***0.542***

t statistics in parentheses

** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (3). The dependent variable is the drop in credit growth from 2007 to 2009. Our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Appendix: Robustness checks

Table 8: Parsimonious Estimation Results

	DROP BORROWER GROWTH 0709		DROP CREDITGROWTH 0709		DROP CREDITGROWTH 0709	
Main Variable:	*INCLUSION0407*	*CREDIT GROWTH 0407*	*SHARE OF BORROWERS 08*	*CREDIT GROWTH 0407*	*INCLUSION0407*	*CREDIT GROWTH 0407*
	1	*2*	*3*	*4*	*5*	*6*
	pr< 0.10	**pr< 0.10**	**pr< 0.10**	**pr< 0.10**	**pr< 0.10**	**pr< 0.10**
INCLUSION0407	1.054***	0.988***			0.0006	
	(5.15)	(4.06)			(0.01)	
SHARE BORROWERS 08			-0.1130			
			(-1.20)			
CREDIT GROWTH 0407		0.2090	1.038***	1.016***	1.124***	1.125**
		(0.80)	(8.31)	(7.72)	(5.52)	(7.37)
INFLATION0407			-0.0122*		-0.0132**	-0.0132*
			(-1.82)		(-2.12)	(-2.17)
CONCENTRATION07			-0.00261**	-0.00230**	-0.00244*	-0.00244*
			(-2.54)	(-2.27)	(-1.97)	(-2.02)
KAOPEN	0.0362**	0.0376**	0.0279***	0.0331**	0.0302**	0.0302*
	(2.18)	(2.23)	(2.70)	(2.42)	(2.10)	(2.17)
_cons	-0.0793*	-0.100**	0.258***	0.131*	0.216**	0.216*
	(-1.87)	(-2.44)	(3.14)	(1.83)	(2.37)	(2.40)
N	***59***	***59***	***75***	***75***	***59***	***59***
R-square	***0.6399***	***0.6442***	***0.5037***	***0.4607***	***0.5017***	***0.5017***

t statistics in parentheses
** p<0.10, **p<0.05, *** p<0.01*

This table reports the parsimonious estimation results for equations (1) to (3). In panel 1, the dependent variable is the drop in borrower growth from 2007 to 2009. In column 1, our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007, while in column 2 we focus on CREDIT GROWTH 0407 as our main explanatory variable. Columns 3, 4, 5 and 6 present the results of the parsimonious model with the drop in credit growth from 2007 to 2009 being the dependent variable. In columns 3 and 4, we estimate the variables that affect the drop in credit growth 0709 alternating between INCLUSION0407 and CREDIT GROWTH 0407 as the main variables of interest in the model. Columns 5 and 6 display the estimates with the level of inclusion (SHARE BORROWERS 08) and CREDIT GROWTH 0407 serving as the main explanatory variables. We control for a set of financial stability indicators as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 9: Drop in borrower growth in the financial crisis and pre-crisis borrower growth (orthogonalized)

	DROP IN BORROWERS GROWTH 0709		
INCLRESIDUALS	0.984***	0.970***	1.106**
	(3.67)	(3.21)	(2.25)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		1.580***	1.625***
		(4.56)	(5.14)
INTERINCLUSIONRESCREDIT			-0.4230
			(-0.26)
ZSCORE07	-0.0007	0.00578*	0.00582*
	(-0.19)	(1.81)	(1.78)
LIQUIDITY07	0.0022	-0.0019	-0.0020
	(0.90)	(-1.17)	(-1.19)
CONCENTRATION07	-0.0027	0.0000	0.0003
	(-0.98)	(-0.00)	(0.12)
LOANSTODEPTS07	0.00287*	0.0002	0.0002
	(1.75)	(0.21)	(0.19)
Macroeconomic Variables			
GDPGROWTH0407	0.0204***	-0.0103	-0.0111
	(2.92)	(-1.02)	(-1.11)
INFLATION0407	0.0021	0.0044	0.0040
	(0.22)	(0.76)	(0.61)
Structural Variables			
POPULATION07	-0.0948	0.0183	0.0281
	(-1.59)	(0.28)	(0.48)
GDPPERCAPITA07	-0.0693	-0.0133	-0.0058
	(-0.67)	(-0.15)	(-0.07)
KAOPEN	0.0273	0.0286	0.0255
	(1.00)	(1.36)	(1.24)
_cons	0.8210	-0.1480	-0.2590
	(1.02)	(-0.19)	(-0.38)
N	***59***	***59***	***59***
R-square	***0.4841***	***0.6685***	***0.6694***

