

IMF STAFF DISCUSSION NOTE

Financial Inclusion: Can It Meet Multiple Macroeconomic Goals?

**Ratna Sahay, Martin Čihák, Papa N'Diaye, Adolfo Barajas,
Srobona Mitra, Annette Kyobe, Yen Nian Mooi,
and Seyed Reza Yousefi**

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Financial Inclusion: Can It Meet Multiple Macroeconomic Goals?

Monetary and Capital Markets Department
with inputs from Strategy and Policy Review Department and other departments¹

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EXECUTIVE SUMMARY

Financial inclusion is distinctly moving up the reform agenda, both in individual countries and at the international level. To date, more than 60 governments across the world have set financial inclusion as a formal target. This year's post-2015 Development Agenda squarely puts financial inclusion as a key objective for United Nations member countries.

What is financial inclusion? Put simply, it is the access to and use of formal financial services by households and firms. It is seen by policymakers as a way to improve people's livelihoods, reduce poverty, and advance economic development. Despite progress, large gaps remain in financial inclusion: across regions, income, gender, and many other dimensions. At the same time, solid evidence has been lacking on the macroeconomic effects of financial inclusion. This is, in part, because consistent macro-level data on financial inclusion across countries have been in short supply, until recently. Also, barring a few exceptions, it was not on macroeconomists' radar until the U.S. sub-prime crisis of 2007 unleashed its full force.

Since financial inclusion is a multidimensional concept, its macroeconomic effects depend on its nature. This paper examines the linkages of financial inclusion with economic growth, financial and economic stability, and inequality; it offers three key policy-relevant findings.

First, financial inclusion increases economic growth up to a point. Greater access of firms and households to various banking services, as well as increasing women users of these services, lead to higher growth. Further, sectors dependent on external finance grow more rapidly in countries with greater financial inclusion. However, the marginal benefits for growth wane as both inclusion and depth increase. As such, these benefits could be low, and even negative, for some advanced economies.

Second, new evidence shows that financial stability risks increase when access to credit is expanded without proper supervision. Financial buffers decline with broader access to credit, other things being equal. In countries with weaker supervision, the erosion of buffers is larger. On the other hand, countries with strong supervision could see some financial stability gains from higher inclusion. The paper also reveals large supervisory gaps across countries, signaling the potential risks to financial stability from an unchecked broadening of access to credit.

And finally, in contrast to credit access, increasing other types of access to financial services does not impact financial stability adversely. Increasing access to automated teller machines (ATMs), branches, and transaction accounts fall in this category. Moreover, closing gender gaps in account usage and promoting diversity in the depositor base would help to improve growth without impairing financial stability. Therefore, these services can be promoted extensively, from a financial stability perspective.

Overall, financial inclusion can meet multiple macroeconomic goals, but macroeconomic gains wane as both financial inclusion and depth increase, and there are trade-offs with financial stability.

INTRODUCTION

1. **Large gaps in access to finance have prompted policymakers in more than 60 countries to set formal targets for financial inclusion.** A majority of financial regulatory and supervisory agencies have some aspects of financial inclusion in their mandates. The interest derives from the recognition that, despite progress, large segments of the population, as well as the corporate sector, are left out of financial services. The gaps in access, use, and quality of savings accounts in financial institutions, and in the availability of credit and insurance products among different segments of the economy are still large (World Bank, 2014; Demirgüç-Kunt and others, 2015). In developing economies, recent estimates suggest that more than half of the poorest 40 percent are without accounts and 35 percent of small firms face difficulties accessing formal financial services. There are also large gaps in access to financial services between the rich and poor, urban and rural dwellers, and men and women.
2. **In international fora, financial inclusion is prominent in the reform agenda (Lagarde, 2014, IMF, 2015a).** For instance, financial inclusion is mentioned under several of the United Nations Sustainable Development Goals (SDGs) (United Nations, 2014). Further, many SDGs emphasize gender equality in access to finance as users, and as leaders at all levels of decision-making. Moreover, at the June 2012 G20 Leaders' Summit in Los Cabos, G20 heads of state committed to take "concrete actions to overcome the barriers hindering women's full economic and social participation and to expand economic opportunities for women."
3. **Financial inclusion is seen by most policymakers as a way to make financial development work for society.** In conjunction with financial depth, which measures the overall volume of financial services—and efficiency, which reflects the net costs of such services—access and use ensures that financial development is disseminated throughout the population (Sahay and others, 2015a). In general, financial access allows firms to invest and households to smooth their consumption and build capital over time, fostering the creation of business and helping to improve people's livelihoods. It also helps households and firms protect themselves against shocks and better manage risk. Nevertheless, uncontrolled expansion in access to financial services could lead to instability. As the U.S. sub-prime crisis of 2007 and India's 2010 microfinance crisis show, "let them eat credit" (Rajan, 2010) policies can contribute to financial instability and social discontent if supervision and regulation do not keep pace. Financial instability, in turn, can lower growth and worsen inequality (as evidenced, for example, in the United States following the global financial crisis), and thus undo the very objectives that were sought through inclusion.
4. **Despite policymakers' interest, evidence on the macroeconomic effects of financial inclusion is scarce.** Some compelling micro-level evidence exists on the benefits and challenges of financial inclusion. The reason for the lack of macroeconomic evidence was due in part to the short supply, until recently, of consistent macro-level data on financial inclusion. Also, barring few exceptions, the concept of financial inclusion was not on macroeconomists' radar until the U.S. sub-prime crisis.

5. This paper fills a gap by exploring the macroeconomic relevance of financial inclusion.

Armed with recently available cross-country data on access to and use of financial services, this paper examines the linkages of financial inclusion with macroeconomic outcomes: economic growth, financial and economic stability, and inequality. It sheds light on the benefits and trade-offs of financial inclusion in terms of growth, stability (both financial and macroeconomic), and inequality.

6. The paper draws on several sources of data on financial inclusion. These data include cross-country surveys for two different years, long-time series across several countries, and other survey-based data on firms' access to finance (Annex I). The advantage of using a variety of sources is that the analysis can shed light on many aspects of financial inclusion. The disadvantage is that the datasets are not strictly comparable and have shortcomings. Therefore, not all the data can be used to examine the same questions on growth, economic and financial stability, and inequality. Also, the data shortcomings limit the range of econometric techniques that can be used.

7. The paper highlights three key policy-relevant findings. First, overall, financial inclusion can be consistent with other macroeconomic goals, but the macroeconomic gains wane as both financial inclusion and depth increase, and there may be trade-offs with financial stability. With regard to economic growth, most types of financial inclusion, including a greater share of women users of finance, increase economic growth, but the marginal benefits taper off with greater financial inclusion and depth. Sectors dependent on external finance and those with low asset-tangibility grow more rapidly in countries with greater financial inclusion. Second, economic and financial stability risks increase when access to bank credit is expanded without proper supervision. Banking supervision can mitigate these risks, and countries with sufficiently high supervisory quality can even *lower* economic and financial stability risks. Finally, in contrast to credit, other forms of access do not adversely affect financial stability and can be promoted extensively until their effects on growth fade.

8. The remainder of the paper is structured as follows. The next section places this paper's analysis in the context of previous literature. The following section defines the multifaceted concept of financial inclusion and presents stylized facts. The subsequent sections look at the effects of financial inclusion on growth, stability, and inequality. The paper concludes with policy implications.

PREVIOUS EVIDENCE ON MACROECONOMIC EFFECTS

9. Not much is known about the macroeconomic implications of financial inclusion, with a few recent exceptions. As shown by Sahay and others (2015a), household's access to finance has a strong positive relationship with growth. It further found that the relationship between depth and growth is bell-shaped, suggesting that the returns to growth falls with higher depth beyond a certain point. However, financial institution access (FIA), an index of the density of ATMs and bank branches that narrowly defines inclusion, had a monotonic relationship with growth. Dabla-Norris and others (2015) use a general equilibrium model to illustrate how lowering monitoring costs, relaxing collateral requirements and thereby increasing firms' access to credit would increase

growth. Using a model of entrepreneurship, Buera, Kaboski, and Shin (2012) find that microfinance has positive impacts on consumption and output.

10. Some recent studies show that higher financial inclusion impacts stability, and could entail trade-offs. With regard to firms, Dabla-Norris and others (2015) show that higher access to credit could raise non-performing loans in banks, thus entailing a trade-off with stability. For households, Han and Melecky (2013) find that greater financial inclusion through a broader access and use of deposits can significantly mitigate deposit withdrawals during times of financial stress. On economic stability, Mehrotra and Yetman (2015), studying 130 countries, find that aggregate consumption volatility is lower in countries where financial inclusion is high—this is especially for measures of account ownership and saving at a formal financial institution.

11. There is some evidence that effects of financial access on the user vary with the type of financial service (World Bank, 2014). On access to basic payments and savings, the microeconomic evidence on benefits, especially among poor households, is quite supportive. For firms, particularly small and young firms that face greater constraints, access to finance is associated with innovation, job creation, and growth. However, with regard to access to microcredit, several microcredit experiments and other cross-country research paint a mixed picture. The evidence is largely based on field experiments that are small in scope.² For these reasons, generalizing the results and scaling them up to the macroeconomic level has been challenging.

12. Microeconomic and sociological studies find that financial access by women helps society more generally. A majority of women, especially in developing economies, have to rely on their own resources and on informal or semi-formal financial sources. Also, women face greater barriers, than men, in accessing finance (World Bank, 2014). This has implications for not only women, but also their families, economies, and financial systems. There is mounting evidence that financially empowered women are more likely to improve the family's welfare (Sanyal, 2014). Overall, women's financial exclusion limits the growth-promoting potential of finance, and it may also prove costly in terms of lower financial stability.

