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Financial Inclusion in Asia-Pacific

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Executive Summary

In recent years much progress has been made in financial inclusion globally, including in Asia and the Pacific. Nevertheless, financial inclusion gaps remain large across and within countries. Close to half of the adult population in low- and middle-income Asia-Pacific economies does not have a bank account, and less than 10 percent has borrowed from formal financial institutions. Lack of access to formal finance leaves poor households more vulnerable to adverse shocks and poverty traps. While Asia-Pacific countries have made significant strides using financial technology (fintech) to support financial inclusion, the region's use of fintech is uneven, exhibiting large gaps between the rich and poor, men and women, and rural and urban areas.

This paper takes stock of the development and current state of financial inclusion in the Asia-Pacific region. It focuses on the impact of financial inclusion on economic growth, poverty reduction, and income inequality, and the linkages between financial inclusion and macroeconomic policies, as well as structural policies. Given the increasing importance of financial technologies, the paper also provides a snapshot of the fintech landscape in the region. Main findings in this paper include the following:

- Financial inclusion does matter for economic growth and is associated with a reduction in poverty and inequality. Empirical results point to potentially significant growth benefits from financial inclusion, with the largest gains for low-income and developing countries. Simulations indicate that raising financial inclusion in low-income countries to the levels in Asia's emerging market economies could significantly reduce the region's population living in poverty and income inequality.

- Financial inclusion also affects macroeconomic policies. The analysis in the paper suggests that financial inclusion can enhance central banks' ability to stabilize economic activity. Similarly, financial inclusion can affect fiscal policy effectiveness and improve public financial management.

- Fintech is playing a growing role in improving financial inclusion and should be an important component of a national financial inclusion strategy. Linking financial inclusion to national development strategies can help boost resources and align fintech strategies with other development initiatives

The large benefits of financial inclusion suggest that it should become a part of a country's inclusive growth strategy. Such a strategy should target vulnerable groups such as the rural population, low-income households, the elderly, women, and geographically remote communities. Asia's experience with financial inclusion also highlights the benefits of a holistic approach, which calls for concerted action across macroeconomic, financial sector, structural reform, and regulatory policies. It also emphasizes the importance of financial literacy and infrastructure policies. Policymakers should also encourage social experimentation and partnerships between the public and private sectors when pursuing financial inclusion goals.

CHAPTER

1 Introduction and Overview

Financial inclusion is recognized as an important vehicle to promote inclusive growth and reduce poverty. Much progress has been made in financial inclusion, but gaps remain large in many parts of the world, including Asia and the Pacific. Today, 47 percent of the adult population in low- and middle-income countries still does not have a bank account, and only 9 percent of the population borrowed from formal financial institutions in 2016. Women and young adults (age 15–24) often face even greater challenges in accessing financial services. Many micro, small, and medium enterprises (MSMEs) and farmers face limited access to credit and often rely on informal markets for finance, at high costs. Lack of access to formal finance leaves poor households more vulnerable to adverse shocks and poverty traps.

There is broad agreement among practitioners and researchers over the definition of financial inclusion. This paper defines financial inclusion as access to and use of formal financial services by households and firms. Financial inclusion is generally measured across three dimensions: (1) *access* to financial services, (2) *usage* of financial services, and (3) the *quality* of financial products and service delivery (see also IMF 2015b). Similarly, the Indian government's Committee on Financial Inclusion defines financial inclusion as delivery of financial services at an affordable cost to vast sections of disadvantaged and low-income groups (Government of India 2008). In an inverted formulation, Leyshon and Thrift (1995) define financial exclusion as "those processes that serve to prevent certain social groups and individuals from gaining access to the financial system." Finally, the World Bank defines financial inclusion as the proportion of individuals and firms that use financial services (World Bank 2014).

This paper takes stock of the development and current state of financial inclusion in the Asia-Pacific region.[1] The rich regional experience with financial inclusion, along with those of other regions, provides a good opportunity to reflect on past progress and look to the future. This paper focuses on the impact of financial inclusion on economic growth, poverty reduction, and inequality; linkages between financial inclusion and macroeconomic policies; and structural policies that can advance the region's financial inclusion agenda.[2] Given the increasing importance of financial technologies (fintech), the paper also provides a snapshot of the fintech landscape in Asia-Pacific. The paper aims to enhance policy prospects, share lessons learned from recent experience and social experimentation, and provide empirical analysis and case studies that explore how best to move forward with the financial inclusion agenda.

The paper highlights several key findings regarding the development and state of financial inclusion in Asia-Pacific:

- Asia-Pacific has made significant progress in financial inclusion and the pace in recent years has been rapid. Nevertheless, across-country and intracountry disparities are among the highest in the world and, in particular, the gaps between the rich and the poor, rural and urban populations, and men and women remain deep.
- Income is a predominant determinant of the level of financial inclusion. However, other factors, such as geography, financial sector structure, and policies, also play important roles. Pacific island countries face some unique challenges in advancing financial inclusion because of their geographic dispersion, remoteness, and small market size.
- While some countries in Asia-Pacific are leaders in fintech, on average the region lags behind others in several important areas: online (internet) purchases, electronic payments, mobile money, and mobile government transfers. Furthermore, the region's use of fintech is the most uneven in the world, exhibiting large gaps between the rich and poor, and between rural and urban areas.

This paper builds on the literature examining the macroeconomic impact of financial development and more recently financial inclusion. Seminal work by Beck and Levine (2004) and other research, including by the IMF (2016), have analyzed the impact of financial deepening/inclusion on growth, inequality, and stability. The World Bank (2013) has created composite

[1]For this paper, the region is defined as countries in the IMF's Asia and Pacific Department. For a country list, see http://www.imf.org/external/region/apd/index.aspx and see Appendix 1 (published in the online version of the paper) for data availability.

[2]This paper does not address financial stability aspects of financial inclusion, which is well covered in earlier work (see IMF 2015e).

indices of financial inclusion, while other institutions have examined the regulatory and supervisory reforms to support financial innovation while safeguarding stability. More recently, the IMF (2018) has analyzed the impact of digitalization on fiscal outcomes. This paper contributes to this research by examining the Asia-Pacific experience with financial inclusion and its policy implications.

This study provides further evidence that financial inclusion helps boost growth, reduce poverty, and lower inequality. These benefits can be substantial. For example, closing the gap between the least financially inclusive country and the median country in the region could raise GDP growth by 1 percentage point over a five-year period. Moving less inclusive countries to the median could reduce the number of people in poverty in the Asia-Pacific region by about 4 percent. Moreover, a similar improvement in inclusion could lower the Gini coefficient by about 10 to 20 percentage points from current levels of 30 to 43 percentage points.

Asia's experience with financial inclusion highlights the benefits of a holistic approach, recognizing that policies for tackling the gaps in financial inclusion are mutually reinforcing. A holistic approach would call for concerted action across macroeconomic, financial sector, structural reform, and regulatory policies and emphasizes the importance of financial literacy and infrastructure strategies, centered on the internet, telecommunications, and other technological innovations. Specifically, a holistic approach should include the following elements:

- *Structural reforms and financial sector policies should continue to aim to remove obstacles to access to formal services*: Improvements in financial infrastructure have been critical to financial inclusion over the past decades, and continued efforts in areas such as credit bureaus, asset registration, payment systems, and micro-finance institutions would further reduce the cost of financial services. Greater transparency in financial services and fiscal operations in turn would encourage greater use of formal systems.
- *Countries should allocate adequate resources to invest in technology infrastructure, such as internet and mobile phone connectivity, to enable greater financial inclusion*: In some countries, further liberalization of the telecommunications and internet industries would help bring down costs and improve services. This in turn would increase penetration rates, ensure stable connectivity, and make mobile financial services more affordable and available, especially for disadvantaged groups.
- *Policymakers should leverage fintech innovations for financial inclusion and tilt policies toward disadvantaged groups to close digital divides*: Fintech plays a vital role by complementing traditional approaches to financial inclusion. Close collaboration with the private sector can help achieve inclusion goals.

At the same time, policymakers from various government agencies and regulatory bodies need to coordinate and strike the right balance between encouraging fintech innovations and ensuring financial stability.

- *More resources should be devoted to financial and technology literacy as part of a broader inclusion strategy*: The emphasis should be on effective education for both service suppliers and consumers to enhance support and protect consumers of financial services. This is important not only to increase demand for financial services, but also to close inclusion gaps and mitigate the risks from greater exposure to financial services and technology.
- *Policymakers should encourage social experimentation and partnership between the public and private sectors in pursuing financial inclusion*: As demonstrated by the Grameen Bank's microcredit initiative and mobile payments in some African countries, social experimentation encourages innovation, entrepreneurship, and grassroots ingenuity. Such experimentation, supported by public policy, may be even more important for completing the financial inclusion journey.
- *Finally, macroeconomic and financial inclusion policies should take into account their interlinkages*: Financial inclusion, by strengthening the interest rate channel of transmission, can enhance the effectiveness of monetary policy as a tool for macroeconomic management but also amplify its distributional impact.[3] Financial inclusion can also raise the efficiency and effectiveness of fiscal policy by boosting revenue collection and improving spending efficiency, which in turn can generate more resources for promoting inclusive growth. In addition, financial inclusion can enhance the countercyclical role of fiscal policy by raising the fiscal multiplier.

The rest of the paper is organized as follows. Chapter 2 provides an overview of the current state and development in financial inclusion in Asia and the Pacific. Chapter 3 focuses on empirical analysis of the economic impact of financial inclusion, including on economic growth, poverty, and inequality. Chapter 4 analyzes interactions between financial inclusion and macroeconomic (monetary and fiscal) policies. Chapter 5 examines the role of financial technology. Chapter 6 provides several case studies. Chapter 7 concludes the paper with a discussion of the way forward.

[3]The recent empirical research (IMF 2015e, 2015b) found that financial stability risks increase when access to credit expanded without proper supervision. However, countries with strong supervision could see some financial stability gains from higher inclusion. In contrast to credit access, increases in other types of access to financial services, such as access to automated teller machines (ATMs), bank branches, and transaction accounts, do not affect financial stability.

CHAPTER

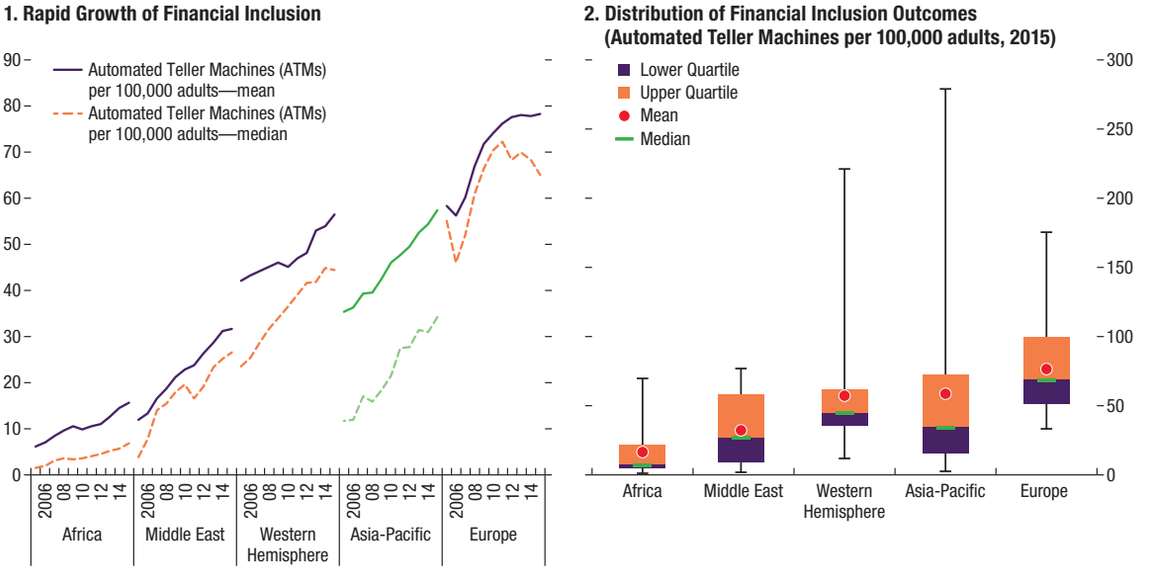
2 Financial Inclusion in Asia-Pacific—Stylized Facts

Asia-Pacific countries have made significant progress in financial inclusion along with financial deepening, broadly in line with other regions (Figure 1, panel 1). The use of financial services in the region's emerging market economies is comparable to that of their peers in aspects such as having an account, borrowing, using ATMs, and sending remittances through financial institutions. Asia-Pacific's low-income and developing countries (LIDCs), however, fare better in both financial access and usage when compared with their peers in other regions, particularly in measures of having an account and borrowing. Both emerging market economies and LIDCs in the region tend to perform well in financial access for enterprises, which are less likely to identify access to finance as a major constraint, despite the higher collateral requirement for loans (World Bank 2017).

Despite the improvement, financial inclusion in Asia-Pacific varies substantially across countries, more so than in other regions (Figure 1, panel 2). The region has the largest disparity in access to finance based on indicators such as access to an ATM or the formal banking sector (Figure 1, panel 2). While some Asian countries are at the forefront of financial inclusion, others are able to provide access to only basic financial services. In Malaysia and Mongolia, for example, most households actively use banks for saving and borrowing and frequently use mobile phones to make payments. In contrast, informal financing remains important in countries such as Myanmar and Nepal, where, despite recent efforts, less than 40 percent of the households have a bank account.

Asia-Pacific countries have made significant strides on the use of technology to support financial inclusion. Adoption of digital financial services has recently picked up in many countries, including EFTPOS-supported

Figure 1. Asia's Rapid Financial Inclusion with Wide Disparity



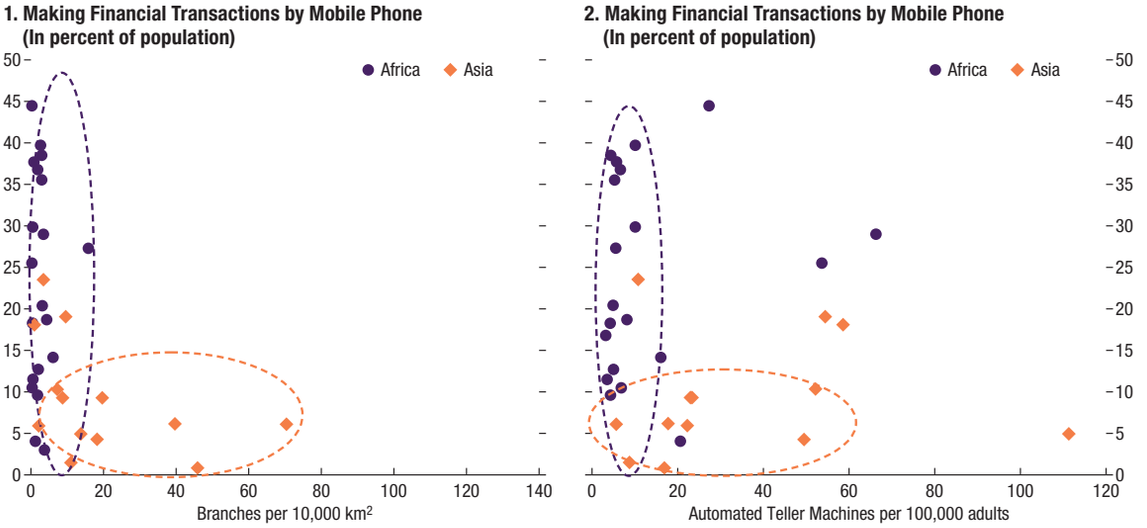
Source: IMF Financial Access Survey.

branchless banking,[1] mobile banking, and mobile money, which has grown noticeably in Bangladesh, Indonesia, and Mongolia. In PICs, where geographical dispersion represents a major obstacle to providing financial services, mobile-based financial products have seen a substantial uptake, such as in Samoa. China, Malaysia, Mongolia, and Thailand among emerging market economies, and Bangladesh and Cambodia among LIDCs, are leaders in mobile payments (World Bank Global Financial Index [Findex]). In addition, Bangladesh, Cambodia, and the Philippines have seen increased use of mobile phones in sending cross-border remittances.

However, mobile banking in most Asia-Pacific countries lags behind that in sub-Saharan Africa. For example, while the Asia-Pacific region is ahead of sub-Saharan Africa in traditional infrastructure such as bank branches and ATMs, in mobile transactions it is substantially behind Kenya, Uganda, Tanzania, and Zimbabwe, where more than 70 percent of the population uses mobile technology for receiving remittances. The L-shaped relationship (Figure 2) between traditional infrastructure and the use of mobile technology for financial inclusion suggests that countries with less traditional infrastructure have stronger incentives to use mobile technology as a cost-effective alternative, an issue that will be discussed further in the fintech section of this paper.

[1]EFTPOS stands for electronic funds transfer at point sale.

Figure 2. Physical Infrastructure and Use of Technology for Financial Transactions

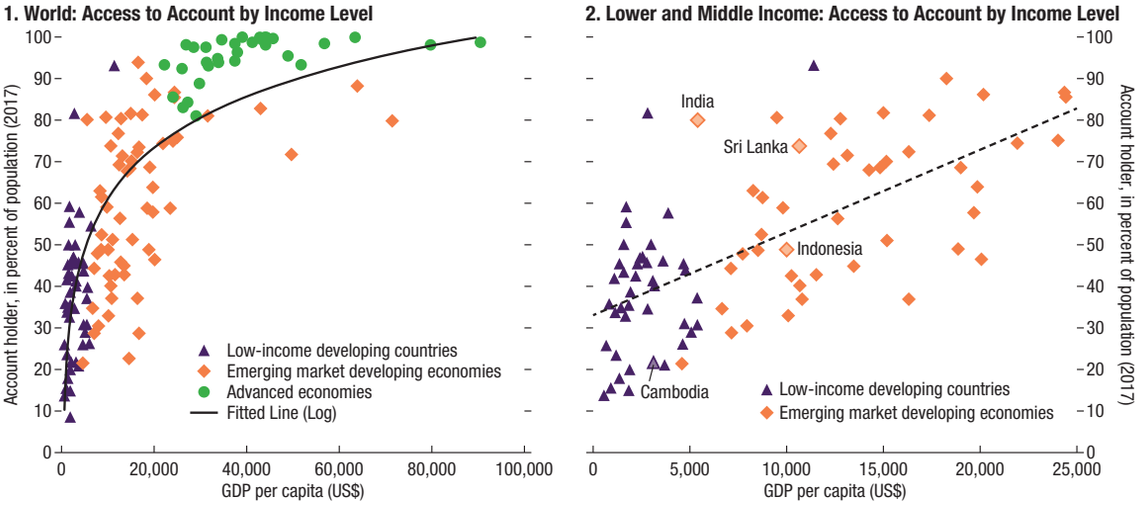


Sources: IMF Financial Access Survey; and World Bank Global Findex.

Income level is a key determinant of financial inclusion, but other factors, such as banking structure, geography, and policy, also play a role (Figure 3). Countries at higher income levels typically exhibit higher financial inclusion, but economies at similar income levels can differ in their levels and attributes of financial inclusion. For example, per capita income in India is higher than in Cambodia, and a higher percentage of people in India have bank accounts than in Cambodia. However, Cambodia has greater financial inclusion in terms of mobile payments, thanks to a strong public-private partnership in promoting mobile financial services. Indonesia and Sri Lanka have similar levels of per capita income, but Sri Lanka has used the formal banking system for financial inclusion while Indonesia, with its greater geographic dispersion, has relied more on mobile banking.

Small states in Asia-Pacific face major challenges from geographic dispersion as well as their small size. Many of these countries consist of small islands that are widely dispersed and sparsely populated, making the delivery of financial services expensive. Severe infrastructure gaps, narrow production bases, and high dependence on imports contribute to high transaction costs. These countries' vulnerability to natural disasters also raises the risk premium associated with financial services. In addition, many PICs face difficulty in maintaining correspondent banking relationships, which has increased the costs and complexities in transferring money and sending remittances (Alwazir and others 2017, also see the Samoa case study below).

Figure 3. Financial Inclusion and Income Level

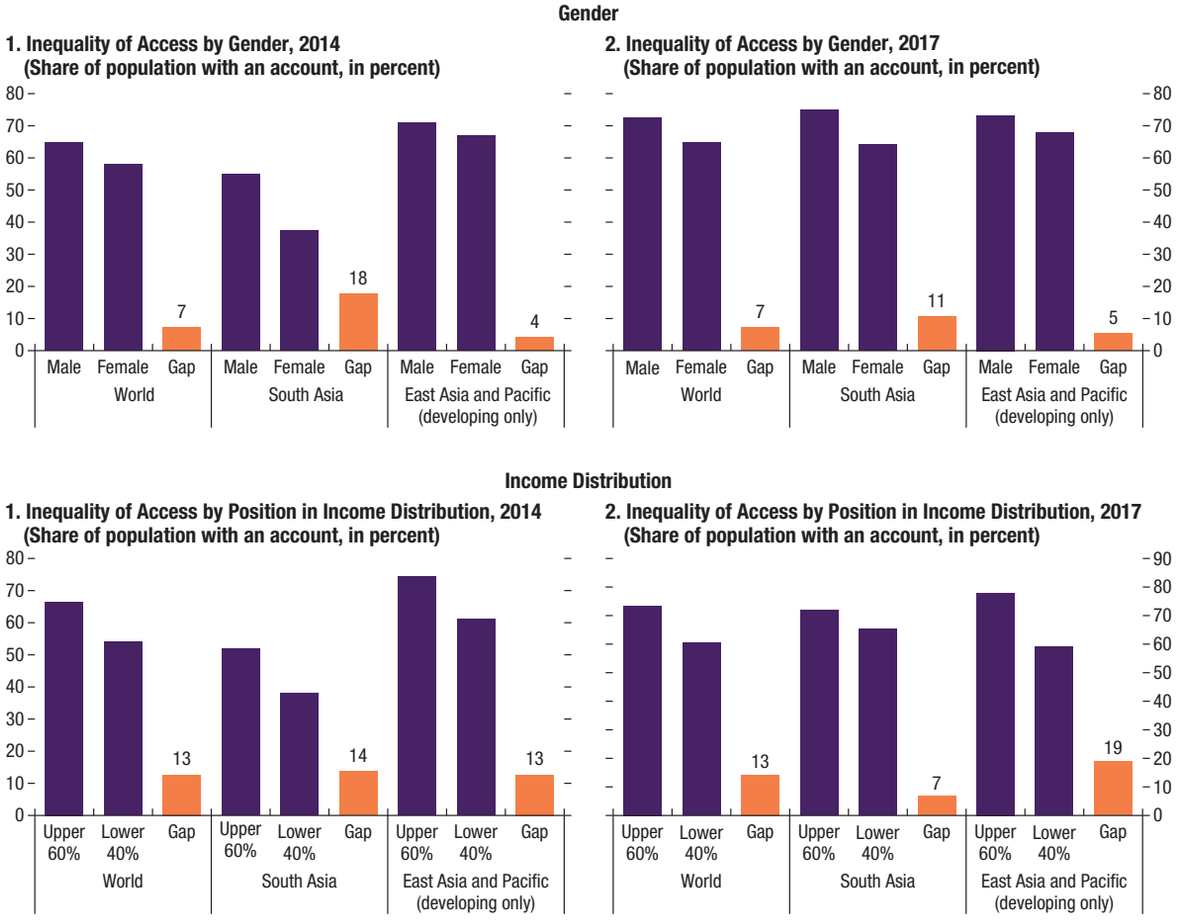


Sources: Financial Access Survey; and Global Findex.

The disparity of financial inclusion in Asia is also significant within countries. Despite recent improvements, large gaps still remain in access to financial services between the rich and the poor, urban and rural dwellers, and men and women. For example, in Indonesia, only about 10 percent of adults from the poorest quintile have a formal bank account, compared with about 60 percent from the richest quintile. Similarly, in India, only about 46 percent of male adults from the poorest quintile have a formal account, compared with 79 percent from the richest quintile. India's disparity between the richest and poorest groups is even more pronounced when measured by use of mobile transactions (fourfold difference) or borrowings from a financial institution (about threefold difference). Despite recent progress, gender disparities have been significant, particularly in South Asia, where less than 40 percent of women have a bank account, compared with nearly 60 percent of men (Figure 4) (Global Findex 2017).