t statistics in parentheses

** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (1). The dependent variable is the drop in the borrower growth rate from 2007 to 2009. Our main variable of interest, INCLRESIDUALS, represents the residuals of regressing the compound borrower growth rate 2004 to 2007 on the compound real credit growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the orthogonalized pre-crisis borrower growth rate and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 10: Drop in borrower growth in the financial crisis and pre-crisis credit growth (orthogonalized)

	DROP IN BORROWERS GROWTH 0709		
INCLUSION0407	1.129***	1.116***	1.185***
	(4.69)	(4.07)	(5.05)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH RESID		0.4590	0.1800
		(1.55)	(0.44)
INTERINCLUSIONCREDITRESD			0.7890
			-0.6200
ZSCORE07	0.0115	0.00578*	0.00531*
	(1.56)	(1.81)	(1.70)
LIQUIDITY07	-0.0023	-0.0019	-0.0025
	(-0.92)	(-1.17)	(-1.45)
CONCENTRATION07	0.0032	0.0000	0.0001
	(0.77)	(-0.00)	(0.03)
LOANSTODEPTS07	0.0012	0.0002	-0.0003
	(0.85)	(0.21)	(-0.31)
Macroeconomic Variables			
GDPGROWTH0407	0.0373	-0.0103	-0.0123
	(0.97)	(-1.02)	(-1.25)
INFLATION0407	0.0006	0.0044	0.0048
	(0.04)	(0.76)	(0.79)
Structural Variables			
POPULATION07	0.0557	0.0183	0.0269
	(0.65)	(0.28)	(0.43)
GDPPERCAPITA07	0.0005	-0.0133	0.0118
	0.00	(-0.15)	(0.14)
KAOPEN	0.0610	0.0286	0.0274
	(1.44)	(1.36)	(1.26)
_cons	-1.1880	-0.1580	-0.2490
	(-0.92)	(-0.20)	(-0.34)
N	***60***	***59***	***59***
R-square	***0.4276***	***0.6685***	***0.6736***

t statistics in parentheses

** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (1). The dependent variable is the drop in the borrower growth rate from 2007 to 2009. Our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces orthogonalized pre-crisis CREDIT GROWTH resulting from regressing the compound real credit growth rate 2004 to 2007 on the compound borrower growth rate 2004 to 2007, and then using the residuals of this regression as control variable (CREDIT GROWTH RESID). Column 3 adds an interaction term between the inclusion and the orthogonalized credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 11: Credit growth drop in the financial crisis and pre-crisis borrower growth (orthogonalized)