² For example, Karlan and Zinman (2011) find, in an experiment in the Philippines, that access to credit led to a decline in the number of business activities and employees in the treatment group relative to controls, and subjective well-being declined. Surveys of access to microcredit data from dozens of microcredit experiments provide a rather mixed picture (Roodman 2011; World Bank 2014). Kumar, Narain, and Rubbani (2015) also find mixed results, pointing out that higher access to credit can be beneficial if it is accompanied by training programs. One notable exception is Buera, Kaboski, and Shin (2012) whose model shows that microcredit could have redistributive effects, benefitting the poor through greater access of capital for marginal entrepreneurs and higher wages for workers.

CONCEPT, EXAMPLES, AND STYLIZED FACTS

A. Financial Inclusion: A Multifaceted Concept

13. Financial inclusion is defined as the access to and use of formal financial services. The idea is that finance should be available to as many as possible for a variety of uses: accounts to receive income or transfers, savings accounts to store money safely and prudently, credit sources for personal or business borrowings, and insurance products to tide against bad times. As The World Bank (2014) points out, the concept of financial inclusion could range from “access and use of services provided responsibly and sustainably” to “delivery of financial services at affordable costs to disadvantaged and low-income segments of society.” The goal for the purposes of this paper is to use a concept that is measurable and relevant for public policy. Hence, as elaborated as follows, the definition has been narrowed down to a tractable form.

14. Financial inclusion is a multidimensional concept, and the details matter. Pair-wise correlations among different financial inclusion indicators show that most are below 0.3, indicating that each measures different factors. For instance, the percentage of adults holding accounts at a formal financial institution is negatively related to the percentage of firms that cite access to finance as a major constraint to firm growth. The number of ATMs per 1,000 square kilometers, a measure of infrastructure, is positively related to the percentage of adults that had borrowed from a formal financial institution in the last year. In many countries that have minimal infrastructure of this type, it is still possible for a relatively large percentage of the population to use bank loans, again showing the imperfect nature of the correlation.

15. Therefore, the paper takes a granular approach. The analysis covers financial inclusion from various aspects to bring out the returns to growth and trade-offs with stability (Annex I).³ The indicators span the providers’ and the users’ sides. On the providers’ side, the index of Financial Institutions Access introduced in Sahay and others (2015a) covered the number of branches of commercial banks and ATMs per 100,000 adults. On the users’ side, a number of indicators are examined: share of firms and investment financed by bank credit, share of the population with account at a formal financial institution by gender and by income groups, share of firms citing finance as a major obstacle, share of adults using accounts to receive transfers and wages, share of bank borrowers in the population, and, finally, the extent of the use of insurance products.

16. The paper’s analysis is enriched by country examples. Addressing financial inclusion involves casting a very wide net across its various elements: channels and modes of access, deposits, credit, and insurance. The examples in Box 1 highlight how countries are tackling trade-offs with financial stability and promoting both access and use of financial services.

³ See Dabla-Norris and others (2015) for financial inclusion indices for firms, households, and infrastructure.

Box 1. Promoting Safe Financial Inclusion: Country Examples ^{1/}

India: priority sector lending and universal access. The Reserve Bank of India's long-standing policy on priority-sector lending (PSL) requires banks to set aside 40 percent of their assets to priority sectors. Most public sector banks meet this requirement, but end up with high nonperforming loans and concentrated credit risk. The Reserve Bank of India (2014) report offers the following recommendations, among others: (1) creating wholesale consumer and investment banks that do not take retail deposits and would, therefore, be subject to lower capital requirements; (2) engaging in relationship-based lending so that loan officers would have more "soft" information on their client; and (3) purchasing protection against rainfall and commodity-price risks. It would be mandatory to report loans to credit bureaus and disclose concentration levels in their financial statements. Recently, the *Pradhan Mantri Jan Dhan Yojana*, a financial inclusion initiative, was launched with the goal of opening a bank account for every household. By offering incentives such as zero balances, overdraft facilities, and free life insurance, the enrollment figures shot up, with close to 170 million accounts opened by early July 2015. The program has relied heavily on state-owned banks, accounting for 97 percent of enrollment. It remains to be seen how much the accounts are actually used. The push toward financial literacy by the National Center for Financial Education (<http://www.ncfeindia.org/financial-education>) is a welcome step (see also Government of India, 2009).

The Netherlands: financial literacy. In 2006 the national strategy for financial education brought together some 40 partners from the financial sector, government, information and consumer organization, and academia to empower consumers on financial services. Chaired by the Ministry of Finance, the national strategy (the Money Wise Action Plan) concentrates on increasing the financial literacy of households through the education of consumers and the regulation of financial markets. The 2014–18 revised Action Plan focuses on managing money, engaging in financial planning, and making well-informed decisions on financial products.

Nigeria: a multi-pronged approach. The comprehensive Financial Inclusion Strategy in 2012 aims to reduce the exclusion rate from 46 percent of the adult population (in 2010) to 20 percent by 2020. Working across key stakeholders, the strategy seeks to address five major barriers to financial inclusion: (1) income; (2) physical access; (3) financial literacy; (4) affordability; and (5) eligibility. Key elements include the introduction of a tiered Know-Your-Customer approach that balances barriers to entry with the need to ensure the integrity of the financial sector; an active financial literacy program; strengthened consumer protection framework; enhanced mobile payment system; and efforts to improve access to credit for small and medium-size enterprises (SMEs), such as the introduction of a movable collateral register. (IMF, 2015b).

Peru: e-money. The authorities have taken various measures to expand access and usage of financial services. In 2014 the "financial inclusion opportunities map," an interactive tool, was launched. It promotes an innovative "Peruvian model" based on the 2012 electronic e-money legislation and a new unified mobile payments platform that links various providers of financial services with customers. The goal is to leverage the high penetration of mobile telephone in Peru (more than 75 percent) and create a system of mobile payments based on electronic money that can become an access point for other financial services. The platform is expected to become operational in 2015 (IMF, 2015c).

The United States: consumer protection and financial literacy. The recently completed Financial Sector Assessment Program (FSAP) (IMF, 2015d) calls for financial inclusion to feature more prominently on the U.S. policy agenda. The Global Findex survey ranks the United States 27th out of 147 countries in terms of the percentage of adults with a bank account in a formal financial institution, and a 2013 Federal Deposit Insurance Corporation (FDIC) survey finds that 20 percent of U.S. households are "underbanked" and 8 percent are "unbanked." More work is needed to identify barriers to inclusion, especially for households and small enterprises. The enhanced focus on consumer protection, including the setting up of the Consumer Financial Protection Bureau, is an important part of the crisis response, and is beneficial for both financial stability and financial inclusion. The activities of the Financial Literacy and Education Commission are welcome steps toward improvements in households' financial capability.

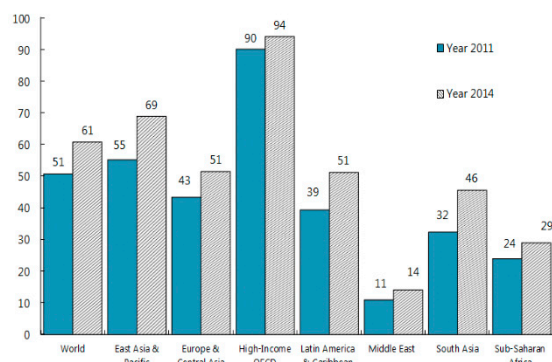
^{1/}By Adolfo Barajas, Martin Čihák, Michelle Hassine, Allison Holland, Srobona Mitra, Kevin Ross, and Mika Saito.

B. Five Stylized Facts

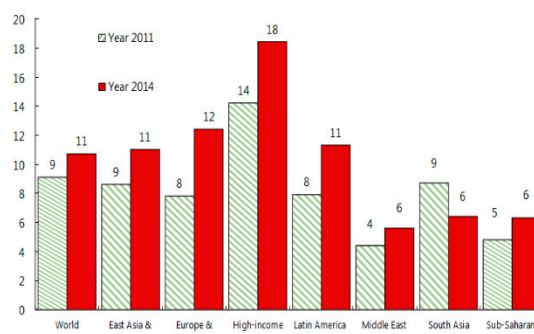
17. Fact one: there has been a striking increase in various measures of financial inclusion around the world in recent times. More than 61 percent of adults had an account with a financial institution or a mobile money service in 2014 compared to about 50 percent in 2011 (Figure 1). The increase comes from all regions, but is the sharpest in Asia, where the share of adults with accounts increased by 14 percentage points. This trend is echoed in the fraction of adults who borrowed from financial institutions (with the exception of South Asia), although the increase is less than that of account ownership in all the regions. Of course, the credit trends could reflect the cyclical conditions in the economy, expansion of alternative sources of financing such as through venture capital and bond issuance in emerging markets, and the still-nascent recoveries from the global financial crisis in many parts of the world. A closer look at the purpose of borrowing shows that, except for sub-Saharan Africa, the primary demand was for mortgages.

Figure 1. Account Holders and Credit Users Have Increased between 2011 and 2014

Good News: Financial Institution Accounts Increased in All Regions
(Regional, % of all adults)



Credit in Past Year - Borrowed from Financial Institution
(Regional, % of all adults)



Sources: IMF staff calculations based on Global Findex data.