Asia-Pacific countries need to redouble efforts to address large disparities in financial inclusion. The concentration of financial exclusion among vulnerable groups such as the young, uneducated, and unemployed, as well as the poor in rural areas, is a major concern. Evidence presented in the next section suggests that financial exclusion is associated with higher poverty and greater income inequality, as well as lower overall economic growth. Addressing financial exclusion and inequality is important for inclusive growth, and the sharing of experiences among Asia-Pacific countries will be valuable for formulating policies that reduce such disparities.

Figure 4. Average Within-Country Inequalities (Aggregated by Subregion)



Source: Global Findex.

CHAPTER

3 The Economic Impact of Financial Inclusion in Asia-Pacific—An Empirical Analysis

While it is widely accepted among researchers and policy makers that financial inclusion matters for growth, poverty, and inequality,[1] identifying the precise relationship between those is challenging. The lack of access to a formal financial system, arising from insufficient income, high-risk profiles, and market imperfections, could result in suboptimal savings and investment. Policies that focus on financial inclusion could ease access to finance, boost investment and consumption, increase income levels, and correct market failures and imperfections. Empirical analysis, however, faces several constraints, such as dealing with limited data and causality between financial inclusion and growth, which could lead to omitted variables, measurement errors, or endogeneity problems. To address these statistical issues, the econometric approach here controls for various factors linked to growth, including human capital, rule of law, government involvement, and economic and financial crises.[2] Furthermore, this study uses a new index of financial inclusion (FI index) that allows for more robust estimation across a range of indicators (Table 1).[3] Nevertheless, given these limitations, the empirical results should be interpreted as correlations between financial inclusion and macroeconomic outcomes, rather than causality.

The results point to potentially significant growth benefits from financial inclusion, especially for low-income and developing countries in Asia-Pacific. Financial inclusion, as measured by the new FI index, appears to be positively correlated with per capita income growth (Figure 5). The benefits of financial inclusion for growth also decline as it progresses, suggesting that LIDCs would benefit the most from expanding financial inclusion than

[1]Examples of studies on this subject include IMF (2015a), Park and Mercado (2016), Burgess and Pande (2015), Allen and others (2013), and Honohan (2008).

[2]See Appendix 2 for technical details.

[3]See Appendix 2 and Mialou and others (2015) for the methodology of constructing the FI index.

Table 1. Financial Inclusion Index—Ranking, 2015[1]

	Country	Rank		Country	Rank
Fourth Quartile	Singapore	1	Second Quartile	New Zealand	16
	South Korea	2		Marshall Islands	17
	Japan	3		Fiji	18
	Maldives	4		Vietnam	19
	Thailand	5		Australia	20
	Brunei	6		Vanuatu	21
	Indonesia	7		Nepal	22
	Tonga	8			
Third Quartile	India	9	First Quartile	Mongolia	23
	China	10		Bhutan	24
	Sri Lanka	11		Cambodia	25
	Philippines	12		Timor-Leste	26
	Bangladesh	13		Lao P.D.R.	27
	Samoa	14		Solomon Islands	28
	Malaysia	15		Myanmar	29
				Papua New Guinea	30

[1]The quartiles are based on the country rankings. Color indicates the index value, ranging from the highest (dark green) to lowest quartile (orange), with Malaysia representing the median level of financial inclusion among countries in Asia.
The index is based on 3 indicators: ATMs per 100,000 adults, Bank branches per 100,000 adults, and Bank branches per 1,000 km^2 (Appendix 2). Thus, it mainly captures financial access. Limited country coverage of more indicators prevented construction of the index that could reflect additional aspects of financial inclusion.

their more advanced peers.[4] For illustrative purposes, a 1 percent increase in the financial inclusion index level in LIDCs—which is equivalent to improving financial inclusion from the fourth quartile to third quartile (for example, from Cambodia's level to Vietnam's; see Table 1)—is associated with a cumulative 0.14 percentage point increase in per capita income growth over a five-year period. In contrast, the same improvement for high-income countries is associated with a gain of only about 0.09 percentage point. Based on these results, an increase in financial inclusion level from the bottom quartile to the median could be accompanied by an increase of 0.2 percent in per capita income growth over a five-year period.

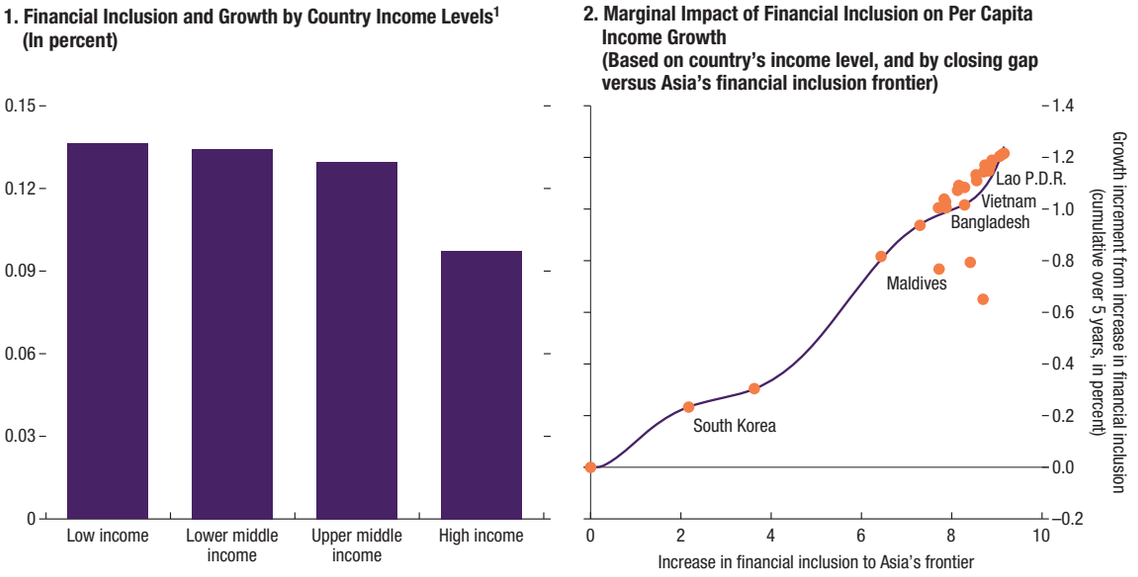
Greater financial inclusion, as measured by the new index, is associated with significant poverty reduction (Figure 6). This result is robust to various specifications and poverty measures. As an illustration of this relationship, an increase in the financial inclusion index level of 1 percent, corresponding to moving from the fourth to third quartile, is estimated to lower the poverty level by 1.4 percent of the total population in Asia-Pacific over a five-year period.[5] If all Asia-Pacific countries with low financial inclusion would improve it to the level of Asia's emerging market frontier, Thailand, the region's population in poverty could fall by about 4 percent of the region's 2015 poverty count (equivalent to 20 million people). Even if the region's less developed countries could converge to the level of financial inclusion in Malaysia, a median country, this could be associated with a decline in the region's population in poverty by 1 million, roughly equivalent to the entire number of people living in poverty in Sri Lanka.[6]

[4]The results are consistent with IMF (2015a) and robust to alternative specifications (based on Barro and Sala-i-Martin 1992).

[5]This result is derived from the estimated coefficient of the financial inclusion index from equation 5 in Appendix Table 3.1, based on each country's gap vis-à-vis Thailand in the financial inclusion index (Table 3 in Appendix 2, all appendices are published in the online version of the paper). The indirect impact on poverty via the growth effect of financial inclusion is not considered here.

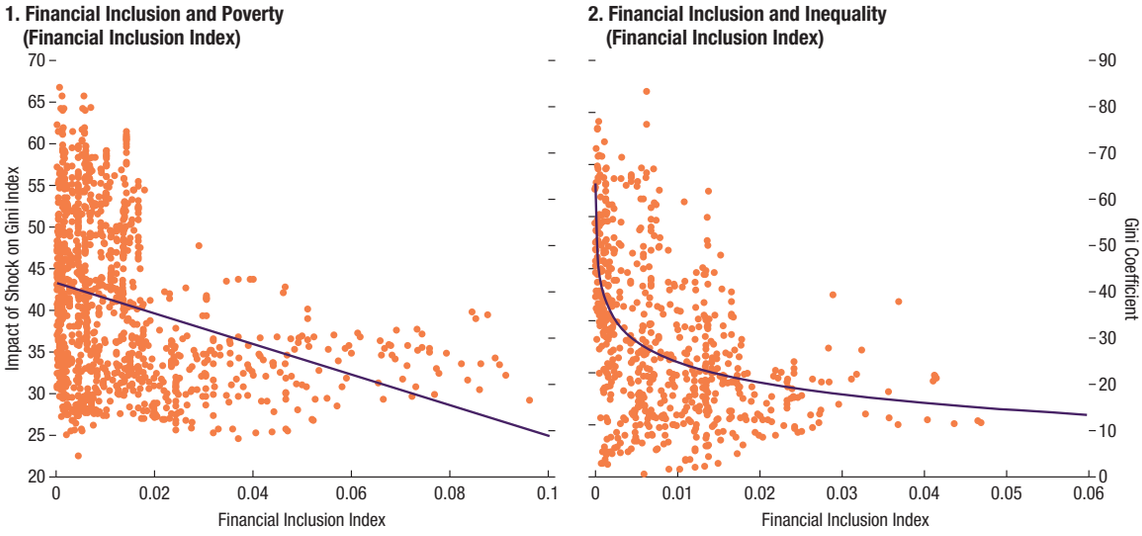
[6]The levels of financial inclusion in India, Indonesia, and China are above the median, and excluding these countries from this simulation significantly reduces the estimated impact on poverty because the absolute numbers of people living in poverty in these countries are large.

Figure 5. Financial Inclusion and Marginal Growth Benefits



Source: IMF staff estimates.
[1]Marginal effect of financial inclusion on growth at different country-income level, following the World Bank's classification. The estimates apply the median incomes in each income group to calculate the estimated marginal effects of each group.

Figure 6. Financial Inclusion, Poverty, and Inequality



Sources: IMF, Financial Access Survey; and World Bank, World Development Indicators.

Figure 7. Financial Inclusion and Inequality
(A decline in Gini coefficient if a country reaches Asia's financial inclusion frontier)

Source: IMF staff estimates.

The results also provide further evidence that financial inclusion can help reduce income inequality. Simulations indicate that closing the gaps relative to the level of Singapore would be associated with a significant narrowing of intracountry inequality in the region, with the Gini coefficient falling by as much as 10–20 percentage points (from the current level of 30–43 points) across countries depending on their initial levels of financial inclusion and inequality (Figure 7). The empirical results are robust to different measures of income inequality, including the Gini coefficient and income gaps between the top and bottom 10th and 20th percentiles.[7] The results are mainly driven by improvements at the lower income percentiles. For example, if Lao P.D.R. could improve its financial inclusion to the level of Thailand, it would help restore its Gini coefficient from the current level of 0.38 to 0.33—a level not observed since 2002.

Policy Implications

The large estimated benefits of financial inclusion suggest that it should become a part of the inclusive growth agenda for Asia-Pacific countries. In fact, many countries already have or are in the process of preparing such a strategy (Appendix 8). A strategy that targets vulnerable groups—such as the rural population, low-income households, women, and remote communities—will inevitably be country-specific. A national strategy can help policymakers identify inclusion gaps, improve monitoring, strengthen national focus, and facilitate interagency coordination. A national financial inclusion strategy can also help prioritize reforms and resource allocation and exploit policy synergies, including the interactions between macro and financial inclusion policies.

[7]IMF (2015b) also finds a negative and significant relationship between financial inclusion and income inequality, but only on an income gap measure of income inequality.

CHAPTER

4 Interactions between Macroeconomic Policies and Financial Inclusion

As financial inclusion improves, there is a need to understand how it affects macroeconomic policies and feedback of these policies to financial inclusion. Research and policy discussions on financial inclusion have largely focused on structural issues, leaving aside macroeconomic policy issues. Recent advances in financial inclusion, however, may have an impact on macroeconomic policy effectiveness, which in turn can affect financial inclusion efforts.

Interactions between Monetary Policy and Financial Inclusion

Financial inclusion can affect the transmission channels for monetary policy. For example, greater financial inclusion may enhance the role of interest rate in the economy and hence the interest rate channel of monetary transmission (Table 2). Broader reach of financial services can also influence the distributional impact of monetary policy, thereby affecting income equality (see Draghi 2016; Bernanke 2015; Bullard 2014; Mersch 2014; Yellen 2014).[1] Greater financial inclusion may also facilitate the transition to monetary policy frameworks that target price stability, such as inflation targeting.[2]

How Does Financial Inclusion Affect Interest Rate Transmission?

As financial inclusion rises, interest rates should play a larger role in economic decision making. Greater financial inclusion means that more con-

[1]Various structural factors, including demographics (Karahan and Ozkan, 2013), foreign trade, and technological changes (Acemoglu 2002; Bound and Johnson 1992) have been considered as important determinants of growing inequality over longer periods of time.

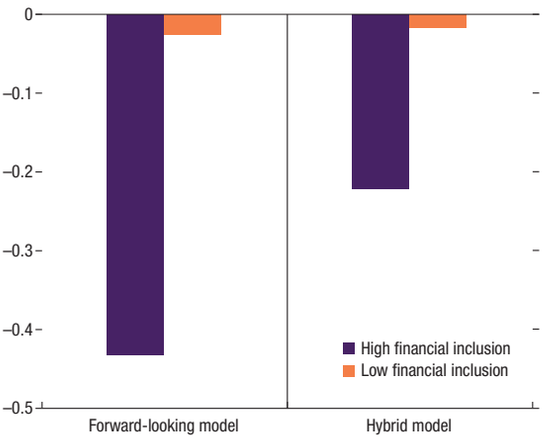
[2]The paper leaves aside recent research that finds that financial stability risks increase when access to credit expands without proper supervision, while countries with strong supervision could see financial stability gains from higher inclusion (IMF 2015e, 2015b).

Table 2. Potential Channels of Financial Inclusion Impact on Monetary Policy

	Monetary Policy Effectiveness	Distributional Impact	Monetary Policy Framework/Goals
Payment	Increase coverage and pace of transmission in the formal financial system	Unclear	Smooth consumption and association with price stability as the target for monetary policy
Savings	Increase response to interest rate changes	Increase impact via financial income and wealth	
Credit	Increase response to interest rate changes	Increase impact via borrowing costs	
Insurance		Increase impact via financial income and wealth	

Source: IMF staff estimates.

Figure 8. Selected Asia-Pacific: Coefficient on Real Interest Rate in Euler Equation



Source: IMF staff estimates.

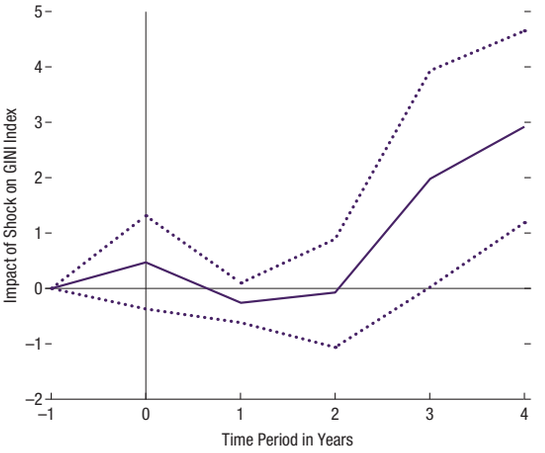
sumers and producers save and borrow in the formal financial system. As a result, their economic behavior should be more sensitive to interest rates (Gali and others 2004), in the same way that financial deepening affects monetary transmission. To test this hypothesis, the sensitivity of output to real interest rate is estimated for a group of Asia-Pacific countries using two types of Euler equations—forward-looking and hybrid. The countries are divided into high and low financial inclusion groups, based on the FI index. The output equations for each group are estimated in separate panel regressions, after controlling for the level of economic development, openness, and financial depth.[3]

The results show that economies with greater financial inclusion are more sensitive to interest rates. For economies with higher financial inclusion, the mean estimate of the output elasticity with respect to the real interest rate is –0.43, compared with only –0.03 for the low financial inclusion group (Figure 8). This indicates that real interest rate changes are much more powerful in influencing the output level in more financially inclusive countries than their less inclusive peers. The result is

[3]For a detailed description of methodologies and data, please see Appendix 4 (Appendices are published in the online version of the paper). Incorporating the optimizing private agents' behavior, the output Euler equations are used to evaluate the interest rate sensitivity of output, following Fuhrer and Rudebusch (2004), Mehrotra and Nadhanael (2016), and others. The main difference between the two Euler equations is that in addition to forward-looking output gap and inflation expectations, the hybrid model also includes past output gaps to account for habit formation. Economies included in the sample are Australia, Bangladesh, China, Fiji, Hong Kong SAR, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan Province of China, and Thailand. Countries are grouped depending on whether they are above or below the average on the financial inclusion index. The results are robust to grouping using the median.

robust to the level of economic development, trade openness, and financial depth.[4]

Figure 9. Impact of Monetary Policy Shock on Inequality[1]
(In percent)



[1] $t = 0$ is the year of the shock. Solid line denotes the response to an unanticipated 100 basis point increase in the policy rate. Dotted lines are 90 percent confidence intervals.

How Does Financial Inclusion Affect the Distributional Impact of Monetary Policy?

By affecting the ability of monetary policy to stabilize inflation and output, financial inclusion can also alter its distributional effects. The various channels of policy transmission do not point to a uniform impact of monetary policy on income distribution, leaving the identification and quantification of the combined impact to empirical analysis.[5] For instance, an increase in expected inflation (for example, due to expansionary monetary policy) can adversely affect lower-income and financially excluded households and firms that rely more on cash to conduct their transactions (Erosa and Ventura 2002). On the other hand, an unexpected increase in inflation, by lowering the real value of nominal assets and liabilities, can make borrowers better off at the expense of lenders, who tend to be wealthier (Doepke and Schneider 2006). Similarly, because labor earnings at the bottom of the distribution are most affected by changes in economic activity (Heathcote and others 2010), expansionary monetary policy in response to a shock can reduce inequality (Figure 9).

Monetary policy shocks can have a significant impact on inequality.[6] Model simulations show that a 100-basis-point unanticipated policy rate increase can lead to a medium-term (four-year) increase in inequality of 3 percent as measured by the Gini coefficient.[7] The results are similar to those of Furceri

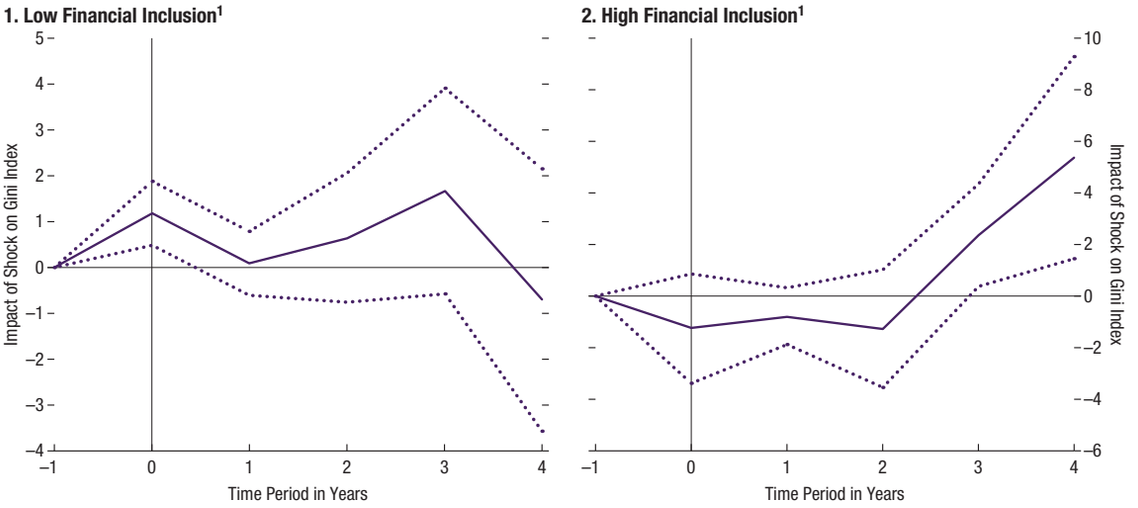
[4]Using the hybrid specification, the difference in magnitude becomes smaller, but remains significant.

[5]See Amaral (2017) for a review of main channels through which conventional monetary policy might affect inequality.

[6]Applying exogenous monetary policy shocks to empirical models helps avoid endogeneity problems, as both monetary policy actions and inequality can be influenced by the same macroeconomic variables. The models are estimated using a sample of 32 advanced and emerging market economies that includes 12 countries in Asia-Pacific. See Appendix 4 for more details.

[7]Based on the sample, the impact of monetary policy shocks on inequality is found to be asymmetric, with expansionary shocks being more powerful in reducing inequality while contractionary shocks are less powerful in increasing inequality.

Figure 10. Financial Inclusion, Monetary Policy, and Inequality



[1] $t = 0$ is the year of the shock. Solid line denotes the response to an unanticipated 100-basis-point increase in the policy rate. Dotted lines are 90 percent confidence intervals.

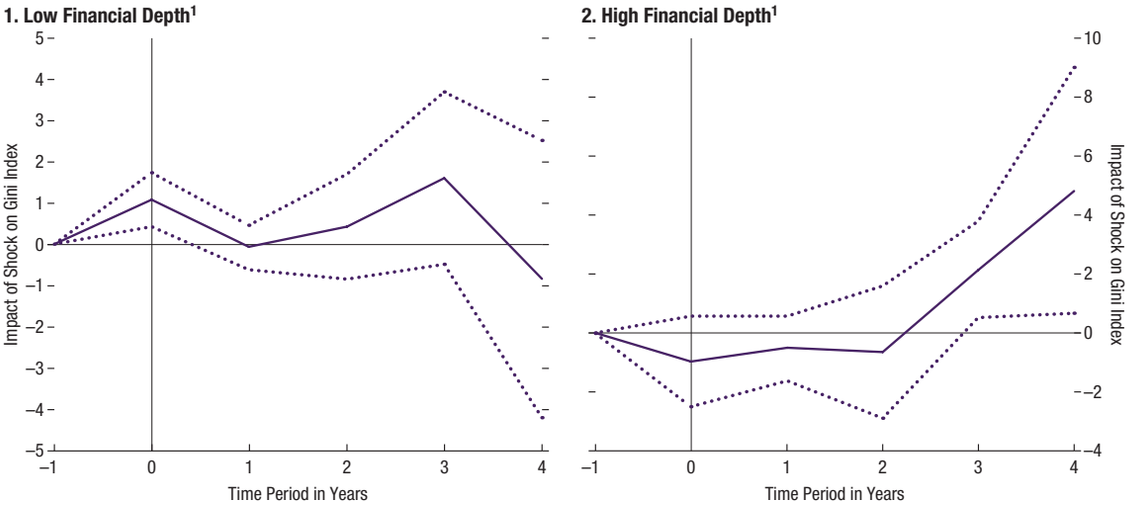
and others (2016), who find a medium-term increase in inequality of about 2.5 percent in the United States. These estimates are, however, larger in magnitude than those found by Coibion and others (2012) for the United States (1.1 to 1.5 percent).

Furthermore, the impact of monetary policy shocks on inequality increases with the level of financial inclusion (Figure 10). Reestimation of the baseline model with the FI index finds that inequality rises more in response to a contractionary monetary policy shock at higher levels of financial inclusion[8]; for example, inequality could rise by as much as 5 percent, as compared with 3 percent on average, in response to a 100-basis-point increase in policy rate. To put the magnitude in perspective for high financial inclusion countries, the average decline in the Gini coefficient in Asia over the past three years was about 5 percentage points. Similarly, financial inclusion amplifies the impact of an expansionary monetary policy in reducing inequality.