	DROP IN CREDITGROWTH 0709		
INCLRESIDUALS	-0.0385	-0.0480	-0.3290
	(-0.21)	(-0.41)	(-0.86)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		1.066***	0.972***
		(4.56)	(3.40)
INTERINCLUSIONRESCREDIT			0.8740
			-0.8400
ZSCORE07	-0.0036	0.0008	0.0007
	(-0.96)	(0.17)	(0.16)
LIQUIDITY07	0.0022	-0.0007	-0.0005
	(1.37)	(-0.45)	(-0.36)
CONCENTRATION07	-0.00591**	-0.00408**	-0.00471*
	(-2.57)	(-2.07)	(-1.91)
LOANSTODEPTS07	0.00216*	0.0004	0.0004
	(1.81)	(0.46)	(0.50)
Macroeconomic Variables			
GDPGROWTH0407	0.0213**	0.0007	0.0024
	(2.48)	(0.09)	(0.32)
INFLATION0407	-0.0152	-0.0136	-0.0127
	(-1.17)	(-1.46)	(-1.38)
Structural Variables			
POPULATION07	-0.153***	-0.0770	-0.0972
	(-2.94)	(-1.28)	(-1.35)
GDPPERCAPITA07	-0.1170	-0.0791	-0.0946
	(-1.42)	(-1.37)	(-1.53)
KAOPEN	0.0366*	0.0374**	0.0438**
	(1.84)	(2.39)	(2.50)
_cons	1.788***	1.135*	1.364*
	(2.98)	(1.97)	(1.91)
N	***59***	***59***	***59***
R-square	***0.3671***	***0.5361***	***0.544***

t statistics in parentheses

** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (3). The dependent variable is the drop in credit growth from 2007 to 2009. Our main variable of interest, INCLRESIDUALS, represents the residuals of regressing the compound borrower growth rate 2004 to 2007 on the compound real credit growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the orthogonalized pre-crisis borrower growth rate and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 12: Credit growth drop in the financial crisis and the orthogonalized pre-crisis credit growth

	DROP IN CREDITGROWTH 0709		
INCLUSION0407	0.247**	0.310***	0.280**
	(2.40)	(3.55)	(2.32)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH RESID		1.121***	1.245***
		(3.69)	(2.97)
INTERINCLUSIONCREDITRESD			-0.3500
			(-0.48)
ZSCORE07	-0.0025	0.0008	0.0010
	(-0.66)	(0.17)	(0.21)
LIQUIDITY07	0.0004	-0.0007	-0.0004
	(0.25)	(-0.45)	(-0.29)
CONCENTRATION07	-0.00433*	-0.00408**	-0.00412**
	(-1.91)	(-2.07)	(-2.02)
LOANSTODEPTS07	0.0015	0.0004	0.0006
	(1.45)	(0.46)	(0.67)
Macroeconomic Variables			
GDPGROWTH0407	0.0163**	0.0007	0.0016
	(2.22)	(0.09)	(0.20)
INFLATION0407	-0.0136	-0.0136	-0.0138
	(-1.11)	(-1.46)	(-1.50)
Structural Variables			
POPULATION07	-0.117**	-0.0770	-0.0809
	(-2.20)	(-1.28)	(-1.29)
GDPPERCAPITA07	-0.0312	-0.0791	-0.0902
	(-0.44)	(-1.37)	(-1.42)
KAOPEN	0.0237	0.0374**	0.0380**
	(1.39)	(2.39)	(2.32)
_cons	1.186**	1.248**	1.288**
	(2.08)	(2.17)	(2.12)
N	***59***	***59***	***59***
R-square	***0.4073***	***0.5361***	***0.5381***

t statistics in parentheses

** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (3). The dependent variable is the drop in credit growth from 2007 to 2009. Our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces orthogonalized pre-crisis CREDIT GROWTH resulting from regressing the compound real credit growth rate 2004 to 2007 on the compound borrower growth rate 2004 to 2007, and then using the residuals of this regression as control variable (CREDIT GROWTH RESID). Column 3 adds an interaction term between the inclusion and the orthogonalized credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 13: Drop in borrower growth in the financial crisis

