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Author(s)	Chang, E; Lin, TC; MA, X
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Financial Inclusion for Stability:

Access to Bank Deposits and the Deposit Growth during the Global Financial Crisis

Abstract

In crisis times, depositors get anxious, can run on banks, and withdraw their deposits. Correlated deposit withdrawals of bank deposits could be mitigated if bank deposits are more diversified, i.e. held by more individuals. This paper examines the link between a broader access to bank deposits prior to the 2008 crisis and the dynamics of bank deposit growth in the crisis, while controlling for relevant covariates. Employing the proxies of Honohan (2008) for access to deposits and of Demirguc-Kunt and Klapper (2012) for the use of bank deposits, the authors find that greater access to bank deposits can make the deposit funding base of banks more resilient in times of financial stress. Policy efforts to enhance financial stability should thus focus not only on macroprudential regulation, but also recognize the positive effect of broader access to bank deposits on financial stability.

Keywords: Financial Inclusion, Access to Deposits, Deposit Withdrawals, Financial Stability, the 2008 Financial Crisis.

JEL Classification: G21, G01, G28, G32.

1. Introduction

In 2009, the volume of deposits shrank worldwide, with a median decrease 12 percent in the ratio of deposits value to GDP (Khan, 2011). In times of financial stress or crises, depositors get anxious, can run on banks, and withdraw their deposits (Diamond and Dybvig, 1983; Shin, 2009). Large depositors are usually the first ones to run (Huang and Ratnovski, 2011). By the law of large numbers, correlated deposit withdrawals could be mitigated if bank deposits are more diversified. Greater diversification of deposits could be achieved by enabling a broader access to and use of bank deposits, i.e. involving a greater share of adult population in the use of banks deposits (financial inclusion). Based on this assumption, broader financial inclusion in bank deposits could significantly improve resilience of banking sector funding and thus overall financial stability (Cull et al. 2012).

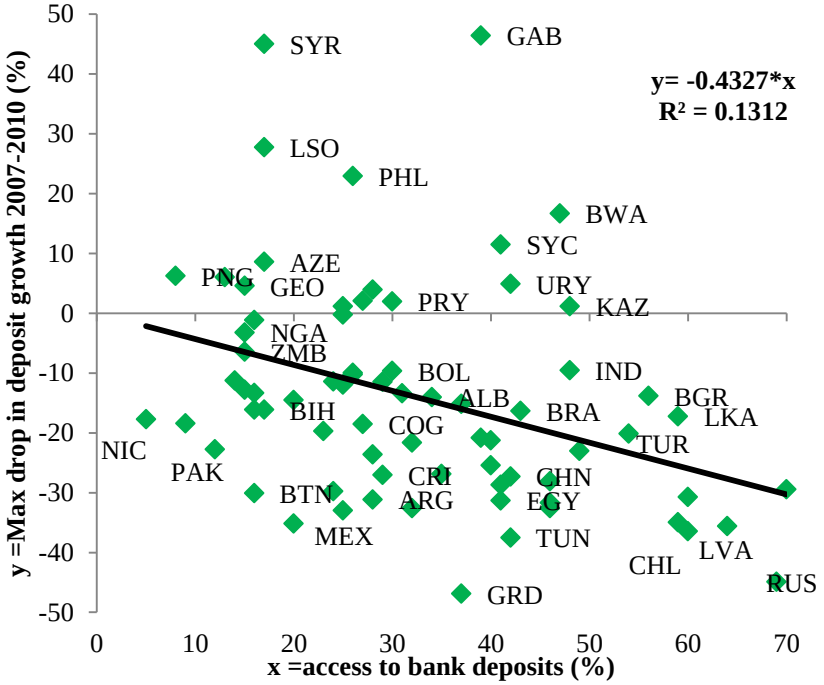
This paper investigates the implications of a *broader* access to deposits for the *dynamics* of bank deposits during the 2008 global financial crisis. Namely, we analyze whether access to bank deposits by a larger share of a country's population can help explain differences in the drop of deposit growth over 2007-2010 across our sample of 113 countries. We also separately estimate the differences in the relationship between the drop in deposit growth and access to deposits for low-income (LIC), middle-income (MIC), and high income (HIC) countries. The employed proxies for access to and use of deposits are based on Honohan (2008) and Demirguc-Kunt and Klapper (2012). In the regression analysis, we condition on relevant control variables including GDP per capital, the population size, occurrence of a banking crisis, existence of explicit deposit insurance, a banking sector stability indicator, the banking sector liquidity position, and banking sector concentration. We address the problem of potential endogeneity by the timing of the explanatory variables before or by 2008. When using the measure of financial inclusion in deposits of Demirguc-Kunt and Klapper, we estimate the regression by the general method of moments (GMM), instrumenting the measure by the deposit access proxy of Honohan. Moreover, we use *robust* regressions to gauge the impact of outliners on the estimation results.

We find that a broader access to and use of bank deposit can significantly mitigate bank deposit withdrawals or growth slowdowns in times of financial stress (Figure 1). While this finding holds for the entire sample of HICs, MICs, and LICs, it could be particularly strong in MICs, where a large share of population still lacks access to bank deposits, trust in banks is yet to be firmly established, and the integration in global financial flows is growing. In addition to the access and use of deposits, bank stability—measured by the aggregate z-score, and the dummy for the occurrence of banking crises are the most significant explanatory variables in our regressions. The results hold even when accounting for the possible leverage effects of outliers.

The main message is that countries should recognize that policies to promote a broader use of bank deposits could improve resilience of bank funding. Such policies can thus enhance

overall financial stability and complement the mainstream macroprudential policies to foster stability of the financial system.