Financial deepening is also found to amplify the impact of monetary policy on inequality. Similar to the exercise with financial inclusion, a 100-basis-point increase in the policy rate increases inequality by about 5 percent when financial depth, measured as credit-to-GDP ratio, is high. In contrast, with low financial depth, monetary policy has an insignificant impact on inequality (Figure 11). The impact on inequality is greatest when

[8] The estimation includes controls for financial depth, to account for overlapping effects of financial depth and inclusion in the empirical analysis.

Figure 11. Financial Depth, Monetary Policy, and Inequality



[1] $t = 0$ is the year of the shock. Solid line denotes the response to an unanticipated 100-basis-point increase in the policy rate. Dotted lines are 90 percent confidence intervals.

both financial depth and financial inclusion are high, but the impact is not additive, which suggests overlapping effects.

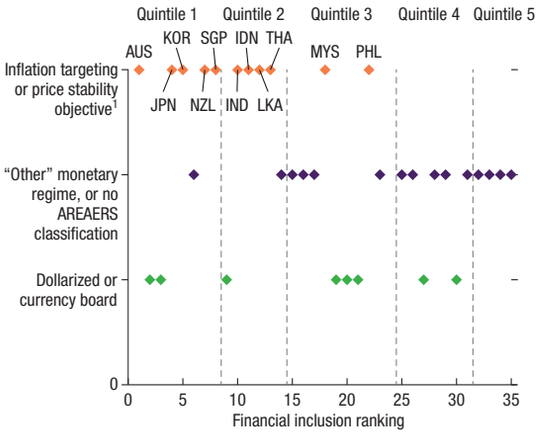
What Is the Link between Financial Inclusion and Monetary Policy Frameworks?

Recent research finds a link between financial inclusion and inflation stabilization. Mehrotra and Yetman (2014) showed how financial inclusion affects the ratio of output to inflation variability under optimal monetary policy, by incorporating welfare-maximizing monetary policy into the model of Gali and others (2004). In their model, financially included households can use financial services to smooth consumption, and welfare is maximized when monetary policy stabilizes inflation, even at the expense of higher output variability.[9] With higher financial inclusion, a central bank tends to prefer stabilizing inflation over output (consistent with Bilbije 2008). Another possible reason for this could be that financial inclusion helps central banks better target inflation.

More robust regression analysis confirms that both financial inclusion and financial depth are associated with a greater preference for stabilizing inflation over output. A cross-sectional regression of the log of the ratio of output gap variance to inflation variances on financial inclusion finds that (1) higher

[9] A positive relationship exists between financial inclusion and a ratio of output to inflation variance.

Figure 12. Financial Inclusion and Monetary Regimes in Asia
(Asia-Pacific countries grouped by financial inclusion index quintile and monetary regime)



Sources: AREAERs and staff estimates. Quintiles are as for Table 1.
[1]Classified according to staff judgment.

financial inclusion has a statistically significant and positive relationship in minimizing inflation volatility over output volatility (that is, stronger central bank preference for price stability), and (2) higher financial depth (measured by credit-to-GDP ratio) is also associated with greater price stability relative to output stability. Notwithstanding the increase in the variance ratio, inflation variability and output variability both decline as financial inclusion increases, with declines also related to the overall stage of economic development.

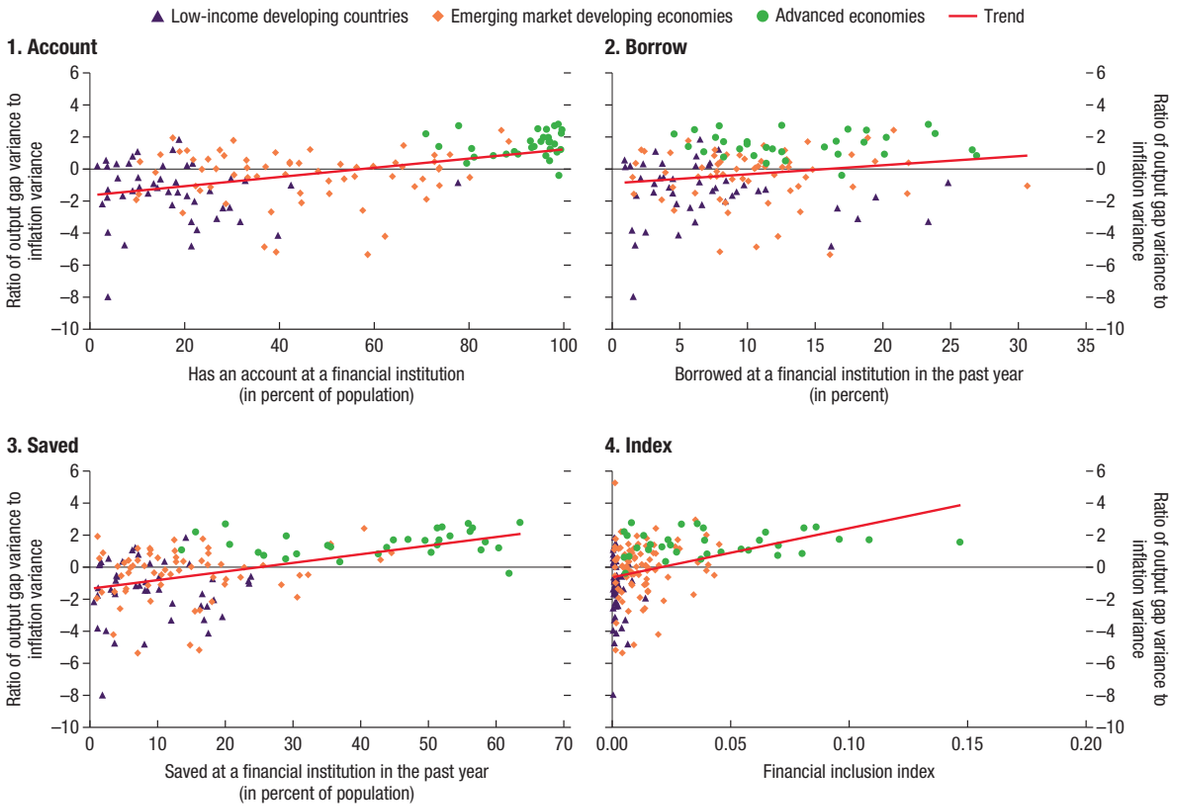
Across the Asia-Pacific region, higher financial inclusion is linked to more active use of a policy interest rate, and the adoption of price stability and inflation objectives. Leaving the dollarized or currency board regimes aside, countries with high financial inclusion tend also to have more formal and quantified inflation targets, and rely more on a policy interest rate as the main instrument of monetary policy (Figure 12). Countries with lower levels of financial inclusion tend to have more broadly specified monetary frameworks, which may include multiple objectives (Figure 13). Other factors, such as the level of economic development, financial depth, and institutional history, also are associated with the types of monetary frameworks. To the extent that these factors are interrelated, financial inclusion may be a factor or even a condition for transitioning to a more price-based inflation-targeting monetary framework.[10]

Policy Implications

The analysis suggests that financial inclusion can enhance central banks' ability to stabilize economic activity. More effective transmission of interest rate changes from greater financial inclusion reduces reliance on more direct and quantitative interventions by central banks when conducting countercyclical operations. Even though financial inclusion accentuates the distributional impact of monetary policy, central banks' increased ability to fine-tune policy with rising financial inclusion—often accompanied by greater institutional emphasis on price stability—means that overall economic volatility can be reduced, as observed in more advanced economies. Nevertheless, care should

[10]To differentiate financial inclusion from financial deepening the study pays attention to indicators of breadth of access to financial services.

Figure 13. Output Gap and Inflation Variance



be taken when central banks tighten monetary policy, as its adverse impact on income distribution tends to be amplified as financial inclusion increases.

These implications of financial inclusion for monetary policy and inequality highlight the importance of structural reforms that enhance both financial inclusion and monetary policy effectiveness. In the financial sector, establishing asset registries, expanding the client coverage of credit bureaus (especially to less established clients), and enhancing payment systems are examples of such reforms. These can be reinforced by efforts in financial literacy and reporting, for consumers, MSMEs, and farmers. Other reforms, such as those that strengthen bank regulation and supervision and increase the transparency of financial products and services, can boost confidence in using banks (instead of informal markets), as well as improve monetary policy transmission. Removing financial repression and allowing interest rates to play a greater role in resource allocation would have the same effect. Finally, as discussed in the next section, fiscal policy and public financial management and macroprudential measures can complement and support structural policies as well as financial inclusion.

Interactions between Fiscal Policy and Financial Inclusion

Financial inclusion can also affect fiscal policy effectiveness and improve public financial management. Like its relationship to monetary policy, financial inclusion affects fiscal policy and public financial management policies by changing the environment and conditions in which these policies operate. At the same time, fiscal policy can be used to improve financial inclusion.

How Does Financial Inclusion Affect Fiscal Policy?

Financial inclusion that enhances access to payment services may also increase fiscal policy effectiveness (Table 3). For example, access to *transaction accounts* can reduce the leakage of government expenditure, as transfers and payments can be sent directly to personal and business accounts. When biometric technology is used as a tool for greater financial inclusion, as is done in India (Appendix 9), it can improve targeting by providing more accurate and detailed information about eligibility for government subsidies. On the revenue side, *electronic payment systems* help move transactions into the formal economy and reduce the costs of tax filings and compliance, thereby raising tax revenue, efficiency, and administration. Increasing availability of *insurance services* can also enhance fiscal policy by reducing the vulnerability of the poorest segments of the population and pressures on social safety nets.

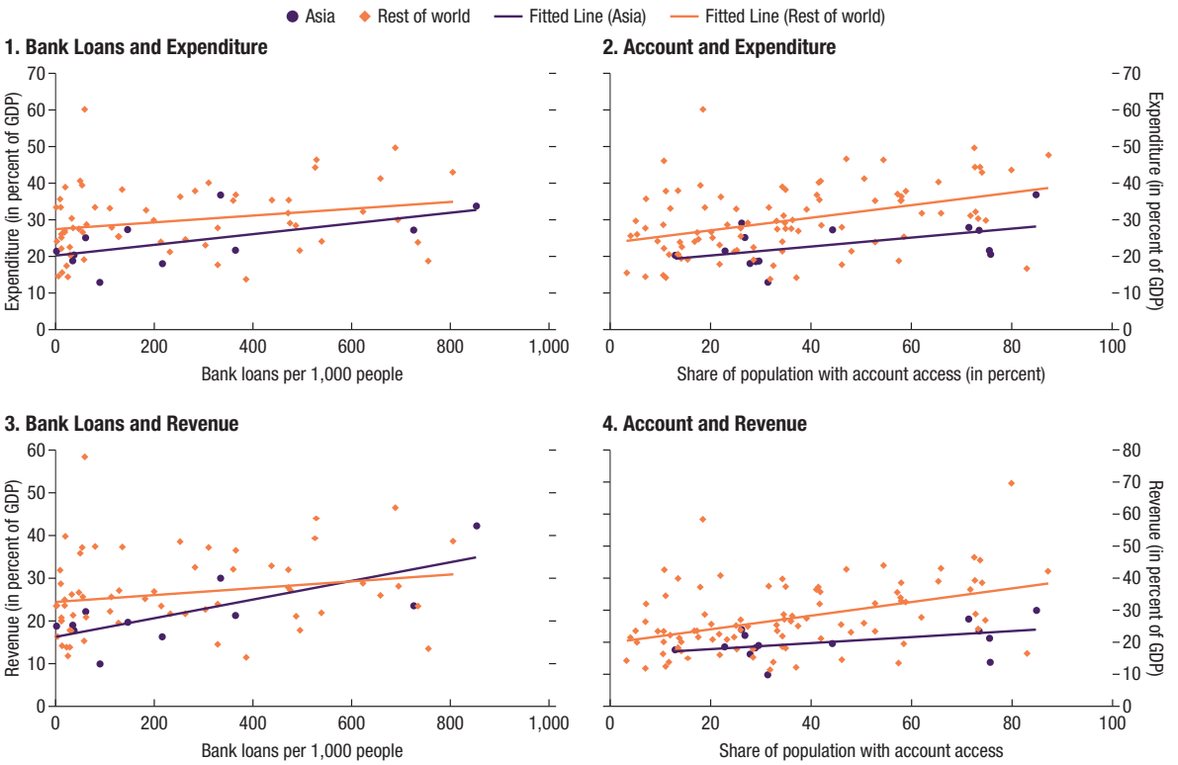
Moreover, financial inclusion can affect fiscal policy effectiveness through indirect channels. A *savings account* can offer the poor a vehicle to accumulate assets that are less risky compared with cash holdings, or more liquid and divisible compared with livestock. This provides a cushion against shocks and a more secure source of self-financing, which can increase tax revenue and reduce pressure on social safety nets. Similarly, expanding access to *credit products* can help finance private expenditure on health and education and smooth consumption. In addition, a reduction in borrowing constraints for individuals and businesses can increase productive investment and growth, thereby raising tax revenue. In a similar manner, insurance services can

Table 3. Potential Channels of Financial Inclusion Impacting Fiscal Outcomes

	Expenditure	Revenue
Payments	• Improve targeting • Reduce leakage	Reduce tax avoidance
Savings	Reduce pressure on social safety net	Reduce tax avoidance
Credit	Unlock private complementary investments	Reduce credit constraints for productive investment
Insurance	Reduce pressure on social safety net	Encourage business activity

Source: IMF staff estimates.

Figure 14. Financial Inclusion and Fiscal Outcomes



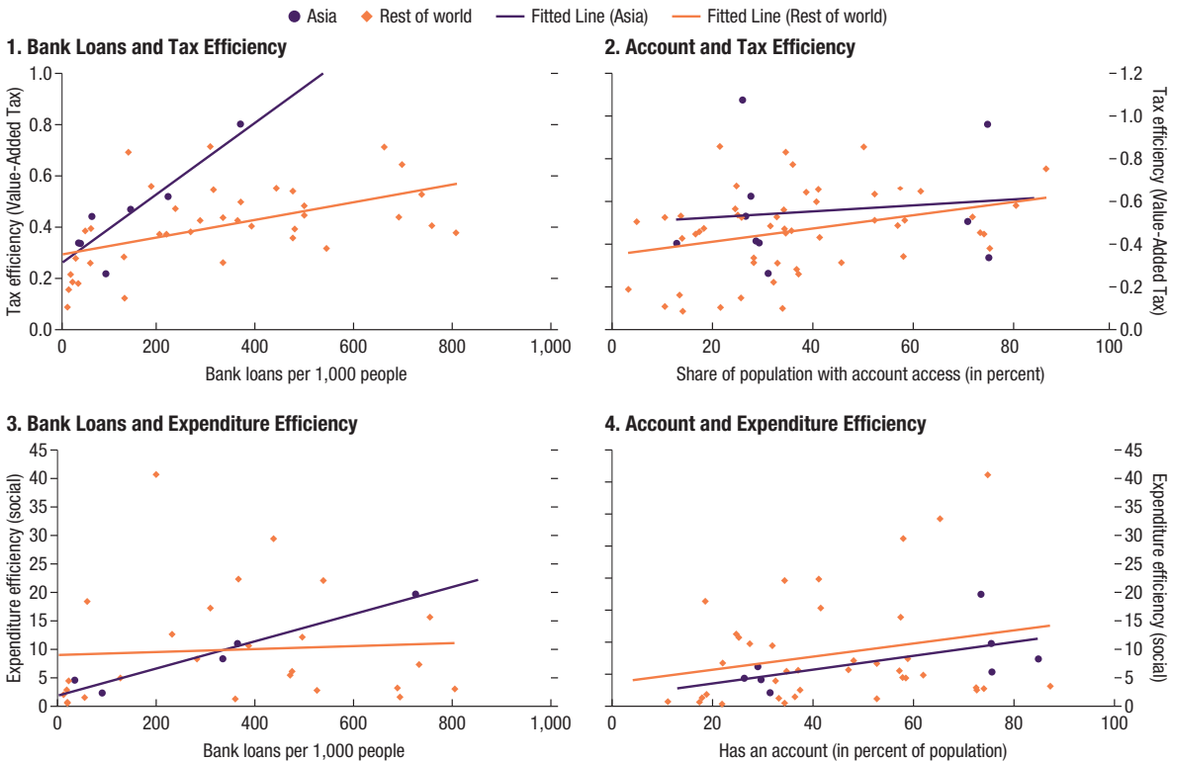
enhance risk management, thereby raising tax revenue. More broadly, financial inclusion is also likely to reduce informal and shadow economic activities and bring them into the formal economy, thus allowing them to be properly measured and taxed.

What Is the Macrofiscal Impact of Financial Inclusion?

Simple correlation analysis shows that financial inclusion is associated with higher revenues and expenditure as a share of GDP (Figure 14). This relationship between financial inclusion and standard fiscal indicators, such as revenue and expenditure as a percentage of GDP, appears to be broadly stable. This is true whether financial inclusion is measured through greater access (share of population with bank accounts) or usage (bank loans per person). For Asia-Pacific, the relationship seems stronger with revenue than with expenditures, based on usage. Extending fiscal outcomes to include efficiency measures (Figure 15),[11] the results show that higher financial inclusion is associated with higher revenue (Value-Added Tax [VAT]) efficiency, although

[11]Revenue efficiency is measured as VAT C-efficiency (ratio of tax rate multiplied by consumption all divided by the actual tax take from VAT); social expenditure efficiency is the ratio of poverty levels ($10 a day) to poverty spending.

Figure 15. Financial Inclusion, Revenue Efficiency, and Expenditure Efficiency



it is not always stronger in the Asia-Pacific region.[12] On the other hand, higher financial inclusion is also associated with higher social tax and expenditure efficiency in Asia-Pacific, compared with other regions, based on usage. These results also hold when new measures, such as electronic payments, are used to gauge financial inclusion.

More rigorous analysis suggests that financial inclusion could have a macro impact on fiscal outcomes.[13] Even after controlling for income level, financial inclusion, measured by ATMs or branches per 100,000 people,[14] is correlated with higher revenue, expenditure, revenue efficiency, and in some cases

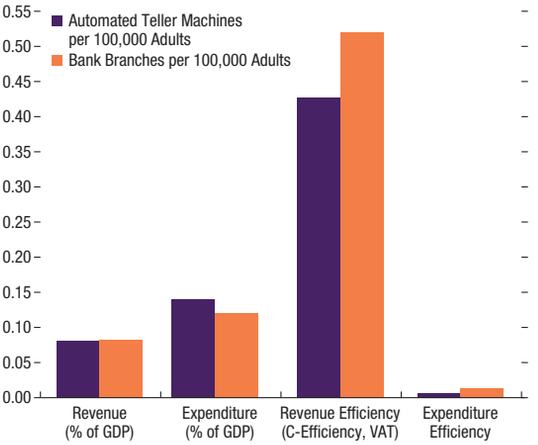
[12]See the 2018 IMF Fiscal Monitor for anecdotal evidence on countries outside Asia-Pacific.

[13]A standard Ordinary Least Squares approach is applied, controlling for the level of income and Asia-Pacific-specific factors. There is also an interaction term to capture how the relationship in Asia-Pacific differs from the rest of the world. In addition to using the numbers of ATMs and bank branches per 100,000 people, depositors and borrowers per 1,000 people are also used as robustness checks. See Appendix 5 for more detailed description and results.

[14]To make the interpretation of results more intuitive, this section employs the underlying variables rather than the financial inclusion index to show changes in expected fiscal revenues, rather than the distance to frontier. The robustness of these relationships is confirmed through use of the financial inclusion index, described in Appendix 2.

expenditure efficiency. For the Asia-Pacific region the positive relationship between financial inclusion and fiscal outcomes remains significant, albeit at a lower level than in the rest of the world (Figure 16). Robustness checks include other control variables (inflation, inequality, and financial depth) and additional measures of financial inclusion (depositors per capita or borrowers per capita). To illustrate the strength of the relationship, a country in the highest quartile of financial inclusion (based on access to ATMs and bank branches) has on average 2.4 percent of GDP higher revenue compared with a country in the bottom quartile, after controlling for the effect of income.

Figure 16. Financial Inclusion and Fiscal Outcomes
(Marginal Impact of 1-unit increase in inclusion)



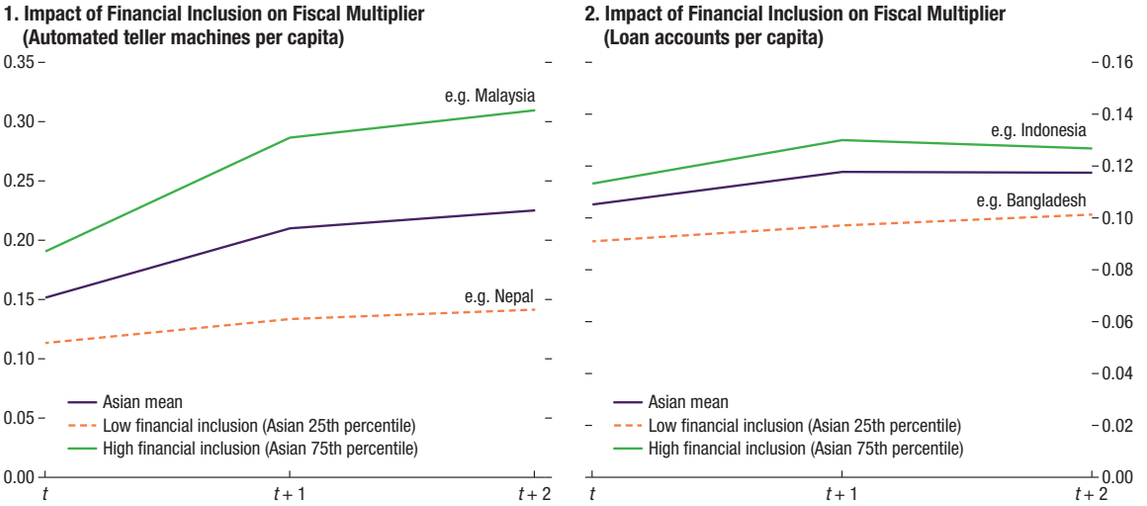
Sources: Financial Access Survey, World Economic Outlook, Revenue Performance Indicators Database and IMF Staff Estimates.
Note: VAT refers to Value-Added Tax.

Financial inclusion can also amplify the fiscal multiplier, going beyond enhancing government revenue and expenditure performance (Figure 17).[15] According to Batini and others (2014), improving public expenditure management or revenue administration can also raise the fiscal multiplier. Therefore, financial inclusion can increase the fiscal multiplier directly through enhancing public expenditure management or revenue administration (see Table 3 for the channels and Appendix 5 for detailed description of the multiplier), which is supported by this paper's empirical analysis. For the first period effect, the results of the analysis show that the estimated fiscal multiplier for Malaysia, a country in Asia with high ATM coverage at 51 ATMs (or 81 cash-out points)[16] per 100,000 adults in 2015, is almost twice the size of that for Nepal, which has low coverage (9 ATMs). The cumulative effect increases to nearly three times the size for the following two periods. This finding is robust across several measures of financial inclusion.

[15]This finding is based on a panel regression using annual data, with controls for other factors that have been found to affect fiscal multipliers and growth, such as trade openness, exchange rate regime, inflation, level of development, financial depth, capital account openness, Gini coefficient, Asia-specific dummy variables, interaction terms, and fixed effects. The introduction of controls significantly reduces the sample size because of data limitations and the lags specifications, but qualitative outcomes are retained even though the statistical significance is reduced (see technical appendix for details on methodology and regression results). Despite the extensive use of controls, as is common in empirical estimations, the results may still have endogeneity issues, making identification of causality challenging. Therefore, all these results should be interpreted as correlations.

[16]Cash-out points in Malaysia comprise ATMs and cash points of agent banks.

Figure 17. Financial Inclusion, Revenue Efficiency, and Expenditure Efficiency



Policy Implications

There seems to be a virtuous circle between financial inclusion and fiscal policy. On the one hand, greater financial inclusion enhances the effectiveness of fiscal policy through higher revenue collection and better targeting of government expenditure and efficiency. On the other hand, fiscal policy and better public financial management can facilitate financial inclusion. For example, better targeted and more transparent spending programs and revenue administration can strengthen confidence in the formal systems. Given the benefits of financial inclusion for fiscal policy, fiscal policy should factor in these synergies when allocating budget resources. Financial inclusion can also be integrated with health and education priorities to reduce income, regional, and gender inequality.