Excluding countries with a population < 1 million

	DROP IN BORROWER GROWTH 0709		
INCLUSION0407	1.127***	0.918***	1.068*
	(4.40)	(2.88)	(1.89)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		0.621*	0.7760
		(1.86)	(1.56)
INTERCREDITBORRW0407			-0.4530
			(-0.30)
ZSCORE07	0.0108	0.0045	0.0048
	(1.38)	(1.29)	(1.50)
LIQUIDITY07	-0.0010	-0.0006	-0.0003
	(-0.33)	(-0.31)	(-0.13)
CONCENTRATION07	0.0030	-0.0007	-0.0003
	(0.66)	(-0.26)	(-0.14)
LOANSTODEPTS07	0.0014	0.0005	0.0006
	(0.94)	(0.46)	(0.55)
Macroeconomic Variables			
GDPGROWTH0407	0.0446	-0.0138	-0.0140
	(0.96)	(-1.19)	(-1.17)
INFLATION0407	-0.0033	0.0039	0.0042
	(-0.19)	(0.56)	(0.60)
Structural Variables			
POPULATION07	0.0792	-0.0308	-0.0202
	(0.48)	(-0.30)	(-0.23)
GDPPERCAPITA07	-0.0221	-0.0107	-0.0080
	(-0.16)	(-0.10)	(-0.08)
KAOPEN	0.0718	0.0342	0.0331
	(1.37)	(1.31)	(1.31)
_cons	-1.3450	0.1370	-0.0323
	(-0.76)	(0.12)	(-0.03)
N	***52***	***51***	***51***
R-square	***0.4403***	***0.6784***	***0.6801***

t statistics in parentheses
** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (1) excluding countries with population of less than 1 million. The dependent variable is the drop in the borrower growth rate from 2007 to 2009. Our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 14: Credit growth drop in the financial crisis and the level of financial inclusion.

Excluding countries with a population < 1 million

	DROPCREDITGROWTH 0709		
SHARE BORROWERS 08	-0.0472	-0.0647	0.1280
	(-0.42)	(-0.68)	(1.01)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		1.074***	1.252***
		(7.11)	(7.16)
INTERSHARE 08CREDIT GRW			-1.482**
			(-2.04)
ZSCORE07	-0.0028	0.0024	0.0021
	(-0.88)	(0.82)	(0.74)
LIQUIDITY07	0.0021	0.0001	-0.0004
	(1.19)	(0.06)	(-0.25)
CONCENTRATION07	-0.00468**	-0.00340**	-0.00315*
	(-2.28)	(-2.02)	(-1.96)
LOANSTODEPTS07	0.00170*	0.0005	0.0006
	(1.94)	(0.87)	(1.14)
Macroeconomic Variables			
GDPGROWTH0407	0.0210**	0.0032	0.0042
	(2.10)	(0.43)	(0.55)
INFLATION0407	-0.0144	-0.0124	-0.0098
	(-1.10)	(-1.50)	(-1.16)
Structural Variables			
POPULATION07	-0.0777	0.0029	0.0021
	(-1.54)	(0.06)	(0.04)
GDPPERCAPITA07	-0.0694	-0.0492	-0.0308
	(-0.84)	(-0.83)	(-0.54)
KAOPEN	0.0245	0.0356**	0.0353**
	(1.17)	(2.54)	(2.51)
_cons	1.049*	0.3310	0.2230
	(1.89)	(0.65)	(0.47)
N	***67***	***67***	***67***
R-square	***0.2959***	***0.571***	***0.5876***

t statistics in parentheses
** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (2) excluding countries with population of less than 1 million. The dependent variable is the drop in credit growth rate from 2007 to 2009. Our main variable of interest is the level of financial inclusion expressed as the share of borrowers in the adult population in 2008. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 15: Credit growth drop in the financial crisis and pre-crisis borrower growth