Figure 1: Broader Access to Bank Deposits Can Aid Financial Stability—Especially in Middle-Income Countries



Source: Authors' calculation based on data from IMF, Honohan (2008), Laeven& Valencia (2012), FinStats, Global Financial Development Database and WDI.
Note: The drop in bank deposit growth is conditional on per capita income, bank z-score, and occurrence of banking crisis, and implemented explicit deposit insurance. The Honohan (2008) composite measure of access to financial services is used as a proxy for access to bank deposits.

Our paper responds to an existing gap in the empirical literature linking greater access to deposits with greater financial (banking sector) stability. While the literature postulates that an inclusive financial sector will have a more diversified, stable retail deposit base that can increase systemic stability, empirical research confirming existence of such a relationship, especially at the level of the financial system, is largely absent in the literature (GPFI, 2012; Cull et al., 2012; Prasad, 2010).

At the individual and household level, savings support stability and, given their very large numbers, small savers potentially contribute to stability at the financial system level (Cull et al, 2012). Low income savers tend to maintain steady financial behavior through the business cycle. Hence, during crises, deposits from low income clients typically act as a continued source of funds even when other sources of bank financing dry up or become difficult to roll over. Small customers thus provide big opportunities to mobilize stable deposits (Khan, 2011). Greater financial inclusion, including access to savings, can also enhance financial stability indirectly, by

providing individuals, households, and small firms with greater access to financial risk-managing tools. This greater access can enhance resilience and stability of the real economy and thus also the financial system that serves it (GPFI 2012; Cull et al, 2012; Khan, 2011).

At the bank level, focusing on retail deposit generation can produce a more diversified and stable funding base that is less sensitive to changes in market interest rates and a bank's financial condition. In stress times, insured depositors have proven to be a bank's most reliable funding source and, therefore, play an integral role in mitigating liquidity risk (OCC, 2012). The global crisis demonstrated that stable retail sources of funding, in contrast with reliance on borrowed funds, can greatly enhance the soundness and resilience of financial institutions and reduce volatility of earnings (Khan, 2011). Diversified funding base of financial institutions has played a role in cushioning the impact of a global credit (wholesale funding) crunch on domestic financial intermediation (Hanning and Jasen, 2010).

At the country level, financial inclusion can boost efficiency of financial intermediation, through intermediation of greater amounts of domestic savings, and thus improve soundness of domestic savings and investment cycles. Provided that quality financial infrastructure and competent supervision are implemented, such improvement will, in turn, produce both greater economic and financial stability (Prasad 2010; Cull et al. 2012)

The paper proceeds as follows. Section two lays out our regression model and explains the employed estimation approaches. Section three describes the data used for estimation of the regression model. Section four discusses the baseline regression results for the entire sample of 113 countries, along with a robustness analysis using the robust regression approach, and an alternative access to deposit proxy together with a GMM estimator. Section five presents and discusses differences in the model's estimates across HICs, MICs, and LICs, and reports related robustness tests. Section six concludes and offers some policy implications.

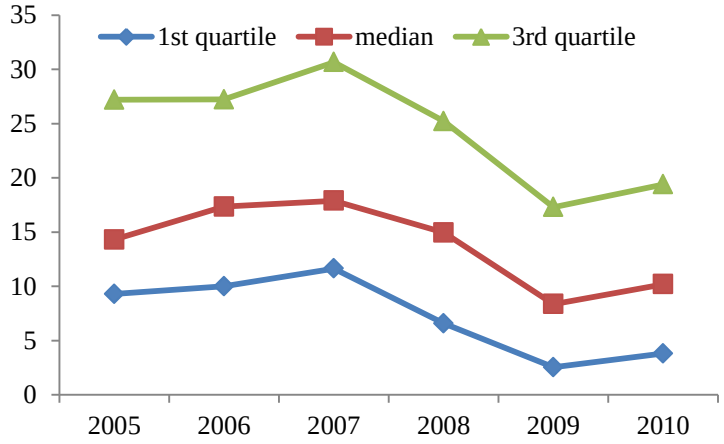
2. Some Stylized Facts

In this section, we preview some stylized facts about the main variables of interest, i.e. bank deposit growth around the 2008 global financial crisis and access to bank deposits before the crisis. The preview will motivate some choices that we will make for our regression analysis, and further illustrate the extent of the heterogeneity in deposit growth and access to deposits across country income groups.

Consider the global growth in bank deposits first. Figure 2 shows that the median growth in bank deposit across countries dropped significantly from 2007 to 2009 by about 9 percentage points, and then recovered slightly in 2010. The drop in deposit growth was much more apparent among the countries with high growth of deposits prior to the 2008 crisis (13 percentage points) than for countries with lower pre-crisis deposit growth (5 percentage points). In addition, some

countries, such as Azerbaijan, Botswana, Island, Moldova, and Montenegro transitioned from the 75th percentile of countries with the most growing deposits to the 25th percentile of countries with the least growing (dropping) deposits, generally experiencing deposit withdrawals in 2009 and thus much larger declines in deposit growth than other countries (60 p.p., 31 p.p., 59 p.p., 45 p.p., and 102 p.p., respectively).