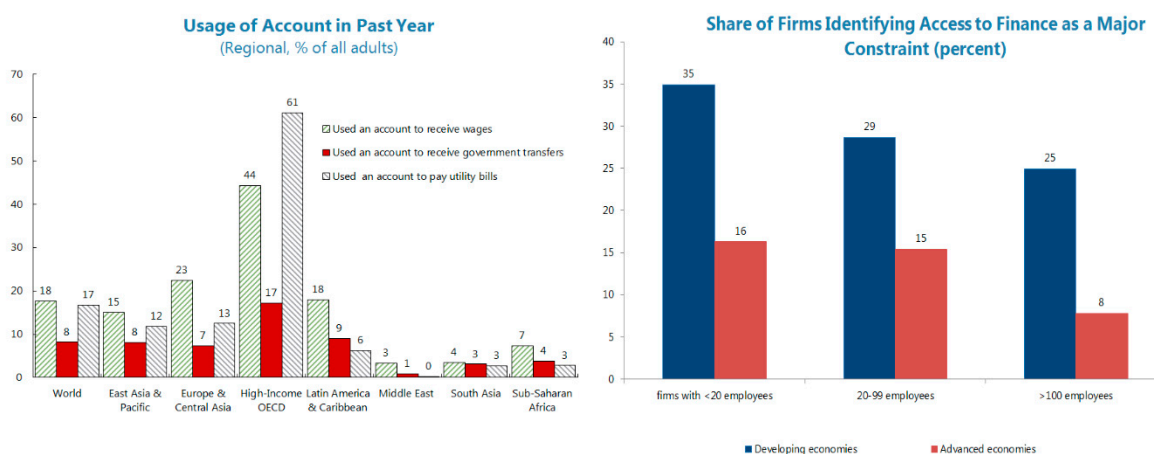
Note: For definitions of the regions, see <http://data.worldbank.org/about/country-and-lending-groups>.

18. Fact two: there is a wide variation among countries in account holdings and usage. In Asia, for instance, 69 percent of adults in East Asia and Pacific (EAP) had an account in 2014, compared to only 46 percent in South Asia and 14 percent in the Middle East (Figure 1). In contrast, 94 percent of adults in high-income Organization for Economic Co-operation and Development (OECD) countries had an account. While account ownership is a first step toward financial inclusion, what matters is how much the accounts are being used. For instance, the 2014 Global Findex data from the World Bank showed that 37 percent of adults with an account do not make any deposits in a typical month, and a similar figure for withdrawals. Only about 18 percent of adults worldwide used an account to receive wages and pay utility bills, with a comparable figure for EAP and Latin America and the Caribbean (LAC) regions (Figure 1). However, only about 5 percent of adults used

an account to receive wages in South Asia, the Middle East and sub-Saharan Africa. This is in stark contrast to the 44 percent for high-income OECD countries.

19. Fact three: small firms' cite access to finance as a major constraint even in advanced economies. More than one-third of small firms in developing economies and 16 percent of small firms in advanced economies cite access to finance as a major constraint. Further, even large firms in developing economies (25 percent) have problems accessing credit (Figure 2).

Figure 2. Use of Accounts and Small Firms Access to Credit in 2014



Sources: Global Findex; World Bank Enterprise Survey; and IMF staff calculations.

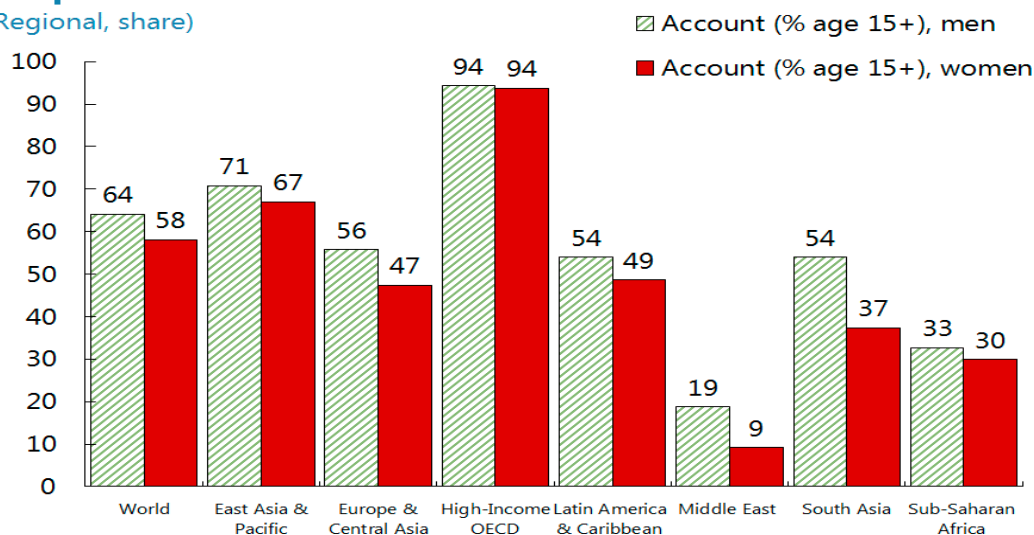
Note: For definitions of the regions, see <http://data.worldbank.org/about/country-and-lending-groups>.

20. Fact four: the gender gap for users is persistently high in some regions. Globally, 58 percent of women have an account, compared to 64 percent of men (Figure 3). While the gender gap is nonexistent in the advanced OECD economies, where 94 percent of all adults have an account, the gap is particularly large in South Asia where only 37 percent of women have accounts. The gender gap is even higher when one moves beyond account ownership to the usage of financial services. For instance, women entrepreneurs are more likely than men to face barriers in financial access. For example, an estimated 70 percent of women-owned small and medium-size enterprises (SMEs) in developing economies are unserved or under-served by financial institutions. On the credit-supply side, they often face more restrictive collateral requirements, shorter maturity of loans, and higher interest rates than men. On the demand side, illiteracy and lack of control over household financial resources are barriers to getting loans (DFiD-GIZ, 2013).

Figure 3. Gender Gap in Accounts in 2014

People with Accounts

(Regional, share)



Source: Global Findex 2014.

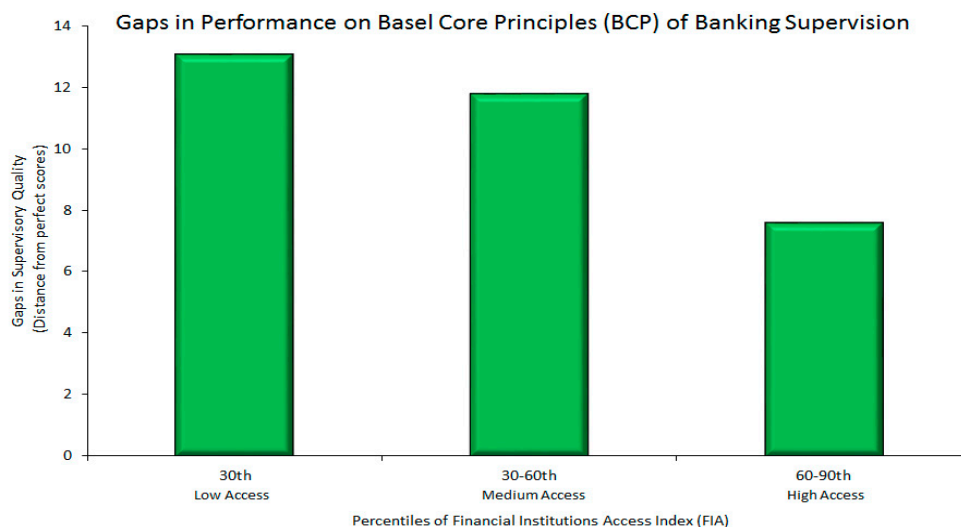
Note: For definitions of the regions, see <http://data.worldbank.org/about/country-and-lending-groups>.

21. Fact five: gaps in supervisory capacity are the largest in countries that also lag the most in terms of financial inclusion. The assessment of the Basel core principles (CP) of banking supervision, conducted during the IMF-World Bank FSAP various jurisdictions, is used to score countries on supervisory quality. We define here the “gap” in supervision quality as the distance from the perfect score on all 16 CPs relevant to financial inclusion.⁴ This gap is added up across all CPs for each country, zero being the perfect score. The gap is compared across groups of countries with low, medium, and high level of financial institutions access (Figure 4). The figure shows that the countries that lag behind in financial institutions access (FIA) also fare poorly on their quality of banking supervision.⁵

⁴ According to the Basel Committee of Banking Supervision (BCBS, 2015), the relevant core principles (CP) are: 1, 3, 4, 5, 8, 9, 10, 11, 14, 15, 16, 17, 18, 24, 25, and 29. Except for five, the set of CPs are different from the set that was found to be relevant for both financial stability and financial development in Sahay and others (2015a).

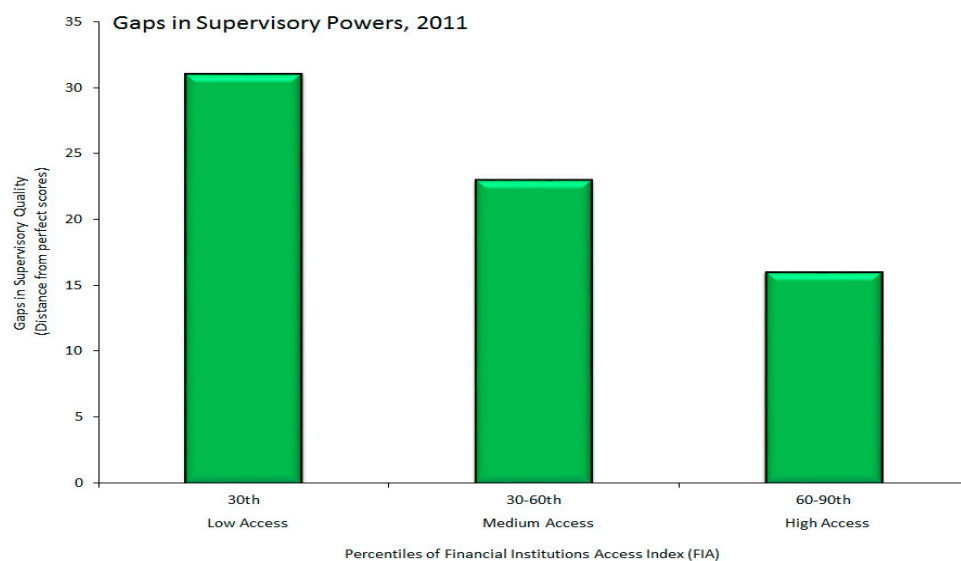
⁵ Note that even countries with high access have less than perfect scores on supervisory quality.