Excluding countries with a population < 1 million

	DROPCREDITGROWTH 0709		
INCLUSION0407	0.268**	-0.0980	-0.2040
	(2.57)	(-0.81)	(-0.48)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		1.346***	1.237***
		(4.48)	(2.77)
INTERCREDITBORRW0407			0.3200
			(0.30)
ZSCORE07	-0.0018	0.0012	0.0009
	(-0.48)	(0.26)	(0.22)
LIQUIDITY07	0.0004	-0.0002	-0.0004
	(0.23)	(-0.09)	(-0.20)
CONCENTRATION07	-0.00431*	-0.00438**	-0.00461*
	(-1.85)	(-2.08)	(-1.74)
LOANSTODEPTS07	0.0018	0.0008	0.0007
	(1.66)	(0.96)	(1.08)
Macroeconomic Variables			
GDPGROWTH0407	0.0167*	-0.0026	-0.0024
	(1.79)	(-0.30)	(-0.29)
INFLATION0407	-0.0141	-0.0140	-0.0142
	(-1.08)	(-1.52)	(-1.52)
Structural Variables			
POPULATION07	-0.0955	-0.0729	-0.0803
	(-1.63)	(-1.11)	(-1.02)
GDPPERCAPITA07	-0.0420	-0.107*	-0.109*
	(-0.52)	(-1.81)	(-1.82)
KAOPEN	0.0273	0.0515***	0.0523***
	(1.28)	(2.84)	(2.79)
_cons	1.026*	1.161*	1.2810
	(1.70)	(1.85)	(1.59)
N	***51***	***51***	***51***
R-square	***0.4272***	***0.6069***	***0.6086***

t statistics in parentheses

** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (3) excluding small countries with population of less than 1 million. The dependent variable is the drop in credit growth rate from 2007 to 2009. Our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 16: Drop in borrower growth in the financial crisis

Excluding advanced economies

	DROP IN BORROWER GROWTH 0709		
INCLUSION0407	1.181***	0.986***	1.082*
	(4.65)	(3.17)	(1.83)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		0.4600	0.5560
		(1.57)	(1.09)
INTERCREDITBORRW0407			-0.2860
			(-0.18)
ZSCORE07	0.0137	0.00650*	0.00676**
	(1.55)	(1.84)	(2.04)
LIQUIDITY07	-0.0042	-0.0026	-0.0025
	(-1.25)	(-1.31)	(-1.28)
CONCENTRATION07	0.0044	0.0003	0.0005
	(0.87)	(0.10)	(0.20)
LOANSTODEPTS07	0.0005	0.0000	0.0000
	(0.32)	(-0.03)	(0.02)
Macroeconomic Variables			
GDPGROWTH0407	0.0417	-0.0080	-0.0081
	(1.01)	(-0.76)	(-0.76)
INFLATION0407	0.0007	0.0043	0.0045
	(0.05)	(0.71)	(0.77)
Structural Variables			
POPULATION07	0.0529	0.0117	0.0165
	(0.54)	(0.17)	(0.28)
GDPPERCAPITA07	-0.0050	-0.0237	-0.0243
	(-0.04)	(-0.24)	(-0.24)
KAOPEN	0.0586	0.0270	0.0257
	(1.40)	(1.22)	(1.19)
_cons	-1.1800	-0.1230	-0.2060
	(-0.79)	(-0.14)	(-0.29)
N	***55***	***54***	***54***
R-square	***0.4429***	***0.6691***	***0.6698***

t statistics in parentheses

** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (1) excluding advanced economies. The dependent variable is the drop in the borrower growth rate from 2007 to 2009. Our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 17: Credit growth drop in the financial crisis and the level of financial inclusion.