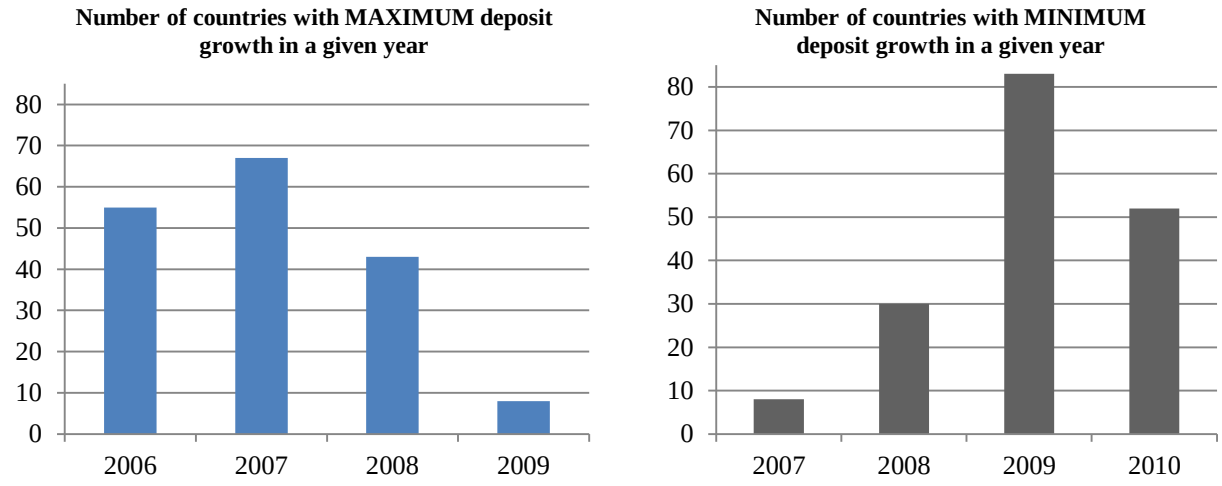
Figure 2: Global Growth of Bank Deposits During 2005-2010



Source: Authors' calculation based on deposits data from IMF's FAS database.
Note: This figure displays the year on year percentage growth rate of outstanding deposits of commercial banks.

The timing of the peak and through of deposit growth around the 2008 financial crisis varies notably across countries. While the global average suggests that the peak of global deposit growth was in 2007, and the through of global deposit growth was in 2009, there is a significant heterogeneity across countries regarding the year, in which the peak and trough actually occurred. Figure 3 shows that although 67 countries experienced the peak of deposit growth in 2009, 55 countries experienced the peak in 2006, and 43 experienced it in 2008. Similarly, 2009 was the year of deposit growth slowdown for 83 countries, but other 52 countries experienced the growth slowdown only in 2010. These observations lead us to concur that we need to allow for a country specific timing in calculation of the drop in deposit growth experienced by a given country around the 2008 global crisis. This variable will be our first main variable of interest and also our dependent variable in the regression analysis, later in the paper.

Figure 3: Histogram of the Timing of the Peak (left) and Trough (right) in Deposit Growth in Individual Countries

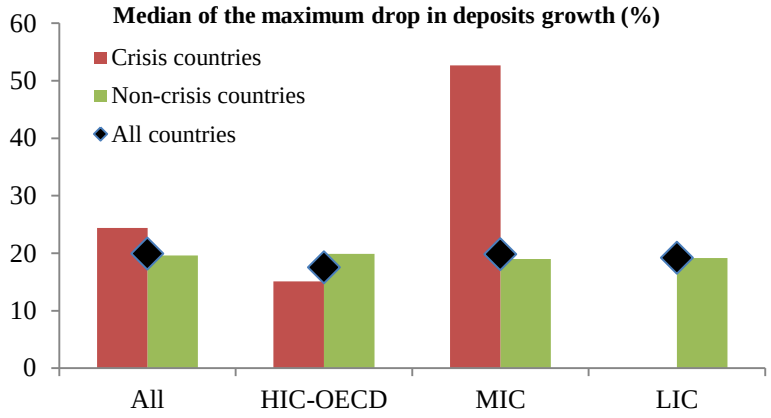


Source: Authors' calculation based on deposits data from IMF's FAS database.

An interesting stylized fact to inspect at this point is the maximum drop in deposit growth across countries that have experienced and those that have not experienced a banking crisis around 2008. Figure 4 shows the calculated drops in deposit growth for different country groups (the details of this calculation are provided in section 4). When looking across all countries (the "ALL" column), there is no apparent difference in the maximum drop in deposit growth across crisis and non-crisis countries. The picture, however, becomes much more heterogeneous when countries are grouped by income level.

First, there are no LICs that have experienced banking crises during 2006-2010. Second, there is a large difference in the maximum drop in deposit growth between crisis and non-crisis countries in the MIC group—non-crisis countries experienced, on average, a 25 percentage point drop in deposit growth, while crisis countries experienced a 53 percentage point drop. Third, there is no significant difference in the maximum drop in deposit growth between crisis and non-crisis countries in the HIC group. Interestingly, the data show a higher maximum drop in deposit growth for *non-crisis* MICs compared with *crisis* MICs, by about 5 percentage points. Our conjecture is that people in richer countries diversify their saving portfolio much more than in lower income countries, allocating their savings also in investment securities. When the 2008 crisis hit, the uncertainty about future returns and general risk aversion mounted. Hence, people in HICs, especially those living through a crisis, might have liquidated their investment in securities and used bank deposits as a safe haven instrument propped by public deposit insurance. Overall, the maximum drop in deposit growth was the strongest in crisis affected MICs, and was very heterogeneous across HICs, MICs and LICs

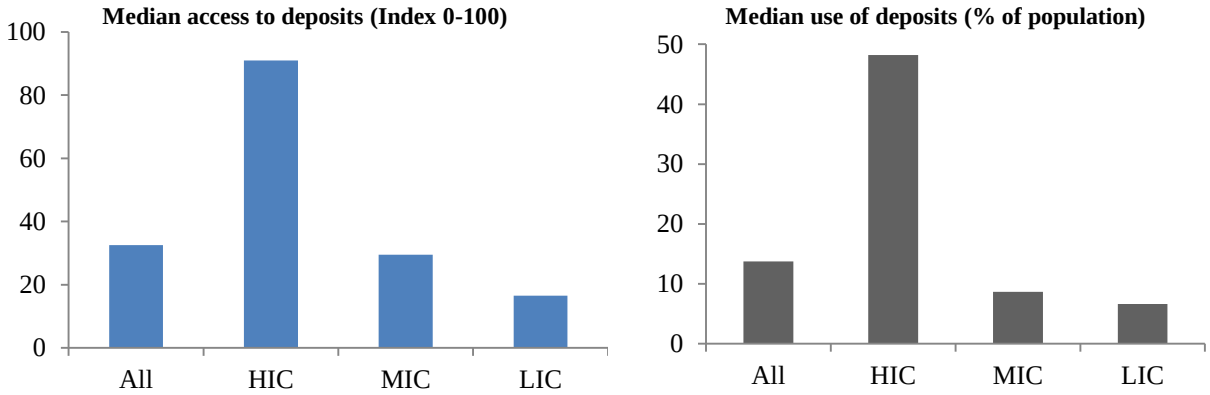
Figure 4: The Drop in Deposit Growth in Crisis and Non-Crisis Countries