Figure 4. Gaps in Supervisory Quality



Sources: Confidential BCP scores from various FSAPs; FIA from Sahay and others (2015a); IMF staff calculations.

Note: The BCP scores are the aggregates for those relevant for financial inclusion. The bars represent the distance from perfect scores on the quality of banking supervision. For perfect BCP scores, the gaps are zero.



Sources: Barth, Caprio, and Levine (2013); FIA from Sahay and others (2015a); IMF staff calculations.

Note: The data are from Barth, Caprio, and Levine (2013) dataset on supervisory quality; bars are based on the average gap between the maximum observed score and the countries' scores. The higher the gap, the worse the supervisory quality.

FINANCIAL INCLUSION AND GROWTH

22. Determining the direction of causation between financial inclusion and economic growth has been a challenge. Stylized facts such as those presented in the previous section are illustrative, but it could well be that, for example, civil conflict, a lack of rule of law, or severe income and wealth inequality cause both low financial inclusion and low growth. Addressing those other issues may help in promoting growth and possibly also inclusion, and promoting the opening of bank accounts and other financial services may not help much and could indeed be harmful (as was the case of, for example, the Albanian pyramid schemes in the 1990s). There is also a possibility of reverse causation: higher economic growth may allow for greater financial inclusion. The econometric methods applied in this note (Annex II) control for other factors and for the possibility of reverse causation. While these approaches are more robust than those used thus far in the literature, the approach hits some important data constraints, given that comparable international data are available for only 10 years or even less (Annex I). The note uses alternative approaches that work within the data limitations.

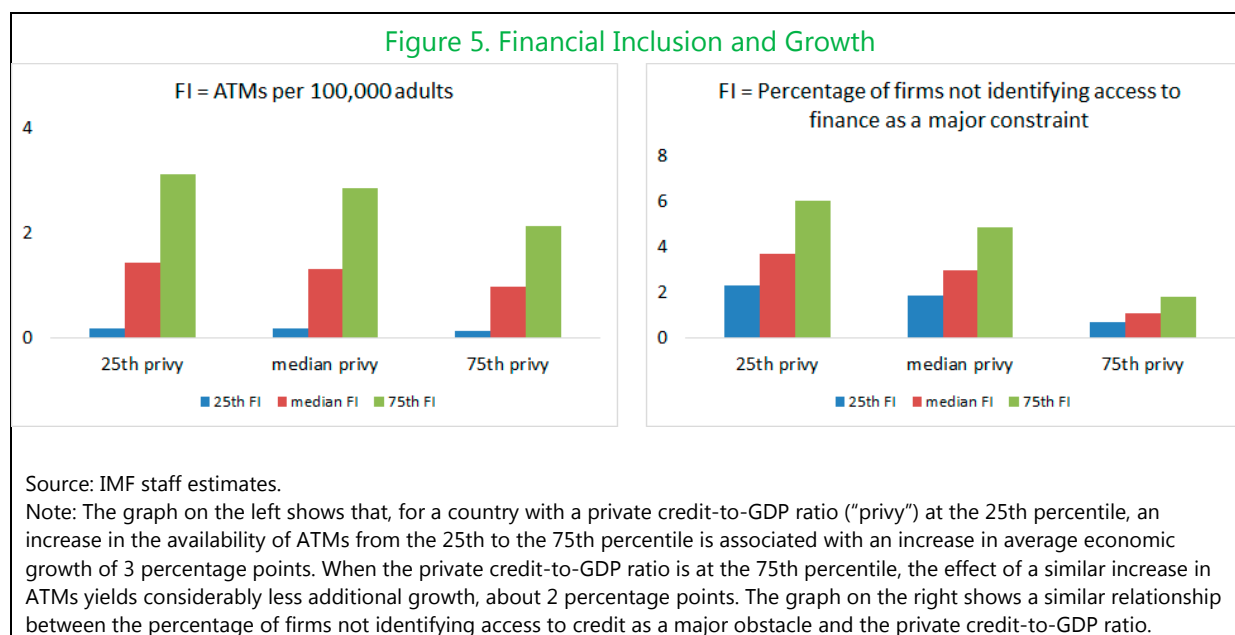
23. Financial sectors that are not only deep but also provide broader access to finance appear more conducive to economic growth. In simple cross-country regressions, the initial levels of various types of financial inclusion (FI) indicators have a positive impact on 10-year growth. However, these impacts are statistically significant only after the regressions include the overall level of financial depth or development (henceforth, FIN), together with other standard controls (Annex II). This means that financial inclusion reaps growth benefits that are separate from those achieved by the overall level of development of the financial sector. Types of financial inclusion with such benefits are: firm-level indicators—percentage of firms with bank credit, percentage of investments financed by banks, and the (inverse of) percentage of firms (both small and large) citing access to finance as a major constraint—as well as household indicators—percentage of adults with an account in a formal financial institution or with a credit card, percentage of adults that have borrowed from a formal financial institution, or used an account to receive government transfers or wages. The positive impacts continue to hold for the FI indicators related to the bottom income quartile and to women users.

24. At high levels of financial development, the marginal benefits to growth of increasing financial inclusion begin to decline. While the effects of FI on growth is positive, its impact on the interaction between FI and FIN is most often negative. That is, marginal growth effects decline as *both* FIN and FI become progressively larger (Figure 5). At low levels of both, the marginal effects are large, while at high levels of both marginal effects are small and possibly negative in some cases.

25. At a disaggregated level, sectors that are more dependent on external finance grow more rapidly in countries with greater financial depth, and even more so with greater financial inclusion. Taking the Rajan-Zingales (RZ, 1998) approach to identifying one possible channel through which finance can affect growth as a baseline, the analysis in this paper began by estimating the RZ equation using only the financial institution depth or development indicator (*FIN*). The analysis found support for the main hypothesis: sectors that typically require more external

financing (*EXT*) tend to grow faster in countries where *FIN* is higher. Thus, financial development enhances growth by relaxing financing constraints. To investigate whether financial inclusion is also associated with this channel, two additional tests were undertaken. First, a financial inclusion indicator was inserted in place of the *FIN* variable. Several access and usage indicators were positively and significantly associated with higher growth of externally dependent sectors: the availability of ATMs, and the percentage of adults with an account with a formal financial institution as well as that of using those accounts to receive government transfers. Second, an additional interaction between the *FIN* variable, the financial inclusion variable, and the measure of external dependence (*EXT*) was included to assess whether financial inclusion has an additional role in this channel, over and above financial development or depth. Again, the analysis finds the above indicators to have a significant positive effect on the growth rate of sectors dependent on external finance.

26. Financial inclusion is especially beneficial in sectors where pledging collateral is more problematic. A second application of the RZ approach involves using a sector's degree of "tangibility of assets" as the distinguishing characteristic of different sectors. Here the hypothesis is that when financial conditions are better, then those sectors with lower tangibility of their assets (those assets that cannot be easily pledged as collateral) will be able to obtain financing and therefore grow faster. This analysis shows that a similar group of indicators of financial infrastructure, access to and use of accounts by households, and firms' use of credit, is associated with greater growth of sectors with low tangibility of assets.



FINANCIAL INCLUSION AND STABILITY

27. A better understanding of the linkages between financial inclusion and stability can inform policy setting, design, and implementation. In response to the global financial crisis, major policy efforts in the financial sector have focused on achieving macrofinancial stability; at the same time, national policymakers are placing increasing recognition on policies that promote financial inclusion. Despite some coordination at the global and individual country level, these two policy sets have at times proceeded in parallel (“in silos”), potentially overlooking the positive and negative linkages between financial inclusion and macrofinancial stability.

28. There could be considerable trade-offs and synergies between inclusion and stability. Conceptually, one can think of the interactions between financial inclusion and stability as two important outcomes, $E[\text{stable} \cdot \text{inclusive}] = E[\text{stable}] + E[\text{inclusive}] + \text{Cov}[\text{inclusive}, \text{stable}]$, in which $E[\cdot]$ and $\text{Cov}[\cdot]$ are the expectation and covariance respectively, and “stable” and “inclusive” are the two potentially dependent outcomes of financial inclusion and stability (Čihák and others, forthcoming). The existing empirical work has focused on the expected outcomes of stable or inclusive financial systems separately. In contrast, this paper examines the covariance term and its empirical relevance. The covariance term is negative when achieving the two outcomes involves a trade-off for policymakers—for instance, taking more systemic risk in the pursuit of increasing financial inclusion. The term is positive when achieving the two outcomes produces synergies—for instance, greater financial stability improves trust in the financial sector and increases demand for bank deposits.