Excluding advanced economies

	DROPCREDITGROWTH 0709		
SHARE BORROWERS 08	-0.086	-0.183	0.255
	(-0.34)	(-0.83)	(0.91)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		0.975***	1.185***
		(6.15)	(6.76)
INTERSHARE 08CREDIT GRW			-1.811**
			(-2.24)
ZSCORE07	-0.004	0.001	0.000
	(-1.22)	(0.17)	(0.13)
LIQUIDITY07	0.00321*	0.001	0.001
	(1.84)	(0.38)	(0.53)
CONCENTRATION07	-0.00514**	-0.00395**	-0.00347**
	(-2.38)	(-2.37)	(-2.15)
LOANSTODEPTS07	0.00245**	0.001	0.001
	(2.31)	(1.33)	(1.52)
Macroeconomic Variables			
GDPGROWTH0407	0.017	0.002	0.001
	(1.67)	(0.29)	(0.18)
INFLATION0407	-0.013	-0.011	-0.008
	(-0.95)	(-1.19)	(-0.89)
Structural Variables			
POPULATION07	-0.105**	-0.052	-0.050
	(-2.15)	(-1.08)	(-1.08)
GDPPERCAPITA07	-0.043	-0.022	-0.003
	(-0.44)	(-0.30)	(-0.04)
KAOPEN	0.028	0.0303**	0.0319**
	(1.47)	(2.17)	(2.41)
_cons	1.127*	0.667	0.479
	(2.00)	(1.37)	(1.01)
N	***67***	***67***	***67***
R-square	***0.323***	***0.541***	***0.560***

t statistics in parentheses

** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (2) excluding advanced economies. The dependent variable is the drop in credit growth rate from 2007 to 2009. Our main variable of interest is the level of financial inclusion expressed as the share of borrowers in the adult population in 2008. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 18: Credit growth drop in the financial crisis and pre-crisis borrower growth

Excluding advanced economies

	DROPCREDITGROWTH 0709		
INCLUSION0407	0.239**	-0.057	-0.244
	(2.22)	(-0.47)	(-0.55)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		1.126***	0.938*
		(3.60)	(1.88)
INTERCREDITBORRW0407			0.559
			(0.50)
ZSCORE07	-0.002	0.001	0.000
	(-0.49)	(0.20)	(0.09)
LIQUIDITY07	0.001	0.000	-0.001
	(0.40)	(-0.23)	(-0.32)
CONCENTRATION07	-0.00427*	-0.00430**	-0.00472*
	(-1.78)	(-2.10)	(-1.81)
LOANSTODEPTS07	0.002	0.001	0.000
	(1.37)	(0.48)	(0.40)
Macroeconomic Variables			
GDPGROWTH0407	0.0151*	0.000	0.001
	(1.75)	(0.04)	(0.07)
INFLATION0407	-0.013	-0.013	-0.014
	(-1.04)	(-1.37)	(-1.39)
Structural Variables			
POPULATION07	-0.111*	-0.083	-0.092
	(-2.00)	(-1.40)	(-1.36)
GDPPERCAPITA07	-0.026	-0.089	-0.088
	(-0.33)	(-1.33)	(-1.26)
KAOPEN	0.025	0.0367**	0.0393**
	(1.40)	(2.15)	(2.15)
_cons	1.088	1.203*	1.364*
	(1.67)	(1.97)	(1.88)
N	***54***	***54***	***54***
R-square	***0.412***	***0.539***	***0.544***

t statistics in parentheses

** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of the OLS model presented in equation (3) excluding advanced economies. The dependent variable is the drop in credit growth rate from 2007 to 2009. Our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 19: Credit growth drop in the financial crisis and the Honohan indicator of inclusion.

	DROPCREDITGROWTH 0709		
HONOHAN	-0.00427***	-0.00271**	-0.001
	(-2.71)	(-2.50)	(-0.74)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		0.995***	1.325***
		(6.62)	(7.22)
INTHONOHANCREDIT			-0.0126***
			(-2.99)
ZSCORE07	-0.003	0.001	0.000
	(-0.95)	(0.43)	(0.10)
LIQUIDITY07	0.002	0.001	0.001
	(1.38)	(0.40)	(0.35)
CONCENTRATION07	-0.00461**	-0.00351**	-0.00330**
	(-2.25)	(-2.13)	(-2.05)
LOANSTODEPTS07	0.00173**	0.000	0.001
	(2.09)	(0.64)	(1.21)
Macroeconomic Variables			
GDPGROWTH0407	0.0188**	0.005	0.005
	(2.27)	(0.70)	(0.68)
INFLATION0407	-0.0183*	-0.0148**	-0.0134*
	(-1.79)	(-2.00)	(-1.80)
Structural Variables			
POPULATION07	-0.108**	-0.061	-0.067
	(-2.09)	(-1.13)	(-1.28)
KAOPEN	0.0378**	0.0420***	0.0423***
	(2.09)	(3.69)	(3.85)
_cons	1.198**	0.745	0.705
	(2.57)	(1.67)	(1.61)
N	***68***	***68***	***68***
R-square	***0.357***	***0.566***	***0.586***