Source: Authors' calculation based on data from IMF and Laeven&Valencia (2012).
Note: None of the LICs in authors' sample experienced banking crises between 2006 and 2010.

Consider the access to bank deposits prior to the 2008 crisis next. Figure 5 (left panel) plots the median access to deposits using Honohan (2008) index for all countries and their income groups. Similarly, Figure 5 (right panel) plots the use of deposits measure of Klapper and Demirguc-Kunt (2012). Both measures show a similar pattern with generally low access to deposits worldwide (the "ALL" column). Although people in HICs enjoy relatively high access to bank deposits, people in MICs and LICs face much greater challenge in accessing bank deposits (see also Allen et al. 2012).

Figure 5: Access to Bank Deposits in 2005 (left), and the Use of Bank Deposits in 2011 (right)



Source: Honohan (2008) and Demirguc-Kunt & Klapper (2012).

In sum, countries within the MIC group show the greatest variation in both the maximum drop in deposit growth and the pre-crisis access to deposits. We can thus expect that most of the action between the access to deposits before the 2008 crisis and the changing deposit growth in the immediate aftermath of the crisis could happen within the subsample of MICs. We will

formally examine the link between the maximum drops in deposit growth and the pre-crisis access to deposits next, using a regression model, which controls for other factors that could significantly influence the effect of access to deposits on the drop in deposit growth during the 2008 crisis.

3. Regression Model

To formally analyze the link between access to bank deposits prior to the 2008 crisis and the deposit dynamics in the crisis, we use a regression model of the following form:

$$y_i = \alpha(atd_i) + \beta X_i + \varepsilon_i \quad (1)$$

where y_i is the maximum drop in bank deposit growth between 2006 and 2010, and atd_i is an index of Honohan (2008) measuring access to bank deposits before the 2008 crisis period (Honohan(2008)). As an alternative measure of access to (the actual use of) deposits, we use the Demirguc-Kunt and Klapper (2012) measure of the share of people that use banking deposits in 2011 (D-K&K(2012)). The X_i is a vector of control variables, ε_i a white noise disturbance, and the subscript *i* stands for countries.

The vector of control variables, X_i, includes a constant, the population size (popsize), GNI per capita (gnipc), a dummy variable taking the value of 1 if the country experienced a banking crisis around 2008 and 0 otherwise (bc), the change in GDP growth corresponding to the time period over which the maximum drop in deposits happened (gdpgr), a dummy variable taking the value of 1 if the country had explicit public deposit insurance and 0 otherwise (depins), the aggregate z-score for the banking sector as a measure of financial stability (z-score), the ratio of liquid assets to deposits and short term funding as a measure of the banking sector liquidity position (liquidity), and the share of the three largest banks' assets in the total banking sector assets as a measure of banking sector concentration (concen). We discuss the expected effects of the control variables next, before explaining how the issue of possible endogeneity of some control variables was handled, as well as the estimation methods employed.

We expect that countries with larger population could be more prone to herd behavior because it simply takes more people to converge on the same idea and timing of deposit withdrawals. Richer countries (with higher GDP per capita) will have more savings per person so that deposit withdrawals by the same number of people will be relatively higher in richer countries. Countries that experienced a banking crisis around 2008 could have experienced larger deposit withdrawals because of possible contagion-like effects and self-fulfilling run on banks. The slowdown in deposit growth could have been particularly stronger in countries that have experienced a slowdown in GDP growth over the same period. If a country has explicit deposit insurance it is less likely to experience panicky withdrawals of deposits, especially those of smaller size that are fully insured. Banking sectors with higher z-scores are perceived by

depositors as more stable and should experience relatively smaller deposit withdrawals. Similarly, banking sectors with a stronger liquidity position have a large capacity to meet deposit withdrawal demand of a given size, and should thus be more credible and less prone to deposit withdrawals. Finally, more concentrated banking systems could be more prone to deposit withdrawals due to possibly greater interconnectedness and thus greater worries of depositors about transmission of problems from one bank to another and subsequently to the whole system.

We handle the possible endogeneity of explanatory variables by dating most of them prior to the crisis and running an ordinary least square (OLS) regression with robust standard errors. In addition, we test the robustness of our baseline results to outliers by running robust regression estimation that proportionally underweights the information from leverage points (outliners) in the regression estimation. Further, since our alternative measure of access to deposits based on Demirguc-Kunt and Klapper (2012) dated by 2011, and because GDP growth could also suffer an endogeneity problem, we estimate the regression model by GMM in addition. In this case, we use the 2005 Honohan's index as an instrument for the 2011 Demirguc-Kunt and Klapper's index, and the log of GDP at the peak of deposit growth prior to the crisis as an instrument for GDP growth during the period when the maximum drop of deposit growth occurred in each country. We have used the rule of thumb of Stock, Wright and Yogo (2002) and Stock and Yogo (2005) to check that our instruments are relevant and our GMM regression does not suffer from the weak instrument problem.