There is much room to experiment on how fiscal policy can promote financial inclusion in conjunction with other policy objectives. Traditionally, governments have used subsidized credit to target groups (such as farmers and MSMEs) and directed credit through banks, particularly state-owned banks, which are often given a financial inclusion mandate. However, the results have often been mixed (see the example of India in Appendix 9). Many countries have also tried other interventions, including gender budgeting, promoting micro-finance and financial literacy, and subsidizing activities such as crop insurance (Appendix 10). China, for example, has used a series of tax benefits to promote financial inclusion of micro, small, and medium-scale enterprises. These interventions have public resource implications and trade-offs that must be considered. For example, an expansion of crop insur-

ance may well increase the resilience of famers who typically have less access to other financial services, but it is likely to incur non-negligible fiscal cost. In addition, many countries rely on technological innovations, such as digital and mobile applications, to target the less financially included. Countries could also undertake strategic partnerships to scale up outreach to the underserved, including leveraging telecommunication companies and agent bank networks to provide insurance, as well as focusing on easy-to-understand and affordable microinsurance products.

CHAPTER

5 Impact of Technology on Financial Inclusion

Fintech Use and Financial Inclusion: Stylized Facts

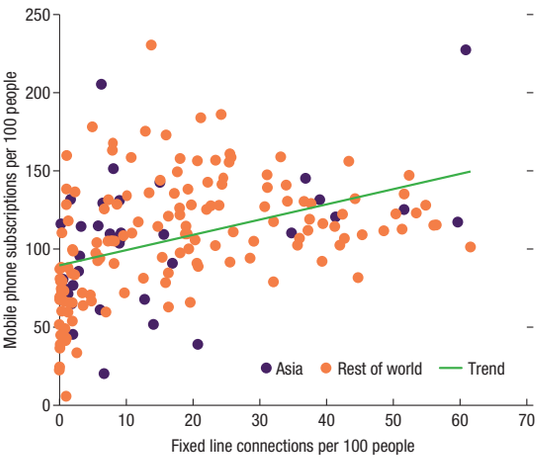
Fintech[1] is playing a growing role in improving financial inclusion around the world. The cost savings and economies of scale arising from fintech have made financial services commercially viable for some previously excluded groups. This is particularly true for developing countries, where telecommunications technology—such as mobile communications and internet access—has been instrumental in expanding digital financial services in recent years.

Technology access has grown rapidly in Asia-Pacific over the past decade, but the region lags behind others in *per capita* access to technology. On a per capita basis, Emerging Market and Developing countries in Asia-Pacific have lower access to technology than their counterparts in Europe, Latin America, and the small Caribbean island economies, with only sub-Saharan Africa faring worse. In the case of Pacific island countries, average per capita mobile phone subscriptions are lower than those of sub-Saharan Africa, despite recent rapid growth in mobile infrastructure. Similarly, average levels of internet access per capita are below those in other regions.

Asia-Pacific—especially Pacific island countries and low-income and developing countries—have exhibited a greater tendency to "leapfrog" in technology (Figure 18). "Leapfrogging" refers to the adoption of the latest form of a technology while bypassing one or more of its antecedents (see, for example, Fong 2009). Using the ratio of mobile phone subscriptions to fixed line subscriptions as a proxy, Asia-Pacific appears to be ahead of other regions in

[1]While digital financial services take various forms and cover a broad range of activities and technology applications (including, but not limited to, digital payments, peer-to-peer lending, and Distributed Ledger Technology), a fuller description can be found in IMF SDN 17/05. This section focuses on mobile banking/money, where data are more readily available, to facilitate meaningful cross-country comparison.

Figure 18. Technology Adoption—Leapfrogging



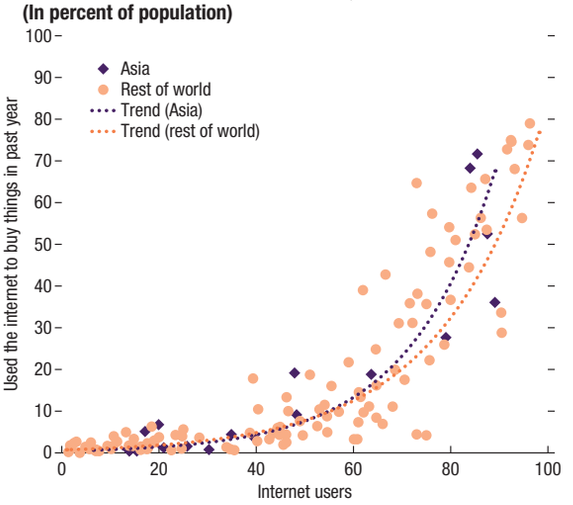
Sources: World Development Indicators; Financial Access Survey and IMF Staff Estimates.

leapfrogging, except when compared with sub-Saharan Africa, where low capital stocks have likely spurred even faster leapfrogging. In Pacific island countries and some Asia-Pacific low-income and developing countries, where small market size and geographical barriers often make conventional technology too expensive, mobile phones have emerged as a viable alternative (Khor and others 2016).

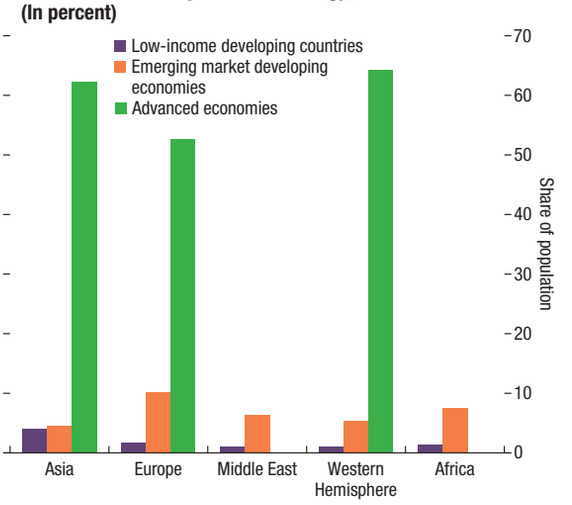
However, greater access to technology does not necessarily translate into greater fintech use. While the rise in technology access has been broadly associated with greater use of digital financial services, the relationship is not linear. For example, meaningful use of the internet to make online purchases is observed only in countries with relatively high internet penetration—at least 60 percent of the population (Figure 19). In Asia-Pacific, advanced economies initially drove the use of electronic payments, followed by Emerging Market and Developing countries, while most low-income and developing countries have just seen its beginning.

Figure 19. Technology and Financial Inclusion

1. Internet Access and Financial Inclusion, 2014
(In percent of population)



2. Use of Electronic Payments Technology, 2011
(In percent)



Sources: Global Findex and International Telecommunication Union.

Nevertheless, a number of Asia-Pacific EMDCs are at the forefront of some fintech use. For example, China is a global leader in mobile payments, accounting for more than half of total mobile payments in the region as of the end of 2015.[2] Mobile payments in China have reached levels greater than those in most developed countries. Many Chinese consumers have moved directly from cash to mobile payments, bypassing debit and credit cards. Fintech use in China has also expanded to include savings and credit products. In India, large-scale adoption of mobile payments has driven growth in the mobile payments industry over recent years. Fintech use in a number of Association of East Asian Nationas (ASEAN) countries has also expanded beyond payments to include lending, insurance, investment, and mobile money.

Mobile money and mobile banking have emerged as powerful enablers of financial inclusion in Asia-Pacific low-income and developing countries and Pacific island countries.[3] In line with global trends, the provision of mobile money services has grown markedly in Asia-Pacific (Figure 20). The region has emerged as a major center for mobile money service providers and users, second only to sub-Saharan Africa. In Pacific island countries, where access to financial services through traditional channels is impeded by infrastructure deficiencies, greater access to mobile phones has provided for greater access to basic financial services. This was initially achieved through mobile banking, but has expanded to also include mobile money in Fiji, Samoa, Solomon Islands, and Tonga.

Despite important strides, the benefits of fintech use in Asia-Pacific are unevenly spread. Almost all segments of society in the region have benefited from greater mobile banking use, and almost all demographic groups have better access to these technologies than their counterparts in most other regions. However, the gaps in usage between rural and urban populations, and between the poorest and the richest, are strikingly large in Asia-Pacific (Figure 21). Specifically, data on mobile financial transactions show that the rural–urban gap is most stark in Asia-Pacific.[4] Similarly, fintech use among the poorest 40 percent is also significantly lower than those in all regions except sub-Saharan Africa.

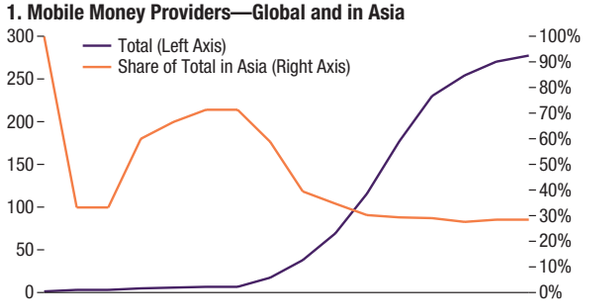
[2]"China Mobile Payments Dwarf Those in US as Fintech Booms," Financial Times (G. Wildau and L. Hook, 02/13/17), and "China Leads The World In On-Demand Services, Mobile Payments, Games, eCommerce—What Next?", Forbes Magazine (R. Fannin 06/06/17).

[3]Mobile banking is distinct from mobile money (or mobile wallet). The former requires an underlying bank account while the latter does not. M-PESA and similar services in Kenya and Tanzania are examples of mobile money services.

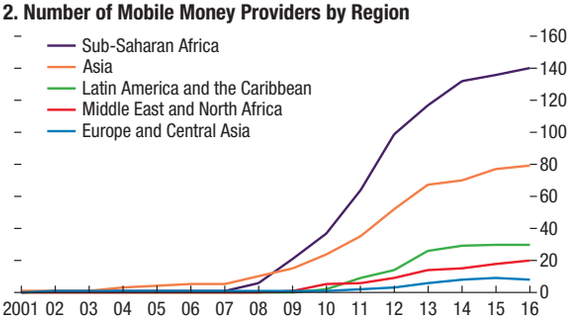
[4]This analysis is based on Global Findex data, which do not report numbers for the urban population separately. The urban rate of fintech use here is derived using World Bank data on the split of rural and urban populations and Global Findex data on the rate of mobile transactions for the overall population.

Figure 20. Mobile Money Availability and Use in Asia

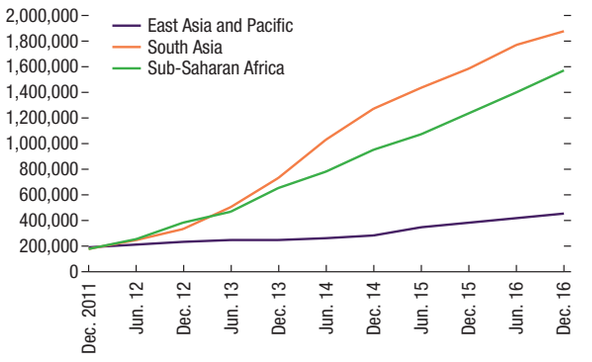
1. Mobile Money Providers—Global and in Asia



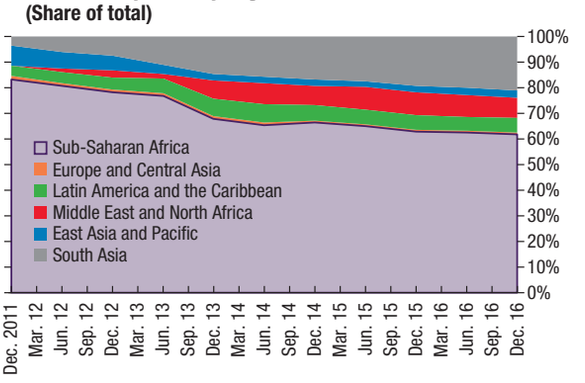
2. Number of Mobile Money Providers by Region



3. Registered Mobile Money Agents by Region



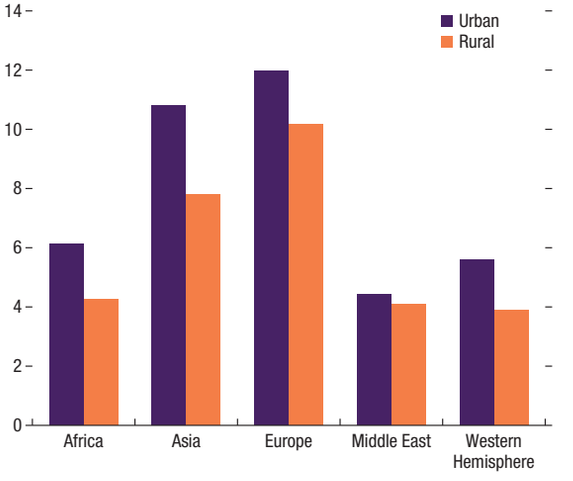
4. Mobile Money Users by Region (Share of total)



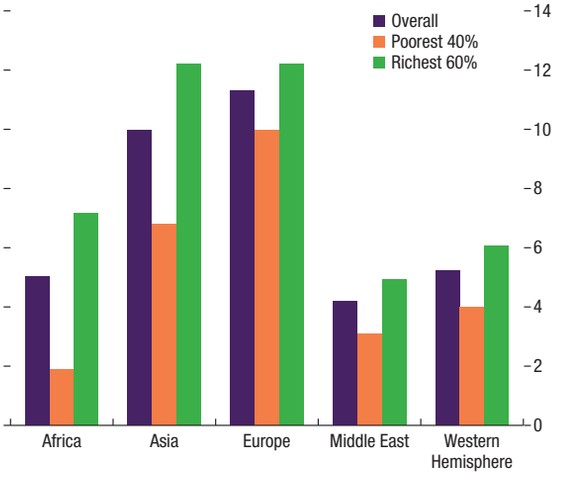
Sources: GSMA Mobile Money Dataset.

Figure 21. Unequal Use of Technology for Financial Services

1. Made a Transaction from an Account at a Financial Institution Using a Mobile Phone



2. Made a Transaction from an Account at Financial Institution Using a Mobile Phone



Source: Global Findex.

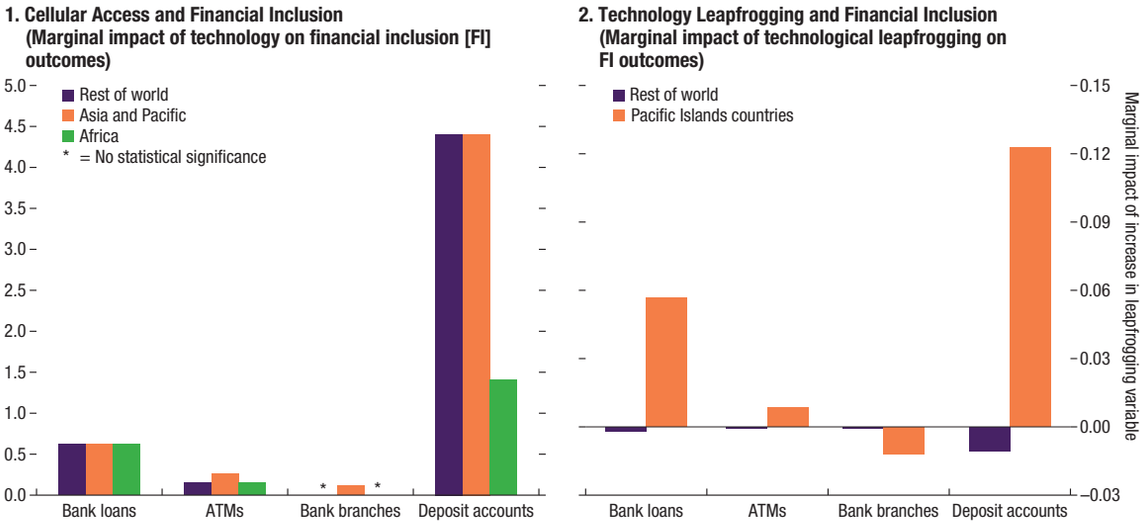
The Impact of Technology on Financial Inclusion: Empirical Evidence

How technology affects financial inclusion is an important policy question. Data limitations preclude a direct examination of the relationship between *fintech use* and *financial inclusion*. Nevertheless, given the likely corellations between access to technology and the diffusion of digital financial services, indicators of technology access are used to help gauge the likely impact of fintech on financial inclusion.[5]

- *Cellular and internet access*: Overall, a statistically significant and positive relationship exists between various measures of access to technology and financial inclusion. The results suggest that a 1 percentage point increase in mobile phone access is associated with a 4-unit increase in deposit accounts per 1,000 inhabitants in Asia-Pacific (Figure 22).[6] A stronger effect is found for internet penetration: a 1 percentage point increase in internet access is associated with an increase of deposit accounts in Asia-Pacific by about 19 out of 1,000 inhabitants. Similarly, access to bank loans is positively related to internet penetration, with a 1 percentage point increase in the internet user share associated with 9 additional loan accounts per 1,000 people, on average. These findings confirm that broader access to technology can help expand traditional financial services, thereby achieving greater financial inclusion.
- *Leapfrogging*: Technological leapfrogging, proxied by mobile phones as a percentage of fixed line subscriptions, is negatively related to traditional financial access indicators like the number of ATMs, bank branches, and bank account per capita. Similarly, leapfrogging is also negatively correlated with the number of bank deposits and loans per capita. While leapfrogging likely reflects deficiencies in traditional banking services, these results may also suggest that leapfrogging is associated with deposits and loans moving outside of the banking system. Hence, with the rapid rise in technology, overreliance on traditional indicators of financial access might present a misleading picture.
- *Technology and Pacific island countries:* Unlike in the rest of the world, leapfrogging has a positive impact on traditional banking services in Pacific island countries. For instance, a 25 percentage point increase in the leapfrogging variable—which is equivalent to raising the mobile-to-fixed-line subscription ratio from the level in Samoa to that in Fiji—is associated with an increase of 150 and 325 bank loans and deposit accounts per 1,000 inhabitants, respectively. At the same time, leapfrogging has less impact on the number of ATMs and bank branches. Overall, these results suggest that the spread of mobile technology has improved access to tradi-

[5]For a description of the methodology, see Appendix 6.
[6]The relationship appears weaker in Africa than in other regions.

Figure 22. Link between Technology and Provision of Traditional Financial Services



Sources: Financial Access Survey; World Development Indicators; and IMF Staff Estimates.

tional banking services in Pacific island countries despite their deficiencies in financial infrastructure. Thus, technology appears to have reduced the importance of physical points of access to financial services, as shown in the case of Solomon Islands, where, for example, an unbanked person would have to travel an average of six hours to reach the nearest bank branch, and mobile banking and money offer the only practical way to access financial services. Solomon Islands' experience also shows that mobile banking has complemented traditional channels in enabling greater use of financial services, especially for domestic remittances purposes (Solomon Islands National Financial Inclusion Taskforce 2016). Meanwhile, technology leapfrogging in some Pacific island countries has spurred a switch from cash to mobile banking, and in the case of some users, bypassing credit and debit cards.

Policy Implications

The positive impact of fintech presented above suggests that it should be an important component of a national financial inclusion strategy. Linking financial inclusion to broader national development strategies can help secure adequate resources and align fintech strategies with other development initiatives. Moreover, a fintech strategy endorsed by all government agencies would enable policymakers to pay greater attention to emerging regulatory issues

to ensure that fintech innovations do not undermine financial stability and integrity or consumer rights (Box 1).

Continued investment in technology infrastructure will be crucial for further development of fintech and should aim to spread the benefits more broadly to close cross-country and intracountry gaps. This is particularly important for Asian LIDCs and PICs that face large infrastructure gaps. For instance, expanding infrastructure for mobile payments, as seen in Kenya and Tanzania, can overcome traditional infrastructure constraints on financial inclusion and bring substantial benefits to remote communities such as those in PICs. To expand fintech-enabling infrastructure, policymakers need to ensure strong competition in the telecom and internet industries and provide necessary support to extend telecom and internet services to disadvantaged groups.

Box 1. Inclusive Fintech: Emerging Issues[1]

The strong growth in fintech use in Asia-Pacific has benefited from a careful balance between fostering innovation and ensuring systemic stability and consumer protection. The ex post, rather than ex ante, approach to regulation has served the region well. However, as fintech products expand in depth and reach, with transaction volumes increasing rapidly (for example, China's mobile payments), it is critical that regulators keep abreast of fintech developments and forestall systemic risks. This includes those from imprudent lending practices, cyberattacks, money laundering, and large-scale technology failures. Greater efforts are needed to safeguard consumer rights and privacy. These efforts should be supported by technology literacy programs to increase the awareness of risks, as well as the benefits, of fintech. Key themes for consideration in fintech regulation include the following:

- *Establishing oversight:* Regulatory jurisdiction is normally determined by institutional structure and activity (that is, institutions engaged in the business of banking have one regulator and those that operate pension funds have another). This jurisdictional approach can make it difficult to effectively assign a regulator to fintech companies, as their structures do not map neatly onto those of conventional financial institutions. For fintech to drive inclusion it is important that all new entrants are subject to risk-based regulations. This begins with ensuring a relevant regulator is legally empowered and has the capacity to provide oversight.
- *Know your customer:* A core appeal of using technology to promote inclusion is that it is easily scalable and allows firms to innovate without the full burden of traditional regulatory frameworks under the ex post approach. However, this new approach should not dilute established Anti Money Laundering and Combating the Financing of Terrorism (AML/CFT) provisions. Peer-to-peer lending, blockchain, and electronic payments systems will require special attention, as there is significant potential for abuse. Strong regulatory frameworks and accurate recording of customer information, as well as clear guidance on what is required from correspondent jurisdictions, will be needed if fintech is to connect an increasing proportion of the world population to the financial system.
- *Consumer protection:* Widening access to finance through technology increases the risk of exploitation of vulnerable consumers. To combat this, authorities will need to combine effective regulations with efforts to ensure financial and technological literacy. In addition, governments will need to ensure resolution procedures for fintech companies that fail. This is particularly important for promoting inclusion, given the strong evidence that the memory of disorganized collapses of financial institutions acts as a barrier to inclusion for a substantial amount of time. Finally, the proliferation of financial data creates additional consumer protection challenges concerning cybersecurity.

[1]Based on IMF 2017.

Box 1. Inclusive Fintech: Emerging Issues *(continued)*

Better data on the use of financial services—including fintech use—are also crucial to strengthening regulation. Regulators need to better understand the business models of fintech companies. Given the rapid pace of change in fintech, the lack of timely and critical data to allow risk assessment poses an important challenge. In addition, conventional indicators of financial inclusion are no longer adequate to gauge the progress and impact of policy on financial inclusion, least of all the impact of technology on financial inclusion. Supplementing existing data with granular data on mobile payments, digital economy, types and value of fintech companies, and fintech transaction volumes would help policymakers refine policies targeted at fostering fintech development and, more broadly, financial inclusion.

CHAPTER

6 Case Studies

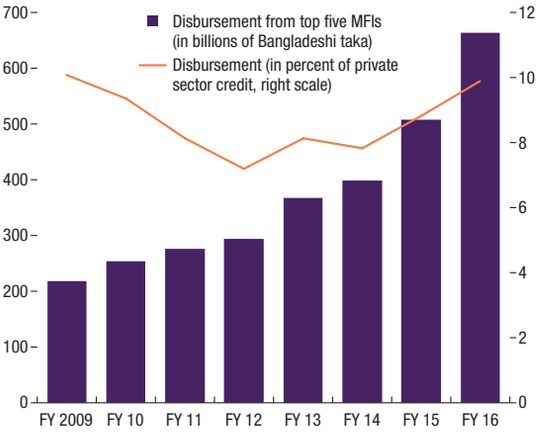
Bangladesh: Building on Success[1]

Bangladesh's efforts related to financial inclusion have focused on access to bank accounts and credit for underserved groups. Historically, Bangladesh's strategy has centered on microcredit. In 2016, outstanding disbursements by the top five micro-financial institutions (MFIs) were equivalent to 10 percent of private sector credit extended by the banking system (Figure 23). Grameen Bank's success in reducing poverty and promoting economic growth drew wide acclaim. Policy measures on financial inclusion have broadened over time, with the introduction of no-frill accounts, agent-based banking and mobile financial services, the requirement that banks open at least 50 percent of new branches in rural areas, floors on credit to the agricultural and rural sectors backed by credit refinancing lines on concessional terms and support to MSMEs and women entrepreneurs.