t statistics in parentheses
** p<0.10, **p<0.05, *** p<0.01*

The Honohan indicator is highly correlated with GDP per capita (Table 4). Thus, we drop GDP per capita as a control variable in the regression.

This table reports the estimated coefficients of the OLS model presented in equation (2). The dependent variable is the drop in credit growth rate from 2007 to 2009. Our main variable of interest is the financial access indicator constructed by Honohan (2008). Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 20: Maximum credit growth drop over 2006-2010 and Honohan indicator of inclusion.

	H-M CREDIT DROP Max Drop on Outstanding Loans 0610		
HONOHAN	-0.00231** (-2.28)	-0.00136* (-1.85)	-0.0008 (-0.81)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		0.608*** (4.19)	0.712*** (5.04)
INTHONOHANCREDIT			(0.00) (-0.96)
ZSCORE07	-0.00793*** (-3.60)	-0.00528** (-2.28)	-0.00558** (-2.36)
LIQUIDITY07	0.00227* (1.95)	0.0012 (1.14)	0.0012 (1.11)
CONCENTRATION07	-0.0009 (-0.64)	-0.0002 (-0.17)	-0.0001 (-0.11)
LOANSTODEPTS07	0.00128** (2.59)	0.0005 (1.09)	0.0005 (1.27)
Macroeconomic Variables			
GDPGROWTH0407	0.0178*** (3.74)	0.00945** (2.30)	0.00954** (2.21)
INFLATION0407	0.0035 (0.77)	0.00563* (1.85)	0.00606* (1.90)
Structural Variables			
POPULATION07	-0.0979*** (-2.80)	-0.0690* (-1.83)	-0.0711* (-1.87)
KAOPEN	0.0304** (2.18)	0.0330*** (2.79)	0.0330*** (2.78)
_cons	0.872*** (2.67)	0.596* (1.76)	0.583* (1.74)
N	***68***	***68***	***68***
R-squared	***0.4811***	***0.6216***	***0.6253***

t statistics in parentheses
** p<0.10, **p<0.05, *** p<0.01*

The Honohan indicator is highly correlated with GDP per capita (Table 4). Thus, we drop GDP per capita as a control variable in the regression.

This table reports the estimated coefficients of the OLS model presented in equation (2). The dependent variable is the maximum credit drop in the period 2006-2010. Our main variable of interest is the financial access indicator constructed by Honohan (2008). Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the Honohan indicator and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 21: Crisis countries and the level of financial inclusion

	CRISIS COUNTRIES		
SHARE BORROWERS 08	-3.630*	-3.732**	-2.3890
	(-1.93)	(-2.01)	(-1.49)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		0.8740	2.1350
		(0.59)	(1.29)
INTERSHARE 08CREDIT GRW			-7.3500
			(-1.21)
ZSCORE07	-0.0354	-0.0323	-0.0327
	(-1.55)	(-1.26)	(-1.33)
LIQUIDITY07	0.0035	0.0017	0.0007
	(0.30)	(0.13)	(0.05)
CONCENTRATION07	0.0042	0.0041	0.0037
	(0.37)	(0.36)	(0.34)
LOANSTODEPTS07	0.0116**	0.0105**	0.0107**
	(2.35)	(2.02)	(2.07)
Macroeconomic Variables			
GDPGROWTH0407	-0.127**	-0.148**	-0.151**
	(-2.25)	(-2.06)	(-2.16)
INFLATION0407	0.0251	0.0269	0.0379
	(0.68)	(0.70)	(0.90)
Structural Variables			
POPULATION07	0.4250	0.4640	0.3870
	(1.21)	(1.21)	(1.00)
GDPPERCAPITA07	1.436**	1.487***	1.553***
	(2.45)	(2.60)	(2.63)
KAOPEN	0.1470	0.1500	0.1600
	(1.13)	(1.15)	(1.17)
_cons	-8.847**	-9.197**	-9.133**
	(-2.20)	(-2.19)	(-2.23)
N	***75***	***75***	***75***
R-square	***0.3846***	***0.4017***	***0.4042***