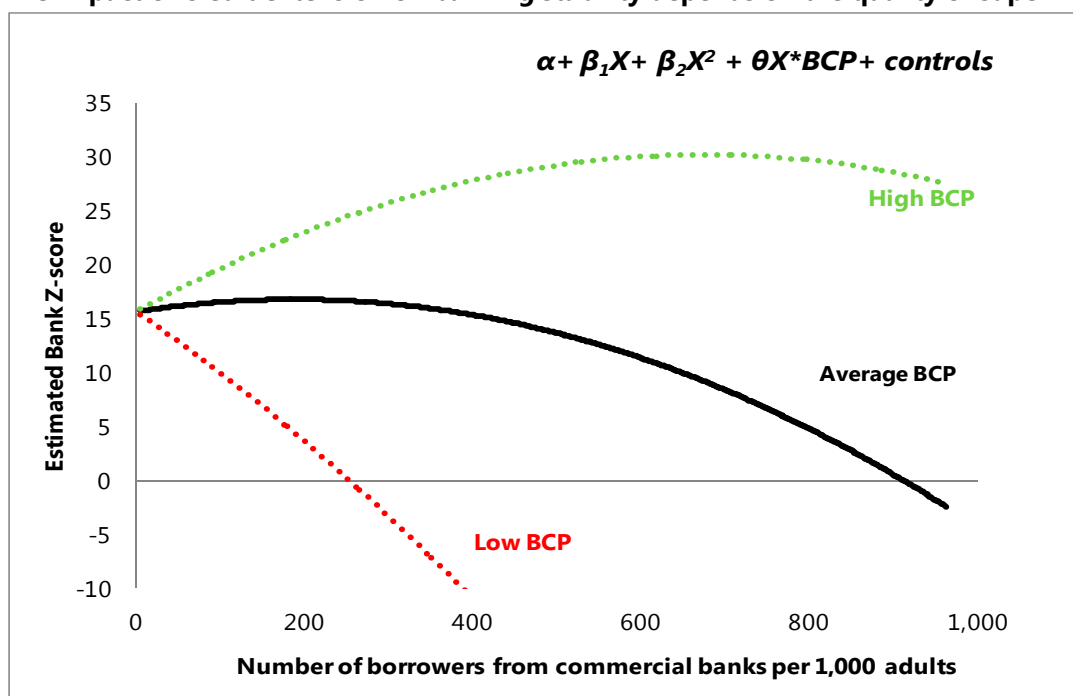
29. Financial inclusion can also enhance stability, through direct and indirect channels. Directly, if more people use bank deposits, banks could have a more solid funding base especially in periods of stress. Preliminary evidence on this effect suggests that a 10 percent increase in access to deposits can reduce the likelihood of a large (20 percent or more) average withdrawal rate of deposits in periods of stress by 4 percentage points (Han and Melecky, 2013). Indirectly, financial inclusion can provide clients of financial firms with better risk management tools, boosting their resilience (for example, more resilient borrowers imply more resilient banks).

30. New evidence shows that the impact of broadening access to credit on banking stability depend on the quality of supervision. Recent analysis by IMF staff and others suggests that the link between bank stability—approximated by the z-score or banks’ distance to distress—and financial inclusion depends considerably on the measure of inclusion (Čihák and others, 2014). Using the share of borrowers in the adult population as a measure for credit inclusion, the relationship between inclusion and stability appears bell-shaped at the sample average level of bank supervision. That is, there is an initial positive link with bank stability, but then buffers tend to decline, keeping other factors constant (Figure 6). In countries with weaker bank supervision—measured by lower observance of the Basel Core Principles for Effective Banking Supervision (BCP)—the negative effect of broadening credit access on bank buffers is more pronounced. Conversely, at sufficiently high levels of supervisory quality, credit inclusion is positively associated with higher bank buffers. Using the subset of the 16 BCP indicators relevant for financial inclusion, the results

were similar. This underscores the need for strong supervision to accompany financial inclusion through credit—the impact of broadening credit access on bank stability could have opposing effects, depending on the quality of supervision.

Figure 6. Credit Extension and Bank Stability

The impact of credit extension on banking stability depends on the quality of supervision



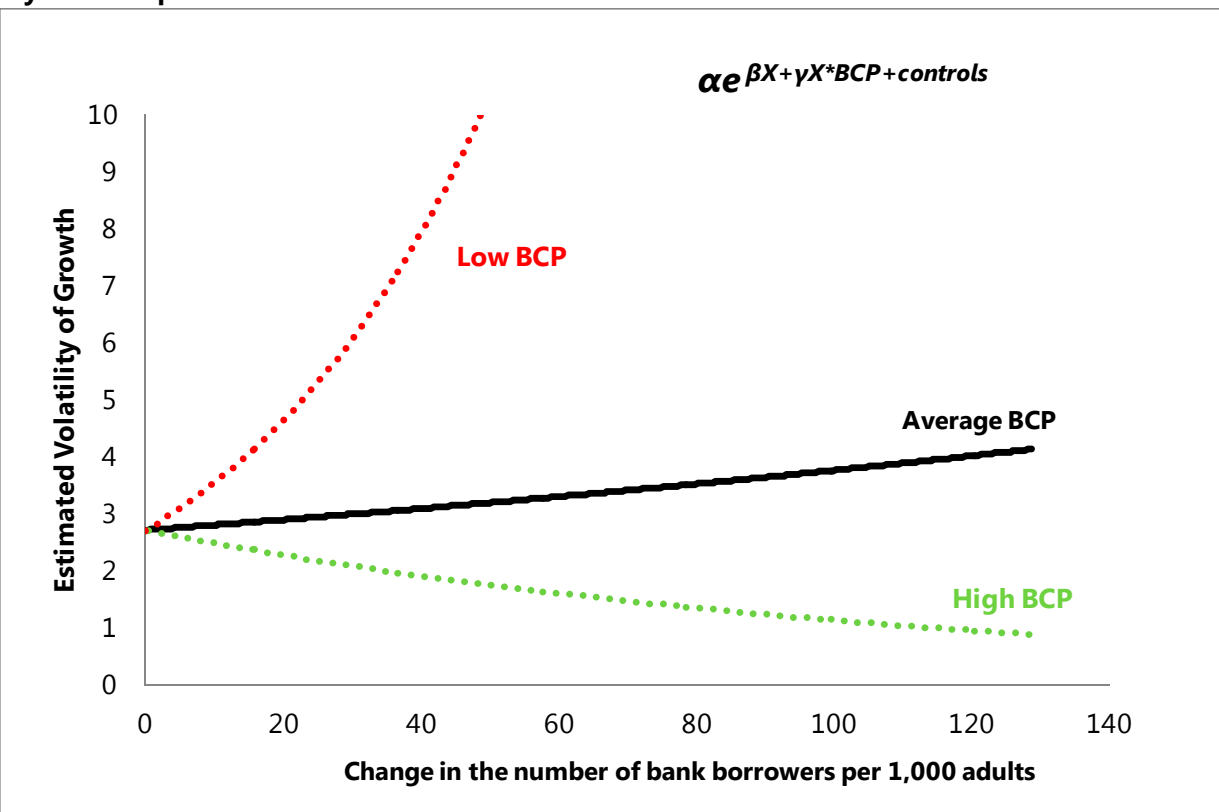
Source: IMF staff calculations.

Note: The line shows the estimated z-score from the regression described in Annex III. The dependent variable, bank z-score, captures banks' distance-to-distress (the amount of buffers banks have against shocks to earnings). BCP is the quality of bank supervision, approximated by the degree of compliance with the Basel Core Principles. The estimated values correspond to country observations for the number of borrowers, and the sample average for controls and BCP scores. High and low BCP cases show the estimated value of growth volatility using the same dependent variable and the sample average for controls, but with the upper and lower bound of BCP scores, respectively. The chart is plotted using 2011 data.

31. A bigger change in credit access is also related to higher growth volatility, but this impact is negated in the presence of adequate regulation and supervision. Using the share of borrowers as a proxy of credit access, the relationship between growth volatility and financial inclusion through credit is significant and positive, keeping other factors equal (Figure 7). This increase in growth volatility can be counteracted by the impact of regulation and supervision. Replicating the analysis using a subset of the Core Principles relevant to financial inclusion produced similar results. This suggests that financial inclusion, if done responsibly, can contribute to more stable economies, but financial inclusion without adequate regulation and supervision leads to more instability in growth rates.

Figure 7. Broader Credit Access and Economic Stability

Larger changes in access to credit is related to higher output volatility but this impact is negated by better supervision



Source: IMF staff calculations.

Note: The estimated growth volatility from the regression described in Annex III. The dependent variable, economic volatility, is approximated by the 3-year rolling standard deviation of GDP growth. BCP is the quality of bank supervision, approximated by the degree of compliance with Basel Core Principles. The graph shows the estimated values of growth volatility corresponding to country observations for the lagged 3-year change in the share of borrowers, and the sample average for controls and BCP scores. High and Low BCP cases show the estimated value of growth volatility using the same dependent variable and the sample average for controls, but with the upper and lower bound of BCP scores respectively. The chart is plotted using 2011 data.

32. In contrast to credit, increases in the access to and use of other financial services have generally weak overall links to financial stability. For other dimensions of financial inclusion—such as percentages of population with access to transaction or savings accounts—an analysis of linkages to financial stability generally yields inconclusive results (Čihák and others, forthcoming).

33. These results underscore that when it comes to stability, the type of financial inclusion matters. If financial inclusion measures concentrate, for example, on access to transaction accounts, the financial stability effects appear minimal. However, when it comes to credit, extending access at the expense of reduced screening and monitoring standards can have severely negative implications both for consumers and for financial stability. Therefore, in the case of credit, it is preferable to

enhance financial inclusion through interventions that increase supply by removing market imperfections. Examples are new lending technologies that reduce transaction costs and improved borrower identification that can mitigate—even if not fully eradicate—the problems of asymmetric information.