4. Data Description

Our paper examines the relationship between access to deposits and deposit growth during the 2008 global financial crisis. We thus focus on analyzing the dynamics of bank deposit growth between 2006-2010, which covers both pre-crisis years and post-crisis years. We calculate year on year growth rate on bank deposits for 173 countries using data on outstanding deposits of commercial banks from IMF's Financial Access Survey (FAS) database. We choose this indicator over other measures of total deposits to ensure maximum cross sectional coverage (number of countries covered) and best consistency across countries. We observed that it is rarely the case that the year on year deposit growth rate remained stable and many countries experience more than one peak or more than one trough during the period that we examine. In order to capture the potential impact of banking crisis, we define maximum drop in deposit growth in the following manner: first, we document the minimum deposit growth a country experienced between 2007 and 2010 and mark the year when it occurred; then we find the maximum deposit growth the country had experienced before this year. The difference between this maximum deposit growth and the minimum deposit growth then constitutes the maximum drop in deposit growth—our cross-country dependent variable. We use the composite indicator of access to financial services constructed by Honohan (2008) as a proxy for access to deposits.

The actual use of deposits in each country is approximated by the indicator[1] of the use of formal saving in a given country from the Global Financial Inclusion Database (Demirguc-Kunt and Klapper 2012). Detailed descriptions of variables and data sources are listed in Table A1.

We use indicators of aggregate output, income per capita, and population to control for the economic growth during the global crisis period, for the difference in economic development, and for the difference in the country size. The nominal GDP (henceforth GDP in short), GNI per capita and total population data were obtained from World Bank's WDI database and all three variables were log transformed. To control for the impact of GDP growth on deposit growth, we calculate the GDP growth over the same period that the maximum deposit growth drop happened for each country.

We included indicators for deposit insurance, bank stability, bank liquidity and banking concentration to capture the cross sectional variation in financial sector structure and development. Deposit insurance is a dummy variable indicating existence of an explicit deposit insurance scheme as documented in Demirguc-Kunt, Karacaovali, and Laeven (2005). We use banking system z-score as the indicator for financial stability and the ratio of liquid assets to deposits and short-term funding as the indicator for bank liquidity. The data on both indicators were obtained from World Bank's Global Financial Development Database. Banking concentration is approximated by total assets of a country's three largest banks as a share of assets of all commercial banks. The data was obtained from World Bank's FinStats database. Summary statistics of all variables are provided in Table A2 and pairwise correlations of variables are shown in Table A3.

5. Baseline Estimation Results

This section discusses the baseline estimation results presented in Table 1. Namely, Table 1 shows both the full model estimation results and the parsimonious estimation results based on adjusted R-squared maximization. Further, the columns labeled OLS show the OLS estimation results, the columns labeled Robust show the robust regression estimates, and the GMM(1) column shows the GMM estimation of the model where gdpgr is treated as possibly endogenous variable and instrumented by the log of GDP at the peak of the deposit growth cycle prior around 2008. In addition to GMM(1), GMM(2) uses D-K&K measure of access to deposits from 2011, which we instrument by Honohan(2008)—the pre-crisis measure of access to deposits.

The estimation results show, consistently over all estimation methods and using the two different measures of access to deposits, that greater financial inclusion in the use of bank deposits can help enhance banking sector stability by mitigating the vulnerability of bank deposit base. Namely, the estimated coefficient on the Honohan(2008) and D-K&K(2012) variables

[1] percentage of adult population who saved at a financial institution in 2011

indicate that a 10 percent increase in the share of people that have access or actively use bank deposits can mitigate the deposit growth declines (or deposit withdrawal rates) by about 4 percentage points. Recall that, on average, the maximum drop in deposit growth worldwide was 20 percent, and in the MICs that have experienced a banking crisis around 2008, the drop averaged around 50 percent (Figure 4). Also, note that the explanatory power of the regressions is satisfactory, with adjusted R-squared between 0.2 and 0.3. The conditioning set of variables thus adequately tests the relevance of the variables gauging access to bank deposits in explaining declines in deposit growth in the period of the 2008 global financial crisis.

The most important conditioning variables that consistently appear to be significant in explaining the deposit growth declines around 2008 are the experience of a banking crisis (bc), GDP growth decline during the period of deposit growth declines (gdpgr), and the aggregate stability of the banking system (z-score). Namely, the occurrence of a banking crisis around 2008 added about 10 percentage points to deposit growth slowdown, on average, in our sample countries. The GDP growth decline in the period of deposit growth decline intensifies the deposit growth declines but coefficient magnitudes vary notably across different estimation methods. The z-score significantly reduces the drop in deposit growth, and is consistently the strongest conditioning variable across different estimation methods. Also, the deposit decline rates seem to be greater in more developed counties with a higher income per capita. In contrast, countries with explicit public deposit insurance have experienced consistently lower declines in deposit growth during the 2008 crisis period. The coefficients on all significant control variables thus bear the expected sign.

When we inspect the estimation results with the view to possible country heterogeneity, the results seem to indicate that the relationship between access to deposits and the stability of bank deposit funding could vary across country groups at a different stage of economic development (see also section 2). Our hypothesis is that middle-income countries could benefit from a greater synergy between improving access to deposits together with improvements in banking sector stability (the deposit funding base of banks). This is because LICs face huge financial inclusion gaps and can mobilize much less savings from households that are often consumption-constrained. Moreover, LICs are not as well integrated in global finance to import large amounts of foreign savings, and to be subject to cross-border shocks, including those to depositor confidence. In contrast, access to bank deposits in high-income countries approaches 90–100 percent, and high-income countries focus mainly on fostering financial stability, with only marginal gains from further improving the access to deposits. We thus investigate the relationship between access to deposits and bank funding stability separately for countries in different income groups next.