Bangladesh is exploring new measures to increase the effectiveness of its efforts under a draft financial inclusion strategy. This strategy chalks out an overarching framework where credit growth in priority sectors, MSME financing, gender priority, promoting access to finance in rural areas, green financing, a life cycle approach toward inclusion and insurance remain prerogatives. Leveraging technology by building a digital ecosystem to make financial services more accessible for the entire population is also in the works. However, the high level of informal finance, the low use of credit and debit cards, and more generally the low use of bank accounts persist. Applying experiences from other countries, such as strengthening the legal and regulatory framework, establishing a financial ombudsman (as was done in Malaysia), requiring the payment of providing subsidized energy via a bank account (as was piloted in Papua New Guinea), or keeping track of progress

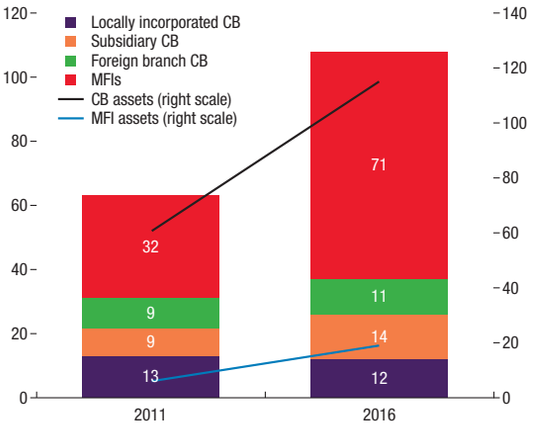
[1]For the full country study, see Appendix 7.

Figure 23. Bangladesh: Disbursements—Five Largest Micro-Finance Institutions (MFIs)



Source: Bangladesh Bank (2016).
Note: FY refers to "fiscal year". Bangladesh fiscal year runs from July–June.

Figure 24. Cambodia: Number of Institutions and Assets to GDP
(In percent)



Sources: National Bank of Cambodia, *Annual Supervision Report 2011–2016*; and IMF staff estimates.
Notes: CB refers to commercial banks, MFIs refers to micro-finance institutions.

and impact with the help of new tools (a financial inclusion index), could help.

Cambodia: Containing Risks while Pursuing Inclusion[2]

The Cambodian government has made financial inclusion a strategic priority. Financial inclusion objectives became a part of the Financial Sector Development Strategy 2016–25. The authorities are planning to develop a National Financial Inclusion Strategy, led by the National Bank of Cambodia. The authorities recently have developed a legislative framework for credit guarantees to facilitate access to credit.

Rapid growth in micro-financial institutions has contributed to improving financial inclusion. MFIs offer affordable and customized financial products for the rural and low-income groups of the population. In 2011–16, the number of MFIs almost tripled, and the MFI-assets-to-GDP ratio increased from 4 to 20 percent, extending formal financial services to previously unbanked populations (Figure 24). In 2016, MFIs provided loans to over 2 million borrowers (20 percent of the adult population). As MFIs become a larger part of the financial system, they may become a source of financial stability risks, relying on external sources of funding more than the banking sector, and are expanding loans at a faster pace due to fierce competition within the industry.

Despite this progress, financial inclusion remains low and uneven. The share of Cambodian adult population with bank accounts (including mobile accounts) is much lower than the global average of 60 percent. Credit access is much higher than other forms of financial inclusion. In 2014 Cambodia

[2]For the full country study, see Appendix 8.

had one of the highest shares of the adult population (28 percent) that borrowed from financial institutions, but one of the lowest (4 percent) that saved (Findex 2014). Financial services seem to be skewed toward credit, with relatively lower usage of savings, transactions, and insurance, despite rapid credit growth from a low base (Figure 25).

Figure 25. Use of Financial Products
(In percent of those financially included)

Source: FinScope Surveys.
Note: EMDE Asia include: India, Lao P.D.R., Myanmar, Nepal, and Thailand.

India: From Directed Credit to a More Holistic Approach[3]

India's financial inclusion approach has traditionally focused on channeling credit to weaker segments of the economy. Various schemes and policy initiatives were used to target rural areas and underserved populations, including minimum priority-sector lending requirements for commercial banks. In addition, India relied heavily on specialized development financial institutions,[4] intended to support industrial growth via project funding until the 2000s.

The directed credit approach had limited success in achieving the desired outcomes, with some trade-off between credit-focused financial inclusion and financial stability. While the priority-sector lending requirement has been somewhat effective in increasing credit flows to priority sectors, banks often circumvent targets by investing in other eligible instruments such as development financial institution–issued bonds. Thus, the share of long-term credit flows to the agricultural sector declined between 2006 and 2007 and 2011 and 2012. In the past, priority-sector lending has boosted financial inclusion and enterprises' access to credit, but has led to higher non-performing loans.

Recent policy efforts have taken a more holistic approach to financial inclusion, with greater use of digital technology. The priority has been to (1) rapidly expand access to formal bank accounts, (2) create incentives for boosting transactional volumes of financial products and expanding add-on products, and (3) expand the availability of credit to underserved sectors. This approach

[3]For the full country study, see Appendix 9.
[4]These institutions, established in the 1950–60s, were deemed unviable by the 1990s, and most of them were converted into commercial banks in the early 2000s.

relies on the integration of key enablers, including access to formal accounts (Jan Dhan Yojana), unique biometric identification of each citizen (Aadhaar), and reliance on mobile technologies (Mobile).

Aadhaar plays a critical role in the new approach to financial inclusion and has shown great potential in enabling more targeted and efficient financial services. The inability to reliably identify customers prompted the introduction of unique identification numbers in 2010. Aadhaar has streamlined the opening of bank accounts and enabled application of "know your customer" norms through electronic platforms. Importantly, Aadhaar-leveraged technology has been critical for curtailing misuse of subsidy rolls and financial accounts. The Aadhaar platform has provided a unique opportunity to streamline the delivery mechanism of welfare programs, support transparency and good governance, and enhance the coverage and usefulness of the India's Credit Bureau, thereby facilitating access to financial products for Indian citizens.

Myanmar: Laying Foundations for Leapfrogging[5]

So far, Myanmar's financial inclusion efforts have been dominated by the operations of state-owned financial institutions in an underdeveloped financial market with an outdated regulatory regime. The state-owned Myanmar Agricultural Development Bank has been the main source of credit for the rural population. The agricultural cooperatives run by the government provide microcredit to farmers, but their resources are limited, and the cooperatives have suffered loan losses from natural disasters, particularly floods. There is a burgeoning MFI sector, but its reach has been limited due to funding constraints. Private banks have expanded rapidly in recent years, but regulations limit their lending to only one type of product—one-year overdraft loans. Bank credit tends to concentrate in large enterprises and urban centers such as Yangon.

Thus, Myanmar's financial inclusion efforts need to go together with reforms to promote financial development and stability. The authorities have initiated a program for state-owned bank reform, but progress has been slow. Implementation of Myanmar's banking regulatory framework has been delayed due to capacity constraints and concerns about the impact on stability.

Myanmar has prioritized mobile banking to facilitate financial inclusion. In 2013 the Central Bank of Myanmar formulated a basic regulatory framework to allow technology service providers, financial service providers, and mobile network operators to partner with banks in the provision of financial

[5]For the full country study, see Appendix 10.

services. A recently updated framework also aims to ensure interoperability, agent networks (without exclusivity), know-your-customer norms, customer due diligence, and customer protection.

Myanmar's rapidly expanding usage of mobile phones holds the potential to allow the country to leapfrog in financial inclusion and financial development. With declining costs of telecommunication and rapid smartphone penetration, Myanmar should be able to bypass to some degree traditional modes of financial services delivery and accelerate financial inclusion. However, it is unclear how far a country can leapfrog without the support of physical infrastructure, such as networks of bank branches, and road and electricity distribution, as well as a solid banking system.

Samoa: Building Financial Infrastructure[6]

The government of Samoa launched the National Financial Inclusion Strategy 2017–20 in January 2017 as part of its commitment to promote inclusive growth. There are three strategic priorities: making a wide range of financial products and services accessible to all, especially low-income segments; ensuring that financial service products are appropriately designed and priced to be widely used; and achieving strong partnership and collaboration between the private and public sectors to ensure a cohesive approach. The overall approach is designed to be market driven, with regulatory oversight by the Central Bank of Samoa.

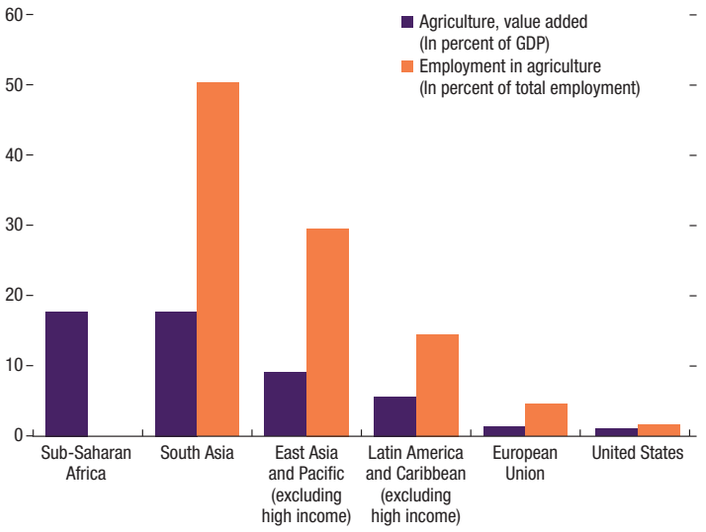
Income level and location are the main drivers of financial exclusion in Samoa. Only about one-third of those in the lower 40th percentile of income have access to formal financial services, compared with two-thirds in the top 40th percentile. The rural population and agricultural workers are less likely to have access to formal financial services. The young population is also relatively more excluded, with 55 percent estimated to be either excluded entirely or relying on informal sources for financial services, reflecting the high youth unemployment rate (about 16 percent). Other barriers to access include high transaction costs, along with travel times to formal financial services, especially in rural areas. In addition, a strong cultural preference for cash remains.

Several reforms are underway to further improve financial inclusion. The Central Bank of Samoa is working toward establishing an effective financial consumer protection regime, creating an enabling environment for inclusive insurance markets and microinsurance, integrating financial inclusion in school curricula, and addressing risks related to strains in correspondent banking relationships. Other reforms to support MSMEs include the recent

[6]For the full country study, see Appendix 11.

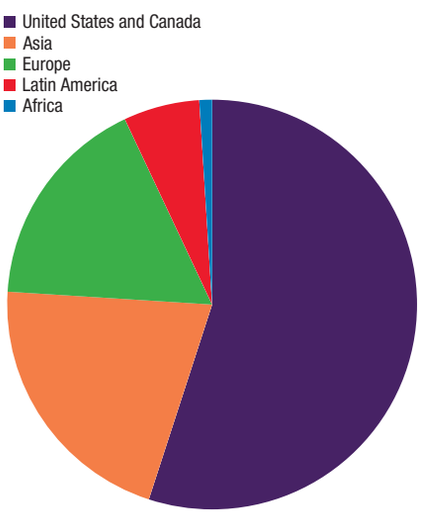
Figure 26. Overview of Agricultural Insurance in Asia

1. Employment and Output of Agriculture



Source: World Bank, *World Development Indicators.*

2. Agricultural Insurance Premiums, 2011 (Share of world total)



Source: Society of Actuaries (2015).

introduction of a movable property registry along with the authorities' commitment to establish a credit bureau and encourage the economic use of land.

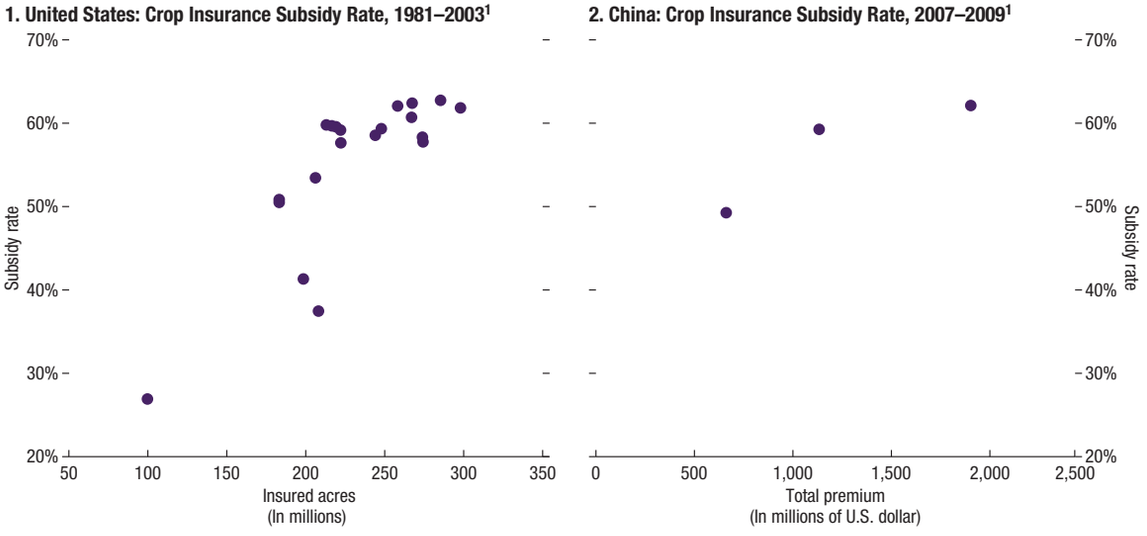
Agricultural Insurance: Inclusion with a Fiscal Cost[7]

Agricultural insurance is an important instrument for financial inclusion (Figure 26). Typically, rural populations in Asia-Pacific are less likely to be financially included, despite a relatively high share of agricultural output and employment. Agricultural insurance can help farmers hedge against adverse climate shocks to small-scale farms (Redfern, Azzu, and Binamira 2012). About half of Asia-Pacific countries have had crop insurance schemes. In terms of insurance premiums, Asia now represents the second largest market for agricultural insurance in the world, after North America.

China and India have developed two of the largest agricultural insurance schemes in the world. Both countries have highlighted these programs as financial inclusion policies to increase access to financial services. China's Agricultural Insurance Program covers $330 billion of agricultural production and receives $6.3 billion in annual subsidies (China Insurance Regulatory Commission 2016). India's Prime Minister's Crop Insurance Program also

[7]For the full study, see Appendix 12.

Figure 27. Marginal Subsidy Costs Increase with Coverage



Source: United States Department of Agriculture Risk Management Agency.
[1]Each observation represents the premium subsidy rate pair for a given year.

Source: Food and Agriculture Organization (2011).
[1]Each observation represents the premium subsidy rate pair for a given year.

receives public subsidies, with the amount capped at 50 percent of the premium value, amounting to about $1.4 billion in 2017–18.

Agricultural insurance is usually not commercially viable and requires substantial fiscal support. The producer loss ratios, defined as total claims divided by total premium collected from farmers, are typically closer to or larger than 1. Considering the premium covers only 25 percent of the operating costs, any loss ratio higher than 75 percent implies that government subsidies or other supports are required to keep insurers in the market (Figure 27). The marginal subsidy rate required for increasing the coverage of insurance programs rises because farmers' demand for insurance tends to be inelastic with respect to premium (Coble and Barnett 2012.

The reasons for the unviability of crop insurance and hence the reliance of crop insurance on government support are multiple. The main reason is that crop risks tend to be undiversified, as yields can be highly correlated across farms. Therefore, it is difficult to eliminate crop risks through cross-sectional risk pooling (OECD 2009). Adverse selection and moral hazard are somewhat more pronounced for agricultural insurance because of the limited availability of actuarial information. Other reasons include low financial literacy in the rural area.

Schemes based on self-insurance are deployed in some countries as alternatives to agricultural insurance products. In Canada, for example, farmers can

open individual special savings accounts, with the government providing matching contributions to the accounts up to a limit. Farmers can withdraw from their subsidized savings accounts only when yields or income fall below a certain threshold (Coble 1995). In Australia, famers can claim a tax deferral for the income they deposit to their savings accounts under a farm management deposit scheme. The main advantage of these schemes is that they are less prone to moral hazard and adverse selection problems, and the management costs of these schemes are typically lower than those of standard agricultural insurance schemes. However, the implementation of such schemes would require some level of financial development, which can be challenging for many developing countries in Asia-Pacific.

These discussions highlight the importance of striking a balance between costs and benefits of agricultural insurance and exploring more cost-effective approaches to achieving policy objectives. Containing costs may require greater targeting in line with the prioritization of financial inclusion. For instance, there may be a need to prioritize small farm holdings over large commercial plantations for agricultural insurance. Agricultural insurance should go together with other financial inclusion measures, such as financial literacy and access to banks accounts. Technology may also have the potential to reduce risk premiums of agricultural insurance by improving the monitoring of risk and mitigating the moral hazard problem.

CHAPTER

7 Conclusions

Asia-Pacific countries have made great progress in financial inclusion, but large disparities across and within countries remain. Large cross-country disparities reflect geography, financial sector structure, and policies, as well as income diversity in the region. The large within-country disparities disadvantage women, the less educated, small businesses, low-income households, and remote and rural populations. These gaps also extend to the access and usage of fintech, which holds much promise for advancing financial inclusion. Furthering financial inclusion in the Asia-Pacific region will require leveling the playing field for its most disadvantaged groups, particularly remote communities in Pacific island countries and in low-income and developing countries.

Asia-Pacific should pursue a more holistic approach to close the gaps in financial inclusion. This approach would build on the substantial progress over the past decades in pursuing structural reforms and expanding financial sector infrastructure, and would recognize the opportunity created by the rapid development of digital and mobile technology to reach the most remote communities ("the last mile"). A holistic approach should encompass simultaneous actions across macroeconomic, structural, technological, and financial policies, and efforts to improve financial and technology literacy and infrastructure.

- *Countries should continue to strengthen the financial infrastructure and regulations*. These reforms remain central, as they directly address impediments to financial inclusion. Efforts should continue in establishing or expanding the coverage of credit bureaus, enhancing payments systems, improving asset registries, and strengthening financial sector transparency.
- *Continued improvement in infrastructure will create the "hardware" for financial inclusion*. Countries should continue to build affordable telecommunication and internet networks that can reach rural and remote communities

as well as the urban poor. Regulatory policies should ensure strong competition in operating these networks.

- *Fintech should be a part of the financial inclusion strategy*. Fintech has significant potential for addressing the needs of excluded groups, as seen in the use of mobile payments in overcoming barriers to financial inclusion, especially for remote communities. Fintech policies should aim to reduce gaps in access to and usage of fintech-enabled services and avoid the digital divide. Fintech regulation needs to strike the right balance between fostering innovation and ensuring systemic stability and consumer protection. Strengthening anti–money laundering regulations will also be important.
- *Improving financial and technology literacy is a priority*. The focus should be on MSMEs, women, and low-income and rural populations. Financial education should include fintech innovations to keep up with technological progress.
- *Better and broader data on financial inclusion will strengthen monitoring and policy design*. Surveys should not substitute administrative data collection, which may better capture the rapid growth of fintech and other dimensions of financial inclusion, such as gender and income distribution. Countries should also explore the feasibility of unlocking big data to better understand consumer needs, develop tailored financial services, and better assess potential borrowers' creditworthiness.[1]
- *Design policies need to consider interactions between macroeconomic policy and financial inclusion*. Higher financial inclusion can increase the effectiveness of interest rate policy as well as amplify its distributional impact. Similarly, greater financial inclusion can also enhance the effectiveness of fiscal policy and help create space for needed public spending. On the other hand, fiscal policy can help promote financial inclusion through targeted assistance.

Asia-Pacific's experience suggests that each country should adopt its own holistic approach to financial inclusion. Countries should encourage social experimentation, much in the same way in which Bangladesh pioneered its microcredit approach and some of the East African countries have popularized mobile payments. An effective holistic approach also calls for joint efforts by central banks, finance ministries, regulatory bodies, telecom regulators, and education authorities, in partnership with the private sector.

The IMF can continue to support financial inclusion efforts in Asia-Pacific through its policy advice and capacity development. To assist countries, the IMF has made financial inclusion an integral part of its policy advice and capacity development. Further work is needed to strengthen the IMF's toolkit

[1]Malaysia, for example, has developed an online Separately Managed Account financing aggregator, which enables digital submission of documents, facilitates multiple financing applications seamlessly, and reduces the information asymmetry between banks and Small-Medium Enterprises.

for financial inclusion analysis through a better understanding of the roles of macro, structural, financial, and technology policies. At the same time, the IMF and other development partners should continue to collaborate closely in providing tailored policy advice and capacity development.

Appendix 1. Data and Statistics for Financial Inclusion

Financial Inclusion Data

The sources of data employed by this report to investigate the level of financial inclusion in Asia are the Financial Access Survey and the Global Findex, produced by the IMF and the World Bank respectively.

- The **Financial Access Survey** is collected by the IMF from regulatory data submitted to central banks and other regulators, documenting the extent of financial services provided.
- The **Global Financial Index (Findex)** is a triannual survey conducted by the World Bank, which asks respondents (sampled from the general population) on their use of financial services.

The tables below outline the major indicators used and the coverage within the Asia and Pacific region.

Several indicators that have been frequently used are listed below alongside the major concept they represent.

Table 1.1. Data Coverage

Global Findex (20)	Financial Access Survey (35)	
Australia	Australia	Micronesia
Bangladesh	Bangladesh	Mongolia
Bhutan**	Bhutan	Myanmar
Cambodia	Brunei Darussalam	Nepal
China	Cambodia	New Zealand
India	China	Palau
Indonesia	Fiji	Papua New Guinea
Japan	Hong Kong SAR	Philippines
Korea	India	Samoa
Lao P.D.R.*	Indonesia	Singapore
Malaysia	Japan	Solomon Islands
Mongolia	Korea	Sri Lanka
Myanmar**	Kiribati	Thailand
Nepal	Lao P.D.R.	Timor-Leste
New Zealand	Macao SAR	Tonga
Philippines	Malaysia	Vanuatu
Singapore	Maldives	Vietnam
Sri Lanka	Marshall Islands	
Thailand		
Vietnam		

*= 2011 only
**= 2014

Table 1.2. Indicator Lists

Saving	• Deposit Accounts per 1,000 people (FAS) • Bank Branches per Capita (FAS) • % of respondents with an account (Findex)
Lending	• % of respondents who have borrowed in past year (Findex) • Bank Loans per 1,000 people (FAS)
Payment	• % of respondents who had made a payment with a mobile phone in past year (Findex) • Number of mobile money transactions (FAS)
Insurance	• Number of Registered Insurance Providers (FAS) • Number of Insurance Premiums per Capita (FAS) • Share of agricultural workers with insurance (Findex, 2011 only)

Data Used in the Production of this Report

Several additional macro-economic and other data sources were used in the production of this report and the accompanying APD Financial Inclusion Database. For the benefit of the reader, they are listed below with corresponding weblinks:

- Financial Access Survey (FAS)
  - (http://data.imf.org/FAS)
- Global Findex (both country level data and individual level microdata)
  - (http://www.worldbank.org/en/programs/globalfindex)

- International Financial Statistics (IFS)
  - (http://data.imf.org/IFS)
- World Economic Outlook (WEO)
  - (http://www.imf.org/external/pubs/ft/weo/2017/01/weodata/index.aspx)
- World Development Indicators (WDI) –
  - (http://data.worldbank.org/data-catalog/world-development-indicators)
- The Standardized World Income Inequality Database (SWIID) - (http://fsolt.org/swiid/)
- IMF's Information Notice System (INS)
- Global Financial Development Database (GFDD)
  - (http://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database)
- IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAERs)
  - (http://www.elibraryareaer.imf.org/Pages/Home.aspx)
- Global Competitiveness Index (GCI)
  - (http://reports.weforum.org/global-competitiveness-index/#topic=data)
- World Governance Indicators (WGI)
  - (http://info.worldbank.org/governance/wgi/#home)
- Global Microscope (Economist Intelligence Unit)
  - (http://www.eiu.com/public/thankyou_download.aspx?activity=download&campaignid=Microscope2016)
- Enterprise Surveys (World Bank)
  - (http://www.enterprisesurveys.org/)
- Financial Development and Structure Dataset (World Bank)
  - (http://www.worldbank.org/en/publication/gfdr/data/financial-structure-database)
- Public Sector Ownership Data - Cull et al. IMF Working Paper No. 17/60: '*Bank Ownership: Trends and Implications*'
- Consolidated Banking Statistics (Bank of International Settlements)
  - (http://www.bis.org/statistics/consstats.htm)
- Global System for Mobile Communications Association (GSMA) Mobile Money Metrics Dataset
  - (https://www.gsma.com/mobilemoneymetrics/#global?y=2017?v=overview?g=global)

Appendix 2. Financial Inclusion Indices for Asia-Pacific Country Analysis

An index can help to combine financial inclusion (FI) indicators and provide a more rounded measure of financial inclusion. Three indices are presented here, based on factor analysis and data from the Financial Access Survey (FAS). The indices show that FI in Asian and Pacific countries is diverse but improving.