34. The results also underscore that high-quality regulation and supervision can make the difference between “bad” and “good” inclusion. Supervising activities related to financial inclusion is challenging. Some of the difficulties involve: assessing credit risk when there is no collateral; supervising, regulating, and collecting information on a large number of small loans and diverse lenders; cooperating and collaborating with multiple supervisory and regulatory agencies; and managing systemic risk with banks providing credit to microlenders. Owing to technological innovations in products, services, and delivery channels such as mobile banking, supervisors need to fully understand the risks involved in their licensing criteria. At the same time, the intensity of the supervision has to be “proportionate” to the risks involved—the intention of supervision cannot be to raise the cost of capital to the point of nonviability of lenders. It is even more complicated when financial inclusion is provided by a large number of institutions outside the regular banking system or the unregulated financial sector. Recognizing these challenges, the Basel Committee on Banking Supervision (BCBS) is in the process of developing guidance to assess the application of the 2012 Basel Core Principles (BCP) for Effective Banking Supervision to entities and activities relevant to financial inclusion.⁶

35. A more inclusive financial sector governance structure can also be important for financial stability. For example, there appears to be an acute lack of women in financial governance. While this paper focuses on vulnerable groups that are left out from accessing and using financial services, there is another aspect to the conduct and delivery of financial services that could be related to financial stability, namely the inclusion of women among financial sector providers (banks) and regulators. In both banks and supervisory institution decision-making boards, the share of women is low (Box 2). Such low shares could have an impact on the risk-taking behavior of banks, on the quality of bank supervision, and ultimately on financial stability outcomes. Evidence is mixed on whether women are more or less risk-averse than men: Croson and Gneezy (2009) suggest that they are more risk-averse, while Nelson (2015) and Niederle (2014) provide mixed evidence. IMF staff’s recent analysis (Sahay and others 2015b) uses new datasets to document the considerable gaps in financial governance and explores the relationship between the share of women in bank boards and bank stability (Box 2).

⁶ The BCBS conducted a survey of supervisory practices for financial institutions engaged in financial inclusion of 59 jurisdictions (BCBS, 2015). The results of the survey will serve as background to further work within the Basel Committee to develop the guidance on the BCP.

Box 2. Stability Implications of Including Women in Bank and Supervisory Boards^{1/}

Across various regions, less than 20 percent of the Board of Directors in banks are women (figure top right). Moreover, Sahay and others (2015b) document that only 15 of some 800 banks across 72 countries had women CEOs in 2013. This is in stark contrast to statistics showing that 50 percent of business and social sciences graduates and 30 percent of economics graduates in the United States and United Kingdom, where most of the banks are located, were women. It is encouraging, however, to see that these shares have increased over the last decade.

Similarly, in bank supervisory and regulatory agencies, the share of women in boards of directors is low. Interestingly, this share is not related to the income levels of countries (figure below right). In 2015, for instance, the low-income countries had a higher share of women than advanced or emerging economies. Moreover, averaging 20 percent in 2015 overall, this share has declined since 2011.

The share of women in banking supervision boards is not related to the quality of supervision. Sahay and others (2015b) find no association between a higher share of women and supervisory quality as measured by three different proxies, after controlling for various other governance indicators and the level of financial development and inclusion.

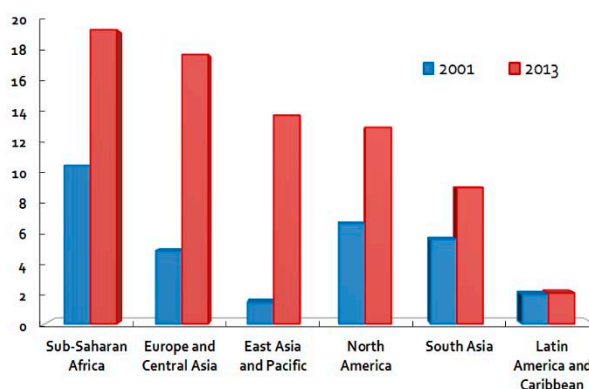
At the same time, there appears to be a positive association between the share of women in supervisory boards and banking sector stability. There is a positive correlation between the share of women in supervisory boards in 2011 and the banking system's average z-score 2011–13, controlling for supervisory quality, various governance indicators, the level of financial access, GDP per capita, GDP growth and the level of nonperforming loans. Z-scores are measures of capital and profit buffers scaled by volatility of earnings.

Does gender diversity matter for bank stability?

Sahay and others (2015b) also explored this question by looking at the associations between the share of women on bank boards and bank-specific z-scores. They find that a higher share of women on bank boards brings in diversity of views and does not seem to hurt stability.

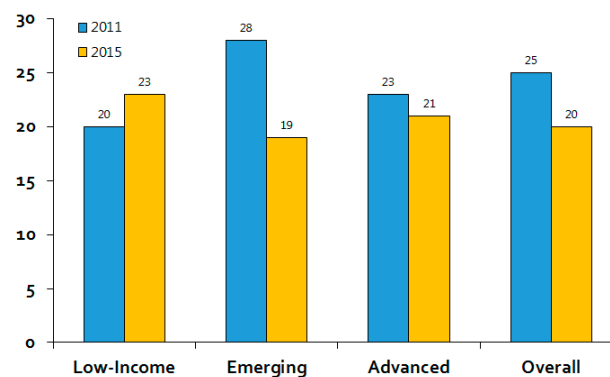
^{1/}Adapted from Sahay and others (2015b).

Share of Women in Boards of Directors of Banks Across Regions (%)



Sources: BoardEx; and authors' calculations.

Share of Women in Banking Supervisory Agency Boards (%)



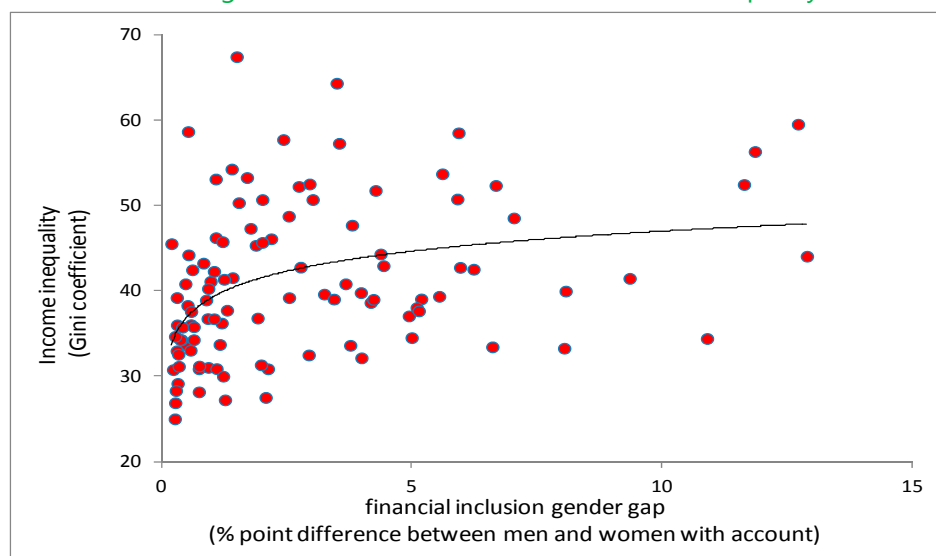
Sources: Various supervisory websites listed in <https://www.bis.org/regauth.htm?m=2%7C269> for 2015; Central Banking Publications (2011) for 2011; and authors' calculations.

FINANCIAL INCLUSION AND INEQUALITY

36. Access to finance can facilitate the poorest segments of the population to improve their economic situation, particularly in developing countries. New research shows that access to an expanded possibility frontier for borrowing helps reduce inequality. Defining inequality as “ratio of 40”—the ratio of the income share of the bottom 40 percent to that of the middle 40 percent—Plotnikov and others (forthcoming) find that increasing households’ access to borrowing lowers inequality. After controlling for measures of human capital development (income, health, and education), the study finds that the ratio of adults obtaining loans has a significant positive effect on the “ratio of 40” during the period 2007–12. However, this effect does not hold when considering only loans from formal financial institutions, thus highlighting the role of informal modes of finance, such as from family and friends, employers, and other sources. This result (reducing inequality) continues to hold for the share of women receiving loans. The effect is stronger and larger for a subsample that excludes high-income countries. Finally, the positive effect on income equality is less pronounced for other measures of inequality, such as the Gini coefficient, in which changes can be driven by movements in countries with high income levels, with already high financial inclusion.

37. The gender gap in financial inclusion seems to be positively related to income inequality. Figure 8 shows that countries that have a larger gender gap in account holdings also tend to have a higher income inequality, approximated here by the Gini coefficient. Similarly, the Gini is positively correlated with inequality in the relative account holdings in the richest segment of the population (World Bank 2014). Of course, these cannot be interpreted as causality. In a recent paper, Dabla-Norris and others (2015) show that greater financial deepening accompanied by financial inclusion (through credit availability) could help lower income inequality.

Figure 8. Financial Inclusion and Income Inequality



Sources: Global Findex, World Bank; and IMF staff calculations.

POLICY MESSAGES

38. In general, inclusion efforts are best targeted toward addressing market failures.

Involuntary exclusion, for instance, in granting credit or opening bank accounts, calls for policy action (World Bank, 2014). Inclusion efforts through a general increase in bank credit or setting up goals for rapid credit growth could undermine macrofinancial stability. Instead, direct and targeted transfers to people in need rather than through bank credit could be a better solution. This is especially so if accounts are opened and then used to make these transfers. Market-based mechanisms that make financial inclusion viable for banks and other institutions—rather than schemes that direct lending to certain sectors—are more likely to achieve macroeconomic goals.

39. The analysis in this paper shows that there are substantial benefits to growth from financial inclusion, but they fall with increases in financial depth.

Enabling firms to access credit markets, financing a greater share of investment with bank credit, increasing the number of households with bank accounts and credit cards, and using accounts to receive government transfers and wages have a positive impact on growth. The results continue to hold for women users of finance and users in the lower-income quartiles. The returns to growth of increasing financial inclusion, however, wane as both financial inclusion and depth increase. Further, sectors that are dependent on external finance and those that typically have assets that are not very tangible, grow more rapidly in countries that have more financial inclusion.

40. New evidence also shows that bank stability risks increase when access to credit is expanded, especially without adequate regulation and supervision.