6. Income-Group Splits

Our sample of countries includes 27 HICs, 68 MICs, and 18 LICs when we estimate the baseline regression. We run separate estimation for MICs, but because of small degrees of freedom for LICs and HICs, we decided to merge these two groups and use it as a control group of countries. Because of its diversity, this group is only used to illustrate the contrasting environment of MICs that are becoming financially developed and integrated with the rest of the world, but at the same time the trust in banks is being still tested and access to deposits needs further improvements.

Table 2 presents the estimation results for MICs and the merged group of HICs and LICs, both for the full regression model and the parsimonious regression. The parsimonious regressions were again obtained by maximizing the adjusted R-squared. The estimation methods and approaches explained in Table 1 were analogously applied to the MIC group and the HIC and LIC group.

For the MICs groups (Table 2, left panel), the full regression can now explain around 50 percent of the variation in the dependent variable, which is almost twice as high explanatory power as that of the full regression for all countries. It thus appears that our model is more fitted to MICs, where the explanatory power of the variables on access to deposits is also more tested. Concerning our main variable of interest, both access to deposit variables, Honohan(2008) and D-K&K(2012), are consistently significant with a coefficient magnitude slightly lower than the coefficient estimate from the baseline regression; but statistically these two are not different. Interestingly, the magnitude of the coefficient attached to D-K&K(2012) is notably higher than that of the coefficients attached to Honohan(2008). Assuming that D-K&K(2012) approximates better the *actual* use of bank deposits whereas Honohan(2008) approximates only access to deposits, the results could indicate that, in MICs, the actual use of deposits can deliver a more beneficial effect on the resilience of bank deposit base in times of financial stress, compared with just access to deposits and their *potential* use by people.

In the regression for MICs, the most significant control variables are the banking crisis dummy and the z-score, followed by the dummy for explicit deposit insurance and GNI per capita. Similarly as in the regression for all countries, a banking crisis can shatter confidence in the banking system, shrink available resources of existing depositors, and thus intensify the drop in deposit growth (deposit withdrawals). The estimated add-on effect of about 30 percentage points is roughly two times higher than the estimate for all countries. The aggregate stability of the banking sector, as approximated by the z-score, is a significant mitigant of deposit withdrawals in MICs, even more so than in the regression for all countries. The presence of explicit deposit insurance can also play a significant mitigating role in regards to deposit growth declines (withdrawals), similarly as in the baseline regression for all countries. Moreover, countries with higher GNI per capital may experience larger declines in deposit growth because of the larger average size of a bank deposit in relatively richer countries.

For the HICs and LICs group (Table 2, right panel), the explanatory power of the regression is notably lower than that for MICs. This result stem from a worse fit of the model to the data or a generally smaller sample size (68 versus 45 observations for the MIC group and the LIC and HIC group, respectively). In three out of four models, the variables measuring access to deposits add to the explanatory power of the regression, as gauged by their contribution to the adjusted R-squared of the regressions, but are no longer statistically significant at common levels. Further research on a larger sample of data, either in the context of event studies or panel regressions, is needed to obtain more conclusive inference for these two groups of countries that should be, ideally, estimated separately and not merged in one group.

In the regression for the HIC and LIC group, the most important conditioning variables are the GDP growth during the period when the decline in deposit growth occurred, followed by GNI per capita and the banking sector concentration. Interestingly, the most significant variables from the baseline regression, indicating the occurrence of banking crises (bc) and banking sector stability (the z-score), are no longer significant. We conjecture that the former result could stem from the fact that no LIC in our sample experienced a banking crisis around 2008. The latter result could arise because banks in LICs have typically large z-scores and capital buffers, to the extent that the buffers can be judged inefficient. In turn, the cross-country variation in z-scores may not necessarily reflect a banking sector's concern about hedging unexpected losses. In contrast, banks in HICs typically keep very efficient capital buffers close to the capital requirements in a given jurisdiction, so that the z-scores are more driven by the variance of profits. The ability of banks to smooth profit in a given country, for instance because of different provisioning rules or accounting standards, could distort the cross-country variation in z-scores so that it reflects less the cross-country differences in the ability of banks to absorb unexpected losses.

In sum, this section established that the positive influence of greater access to deposits (and their use by a greater share of the adult population) on the stability of bank deposit growth (and stability of bank funding base) during the 2008 global financial crisis is stronger in MICs compared with LICs and HICs. For the latter two country groups, further research on a greater sample is needed to obtain more reliable inference.

7. Conclusion

This paper examined the effect of access to bank deposits on the stability of deposit growth during the 2008 global financial crisis using a cross-sectional regression model for 113 countries. We have found that, on average, greater access to bank deposits or their actual use by a country's population can enhance resilience of the deposit funding base of the banking sector in times of financial stress. Specifically, the estimated coefficient on the variables measuring access to deposits indicate that a 10 percent increase in the share of people that have access to bank deposits can mitigate the deposit growth drops (or deposit withdrawal rates) by about 4

percentage points. The enhanced resilience of bank funding then helps foster overall financial stability of the banking sector and the whole financial system. We also find that this effect is likely much stronger in middle-income countries, which could face greater shocks to depositor confidence due to still developing trust in the banking sector and already high integration in global finance. For high-income and low-income countries more research is needed to obtain more reliable conclusions with the help of bigger or richer datasets.

Our findings have important policy implications. A lot of effort is being put into establishing sound macroprudential frameworks to control risk that affects the whole financial system. While such effort is needed, it may not be taking appropriate advantage of the complementarities between financial inclusion and financial stability. Although prudential limits to enabling more people to use credit may exist, as not every borrower is creditworthy, involving more people in the use of bank deposits could be beneficial for people, economic development, and stability of the financial system. Countries should take into account this potential synergy in their financial sector policy strategies and policy implementation. They should strive to promote a broader use of bank deposits not only to aid economic development and poverty alleviation but also to complement the mainstream macroprudential policies for fostering financial stability. With proper business conduct supervision in place, initiatives such as Kenya's M-PESA and M-KESHO projects (Demombynes and Thegeya, 2012) or South Africa's Mzansi accounts could serve as good examples (Bankable Frontier Associates 2009; Demombynes and Thegeya 2012) in this regard.