Index construction follows the process set out in Mialou et al (2017).[1] The data is first normalized for scale invariance, by expressing each variable relative to its maximum value across countries. Factor analysis is then used to group the variables into sub-indices (factors), that can be checked for consistency with variable groupings typically expected for particular "dimensions."[2] The individual variables are weighted and aggregated to form the sub-indices (dimensions), using the factor-loadings as weights. The sub-indices are weighted and aggregated to form a composite index, using each factor's share of explained data variance as the weights.

Three indices are constructed, with varying levels of cross-country coverage. The goal of broad country coverage for Asia, limits the number of indicators that can be used. Index specifications are shown in Table 2. Index 1 has the largest country coverage, and uses data commonly thought of as representing financial inclusion "access" or "outreach." Indices 2 and 3 add data that has been used to represent financial service "usage." Index 2 uses account numbers, but as individuals may hold multiple accounts, Index 3 uses numbers of depositors and borrowers.

[1]We thank the authors for generously sharing their code. See also Svirydzenka (2016).

[2]Financial inclusion dimensions discussed in the literature include: usage and access (Chakravarty and Pal, 2010); accessibility, availability, and usage of banking services (Sarma, 2012); outreach, usage, and quality of financial services (Mialou et al, 2017); and usage, barriers, and access (Camara and Tuesta, 2014).

Table 2.1. Asian Country Coverage of Selected FAS Financial Inclusion Indicators

Indicator	2015	2014	2013	2012	2011	2010
ATMs per km^2	32	32	33	33	33	31
ATMs per 100,000 adults	32	32	33	33	33	31
Brank Branches per km^2	31	32	33	33	32	31
Bank branches per 100,000 adults	24	32	33	33	32	31
Bank deposit accounts per 1,000 adults	20	25	25	24	23	20
Loan accounts per 1,000 adults	18	21	21	20	19	16
Bank loans to households (% of GDP)	15	20	21	21	20	19
Bank deposits by households (% of GDP)	14	17	18	18	17	16
Borrowers at commercial banks per 1,000 adults	14	14	14	13	11	9
Depositors with commercial banks per 1,000 adults	14	14	14	13	10	9
Bank loans to households per 1,000 adults	14	15	15	15	14	11
Number of mobile money transactions	14	13	10	8	8	5
Mobile money transactions per 1,000 adults	14	13	10	8	8	5
Household bank deposit accounts per 1,000 adults	12	13	13	12	12	10
Bank borrowers o/w households per 1,000 adults	10	10	9	9	8	6
Bank depositors o/w households per 1,000 adults	8	8	8	7	7	6

A small number of high and variable FI countries may be excluded. Volatility in the maximum FI indicators will induce volatility in the normalized indicators, and hence in the calculated index values. This does not matter if the index values are used for rankings, as rankings are preserved despite the volatility. Hence, each index was calculated twice: once for rankings, and a second time for reported index values. For ranking purposes, the full sample was used. To reduce noise in the reported index values, recalculated indices excluded a small number of high and variable FI economies from the sample.[3] For Index 1, San Marino, Hong Kong SAR, and Macao SAR were excluded; for Index 2 San Marino and Malta were excluded (Tables 3–5).

Financial inclusion rankings across Asia were diverse, but Asian countries have generally been stable or have improved relative to other countries. Table 6 summarizes changes in Asian country rankings and index levels by year. In most cases, rankings improved or remained the same as the previous year, with the EMs and LICs accounting for most cases of catch up. While index rankings were broadly sensible, some index changes may appear counter-intuitive – e.g. declines in Index 1 for Singapore. The index values should be interpreted with care, for example, where efficiency gains or technological substitution may result in the same level of FI at lower values of the FI indicators (numbers of ATMs or bank branches). In addition, results for Australia and NZ may be biased by the inclusion of indicators by area, given the geographic size of these countries.

[3]This can also result from changes in the maximum country due to reporting gaps for given years.

Table 2.2. Index Specification Summary

	Index 1	Index 2	Index 3
Dimensions	N/A	N/A	Access, Usage
Indicators	(1) ATMs per km^2	(1) ATMs per km^2	(1) ATMs per km^2
	(2) Bank branches per km^2	(2) Bank branches per km^2	(2) Bank branches per km^2
	(3) ATMs per 100,000 adults	(3) ATMs per 100,000 adults	
	(4) Bank branches per 100,000 adults	(4) Bank branches per 100,000 adults	
		(5) Bank depositors per 1,000 adults	(3) Bank depositors per 1,000 adults
		(6) Bank borrowers per 1,000 adults	(4) Bank borrowers per 1,000 adults
Total countries (2015)	163	88	70
Asian countries (2015)	31	19	13
Retained factors	2	3	2

Table 2.3. Index 1 Levels

Country	2011	2012	2013	2014	2015
Singapore	0.4230	0.4054	0.3846	0.2769	0.2764
Korea, Republic of	0.2924	0.2753	0.2569	0.2301	0.2245
Japan	0.2232	0.2053	0.1921	0.1811	0.1804
Maldives	0.0888	0.0928	0.0911	0.0859	0.0880
Thailand	0.0607	0.0585	0.0574	0.0634	0.0638
Brunei Darussalam	0.0580	0.0559	0.0495	0.0509	0.0510
Indonesia	0.0285	0.0413	0.0428	0.0489	0.0505
Tonga	0.0430	0.0376	0.0361	0.0348	0.0456
India	0.0321	0.0344	0.0363	0.0421	0.0455
China, P.R.: Mainland	—	0.0313	0.0326	0.0370	0.0449
Sri Lanka	0.0488	0.0470	0.0455	0.0444	0.0448
Philippines	0.0318	0.0319	0.0331	0.0341	0.0358
Bangladesh	0.0304	0.0305	0.0326	0.0308	0.0340
Samoa	0.0258	0.0240	0.0274	0.0346	0.0323
Malaysia	0.0356	0.0323	0.0302	0.0322	0.0317
New Zealand	0.0319	0.0278	0.0240	0.0292	0.0287
Marshall Islands, Republic of	0.0292	0.0269	0.0252	0.0244	0.0242
Fiji	0.0206	0.0182	0.0183	0.0230	0.0233
Vietnam	0.0237	0.0211	0.0220	0.0225	0.0227
Australia	0.0175	0.0152	0.0133	0.0194	0.0196
Vanuatu	0.0147	0.0149	0.0141	0.0177	0.0186
Nepal	0.0152	0.0152	0.0149	0.0160	0.0166
Mongolia	0.0082	0.0086	0.0083	0.0138	0.0153
Bhutan	0.0096	0.0056	0.0094	0.0122	0.0134
Cambodia	0.0069	0.0070	0.0073	0.0100	0.0115
Timor-Leste, Dem. Rep. of	0.0039	0.0041	0.0039	0.0059	0.0067
Lao People's Democratic Republic	0.0039	0.0039	0.0042	0.0056	0.0061
Solomon Islands	0.0039	0.0035	0.0030	0.0041	0.0041
Myanmar	—	0.0005	0.0015	0.0030	0.0032
Papua New Guinea	0.0019	0.0017	0.0016	0.0021	0.0026

Table 2.4. Index 2 Levels

	2011	2012	2013	2014	2015
Japan	0.5258	0.4761	0.4064	0.4658	0.4745
Maldives	0.2202	0.2218	0.1790	0.2246	0.2435
Thailand	0.2003	0.1757	0.1842	0.1941	0.1952
Brunei	0.2349	0.2151	0.2074	0.1868	0.1844
Indonesia	0.0962	0.1229	0.1288	0.1411	0.1449
India	0.0982	0.1048	0.0997	0.1284	0.1395
Tonga	0.1129	0.0956	0.1021	0.0971	0.1313
Malaysia	0.1633	0.1321	0.1411	0.1334	0.1281
Bangladesh	0.0799	0.0847	0.0739	0.0874	0.0971
Samoa	0.0954	0.0801	0.0936	0.1028	0.0970
Fiji	0.0736	0.0612	0.0693	0.0756	0.0775
Vanuatu	—	—	—	0.0594	0.0608
Mongolia	0.0420	0.0422	0.0584	0.0564	0.0586
Bhutan	0.0414	0.0234	0.0454	0.0471	0.0500
Nepal	—	0.0412	0.0380	0.0434	0.0458
Cambodia	0.0198	0.0203	0.0221	0.0275	0.0313
Lao PDR	—	—	0.0187	0.0194	0.0172
Solomon Is.	0.0155	0.0128	0.0129	0.0140	0.0134
Myanmar	—	0.0000	0.0000	0.0000	0.0064

Table 2.5. Index 3 Levels

	2011	2012	2013	2014	2015
Singapore	1.0000	1.0000	0.9982	0.8520	1.0000
Maldives	0.1477	0.1536	0.1500	0.1552	0.1692
Thailand	0.0800	0.0823	0.0845	0.0858	0.0883
Brunei Darussalam	0.0833	0.0918	0.0826	0.0841	0.0794
Bangladesh	0.0576	0.0607	0.0624	0.0608	0.0705
Malaysia	0.0526	0.0529	0.0515	0.0524	0.0497
Samoa	0.0338	0.0319	0.0351	0.0369	0.0346
China, P.R.: Mainland	—	0.0203	0.0217	0.0218	0.0274
Vanuatu	—	—	—	0.0167	0.0162
Timor-Leste, Dem. Rep. of	0.0063	0.0077	0.0076	0.0102	0.0106
Lao People's Democratic Republic	—	—	0.0060	0.0076	0.0070
Solomon Islands	—	0.0041	0.0041	0.0056	0.0049
Myanmar	—	0.0009	0.0019	0.0029	0.0036

Table 2.6. Change in Asian Country Financial Inclusion (by index level and rank)

	Comparison by rank				Comparison by index level			
Index 1	**2012**	**2013**	**2014**	**2015**	**2012**	**2013**	**2014**	**2015**
Total Asian Countries	30	30	30	31	28	30	30	30
Higher than previous year	14	10	18	18	10	12	22	23
Same as previous year	4	9	5	6	0	0	0	0
Lower than previous year	12	11	7	7	18	18	8	7
Index 2								
Total Asian Countries	17	18	19	19	15	17	18	19
Higher than previous year	3	4	14	14	6	10	13	14
Same as previous year	3	4	3	1	0	1	1	0
Lower than previous year	11	10	2	4	9	6	4	5
Index 3								
Total Asian Countries	11	12	13	13	8	11	12	13
Higher than previous year	1	2	3	9	6	5	10	7
Same as previous year	4	8	4	3	1	0	0	0
Lower than previous year	6	2	6	1	1	6	2	6

Annex 2.1. Selected Previous Approaches

	Chakravarty and Pal (2010)	**Sarma (2012)**	**Camara and Tuesta (2014)**	**IMF (2014)**
Methodology	UNDP approach: Axiomatic measurement	UNDP approach: Weighted geometric average using equally weighted dimension indices.	Two-stage principal component analysis (parametric).	Weighted geometric average, using weights derived from factor analysis.
Data source	Beck et al (2007), Sarma (2008), RBI, CSO	FAS	Global Findex (2011) and FAS (2013)	FAS
Country coverage	21 countries and 24 Indian states	94 countries (10 Asian countries)	82 countries	31 countries for 2012
Year coverage	2007 and 2008 (for Indian states, 1991,2001,2007)	2004–2010	2011	2009–2012
Variables, grouped by dimension	Usage: (1) Deposits per 1,000 people (2) Loans per 1,000 people	Usage: (1) Deposit bank accounts per 1,000 population	Usage: (1) Accounts: individuals who have at least one of the financial products (2) Savings: individuals who save in the formal financial system (3) Loans: individuals who have a loan in the formal financial system	Usage: (1) Total number of resident household depositors with ODCs per 1,000 adults (2) Total number of resident household borrowers with ODCs per 1,000 adults
	Access: (3) Bank branches per 1,000 sq km (4) Bank branches per 100,000 people (5) Bank ATMs per 1,000 sq km (6) Bank ATMs per 100,000 people	Access: (2) Bank branches per 100,000 population (3) ATMs per 100,000 population	Access: (4) ATMs per 100,000 adults (5) Commercial bank branches per 100,000 adults (6) ATMs per 1,000 sq km (7) Commercial bank branches per 1,000 km^2	Access: (3) ATMs per 1,000 sq km (4) Branches of ODCs per 1,000 adults
		Depth: (4) Credit and deposit to adult individuals as proportion of GDP (Loans + Deposits as % GDP)	Barriers: (8) Distance (9) Affordability (10) Documentation (11) Lack of trust	

Appendix 3. Empirical Analysis on Financial Inclusion and Growth, Poverty, and Inequality

The empirical approach used in identifying the impacts of financial inclusion on growth, poverty and income inequality closely follows that used in IMF (2015), Park and Mercado (2016), and Honohan (2008).

On *financial inclusion and growth*, this analysis uses standard growth regression as in Barro and Sala-i-Martin (1992) and Aghion and others (2005) to identify the causality and impact of financial inclusion on growth.[1] As in IMF (2015), control variables are initial per capita income, education, government consumption, and a crisis variable as in Laeven and Valencia (2012). However, financial inclusion is represented by the financial inclusion index type-1 constructed in Appendix I, rather than individual financial inclusion variables.

The analysis on *financial inclusion and poverty and income inequality* follows the empirical setup widely used in literatures. This approach is taken mainly due to the lack of well-established theoretical framework to fundamentally analyze the relationship between financial inclusion and poverty and income inequality. Similar to Honohan (2008) and Park and Mercado (2016), explanatory variables for poverty and income inequality regressions include financial inclusion index, country-income level, financial development, education, institutions, and other controls.

On poverty and income inequality analysis, the dependent variables include poverty measures include the ratio of the number of people whose income falls below the poverty line, as well as the percent of population living under

The authors are grateful to Martin Čihák, Yen Nian Mooi, and Seyed Reza Yousefi for sharing IMF (2015) database and computer code for the analysis.

[1]Despite the application of growth and convergence setup as in neoclassical framework, this analysis simply focuses on the significance of financial inclusion on growth, setting aside the discussion on growth and income convergence for future research.

1.90 and 3.10 a day in 2011 dollars in terms of purchasing power parity. Income inequality is measured by GINI coefficients and income gaps as calculated by the ratios of income levels at top and bottom 10 and 20 percentiles.

The sample includes 188 countries covering the period between 1990 and 2015 and use five-year averages of all variables to smooth out cyclical variations. The panel data is unbalanced. The General Method of Moment (GMM) estimation[2] is used for all regressions, in which various instruments and controls are taken into account—to the extent possible—to address endogeneity, differences in economic structures and filtered impacts of other macro-economic variables. Nonetheless, the approach does not address the reverse causality between macroeconomic variables and financial inclusion. Standard serial correlation and identification tests are performed to test the robustness of the results.[3]

Table 1 presents the estimated results, of which specifications (1)-(4) show the results for the impacts of financial inclusion on growth of per capita income; specifications (5)-(8) present results for the impacts of financial inclusion on poverty, defined as the ratio of people whose income falls below the poverty line; and specification (9)-(12) shows the results for the impacts of financial inclusion on income inequality, measured by GINI coefficients. Table 2 presents the estimated results with Asia-specifics.

[2]STATA code uses Roodman (2009).

[3]Number of observations for each country is less than 10. Tests performed are robust to the choice of instruments.

Table 3.1. Estimation Results of Financial Inclusion on Growth, Poverty, and Income Inequality

	Growth of per capita income				Poverty				Income inequality			
Dependent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Initial income	20.018***	20.017***	20.018***	20.017***	20.584	0.037	0.943	1.519	4.012*	3.990	5.255**	5.061**
	(24.599)	(24.247)	(23.942)	(23.843)	(20.163)	(0.008)	(0.231)	(0.352)	(1.731)	(1.643)	(2.432)	(2.153)
Financial inclusion	0.014***	0.010***	0.013***	0.011***	21.400***	21.372***	21.357***	21.206**	22.637**	22.241*	23.107*	22.530*
	(3.571)	(3.717)	(3.912)	(3.611)	(24.307)	(23.018)	(23.754)	(22.323)	(22.097)	(21.884)	(21.835)	(21.808)
Financial inclusion*per capita income	20.000**	20.000***	20.000*	20.000***	20.000	0.000*	20.000	0.000	0.000*	0.000	0.000*	0.000
	(22.446)	(22.711)	(21.863)	(22.720)	(20.618)	(1.894)	(20.665)	(1.207)	(1.671)	(1.372)	(1.667)	(1.257)
Financial development	20.026*	20.040***	20.018	20.044***	20.319*	0.057	20.382*	20.079	10.087*	10.299**	9.887**	9.048**
	(21.787)	(23.804)	(21.238)	(23.143)	(21.662)	(0.708)	(21.882)	(20.805)	(1.698)	(1.968)	(2.095)	(2.145)
Financial inclusion*financial development	20.007		20.007**		0.027**		0.026**		20.297		20.203	
	(21.434)		(22.024)		(2.423)		(2.134)		(20.426)		(20.233)	
Size of government	20.018	20.018	20.013	20.024*	7.936*	7.730	10.585*	11.196*	22.558	22.072	24.095	23.364
	(21.445)	(21.290)	(21.180)	(21.776)	(1.655)	(0.974)	(1.708)	(1.782)	(20.575)	(20.469)	(20.862)	(20.743)
Education	0.025***	0.026***	0.022***	0.026***	27.835*	210.632*	210.522*	213.126**	28.919***	29.548***	29.558***	29.532***
	(4.288)	(4.226)	(3.757)	(4.073)	(21.687)	(21.883)	(21.868)	(22.247)	(23.918)	(23.983)	(23.940)	(23.813)
Rule of law	0.018***	0.018***	0.016**	0.020***	22.374	28.704	21.525	27.517	29.510***	29.881***	210.760***	210.744***
	(2.930)	(3.153)	(2.463)	(2.937)	(20.464)	(21.349)	(20.256)	(21.600)	(22.674)	(22.757)	(22.875)	(23.213)
Crisis			0.002	0.002			0.048	0.114**			20.341	20.029
			(0.309)	(0.379)			(0.792)	(2.180)			(20.283)	(20.025)
Observations	428	428	428	428	204	204	204	204	312	312	312	312
AR2	0.584	0.694	0.600	0.697	0.494	0.459	0.645	0.745	0.375	0.306	0.464	0.363
Hansen	0.317	0.263	0.136	0.137	0.557	0.329	0.581	0.356	0.323	0.217	0.201	0.137

Source: IMF Staff Estimates

Panel regression applies GMM estimation with the data sample of 188 countries between 1990-2016 and using five-year averages of all variables to smooth out cyclical variations. Instrumental variables include lags of dependent and explanatory variables. Constant term, country and time fixed effects are included in all regressions. Standard serial correlation and identification tests are also performed. Robust standard errors are in brackets. *** p,0.01, ** p,0.05, * p,0.1

Table 3.2. Estimation Results of Asia-Specific Financial Inclusion on Growth, Poverty, and Income Inequality

	Growth of per capita income				Poverty				Income inequality			
Dependent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Initial income	−0.016***	−0.015***	−0.015***	−0.014***	−3.880	−4.609	−3.431	−3.158	4.564*	4.032*	5.098**	4.964**
	(−3.488)	(−3.234)	(−3.087)	(−2.773)	(−0.865)	(−1.183)	(−0.038)	(−0.969)	(1.897)	(1.669)	(2.398)	(2.053)
Financial inclusion	0.013***	0.008***	0.011***	0.008***	−1.490***	−1.490***	−1.442	−1.437***	−3.292**	−2.609**	−3.379**	−2.734*
	(4.492)	(3.873)	(3.880)	(3.508)	(−3.784)	(−3.244)	(−0.473)	(−2.991)	(−2.242)	(−2.269)	(−2.013)	(−1.916)
Financial inclusion*per capita income	−0.000	−0.000*	−0.000*	−0.000*	0.000	0.000*	−0.000	0.000	0.000	0.000*	0.000	0.000
	(−1.642)	(−1.810)	(−1.759)	(−1.923)	(0.108)	(1.672)	(−0.005)	(1.267)	(1.502)	(1.829)	(1.476)	(1.251)
Financial development	−0.000	−0.000***	−0.000	−0.000***	−0.188	0.067	−0.287	−0.109	5.176	7.531*	5.862	6.014
	(−1.120)	(−4.456)	(−1.500)	(−3.779)	(−0.881)	(0.719)	(−0.068)	(−0.813)	(0.767)	(1.782)	(0.981)	(0.983)
Financial inclusion*financial development	−0.000**		−0.000*		0.019*		0.018		0.718		0.233	
	(−2.122)		(−1.817)		(1.766)		(0.183)		(0.598)		(0.240)	
Financial inclusion*Asian dummy	−0.002	−0.002	−0.001	−0.001	1.171	1.967	1.395	2.625	−0.499	0.000	−0.222	0.155
	(−1.298)	(−1.294)	(−0.842)	(−0.624)	(0.771)	(1.345)	(0.065)	(1.542)	(−0.267)	(0.000)	(−0.262)	(0.202)
Asian dummy	0.021*	0.025**	0.015*	0.019**	−23.342	−32.618**	−24.166	−35.181*	6.323	6.025	3.034	1.846
	(1.747)	(2.018)	(1.771)	(2.107)	(−1.276)	(−2.144)	(−0.061)	(−1.876)	(1.025)	(0.923)	(0.640)	(0.350)
Size of government	−0.006	−0.004	−0.011	−0.010	1.208	0.348	2.353	3.399	−0.726	−1.008	−2.958	−2.496
	(−0.456)	(−0.278)	(−0.900)	(−0.796)	(0.174)	(0.067)	(0.013)	(0.410)	(−0.167)	(−0.251)	(−0.615)	(−0.554)
Education	0.023***	0.022***	0.019***	0.019***	−4.819	−4.542	−5.346	−6.355	−9.394***	−9.268***	−9.225***	−9.065***
	(3.536)	(3.200)	(2.728)	(2.798)	(−0.835)	(−0.731)	(−0.047)	(−1.602)	(−3.554)	(−3.556)	(−3.641)	(−3.651)
Rule of law	0.010*	0.015**	0.015**	0.018***	−1.470	−3.542	1.760	−0.382	−8.929**	−9.217**	−9.591***	−9.698***
	(1.813)	(2.569)	(2.402)	(2.638)	(−0.307)	(−0.843)	(0.012)	(−0.085)	(−2.427)	(−2.465)	(−2.679)	(−2.650)
Crisis			0.000	−0.000			0.079	0.136**			0.393	0.737
			(0.268)	(−0.282)			(0.062)	(2.119)			(0.313)	(0.514)
Observations	428	428	428	428	204	204	204	204	312	312	312	312
AR2	0.577	0.666	0.644	0.691	0.537	0.934	0.986	0.550	0.362	0.322	0.497	0.398
Hansen	0.219	0.156	0.143	0.139	0.495	0.379	0.809	0.555	0.308	0.197	0.234	0.153

Source: IMF Staff Estimates

Panel regression applies GMM estimation with the data sample of 188 countries between 1990–2016 and using five-year averages of all variables to smooth out cyclical variations. Instrumental variables include lags of dependent and explanatory variables. Constant term, country and time fixed effects are included in all regressions. Standard serial correlation and identification tests are also performed. Robust standard errors are in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix 4: Financial Inclusion and Monetary Policy

Financial Inclusion and the Effectiveness of the Interest Rate Transmission Mechanism

The study follows Mehrotra and Nadhanael (2016) to evaluate the effectiveness of the interest rate transmission mechanism. We estimate real interest rate sensitivity of output using Euler equations with different levels of financial inclusion. This approach is close to Bilbiie and Straub (2012), who examine the stability of output Euler equations in the United States.