Bank stability weakens as financial buffers (capital and profits in banks) are eroded. The presence of supervision and regulation mitigates this impact. Countries with weaker supervision could find their capital buffers eroding more substantially with greater expansion in access to credit. In contrast, countries with sufficiently strong supervision could see gains in financial stability. Thus, policies that require banks to expand credit to the underserved without adequate supervisory oversight can have a detrimental impact on bank stability. Buffers could deteriorate due to rapidly increasing nonperforming loans, especially in cases where loan losses are under-provisioned. In this regard, India's efforts to minimize these trade-offs include better use of relationship-based lending, greater disclosure, and active trading of credit facilities to create the liquidity for priority sector lending. Including a limit on the "stressed" debt-service-to-income ratio for prospective borrowers could guard against overstretching on loan repayments if interest rates and exchange rates were to rise. Such limits have recently been put in place in Australia, Hong Kong, and the United Kingdom, in these cases for all housing loans.

41. In contrast to credit, increasing access to other financial services does not have a strong impact on banking sector stability.

This means that these services can be promoted extensively, to the extent that their impact on growth is still positive. Access to ATMs, branches, and accounts and getting paid (salaries, pensions, benefits) through these accounts fall into this category. Closing the gender gap in account usage, promoting bank accounts among the low-income households, and encouraging greater diversity in bank deposits would all improve growth

without impairing banking sector stability. Financial literacy programs are being used in many countries, such as the “Money Wise Action Plan” in the Netherlands and spreading financial literacy in schools in India to create greater awareness for using such services. Many countries, such as Peru, are taking advantage of technology and using mobile payment platforms to achieve a more efficient form of financial inclusion.

42. Large gaps in the quality of banking supervision in countries that might aim to increase access suggest that promoting financial inclusion needs to be accompanied with improving financial supervision. The supervisory gaps are the largest in countries that have the lowest levels of access. Importantly, as was shown earlier, supervisory gaps exist even in countries that have a high degree of financial access. These gaps need to close in order to benefit the most from greater financial inclusion without jeopardizing financial stability. The BCBS is in the process of looking closely at those core principles that could pertain to financial inclusion. The aim is to draw up a set of recommendations to make the supervision of the financial inclusion activities proportionate to the risks, rather than imposing onerous regulatory costs on the banking sector. Along with improvements in supervision, setting up consumer protection bureaus could help prevent predatory practices in the provision of financial services.

ANNEX I. DATA ON FINANCIAL INCLUSION

Dataset and Variables describing financial inclusion	Used in analyzing associations between financial inclusion and		
	Growth	Growth Volatility	Financial Stability
World Bank's Enterprise Survey http://www.enterprisesurveys.org/			
Percentage of firms with a checking or savings account (all firms, small firms)	x		
Percentage of firms with a bank loan/line of credit (all firms, small firms)	x		
Proportion of loans requiring collateral (%) (all firms, small firms)	x		
Value of collateral needed for a loan (% of the loan amount) (all firms, small firms)	x		
Percentage of firms whose recent loan application was rejected (all firms, small firms)	x		
Proportion of investments financed by banks (%) (all firms, small firms)	x		
Percentage of firms identifying access to finance as a major constraint (all firms, small firms)	x		
IMF's Financial Access Survey http://fas.imf.org/Default.aspx			
ATMs per 100,000 adults	x	x	x
ATMs per 1,000 km ²	x	x	x
Commercial bank branches per 100,000 adults	x	x	x
Commercial bank branches per 1,000 km ²	x	x	x
Registered mobile money accounts per 1,000 adults	x		
Deposit accounts with commercial banks per 1,000 adults		x	x
Depositors with commercial banks per 1,000 adults	x	x	x
Household depositors with commercial banks per 1,000 adults	x	x	x
Household deposit accounts with commercial banks per 1,000 adults		x	x
Loan accounts with commercial banks per 1,000 adults		x	x
Household loan accounts with commercial banks per 1,000 adults		x	x
Household borrowers from commercial banks per 1000 adults		x	x
Borrowers from commercial banks per 1000 adults		x	x
World Bank's Global Index http://www.worldbank.org/en/programs/globalindex			
Account at a financial institution (% age 15+) [ts]	x		
Account at a financial institution, income, poorest 40% (% age 15+) [ts]	x		
Account (% age 15+) [ts]	x		
Credit card (% age 15+) [ts]	x		
Borrowed from a financial institution (% age 15+) [ts]	x		
Account at a financial institution, female (% age 15+) [ts]	x		
Account, female (% age 15+) [ts]	x		
Borrowed any money in the past year (% age 15+) [w2]	x		
Borrowed any money in the past year, female (% age 15+) [w2]	x		
Borrowed from a financial institution, female (% age 15+) [ts]	x		
Borrowed from family or friends (% age 15+) [ts]	x		
Borrowed from family or friends, female (% age 15+) [ts]	x		
Loan in the past year (% age 15+) [w1]	x		
Loan in the past year, female (% age 15+) [w1]	x		
Used an account at a financial institution to receive government transfers (% age 15+) [w1]	x		
Used an account at a financial institution to receive government transfers, female (% age 15+) [w1]	x		
Used an account to receive wages (% age 15+) [w2]	x		
Used an account to receive wages, income, poorest 40% (% ages 15+) [w2]	x		
Used an account to receive wages, female (% age 15+) [w2]	x		
Insurance policies per 1000 people		x	
Insurance policy holders per 1000 people		x	
Sahay and others (2015a)			
Financial Institution Access (FIA) index	x	x	x

Note: Deposit/accounts-related: green; loan-related: orange; insurance-related: blue; infrastructure-related: black

Additional information on the Financial Access Survey

The Financial Access Survey (FAS) is an annual survey managed by the IMF's Statistics Department and fully funded by donors. The FAS project aims at collecting and disseminating comparable time series data on the geographical outreach and use of basic financial services provided by resident financial corporations to resident customers within a country. The outreach of financial services is approximated by financial institutions' branch network, availability of automated teller machines (ATMs), and beginning with the 2014 round by the number of agent outlets for mobile money providers. The outreach dimension is complemented by the usage dimension through three key financial services: deposits, loans, and insurance. The FAS also identifies separately the following users of financial services: households and small and medium enterprises (SMEs). The FAS contains data and metadata for 189 jurisdictions from 2004 onward in 164 underlying series and 47 indicators. The 2015 round is expected to be released in September 2015. The FAS database is available at <http://fas.imf.org>.

The FAS covers the following financial service providers:

- **Other depository corporations:** all resident financial corporations and quasi-corporations (except the central bank) that are mainly engaged in financial intermediation and that issue liabilities included in the national definition of broad money. Other depository corporations are grouped into the following four categories: (1) commercial banks; (2) credit unions and financial cooperatives; (3) deposit taking microfinance institutions; and (4) other deposit takers such as savings and loan associations, building societies, rural banks and agricultural banks, post office giro institutions, post office savings banks, savings banks, and money market funds.
- **Other financial corporations** consist of a diverse group of resident financial corporations that provide financial services, either through intermediation or auxiliary services, and that do not issue liabilities included in broad money. They are grouped into the following two categories: (1) insurance corporations, which are disaggregated into life and non-life insurance, and (2) other financial intermediaries (finance companies, financial leasing companies, investment funds, securitization vehicles, investment banks, underwriters and dealers specialized in securities market activities, and non-deposit-taking microfinance institutions).

For the purpose of FAS, financial service customers are limited to households and SMEs. The survey uses the definition of the *Monetary and Financial Statistics Manual* for household which is: *a group of persons who share the same living accommodation, pool some, or all, of their income and wealth and consume certain types of goods and services collectively, mainly housing and food*. SMEs are defined according to the classification of the World Bank Group, namely as enterprises with fewer than 300 employees, \$15 million in assets, and \$15 million in annual sales, and loan sizes of less than 1 million (\$2 million for some advanced economies).

ANNEX II. EMPIRICAL APPROACH: FINANCIAL INCLUSION AND GROWTH

The main challenge in establishing a relationship between long-run growth and financial inclusion is lack of sufficiently long time series of financial inclusion (FI) data. For example, the Financial Institution Access (FIA) index constructed by Sahay and others (2015a) contained time series—number of ATMs, number of bank accounts—obtained from the IMF’s Financial Access Survey (FAS) starting in 2004 at the earliest. This proves insufficient to provide robust and usable results in a standard GMM growth regression with a sample period of 1980–2010 and using five-year averages of all variables to smooth out cyclical variations. Within this framework, FIA only provided two usable time observations (averages 2000–04 and 2005–10)⁷. For this reason, GMM regressions of this type cannot test for the impact of FIA—or other financial inclusion indicators, for that matter⁸—as the regressions would not pass the standard diagnostic tests. The following are some alternative approaches that were used and work within the data limitations described above.

Macroeconomic approach

OLS estimation: a cross-country ordinary least squares (OLS) estimation was run, relating a measure of FI at one point in time (or averaged over a period) with growth over a period. Ideally, one would have *initial* FI related to *subsequent* growth (as in early King and Levine study) to address reverse causality:

$$\dot{y}_{2004-14,i} = \beta_0 + \beta_1 FI_{2004,i} + \beta_2 X_{2004,i} + \beta_3 FIN_{2004,i} \quad (1)$$

in which i denotes country and X denotes controls, and one can also include FIN , a financial depth/development variable: either *privy* (private credit-to-GDP), *FD* (the broad financial development index), or *FID* (index of financial institution depth).

Strictly speaking, one can only use FAS data at the initial value during this period. If one uses the more comprehensive Global Findex data, which measure FI at only two points in time (2011 and 2014), it requires making an assumption that the relative measure of financial inclusion across countries did not change dramatically over time. That is, if Korea is observed to have four times the account usage of Vietnam in 2011, the relative measure of financial inclusion at the beginning of the sample period was likely similar. In this case, the Global Findex data are interpreted as a ranking rather than an absolute level.⁹

⁷ By construction, all previous observations of FIA would be equal to zero.

⁸ If the lack of time series coverage of the FAS data is insufficient for this empirical approach, this is even more true for financial inclusion indicators drawn from other sources, such as the Global Findex (two time observations, in 2011 and 2014) and the World Bank Enterprise Surveys (three or less time observations, beginning in 2005).