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Tables and Figures in the Main Text

Table 1: Baseline Estimation Results

Explanatory Variables	Full Models				Parsimonious Models			
	Dependent Variable: Maximum Drop in Deposit Growth 2006-2010							
	OLS	Robust	GMM(1)	GMM(2)	OLS	Robust	GMM(1)	GMM(2)
Honohan(2008)	-0.400***	-0.412***	-0.408***		-0.418***	-0.415***	-0.388***	
	(0.137)	(0.106)	(0.136)		(0.131)	(0.0965)	(0.135)	
D-K&K(2012)				-0.616**				-0.407*
				(0.293)				(0.237)
gnipc	5.436*	7.172***	5.469*	1.996	6.014*	6.867***	5.300*	
	(3.157)	(2.023)	(3.040)	(3.117)	(3.134)	(1.742)	(3.016)	
popsize	-0.867	-1.351	-0.896	-0.794			-1.449	
	(1.175)	(1.071)	(1.105)	(1.023)			(0.998)	
bc	10.26**	8.583*	10.42**	12.95**	10.04**	8.421**	10.33**	13.60***
	(4.879)	(4.566)	(4.632)	(5.315)	(4.693)	(4.238)	(4.433)	(5.244)
gdpgr	21.01**	16.08**	17.73	27.58*	21.28**	19.16***	17.63	41.08
	(10.33)	(6.563)	(14.15)	(15.43)	(10.34)	(5.999)	(14.26)	(43.53)
depins	-9.758**	-3.905	-9.956**	-9.861**	-10.53***		-11.23***	-8.603*
	(4.151)	(3.786)	(4.031)	(4.237)	(3.942)		(4.215)	(4.451)
zscore	-0.584***	-0.435***	-0.587***	-0.649***	-0.606***	-0.440***	-0.567***	-0.678***
	(0.142)	(0.131)	(0.135)	(0.142)	(0.133)	(0.118)	(0.122)	(0.133)
liquidity	0.0157	0.0261	0.00520	0.0677				
	(0.109)	(0.0868)	(0.105)	(0.0996)				
concen	0.109	-0.0608	0.106	0.231*	0.144			0.282**
	(0.124)	(0.0900)	(0.119)	(0.126)	(0.109)			(0.134)
Constant	16.04	11.40	17.82	28.39	-3.080	-14.09	35.18	24.84
	(29.32)	(27.06)	(26.88)	(29.26)	(20.25)	(11.66)	(27.88)	(16.50)
Observations	113	113	113	102	113	113	113	102
R-squared	0.253	0.318	0.252	0.340	0.250	0.310	0.246	0.339
Adjusted R-squared	0.187	0.258	0.186	0.276	0.200	0.278	0.196	0.297

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: GMM(1): endogenous variable gdpgr instrumented by log of gdp at the peak of deposit growth; GMM(2): endogenous variables gdpgr and D-K&K(2012) instrumented by log of gdp at the peak of deposit growth and Honohan(2008) respectively.

Table 2: Income-Group Splits

	Estimation Results for MICs								Estimation Results for LICs and HICs							
	Full Models				Parsimonious Models				Full Models				Parsimonious Models			
Explanatory Variables	Dependent Variable: Maximum Drop in Deposit Growth 2006-2010								Dependent Variable: Maximum Drop in Deposit Growth 2006-2010							
	OLS	Robust	GMM(1)	GMM(2)	OLS	Robust	GMM(1)	GMM(2)	OLS	Robust	GMM(1)	GMM(2)	OLS	Robust	GMM(1)	GMM(2)
Honohan(2008)	-0.330**	-0.350**	-0.343***		-0.394***	-0.370***	-0.388***		-0.349	-0.00663	-0.349		-0.0805		-0.0935	
	(0.129)	(0.140)	(0.128)		(0.131)	(0.105)	(0.130)		(0.365)	(0.175)	(0.324)		(0.0928)		(0.141)	
D-K&K(2012)				-0.902*				-0.882**				-0.708				-0.336
				(0.461)				(0.411)				(0.772)				(0.698)
gnipc	8.298**	6.457**	8.268**	4.339	9.737***	4.594**	9.087***	4.299	7.530	2.239	7.550	6.902		2.163**		0.909
	(3.486)	(2.987)	(3.322)	(3.384)	(3.327)	(2.161)	(3.238)	(3.344)	(6.874)	(3.377)	(6.180)	(8.187)		(0.964)		(6.131)
popsize	-1.147	-1.438	-1.176	-1.193			-0.743	-1.282	1.040	-1.296	1.054	3.367				1.775
	(1.323)	(1.293)	(1.214)	(1.526)			(1.244)	(1.436)	(2.567)	(1.380)	(2.266)	(2.333)				(1.768)
bc	27.22***	28.84***	27.99***	28.47***	28.08***	29.19***	28.63***	28.36***	-3.267	-4.881	-3.326	-5.550		-4.578		
	(5.076)	(6.077)	(4.856)	(5.977)	(4.741)	(4.810)	(4.708)	(5.950)	(6.384)	(5.202)	(5.772)	(8.776)		(4.217)		
gdpgr	11.10	16.93**	3.040	3.526	9.011	23.73***	1.884	3.672	63.21	-3.253	64.87	95.17***	67.18*		58.34	99.09***
	(6.674)	(7.012)	(12.15)	(14.72)	(7.113)	(5.416)	(11.85)	(14.41)	(37.45)	(10.85)	(42.91)	(33.54)	(34.03)		(63.17)	(33.04)
depins	-8.743*	-3.874	-9.018**	-9.850**	-10.08**		-9.741**	-9.748**	-13.54	0.607	-13.30	-11.83				
	(4.432)	(3.923)	(4.284)	(5.012)	(4.214)		(4.120)	(4.969)	(10.30)	(6.703)	(9.286)	(8.775)				
zscore	-0.623***	-0.485***	-0.634***	-0.730***	-0.693***	-0.553***	-0.677***	-0.720***	-0.369	-0.160	-0.367	-0.527				
	(0.165)	(0.154)	(0.155)	(0.162)	(0.161)	(0.114)	(0.157)	(0.157)	(0.334)	(0.191)	(0.291)	(0.356)				
liquidity	0.143	0.135	0.109	-0.0211					-0.155	-0.0318	-0.153	0.224				0.236
	(0.146)	(0.109)	(0.152)	(0.142)					(0.198)	(0.100)	(0.171)	(0.162)				(0.154)
concen	0.0978	-0.0550	0.101	0.249	0.189		0.149	0.239*	0.134	-0.0680	0.137	0.295	0.196		0.192	0.340*
	(0.153)	(0.122)	(0.147)	(0.155)	(0.133)		(0.140)	(0.144)	(0.208)	(0.102)	(0.186)	(0.196)	(0.161)		(0.148)	(0.186)
Constant	-8.485	12.19	-4.425	25.16	-35.21	1.819	-14.48	26.32	-29.21	28.39	-30.17	-86.24	10.06	-1.192	11.73	-41.84
	(40.97)	(37.33)	(37.04)	(37.25)	(26.28)	(16.72)	(36.91)	(36.54)	(62.72)	(34.30)	(58.36)	(83.19)	(10.56)	(7.457)	(14.52)	(63.14)
Observations	68	68	68	62	68	68	68	62	45	45	45	40	45	45	45	40
R-squared	0.455	0.543	0.447	0.420	0.444	0.634	0.440	0.423	0.278	0.175	0.278	0.453	0.248	0.117	0.245	0.433
Adjusted R-squared	0.370	0.472	0.362	0.319	0.379	0.604	0.364	0.336	0.0926	-0.0375	0.0925	0.289	0.193	0.0748	0.190	0.329