t statistics in parentheses
** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of a Probit model. The dependent variable is a dummy variable equal to 1 when a country experienced a banking crisis following Laeven and Valencia (2012) or concluded a Stand-by or Flexible Credit Line arrangements with the IMF in the period 2007-2009 (Belgium, Colombia, Costa Rica, Ecuador, Gabon, Georgia, Guatemala, Italy, Latvia, Nigeria, Pakistan, Poland, Portugal, Romania, Seychelles, UK). Our main variable of interest is the level of financial inclusion expressed as the share of borrowers in adult population in 2008. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the level of inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

Table 22: Crisis countries and pre-crisis borrower growth

	CRISIS COUNTRIES		
INCLUSION0407	1.5210	0.5420	-0.6220
	(1.37)	(0.76)	(-0.22)
Financial Stability Indicators (pre-crisis)			
CREDIT GROWTH 0407		3.0650	2.1900
		(0.97)	(0.52)
INTERCREDITBORRW0407			3.2870
			-0.4400
ZSCORE07	-0.0432	-0.0412	-0.0432
	(-1.28)	(-1.10)	(-1.09)
LIQUIDITY07	-0.0213	-0.0259	-0.0285
	(-1.19)	(-1.30)	(-1.49)
CONCENTRATION07	0.0384**	0.0332*	0.0311
	(1.97)	(1.86)	(1.60)
LOANSTODEPTS07	0.0043	0.0011	0.0000
	(0.66)	(0.16)	(-0.01)
Macroeconomic Variables			
GDPGROWTH0407	-0.206**	-0.317*	-0.323*
	(-2.08)	(-1.81)	(-1.88)
INFLATION0407	0.0060	-0.0086	-0.0181
	(0.08)	(-0.12)	(-0.22)
Structural Variables			
POPULATION07	0.6450	0.6480	0.5990
	(1.45)	(1.42)	(1.20)
GDPPERCAPITA07	1.596**	1.303**	1.311**
	(2.18)	(2.11)	(2.13)
KAOPEN	0.0928	0.0999	0.0986
	(0.58)	(0.64)	(0.62)
_cons	-12.60**	-10.30*	-9.3320
	(-2.03)	(-1.93)	(-1.50)
N	***60***	***59***	***59***
R-square	***0.3753***	***0.4017***	***0.4042***

t statistics in parentheses
** p<0.10, **p<0.05, *** p<0.01*

This table reports the estimated coefficients of a Probit model. The dependent variable is a dummy variable equal to 1 when a country experienced a banking crisis following Laeven and Valencia (2012) or concluded a Stand-by or Flexible Credit Line arrangement with the IMF in the period 2007-2009 (Colombia, Gabon, Georgia, Guatemala, Italy, Poland, Portugal, Seychelles, UK). Our main variable of interest is financial inclusion expressed as the compound borrower growth rate 2004 to 2007. Column 1 displays the baseline results, column 2 introduces the compound real credit growth rate 2004 to 2007 as control variable, and column 3 adds an interaction term between the inclusion and the credit growth variable. We control for a set of financial stability indicators for the pre-crisis period as well as for macroeconomic and structural variables. Robust standard errors are provided in parentheses.

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