⁹ An alternative specification might rank countries as having low, medium or high levels of a given FI indicator.

GMM with interactions: this uses the *FIN* variable, described above as the primary finance variable, but then include an interaction with an FI variable as well. Given the data limitations, the financial inclusion variable is time-invariant, measured as either a period average or a single time observation depending on whether it is from FAS, Global Findex, or from the Enterprise Surveys). Thus, the GMM estimation could be done on the following specification:

$$\dot{y}_{i,t} = \beta_0 + \beta_{11}FIN_{i,t} + \beta_{12}FIN_{i,t} \cdot FI_i + \beta_2 X_{i,t} \quad (2)$$

This estimation, again, requires assuming that the relative ranking of FI across countries does not change dramatically—an assumption that is not implausible based on the available data.

GMM Estimation, 1980-2010 (5-year averages)

Controls variables: initial GDP per capita, education, and government consumption/GDP
privy = private credit-to-GDP, crisis = systemic banking crisis dummy

	FI = ATMs per 100,000 adults				FI = Percentage of firms identifying access to finance as major constraint			
<i>y</i> ₀	-0.013*** (-2.843)	-0.013*** (-2.671)	-0.010*** (-3.073)	-0.009*** (-2.677)	-0.003 (-0.711)	-0.001 (-0.306)	-0.003 (-0.710)	-0.001 (-0.310)
<i>privy</i>	0.007 (0.645)	-0.015 (-1.562)	0.004 (0.393)	-0.008 (-0.930)	-0.056*** (-3.498)	-0.031** (-2.506)	-0.052*** (-3.001)	-0.025* (-1.867)
<i>FI</i>	0.062*** (3.086)	0.049*** (2.679)	0.049*** (3.033)	0.031** (2.446)	-0.182*** (-3.856)	-0.205*** (-3.855)	-0.169*** (-3.941)	-0.173*** (-3.757)
<i>FI X privy</i>	-0.031*** (-2.652)		-0.021** (-1.973)		0.184*** (2.629)		0.162** (2.299)	
<i>Education</i>	0.020*** (3.504)	0.020*** (3.186)	0.016*** (3.242)	0.018*** (3.840)	-0.001 (-0.156)	-0.009 (-1.132)	0.000 (0.056)	-0.005 (-0.625)
<i>Crisis x privy</i>			-0.017** (-2.293)	-0.023*** (-2.941)			-0.006 (-0.644)	-0.006 (-0.530)
<i>Gov. Consumption</i>	-0.024** (-2.388)	-0.028*** (-3.407)	-0.022*** (-2.649)	-0.021** (-2.439)	-0.019* (-1.927)	-0.024** (-2.184)	-0.019* (-1.954)	-0.024** (-2.064)
<i>Constant</i>	0.160*** (3.863)	0.181*** (4.316)	0.144*** (5.335)	0.136*** (4.255)	0.133*** (3.357)	0.146*** (3.099)	0.129*** (3.546)	0.137*** (3.043)
Observations	377	377	377	377	441	441	441	441
Number of Countries	88	88	88	88	105	105	105	105
AR2	0.727	0.802	0.959	0.945	0.957	0.938	0.957	0.992
Hansen	0.311	0.208	0.596	0.403	0.239	0.267	0.236	0.228
Instruments	83	72	94	83	83	72	94	83

t-statistics in parentheses. "****", "***", and "**" denote statistical significance at 1, 5, and 10 percent levels.

Microeconomic Approach: Difference-in-Differences, following Rajan and Zingales (1998)

The Rajan and Zingales (RZ) approach, which moves toward a more micro setting, has two advantages: (1) the results describe a specific channel through which finance can affect growth, and (2) the time dimension requirements are smaller. In the RZ approach, the main hypothesis is that finance affects growth primarily by relaxing financing constraints of “externally dependent” sectors, that is, those with limited capacity to generate cash flows to finance investment projects. One can undertake the RZ approach using an FI variable directly into the equation as an explanatory variable (3), or interacted with the *FIN* variable (4). The bottom line in these regressions would be the finding that $\beta_1 > 0$ in equation (3) or $\beta_{12} > 0$ in equation (4), which shows that sectors dependent on external finance grow faster with greater financial inclusion. In particular, if one finds in equation (4) that $\beta_{11} > 0$ but $\beta_{12} = 0$, then one can conclude that financial inclusion does not generate growth benefits above and beyond those generated by depth:

$$\dot{y}_{i,s,t} = \beta_0 + \beta_1 FI_{i,t0} \cdot EXT_s + \beta_2 X_{i,s,t0} \quad (3)$$

$$\dot{y}_{i,s,t} = \beta_0 + \beta_{11} FIN_{i,t0} \cdot EXT_s + \beta_{12} FIN_{i,t0} \cdot FI_{i,t0} \cdot EXT_s + \beta_2 X_{i,s,t0} \quad (4)$$

in which s = sector, EXT_s indicates the degree of external dependence of sector s , and t indicates that the given variable is measured at some point in time (or as an average) whereas growth of sector s in country t is measured over a period of time. The presentation above simplifies the specification greatly—there are some country and sector-specific variables that should be incorporated—to give the general idea of what is being measured and estimated.

ANNEX III. EMPIRICAL APPROACH—FINANCIAL INCLUSION AND STABILITY

Financial inclusion and financial stability regressions

Method: Panel regression with country fixed effects

$$Z_{t,i} = \alpha + \beta_1 X_{t-1,i} + \beta_2 X_{t-1,i}^2 + \theta(X_{t-1,i} * BCP_{t,i}) + \gamma Controls_{t,i}$$

Timeframe: 2004–11

Dependent variables: Bank Z-score, drawn from the Global Financial Development database. The Z-score measures the “distance-to-distress” for banks, reflecting the buffers against earnings shocks.

Explanatory variables: Financial Access Survey (FAS) variables for financial inclusion (Annex I). The variables were lagged by one year in the regression. The explanatory variables were also interacted with the variable BCP, which approximates the quality of bank supervision by measuring the degree of compliance with Basel Core Principles (BCP). Two measures of BCP were tested: a composite of all the principles, and a subset of BCP principles relevant to financial inclusion (Core Principles 1, 3, 4, 5, 8, 9, 10, 11, 14, 15, 16, 17, 18, 24, 25, and 29).

Controls: Lagged values of the Financial Institutions Depth index (FID) from Sahay and others (2015a), real GDP per capita, excess of credit growth above nominal GDP; contemporaneous variables of population, FDI-to-GDP ratio, trade-to-GDP ratio, inflation, government balance, a dummy for banking crisis, and the Lerner index.

Results: The coefficient on the variable “number of borrowers per 1,000 adults” was found to be negative and significant for both X and X^2 . The coefficient of the interaction with both measures of BCP was positive. For other variables of financial inclusion, the relationships were found to be insignificant or inconclusive. Some variables also suffered from a lack of sufficient coverage for the regressions to be meaningful.

Explanatory variable: Number of borrowers per 1,000 adults	Dependent variable: Bank z-score	
	composite BCP	subset BCP
Constant	16.54*** (5.74)	17.18*** (5.76)
X	-0.086** (0.039)	-0.087* (0.048)
X²	-3.20 x 10 ⁻⁵ *** (9.34 x 10 ⁻⁶)	-2.92 x 10 ⁻⁵ *** (9.20 x 10 ⁻⁶)
X*BCP	0.032*** (0.013)	0.032** (0.015)
Observations	200	200
R-squared	0.27	0.26
Number of Countries	39	39

Standard errors in parentheses

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

Financial inclusion and economic volatility

Method: Non-linear least squares estimation

$$gvol_{t,i} = \alpha e^{\beta X_{t-1,i}} e^{\gamma X_{t-1,i} * BCP_{t,i}} e^{controls_{t,i}}$$

Timeframe: 2004 -2011

Dependent variable: Growth volatility, defined as a 3-year rolling standard deviation of real GDP growth

Explanatory variables: Financial Access Survey (FAS) variables for financial inclusion (Annex I). Contemporaneous and lagged 3-year differences of financial inclusion variables were used. The explanatory variables were also interacted with the variable BCP, which reflects the quality of bank supervision. This is approximated through the BCP scores, which show the degree of compliance with the Basel Core Principles (BCP). Two measures of BCP were tested: a composite of all the principles, and a subset of BCP principles relevant to financial inclusion (Core Principles 1, 3, 4,5, 8, 9, 10, 11, 14, 15, 16, 17, 18, 24, 25, and 29).

Controls: Variables lagged by 3 years—the Financial Institutions Depth index (FID), real GDP per capita, excess of credit growth above nominal GDP; contemporaneous variables of FDI-to-GDP ratio, trade-to-GDP ratio, inflation, government balance, volatility of terms of trade changes, volatility of regional cross inflows, offshore/onshore financial center, volatility of foreign growth, the Polity index, and a crisis dummy.

Results: The coefficient on the variable “number of borrowers per 1,000 adults” was found to be positive and significant for X. Higher changes in the number of borrowers per 1,000 adults (that is, expansion in the share of borrowers) increased growth volatility. This effect is counteracted by the impact of the interaction with BCP, which shows a negative sign. For other variables of financial inclusion, the relationships were found to be insignificant or inconclusive. Some measures of financial inclusion also suffered from a lack of sufficient coverage for the regressions to be meaningful.

Explanatory variable: Lagged 3-year change in number of borrowers per 1,000 adults	Dependent variable: Growth volatility (rolling 3-year standard deviation of growth)	
	composite BCP	subset BCP
Constant	0.712** (0.34)	0.823** (0.38)
X	0.039*** (0.009)	0.047*** (0.011)
X* BCP	-0.012*** (0.003)	-0.014*** (0.003)
Observations	99	99
R-squared	0.863	0.862

Standard errors in parentheses

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

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