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: GMM(1): endogenous variable gdpgr instrumented by log of gdp at the peak of deposit growth; GMM(2): endogenous variables gdpgr and D-K&K(2012) instrumented by log of gdp at the peak of deposit growth and Honohan(2008) respectively.

Appendix

Table A1: Description of Variables

Variable name	Description	Source
drop1	Maximum yoy deposit growth minus minimum yoy deposit growth 2006-2010, provided that the maximum growth occurred before the minimum growth.	Author calculation using Commercial Banks - Outstanding Deposits data from IMF FAS
honohan2008	Honohan (2008) composite measure of access to financial services	Honohan 2008
bc	Systemic banking crisis experience 2006-2010 (0, 1 dummy variable)	Laeven & Valencia 2012
Klapper	Percent of adult population saving at a financial institution in 2011	Demirguc-Kunt and Klapper 2012
gnipc08	Log transformed GNI per capital in 2008	World Development Indicator 2013
popsize08	Log transformed total population in 2008	World Development Indicator 2013
dep_ins	Explisit deposit insurance schemes as of 2003 (0, 1 dummy variable)	Demirguc-Kunt, Karacaovali, and Laeven 2005
gdpgr	GDP growth over the period matching deposit growth drop	Author calculation using GDP data from WDI 2013
zscore2008	z-score of a country's banking system in 2008, GFDD.SI.01	Global Financial Development Database 2012
liquidity2008	Liquid assets to deposits and short-term funding in 2008, GFDD.SI.06	Global Financial Development Database 2012
concen	Three-bank-concentration ratio of a country's banking system in 2008	FinStats 2013

Table A2: Summary Statistics of Variables

Variable name	Observations	Mean	Standard deviation	Min	Max
drop1	173	26.19	23.19	0.19	136.71
Honohan(2008)	159	40.93	27.08	1	100
D-K&K(2012)	148	18.50	16.79	0.12	63.58
gnipc	192	8.41	1.60	5.08	12.13
popsize	214	15.15	2.35	9.19	21.00
bc	144	0.17	0.38	0	1
gdpgr	167	0.16	0.24	-0.38	1.23
depins	178	0.48	0.50	0	1
gdpgr	167	0.16	0.24	-0.38	1.23
zscore	178	18.54	11.10	2.66	75.70
liquidity	168	37.53	19.46	8.47	121.13
concen	145	69.77	19.67	26.99	100

Table A3: Pairwise Correlation of Variables

	drop1	honohan2008	bc	Klapper	gnipc08	popsize08	dep_ins	gdpgr	zscore2008	liquidity2008	concen
drop1	1										
honohan2008	-0.21 *	1									
bc	0.03	0.62 *	1								
Klapper	-0.29 *	0.82 *	0.51 *	1							
gnipc08	-0.13	0.84 *	0.56 *	0.70 *	1						
popsize08	-0.03	-0.01	0.09	0.00	-0.22 *	1					
dep_ins	-0.20 *	0.53 *	0.41 *	0.31 *	0.45 *	0.19 *	1				
gdpgr	0.28 *	-0.32 *	-0.19 *	-0.31 *	-0.32 *	0.04	-0.23 *	1			
zscore2008	-0.26 *	-0.06	-0.14	0.05	0.08	-0.03	-0.07	0.03	1		
liquidity2008	0.12	-0.08	0.09	-0.07	-0.11	0.00	-0.11	-0.11	-0.24 *	1	
concen	0.11	0.03	-0.08	0.11	0.02	-0.52	-0.33 *	-0.11	0.10	0.25 *	1

* p<0.05