Two specifications of Euler equations are used.

The first specification is based on hybrid models, similar to Fuhrer and Rudebusch (2004):

$$y_t = a + a_1 y_{t-1} + a_2 y_{t-2} + \mu E_t y_{t+1} + \beta(i_t - E_t \pi_{t+1}) + \varepsilon_t,$$

the inclusion of past output gap is consistent with habit formation, where a household's utility depends partly on current consumption relative to past consumption. y_t denotes the output gap, and is the expectation of period t +1 output formed at time t. i_t is the nominal policy rate, and captures expectations of future inflation.

The second specification is based on a simple forward-looking model that does not feature persistence in output:

$$y = a + \mu E_t y_{t+1} + \beta(i_t - E_t \pi_{t+1}) + \varepsilon_t.$$

To examine the link between the effectiveness of interest rate transmission mechanism and the level of financial inclusion, we divide the sample into two groups based on the financial inclusion index (the FI index).[1] Economies included in the sample are Australia, Bangladesh, China, Fiji, Hong Kong SAR, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan Province of China, and Thailand. Countries are grouped depending on whether they are above or below the average on the FI index.[2]

The output equations for each group are estimated in separate panel regressions, after controlling for the level of economic development, openness, and financial depth. We also tested and found that coefficients for two groups of economies are significantly different in both specifications of Euler regressions.

Monetary Policy Shocks and Inequality

Data

The sample spans the period from 2004–2013 and captures 33 advanced and emerging market economies. Data on income inequality is taken from the standardized World Income Inequality Database (SWIID 5.1). In particular, the study uses net Gini (post-tax, post-transfers) income inequality measure. Policy rate (or 3-month short term rate when policy rate not available) is taken from Haver Analytics. Inflation and output growth are taken from IMF WEO database. Forecasts errors (for interest rates, inflation and output growth) are computed using forecasts from Consensus Economics. Financial inclusion index is based on staff calculations and includes various financial access and inclusion variables from FAS database (as described in the text).

Methodology

(i) Constructing exogenous monetary policy shocks

To control for the endogenous effect of monetary policy on inequality, the analysis constructs a monetary policy shock series following the approach

[1]Economies included in the sample are Australia, Bangladesh, China, Fiji, Hong Kong SAR, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan Province of China, and Thailand. Countries are grouped depending on whether they are above or below the average on the financial inclusion index. The results are robust to grouping using the median.

[2]The results are robust to a different grouping using the median.

The economies included in the estimation are United States, United Kingdom, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Spain, Turkey, Australia, New Zealand, Argentina, Brazil, Chile, Mexico, Taiwan PoC, Hong Kong, SAR, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, Czech Republic, Hungary and Poland.

developed by Auerbach and Gorodnichenko (2013) and adopted in Furceri and others (2016). First, the study constructs a series for forecast error of the policy rates FE_t^i, defined as the difference between the actual policy or short term 3-month rate (SR_t^i) and that expected by analysts as of October, of the same year (CR_t^i) using forecasts from Consensus Economics:

$$FE_t^i = SR_t^i - CR_t^i$$

Thereafter, for each country the forecast errors of the policy rate are regressed on similarly computed forecast errors for inflation $\left(FE_t^{inf}\right)$ and output growth $\left(FE_t^g\right)$:

$$FE_t^i = \beta_0 + \beta_1 FE_t^{inf} + \beta_2 FE_t^g + \varepsilon_t$$

Where the residual ε_t is the exogenous monetary policy shock (MP).

(ii) Estimating the impact of monetary policy shocks on inequality

The study follows the local projection method proposed by Jorda (2005) to estimate the impact of monetary policy on inequality. In particular, for each future period h we estimate the following equation on annual data:

$$y_{i,t+h} - y_{i,t} = \alpha_i^h + \vartheta_t^h + \beta^h MP_{i,t} + \gamma^h X_{i,t} + \varepsilon_{i,t+h}$$

For $h = 1, \ldots..,4$ and with $y_{i,t+h} - y_{i,t}$ denoting the accumulated change from time t to t+h in 100 times the log of net inequality, α_i^h are country-fixed effects to account for unobserved cross- country heterogeneity, ϑ_t^h are time-fixed effects to account for global shocks, $MP_{i,t}$ is the exogenous monetary policy shock and $X_{i,t}$ is a set of controls including lagged monetary policy shocks and lagged changes in inequality.

The coefficient on monetary policy shock, β^h is used to generate impulse response functions with confidence intervals given by the estimated standard errors of these coefficient.

(iii) Role of financial inclusion

This study focuses on how the impact of monetary policy on inequality may depend on the state of financial inclusion in the economy. To asses this, we estimate the following specification:

$$y_{i,t+h} - y_{i,t} = \alpha_i^h + \vartheta_t^h + \beta_1^h G(z_{i,t}) MP_{i,t} + \beta_2^h (1 - G(z_{i,t})) MP_{i,t} + \gamma^h X_{i,t} + \varepsilon_{i,t+h}$$

Where $G(z_{it}) = \dfrac{\exp(-\gamma z_{i,t})}{1 + \exp(-\gamma z_{i,t})}, \gamma > 0$

Z is the financial inclusion index normalized to have zero mean and unit variance, and $G(z_{i,t})$ is the corresponding smooth transition function between states. A similar exercise is conducted for financial depth.

(iv) Financial inclusion and out-price volatility

The study follows Mehrotra and Yetman (2014) to analyze the relationship between financial inclusion and output-price volatility. In particular, we estimate an equation of the form:

$$V_t = \beta_0 + \beta_1 FI_t + \mathrm{B} X_t + \varepsilon_t$$

Where V_t is the output-price volatility defined as the log of the ratio of output gap to inflation variance. FI_t is the financial inclusion index, and X_t includes other control variables including, the level of financial development and other interaction terms.

Table 4.1. Inflation Output Volatility

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	**Dependent Variable is log of Variance Ratio**					
FI Index	24.70***	34.86***	18.48**	39.13***	24.73**	24.36*
	(5.362)	(7.232)	(7.919)	(11.97)	(12.47)	(12.68)
Index * APD Dummy		−19.29**	−16.66*	−0.939		−1.873
		(9.320)	(8.677)	(11.00)		(10.72)
Real GDP per Capita					2.44e-05***	2.45e-05***
					(8.23e-06)	(8.26e-06)
Credit (% of GDP)			0.0133***	0.0179***	0.0125***	0.0122***
			(0.00396)	(0.00439)	(0.00446)	(0.00468)
Index * Credit				−0.243**	−0.179**	−0.167
				(0.107)	(0.0842)	(0.107)
Constant	−0.566***	−0.652***	−0.998***	−1.284***	−1.321***	−1.313***
	(0.159)	(0.163)	(0.225)	(0.255)	(0.243)	(0.248)
Observations	174	174	150	150	150	150
R-squared	0.110	0.132	0.194	0.222	0.267	0.267

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4.2. Financial Inclusion and Monetary Regimes in Asia

	Monetary Regimes[1]	Inflation/Price Stability Target/ Objective?	Main Policy Instruments	AFI Member?
Financial inclusion, index quintile 1				
Australia[2]	IT	2–3%	Cash rate (overnight money market rate)	
Hong Kong SAR	No (Currency board)	Maintain currency stability	—	
Macao SAR	No (Currency board)	—	—	
Japan	IT	2%	Short and long term policy interest rates	
Korea	IT	2%	Base rate	
Maldives	No (SA)	Price stability is main objective	Marginal reserve requirements, rates on government securities	Yes
New Zealand[2]	IT	1–3%	Official cash rate	
Singapore	Implicit IT	Primary objective to promote low inflation	MAS indicates level, slope and width of NEER band every 6 months	
Financial inclusion, index quintile 2				
Brunei Darussalam	No (Currency board)	—	—	
India	IT	5%	Benchmark repo rate	Yes
Indonesia	IT	4% 1/2 1 ppt	BI policy rate, deposit and lending rates	Yes
Sri Lanka	Other (CLA)	Developing a roadmap to adopt flexible inflation targeting	Repo and reverse repo rates (SDF, SLF), Statutory Reserve Ratio (SRR)	Yes
Thailand	IT	2.5% 1/2 1.5 ppt	BOT 1-day bilateral repo rate	Yes
Tonga	Other (PHB)	Inflation reference range, 6–8%	Growth rate of broad money	Yes
Financial inclusion, index quintile 3				
Bangladesh	Monetary aggregate		Quantitative target (in process of shifting to interest rate target)	Yes
China	Monetary aggregate	Yes, consistent with objective to maintain currency stability to promote growth	Includes PBC benchmark rate, 7-day repo rate	Yes
Fiji	No (Conventional peg)	Has price stability objective	Overnight policy rate	Yes
Malaysia	Other (OM)	Comfort level of about 3%	BNM overnight policy interest rate	Yes
RMI	No (Dollarized)	—	—	
Micronesia[2]	No (Dollarized)	—	—	
Palau[2]	No (Dollarized)	—	—	
Philippines	IT	3% 1/2 1 ppt	Overnight reverse repo rate (RRP), repo rate (RP), SDA rate	Yes
Samoa	Other (Conventional peg)	Has price stability objective	Interest rate on central bank securities.	Yes
Vietnam	No (SA)	Multiple objectives. Inflation objective of 4%, growth objective of 6.7% for 2017	OMOs, FX intervention, credit growth targets	
Financial inclusion, index quintile 4				
Bhutan[2]	(Conventional peg)	Maintain price and financial stability	Cash reserve ratio (CRR) and Statutory Liquidity Ratio (SLR)	Yes
Cambodia	(OM)	Principle mission is maintaining price stability	Reserve requirements; FX intervention	Yes
Kiribati[2]	(Dollarized)	—	—	
Mongolia	Other (Floating)	Core objective is price stability	Policy rate, OMO, reserve requirement, standing facilities	Yes
Nepal	No (Conventional peg)	—		
Timor-Leste	No (Dollarized)	—	—	Yes
Vanuatu	Other (OM)	Domestic and external price stability; includes keeping inflation between 0–4%	OMO, Statutory Reserve Deposit (reserve requirement), standing facilities	Yes
Financial inclusion, index quintile 5				
Lao PDR	Other (SA)	Maintain currency stability	—	
Myanmar	Monetary aggregate	Aim of central bank is domestic price stability	Reserve money growth; reserve requirements	
Papua New Guinea	Other (CLA)	Has price stability objective	Kina Facility Rate, reserve requirement	Yes
Solomon Islands	Other (Conventional peg)	Has price stability objective	Central bank bills	Yes

Sources: IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions*, 2016; IMF, Article IV country reports; Authorities' central bank websites; and Alliance for Financial Inclusion (AFI).

[1]Follows AREAERS, apart from Singapore (classification is from latest AIV report). Where AREAERS has no monetary regime classification ("No"), or classification is "Other" the exchange rate regime classification is given in brackets: SA = Stabilized Arrangement; CLA = Crawl-like arrangement; PHB = Peg within horizontal bands; OM = Other managed exchange rate regime.

[2]Grouped by financial inclusion index comprised of ATMs and bank branches. Australia and NZ added to quintile 1 index group. For missing index values: Palau and FSM were set equal to value for RMI; Kiribati set equal to value for Vanuatu; Bhutan set to value for Nepal.

Appendix 5. Financial Inclusion and Fiscal Policy

Estimation of the Associated between Financial Inclusion and Fiscal Outcomes

An OLS panel regression is applied to find the associated between financial inclusion and fiscal outcomes with fixed effects and variables control variables. We use an unbalanced panel of 190 countries covering the time period 2004–2015. The APD dummy is included in the regression to see how it differs from the rest of the world (i.e., the rest of the world is the control group). In the regression, we also included other non-financial inclusion variables to check for robustness. These variables include trade openness, exchange rate regime, inflation, level of development, financial depth, capital account openness, Gini co-efficient, and interaction terms. The introduction of controls significantly reduces the sample size because of data limitations. Despite the extensive use of controls, as common in empirical estimations, the results may still have endogeneity issues making identification of causality challenging. Therefore, all these results should be interpreted as correlations.

A first set of regression analyzes the relationship between financial inclusion and both quantitative (revenue and expenditure as a share of GDP) as well as qualitative variables (revenue efficiency and tax efficiency[1]) using the most widely used indicators of financial inclusion. A second set of regressions checks for robustness with additional financial indicators (regression table 1B).

[1]Revenue Efficiency is measured as VAT C-efficiency (ratio of tax rate * consumption / actual tax take from VAT); Method a indicates the ratio of the Human Development Indicators to Government Spending based on the input-output methodology followed in Kobe et al. Method b indicates Social Expenditure Efficiency which is the ratio of Poverty Levels ($10 a day) to Poverty Spending.

Table 5.1a. Financial Inclusion and Fiscal Outcome

Variables	(1) Revenue (% of GDP)	(2) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)	(5) Expenditure Efficiency (method b.)
ATMs per 100,000 People	0.0748***	0.129***	0.405***	0.00146	−0.0578
	(0.0118)	(0.0112)	(0.0388)	(0.0010)	(0.1480)
GDP per Capita	0.000231***	0.000017	(0.000024)	0.000006***	0.000482
	(0.000016)	(0.000016)	(0.000121)	(0.000001)	(0.000589)
Asia Dummy	−6.283***	−5.324***	4.361	0.757***	−6.325
	(1.087)	(1.033)	(2.905)	(0.094)	(10.490)
ATMs per 100,000 People *	−0.0126	−0.0309	0.309***	−0.00561**	4.22E-05
Asia Dummy	(0.0300)	(0.0285)	(0.1070)	(0.0026)	(0.3260)
Constant	23.40***	25.81***	36.64***	2.23***	18.2***
	(0.415)	(0.395)	(1.413)	(0.036)	(5.182)
Observations	1,140	1,139	481	1,137	439
R-squared	0.291	0.182	0.292	0.087	0.004
Branches per 100,000 People	0.0781***	0.115***	0.496***	0.00238*	−40.59
	(0.0163)	(0.0158)	(0.0627)	(0.0014)	(78.32)
GDP per Capita	0.000286***	0.000101***	0.000494***	0.000006***	−0.271
	(0.000015)	(0.000014)	(0.000117)	(0.000001)	(0.167)
Asia Dummy	−7.555***	−7.108***	12.59**	0.862***	−3620
	(0.988)	(0.960)	(4.885)	(0.084)	(3,423)
Branches per 100,000 People *	0.0638	0.0866*	−0.593	−0.0152***	55.77
Asia Dummy	(0.0527)	(0.0512)	(0.5710)	(0.0045)	(169.4)
Constant	23.26***	26.03***	34.95***	2.228***	5,457***
	(0.3710)	(0.3610)	(1.3830)	(0.0316)	(1,781)
Observations	1278	1277	536	1273	463
R-squared	0.304	0.145	0.186	0.101	0.012

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Note: The observations are based on the availability of fiscal and financial indicators data. In general, the more sophisticated fiscal indicators have less data coverage (i.e, the efficiency variables).

Table 5.1b. Financial Inclusion and Fiscal Outcome

Variables	(1) Revenue (% of GDP)	(1) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)	(5) Expenditure Efficiency (method b.)
Depositors per 1,000 People	0.00272***	0.00419***	0.0162***	0.0000663	−1.377
	(0.000485)	(0.000478)	(0.001980)	(0.000045)	(2.039)
GDP per Capita	0.000332***	0.000152***	−0.00024**	0.000003	−0.353
	(0.000028)	(0.000028)	(0.000118)	(0.000003)	(0.272)
Asia Dummy	−5.058***	−5.128***	−3.878	0.912***	−6987
	(1.273)	(1.255)	(3.889)	(0.118)	(6,096)
Depositors per 1,000 People *	−0.0024*	−0.00208*	0.0201***	−0.000315***	4.695
Asia Dummy	(0.00126)	(0.00124)	(0.00566)	(0.00012)	(5.525)
Constant	21.95***	24.54***	39.72***	2.26***	7,113***
	(0.505)	(0.498)	(1.725)	(0.047)	(2,612)
Observations	830	829	354	816	306
R-squared	0.273	0.212	0.247	0.096	0.015
Borrowers per 1,000 People	0.0106***	0.0188***	0.0705***	0.000203	−2.078
	(0.00245)	(0.00223)	(0.00749)	(0.00021)	(15.82)
GDP per Capita	0.000257***	0.0000467***	−0.000252**	0.000002	−0.613
	(0.000019)	(0.000018)	(0.000126)	(0.000002)	(0.463)
Asia Dummy	−10.46***	−9.579***	−31.87***	1.263***	−10,712
	(1.933)	(1.756)	(7.998)	(0.166)	(12,657)
Borrowers per 1,000 People *	0.00608	0.00249	0.210***	−0.00181***	42.56
Asia Dummy	(0.00661)	(0.00601)	(0.04140)	(0.00057)	(53.93)
Constant	22.98***	25.48***	39.36***	2.339***	9,267***
	(0.515)	(0.468)	(1.630)	(0.045)	(3,236)
Observations	735	735	292	722	253
R-squared	0.312	0.181	0.327	0.099	0.019

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5.2a. Financial Inclusion and Fiscal Outcome – Robustness Checks

Variables	(1) Revenue (% of GDP)	(2) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)
ATMs per 100,000 Adults	0.0355***	0.0342***	0.0619***	0.000453
	(0.0067)	(0.0065)	(0.0134)	(0.0006)
GDP per Capita (USD)	−0.000581***	(0.000673)***	−0.00201***	−5.12e-05***
	(0.000043)	(0.000035)	(0.000096)	(0.000004)
Credit to Private Sector (% of GDP)	−0.000909***	−0.000726***	−0.00163***	0.0000187
	(0.000241)	(0.000231)	(0.000453)	(0.000022)
Inflation (%)	−0.0132	−0.017	−0.327***	−0.00188
	(0.039100)	(0.037400)	(0.103000)	(0.003560)
Chinn-Ito Index (Trade Openness)	−2.777***	−1.744**	−3.081*	0.382***
	(0.7400)	(0.709000)	(1.7280)	(0.0678)
Gini-Coeffecient	(0.075100)**	−0.135***	0.011000	0.005260*
	(0.031400)	(0.030000)	(0.075500)	(0.002860)
Rule of Law Index	0.852*	1.180000***	3.03***	−0.11***
	(0.4420)	(0.435000)	(0.9400)	(0.0418)
Asia Dummy	−3.508***	−2.029***	−1.552	0.41***
	(0.711)	(0.678)	(1.654)	(0.066)
ATMs per 100,000 Adults * Asia Dummy	−0.0152*	−0.0216**	−0.0247	0.000643
	(0.0089)	(0.0087)	(0.0176)	(0.0008)
GDP per Capita * Revenue	0.000022***			
	(0.000001)			
GDP Per Capita * Expenditure		0.0000237***		
		(0.0000)		
GDP Per Capita * Revenue Eff.			0.000033***	
			(0.0000)	
GDP Per Capita * Expenditure Eff.				0.000018***
				(0.0000)
Constant	30.88***	34.51***	55.94***	2.02***
	(1.642)	(1.578)	(4.164)	(0.152)
Observations	830	829	610	822
R-squared	0.730	0.767	0.618	0.604

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5.2b. Financial Inclusion and Fiscal Outcome – Robustness Checks

Variables	(1) Revenue (% of GDP)	(2) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)
Branches per 100,000 adults	0.0797***	0.0776***	0.165***	0.00038
	(0.0126)	(0.0120)	(0.0256)	(0.0012)
GDP per Capita (USD)	−0.000541***	−0.000649***	−0.00202***	−0.0000456***
	(0.000041)	(0.000034)	(0.000102)	(0.000004)
Credit to Private Sector (% of GDP)	−0.000772***	−0.000604***	−0.00106***	0.000027
	(0.000226)	(0.000211)	(0.000437)	(0.000020)
Inflation (%)	0.0169	0.0262	−0.0826***	0.00531
	(0.038600)	(0.036100)	(0.104000)	(0.003430)
Chinn-Ito Index (Trade Openness)	−1.843**	−0.639	4.448*	0.481***
	(0.7400)	(0.6930)	(1.7150)	(0.0658)
Gini-Coeffecient	(0.038200)	(0.094500)***	0.300000	0.007140***
	(0.030400)	(0.028300)	(0.075700)	(0.002680)
Rule of Law Index	1.074**	1.572***	3.832***	−0.144***
	(0.4300)	(0.4140)	(0.9450)	(0.0394)
Asia Dummy	−5.288***	−2.809***	1.574	0.707***
	(0.893)	(0.837)	(2.157)	(0.081)
Branches per 100,000 adults * Asia Dummy	0.114***	0.04	−0.0812	−0.0117***
	(0.0420)	(0.0393)	(0.1110)	(0.0037)
GDP per Capita * Revenue	0.000022***			
	(0.0000)			
GDP Per Capita * Expenditure		0.000023***		
		(0.0000)		
GDP Per Capita * Revenue Eff.			0.000033***	
			(0.0000)	
GDP Per Capita * Expenditure Eff.				0.000018***
				(0.000001)
Constant	27.43***	30.72***	33.05***	1.75***
	(1.555)	(1.453)	(3.967)	(0.139)
Observations	915	914	666	904
R-squared	0.718	0.766	0.603	0.588

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5.2c. Financial Inclusion and Fiscal Outcome – Robustness Checks

Variables	(1) Revenue (% of GDP)	(2) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)
Borrowers per 1,000 adults	0.00368*	0.00495***	0.00566	0.000109
	(0.0019)	(0.0018)	(0.0059)	(0.0002)
GDP per Capita (USD)	−0.00114***	−0.00108***	−0.00305***	−0.0000831***
	(0.000127)	(0.000111)	(0.000215)	(0.000008)
Credit to Private Sector (% of GDP)	−0.000749***	−0.000644***	−0.000648	0.0000254
	(0.000213)	(0.000206)	(0.000454)	(0.000022)
Inflation (%)	−0.246***	−0.246***	−0.71***	−0.00421
	(0.065500)	(0.063200)	(0.172000)	(0.006670)
Chinn-Ito Index (Trade Openness)	−1.965*	−1.239	2.368	0.42***
	(1.0400)	(1.0000)	(2.7110)	(0.1050)
Gini-Coeffecient	(0.068500)	(0.165000)***	0.241000*	0.008370*
	(0.044400)	(0.042900)	(0.136000)	(0.004520)
Rule of Law Index	2.023***	2.314***	−5.484***	−0.187***
	(0.6800)	(0.6530)	(1.6870)	(0.0682)
Asia Dummy	−8.742***	−9.693***	18.19***	2.035***
	(1.566)	(1.629)	(3.928)	(0.189)
Borrowers per 1,000 adults * Asia Dummy	0.0212***	0.0285***	−0.128***	−0.00727***
	(0.0059)	(0.0065)	(0.0145)	(0.0008)
GDP per Capita * Revenue	0.000038***			
	(0.000003)			
GDP Per Capita * Expenditure		0.0000***		
		(0.0000)		
GDP Per Capita * Revenue Eff.			0.0001***	
			(0.0000)	
GDP Per Capita * Expenditure Eff.				0.000035***
				(0.000002)
Constant	32.31***	37.71***	33.12***	1.80***
	(2.488)	(2.392)	(8.063)	(0.252)
Observations	373	373	248	372
R-squared	0.687	0.741	0.629	0.676

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5.2d. Financial Inclusion and Fiscal Outcome – Robustness Checks

Variables	(1) Revenue (% of GDP)	(2) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)
Depositors per 1,000 adults	0.00204***	0.00228***	0.00147*	−0.00000807
	(0.0004)	(0.0004)	(0.0009)	(0.0000)
GDP per Capita (USD)	−0.000978***	−0.00103***	−0.00229***	−0.0001***
	(0.000081)	(0.000068)	(0.000148)	(0.000005)
Credit to Private Sector (% of GDP)	−0.000879***	−0.00075***	−0.00154***	0.0000356**
	(0.000221)	(0.000209)	(0.000432)	(0.000017)
Inflation (%)	−0.0637	−0.0535	−0.46***	−0.00854*
	(0.062100)	(0.058600)	(0.173000)	(0.004690)
Chinn-Ito Index (Trade Openness)	−4.336***	−3.584***	0.408	0.65***
	(0.9470)	(0.8930)	(2.3820)	(0.0715)
Gini-Coeffecient	(0.040300)	(0.086100)**	0.103000	0.007560**
	(0.039600)	(0.037200)	(0.094800)	(0.002980)
Rule of Law Index	0.316	1.562***	−0.306	−0.128***
	(0.6280)	(0.5940)	(1.3420)	(0.0481)
Asia Dummy	−3.944***	−3.465***	−1.4	0.674***
	(0.944)	(0.891)	(2.238)	(0.072)
Depositors per 1,000 adults * Asia Dummy	−0.000513	−0.000897**	−0.00106	−0.000158***
	(0.0004)	(0.0004)	(0.0009)	(0.0000)
GDP per Capita * Revenue	0.000032***			
	(0.000002)			
GDP Per Capita * Expenditure		0.000030***		
		(0.0000)		
GDP Per Capita * Revenue Eff.			0.000041***	
			(0.0000)	
GDP Per Capita * Expenditure Eff.				0.000042***
				(0.000002)
Constant	30.26***	33.96***	49.24***	1.71***
	(2.333)	(2.203)	(6.001)	(0.178)
Observations	511	510	388	504
R-squared	0.712	0.773	0.545	0.709

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5.3a. Financial Inclusion and Fiscal Outcome – Country Fixed Effects Model

Variables	(1) Revenue (% of GDP)	(2) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)
ATMs per 100,000 Adults	0.0207*	0.0272**	0.0652*	−0.00363***
	(0.0111)	(0.0133)	(0.0340)	(0.0012)
GDP per Capita (USD)	−0.000624***	−0.000454***	−0.00207***	−0.0000499***
	(0.000151)	(0.000125)	(0.000444)	(0.000011)
Credit to Private Sector (% of GDP)	0.000576	0.000177	0.00253**	0.0000642
	(0.000921)	(0.001010)	(0.001170)	(0.000135)
Inflation (%)	−0.035	−0.0736**	0.0069	0.00361
	(0.024600)	(0.028400)	(0.038800)	(0.003130)
Chinn-Ito Index (Trade Openness)	0.298	−2.009	−5.153	0.187
	(1.3000)	(1.3680)	(3.1370)	(0.1240)
GDP per Capita * Revenue	0.000016***			
	(0.000004)			
GDP Per Capita * Expenditure		0.000022***		
		(0.0000)		
GDP Per Capita * Revenue Eff.			0.000032***	
			(0.0000)	
GDP Per Capita * Expenditure Eff.				0.000018***
				(0.0000)
Constant	30.24***	26.10***	56.59***	2.36***
	(1.462)	(2.083)	(5.117)	(0.433)
Observations	1432	1431	785	822
R-squared	0.276	0.467	0.628	0.384
Number of Countries	158	158	98	129
Country Fixed Effects	Yes	Yes	Yes	Yes

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5.3b. Financial Inclusion and Fiscal Outcome – Country Fixed Effects Model

Variables	(1) Revenue (% of GDP)	(2) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)
Branches per 100,000 Adults	0.028	0.0384	0.105**	−0.00363***
	(0.0222)	(0.0315)	(0.0478)	(0.0012)
GDP per Capita (USD)	−0.000622***	−0.000428***	−0.00181***	−0.0000499***
	(0.000146)	(0.000103)	(0.000373)	(0.000011)
Credit to Private Sector (% of GDP)	0.592000	(1.806000)	(7.125000)**	0.0000642
	(1.287000)	(1.341000)	(3.488000)	(0.000135)
Inflation (%)	0.0000953***	0.000105***	0.000175***	0.00361
	(0.000020)	(0.000024)	(0.000025)	(0.003130)
Chinn-Ito Index (Trade Openness)	−0.0305	−0.0755***	−0.00484	0.187
	(0.0273)	(0.0284)	(0.0416)	(0.1240)
GDP per Capita * Revenue	0.000018***			
	(0.000005)			
GDP Per Capita * Expenditure		0.000024***		
		(0.0000)		
GDP Per Capita * Revenue Eff.			0.000032***	
			(0.0000)	
GDP Per Capita * Expenditure Eff.				0.000018***
				(0.0000)
Constant	29.02***	24.64***	53.15***	2.36***
	(1.508)	(1.842)	(5.013)	(0.433)
Observations	1566	1565	848	822
R-squared	0.231	0.456	0.604	0.384
Number of Countries	162	162	98	129
Country Fixed Effects	Yes	Yes	Yes	Yes

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5.3c. Financial Inclusion and Fiscal Outcome – Country Fixed Effects Model

Variables	(1) Revenue (% of GDP)	(2) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)
Borrowers per 1,000 Adults	0.00668**	0.00944***	0.0129	−0.000617**
	(0.0028)	(0.0031)	(0.0108)	(0.0002)
GDP per Capita (USD)	−0.00064***	−0.000521***	−0.00391**	−0.0000616***
	(0.000190)	(0.000105)	(0.001660)	(0.000014)
Credit to Private Sector (% of GDP)	0.0526	−2.64	−9.404*	0.193
	(2.131000)	(2.005000)	(5.144000)	(0.153000)
Inflation (%)	0.0000686***	0.0000629***	0.000156***	0.0000106***
	(0.000018)	(0.000023)	(0.000036)	(0.000002)
Chinn-Ito Index (Trade Openness)	0.0231	−0.0541	0.0442	0.00104
	(0.0382)	(0.0450)	(0.0636)	(0.0047)
GDP per Capita * Revenue	0.000015***			
	(0.000004)			
GDP Per Capita * Expenditure		0.000022***		
		(0.0000)		
GDP Per Capita * Revenue Eff.			0.000056***	
			(0.0000)	
GDP Per Capita * Expenditure Eff.				0.000018***
				(0.0000)
Constant	28.96***	26.55***	65.01***	2.68***
	(2.108)	(1.382)	(13.140)	(0.146)
Observations	690	690	335	689
R-squared	0.278	0.438	0.598	0.401
Number of Countries	82	82	46	82
Country Fixed Effects	Yes	Yes	Yes	YES

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5.3d. Financial Inclusion and Fiscal Outcome – Country Fixed Effects Model

Variables	(1) Revenue (% of GDP)	(2) Expenditure (% of GDP)	(3) Tax Efficiency (VAT, %)	(4) Expenditure Efficiency (method a.)
Depositors per 1,000 adults	0.000886	0.00233***	0.00396	−0.0000842
	(0.0007)	(0.0007)	(0.0024)	(0.0001)
GDP per Capita (USD)	−0.00166***	−0.000795***	−0.00195***	−0.0000878***
	(0.000612)	(0.000162)	(0.000475)	(0.000019)
Credit to Private Sector (% of GDP)	−2.731	−2.892	−6.261*	0.0986
	(2.320000)	(1.795000)	(3.543000)	(0.130000)
Inflation (%)	0.000117***	0.000113***	0.000147***	0.00000636***
	(0.000022)	(0.000019)	(0.000026)	(0.000001)
Chinn-Ito Index (Trade Openness)	0.012	−0.092***	−0.00303	0.00582
	(0.0611)	(0.0345)	(0.0642)	(0.0041)
GDP per Capita * Revenue	0.000051***			
	(0.000018)			
GDP Per Capita * Expenditure		0.000030***		
		(0.0000)		
GDP Per Capita * Revenue Eff.			0.000036***	
			(0.0000)	
GDP Per Capita * Expenditure Eff.				0.000031***
				(0.0000)
Constant	29.03***	26.78***	49.93***	2.61***
	(2.143)	(1.751)	(5.156)	(0.152)
Observations	917	916	503	910
R-squared	0.248	0.519	0.556	0.495
Number of Countries	106	106	65	106
Country Fixed Effects	Yes	Yes	Yes	Yes

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Fiscal Multiplier Estimation

A government's level and efficiency of expenditure and revenue could also affect the fiscal multiplier.[2] For example, multipliers are expected to be smaller in the case of public expenditure inefficiencies or difficulties with revenue collection (Batini et al., 2014). Thus, if financial inclusion enhances efficiency it could also raise the fiscal multiplier. Various concrete channels could be considered as to how financial inclusion could raise the fiscal multiplier. First, higher financial inclusion could enhance targeting of transfers and subsidies and reduce leakage. This could reduce crowding-out effects and increase spending in the formal economy and thereby raise the multiplier. Second, broader access to financing could strengthen the crowding-in effect of private investment. For example, previously credit-constrained individuals would be able to take advantage of new opportunities enabled through public infrastructure investment. Finally, broader account coverage could ensure that government transfers are saved in banks rather than in cash. This could increase funds for intermediation to productive sectors and thereby raise the fiscal multiplier effect.

To test this hypothesis, we follow Espinoza and Senhadji (2011) and run an OLS panel regression with interaction terms to account for different measures of financial inclusion. Financial inclusion tends to increase gradually and reforms often coincide with other major developments, making identification of causality difficult. Therefore, the results point to correlations or associations. The basic regression takes the following form:

$$
\begin{aligned}
&RealGDPgrowth_{t,i} \\
&= \alpha + \beta_1 * FinancialInclusion_{t,i} * FiscalVariable_{t,i} + \beta_2 \\
&* FinancialInclusion_{t,i} + \beta_3 * FiscalVariable_{t,i} + \beta_4 \\
&* FinancialInclusion_{t-1,i} * FiscalVariable_{t-1,i} + \beta_5 * FiscalVariable_{t-1,i} \\
&+ \beta_6 * FinancialInclusion_{t-2,i} * FiscalVariable_{t-2,i} + \beta_7 \\
&* FiscalVariable_{t-2,i} + \varepsilon_{t,i}
\end{aligned}
$$

The fiscal variable is real expenditure growth and the financial inclusion measures include ATMs, borrowers and depositors per capita.[3] To get the cumulative multiplier effect we calculate for the first period

$$
\frac{\partial RealGDPgrowth_{t,i}}{\partial RealExpendituregrowth_{t,i}} = \beta_1 * FinancialInclusion_{t,i} + \beta_3.
$$

[2]The fiscal multiplier measures the short-term impact of fiscal policy on output.

[3]These three financial inclusion indicators were used given their broad coverage across countries and over time. In additional these variables are the most widely applied variables in the literature.

The effect for the second period adds two further terms:

$$\frac{\partial RealGDPgrowth_{t,i}}{\partial RealExpendituregrowth_{t,i}} = \beta_1 * FinancialInclusion_{t,i} + \beta_3 + \beta_4 * FinancialInclusion_{t-1,i} + \beta_5.$$

Table 5.4a. Financial Inclusion and the Fiscal Multiplier

	(1)	(2)	(3)	(4)
Variables	**Real GDP Growth (%)**			
Growth of Real Expenditure	0.102***	0.00936**	0.00463	0.0877***
	(0.0135)	(0.0036)	(0.0034)	(0.0151)
Growth of Real Expenditure (t-1)	0.00341	0.00567	0.00408	0.00466
	(0.003470)	(0.003680)	(0.003420)	(0.003430)
Growth of Real Expenditure (t-2)	0.00468	0.00499	0.00376	0.00531
	(0.003430)	(0.003640)	(0.003390)	(0.003400)
ATMs per 100,000 adults	−0.0454***			
	(0.005450)			
Growth of Real Expenditure * ATMs per 100,000 adults	0.00137***			
	(0.000500)			
Growth of Real Expenditure (t-1) * ATMs per 100,000 adults	0.00148***			
	(0.000436)			
Growth of Real Expenditure (t-2) * ATMs per 100,000 adults	0.000302			
	(0.000443)			
Branches per 100,000 adults		−0.0552***		
		(0.008710)		
Growth of Real Expenditure * Branches per 100,000 adults		0.005040***		
		−0.000664		
Growth of Real Expenditure (t-1) * Branches per 100,000 adults		0.00238***		
		−0.000738		
Growth of Real Expenditure (t-2) * Branches per 100,000 adults		0.000746		
		−0.000687		
Borrowers per 1,000 adults			−0.00716***	
			(0.0011)	
Growth of Real Expenditure * Borrowers per 1,000 adults			0.000518***	
			(0.000103)	
Growth of Real Expenditure (t-1) * Borrowers per 1,000 adults			0.000323***	
			(0.000100)	
Growth of Real Expenditure (t-2) * Borrowers per 1,000 adults			0.000087	
			(0.000098)	
Depositors per 1,000 adults				−0.00108***
				(0.0003)
Growth of Real Expenditure * Depositors per 1,000 adults				0.0000635**
				(0.000021)
Growth of Real Expenditure (t-1) * Depositors per 1,000 adults				0.0000297
				(0.000019)
Growth of Real Expenditure (t-2) * Depositors per 1,000 adults				−0.0000215
				(0.000019)
Constant	4.51***	4.38***	4.72***	4.12***
	(0.209)	(0.164)	(0.228)	(0.253)
Observations	900	1046	554	640
R-squared	0.224	0.118	0.110	0.180

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 5.4b. Financial Inclusion and the Fiscal Multiplier - Robustness Checks

	(1)	(2)	(3)	(4)
Variables	**Real GDP Growth (%)**			
Growth of Real Expenditure	0.119***	0.00685*	0.00366	0.116***
	(0.0168)	(0.0037)	(0.0033)	(0.0182)
Growth of Real Expenditure (t-1)	0.00379	0.00393	0.00231	0.00467
	(0.003510)	(0.003680)	(0.003280)	(0.003500)
Growth of Real Expenditure (t-2)	0.0047	0.00491	0.0041	0.00634*
	−0.00349	−0.00366	−0.00325	−0.00347
GDP Per Capita (USD)	0.00000995	−0.00000671	0.0000142	−0.00000417
	(0.000)	(0.000)	(0.000)	(0.000)
Credit to Private Sector (% of GDP)	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Exchange Rate Regime (fixed 1-4 fully floating)	0.343**	0.151	0.176	0.224
	(0.1550)	(0.1540)	(0.1900)	(0.1730)
Inflation	−0.0109	−0.0203	0.0945**	0.0261
	(0.022900)	(0.022600)	(0.036700)	(0.038900)
ATMs per 100,000 adults	−0.0398***			
	(0.006200)			
Growth of Real Expenditure * ATMs per 100,000 adults	0.000709			
	(0.000569)			
Growth of Real Expenditure (t-1) * ATMs per 100,000 adults	0.000795*			
	(0.000477)			
Growth of Real Expenditure (t-2) * ATMs per 100,000 adults	−0.000175			
	(0.000485)			
Branches per 100,000 adults		−0.0453***		
		(0.0093)		
Growth of Real Expenditure * Branches per 100,000 adults		0.00508***		
		(0.000814)		
Growth of Real Expenditure (t-1) * Branches per 100,000 adults		0.00196**		
		−0.00082		
Growth of Real Expenditure (t-2) * Branches per 100,000 adults		0.000261		
		(0.001)		
Borrowers per 1,000 adults			−0.00529***	
			(0.001)	
Growth of Real Expenditure * Borrowers per 1,000 adults			0.00043***	
			(0.0001)	
Growth of Real Expenditure (t-1) * Borrowers per 1,000 adults			0.000122	
			(0.000105)	
Growth of Real Expenditure (t-2) * Borrowers per 1,000 adults			−0.0000244	
			(0.000104)	
Depositors per 1,000 adults				−0.000857***
				(0.000286)
Growth of Real Expenditure * Depositors per 1,000 adults				0.0000498**
				(0.000024)
Growth of Real Expenditure (t-1) * Depositors per 1,000 adults				0.0000214
				(0.000020)
Growth of Real Expenditure (t-2) * Depositors per 1,000 adults				−0.0000277
				(0.0000)
Constant	3.21***	3.72***	55.94***	2.02***
	(0.515)	(0.504)	(4.164)	(0.152)
Observations	670	749	610	822
R-squared	0.226	0.105	0.618	0.604

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Appendix 6. Financial Technology

Model specification and data. The study conductsd simple OLS regressions on end-2015 cross-sectional data for all countries covered by the IMF's Financial Access Survey (FAS) database (http://fas.imf.org), using a simple model specification[1]:

$$Y_i = \alpha + \beta_1 X_i + \beta_2 C_i + u_i$$

where $\mathbf{Y_i}$ is a measure of financial inclusion, $\mathbf{X_i}$ a set of explanatory variables, and $\mathbf{C_i}$ a set of control variables.

Dependent variables, $\mathbf{Y_i}$. To measure the level of financial inclusion, the study looks at a number of indicators that have been used before in the financial inclusion literature,[2] for which data are available in the FAS database. Specifically: we considered (i) number of ATMs per 1,000 inhabitants; (ii) number of commercial bank branches per 1,000 km^2; (iii) number of bank loans per 1,000 inhabitants; and (iv) number of deposit accounts per 1,000 inhabitants.

Explanatory variables, $\mathbf{X_i}$. Based on the broad trends in technology access in Asia and Pacific, the following variables are considered: (i) level of cellular access, as measured by per capita mobile phone subscriptions; (ii) internet access, as measured by the number of secure internet servers per capita; and (iii) the level of technology leapfrogging, measured by the ratio of mobile

[1]The sample varies based on the availability of data on different financial inclusion indicators. The dataset contains about 190 economies, most of which are features in regressions. The financial inclusion data run from 2004 until 2015, but in many cases data are only available starting from 2008.

[2]See for instance, "Financial Inclusion: Can It Meet Multiple Macroeconomic Goals?" by Ratna Sahay, Martin Čihák and others, International Monetary Fund, Staff Discussion Note 15/17, 2017.

to fixed line phone subscriptions. The study also tests for specific effects of greater technology access in the Asia-Pacific region by including interaction terms between the Asia-Pacific regional dummy and cellular and internet access, as well as technology leapfrogging.

Control Variables, $C_{i.}$ The controls are: (i) level of income, as measured by GNI per capita, (ii) regional effects, captured by dummies, and (iii) financial depth proxied by credit-to-GDP ratio.

The study uses two regional dummies to highlight the performance of Africa, which is a key comparator for the relationship between technology and financial inclusion. The economic interpretation of the coefficients is broadly that positive, significant coefficients imply technology complements inclusion in the traditional financial system. Negative significant coefficients imply a technology is substituting for inclusion in the traditional financial system. No significance implies the two phenomena are independent. There are no controls for cross-sectional dependence because of the short time-series (about 5–6 years in many cases).

Robustness. We also employ a country fixed effects specificaiton to verify the robustness of these results. These should be interpreted with caution due to the limited time series for several countries in our sample. Indeed, it was not possible to employ our second specification for depositors per 1,000 adults and borrowers per 1,000 adults due to the lack of data.

Table 6.1. Financial Inclusion and Fintech: Regression Results

Variables	ATM (per 100,000 adults)	Bank Branches (per 1,000 km^2)	Bank Loans (per 1,000 adults)	Deposit Accounts (per 1,000 adults)
Leapfrogging	−0.03***	−0.01**	−0.12**	−0.64***
	(0.01)	(0.01)	(0.05)	(0.19)
GNI per capita	0.00**	−0.00**	0.00***	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
APD dummy	−3.45	3.83	−2.09	−108.75
	(2.73)	(3.04)	(31.78)	(86.11)
AFR dummy	−2.03	−7.28***	−80.27***	−353.31***
	(1.91)	(1.79)	(29.56)	(59.27)
Leapfrogging * Asia Dummy	−0.06***	0.03	−0.96***	−1.33
	(0.02)	(0.04)	(0.30)	(1.01)
Cellular Access	0.15***	−0.09***	0.50	3.92***
	(0.03)	(0.03)	(0.34)	(1.10)
Cellular * Asia Dummy	0.08	0.15***	−0.30	−1.95
	(0.06)	(0.06)	(0.44)	(1.69)
Cellular * Africa Dummy	−0.04	0.06*	0.63	−2.88**
	(0.03)	(0.03)	(0.45)	(1.18)
Internet Access	0.62***	0.45***	7.12***	8.24***
	(0.06)	(0.07)	(0.74)	(2.32)
Internet * Asia Dummy	−0.11	−0.56***	1.35	9.71**
	(0.12)	(0.10)	(1.13)	(4.42)
Internet * Africa Dummy	0.08	0.49**	−2.19*	24.38***
	(0.10)	(0.23)	(1.26)	(4.01)
Constant	1.79	7.81***	41.22	390.56***
	(1.81)	(1.57)	(29.07)	(56.96)
Observations	1,137	1,250	653	807
R-squared	0.58	0.19	0.54	0.44

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6.2. Technological Leapfrogging and Financial Inclusion

Variables	(1) Branches per 100,000 adults	(2) ATMs per 100,000 adults	(3) Depositors per 1,000 adults	(4) Borrowers per 1,000 adults
Technological Leapfrogging	0.00	−0.03***	0.31	−0.02
	0.0000	(0.0065)	(0.3900)	(0.0200)
Internet Access	0.07***	(0.00067)***	9.93***	2.07**
	(0.040000)	(0.000035)	(2.510000)	(0.810000)
Cellular Access	0.03** ***	−0.000726***	0.89	0.47*
	(0.010000)	(0.000231)	(0.810000)	(0.240000)
GNI per Capita	0.00	−0.017	0.03****	0.00
	0.000000	(0.037400)	(0.010000)	0.000000
Financial Development	0.00***	−1.744**	0.00	0.00***
	0.000000	(0.709000)	0.000000	0.000000
Constant	6.44***	4.56	164.39	99.64*
	(1.32)	(4.15)	(148.12)	(53.66)
Observations	830	829	739	634
R-squared	0.730	0.767	0.460	0.320
Number of Countries	133	127	93	77

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 6.3. Technological Leapfrogging and Financial Inclusion (Pacific Islands)

Variables	(1) Branches per 100,000 adults	(2) ATMs per 100,000 adults	(3) Depositors per 1,000 adults	(4) Borrowers per 1,000 adults
Technological Leapfrogging	0.00	−0.03***	0.31	−0.02
	0.000	(0.010)	(0.390)	(0.020)
Internet Access	0.07***	0.61***	9.93***	2.07**
	(0.040)	(0.140)	(2.510)	(0.810)
Cellular Access	0.03***	0.1***	0.89	0.47*
	(0.010)	(0.040)	(0.810)	(0.240)
GNI per Capita	0.00	0.00	0.03**	0.00
	0.000	0.000	(0.010)	0.000
Financial Development	0.00*	0.00**	0.00	0.00***
	0.000	0.000	0.000	0.000
Technological Leapfrogging * Pacific	0.03***	0.69***	—	—
	0.000	(0.010)		
Internet Access * Pacific	(0.03)***	(0.02)	—	—
	(0.010)	(0.030)		
Cellular Access * Pacific	−0.02	0.03	—	—
	(0.040)	(0.140)		
Constant	6.45***	4.56	164.39	99.64*
	(1.32)	(4.150)	(148.12)	(53.66)
Observations	830	829	739	634
R-squared	0.730	0.767	0.460	0.320
Number of Countries	133	127	93	77

[1]Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Appendix 7. Bangladesh: Building on Success

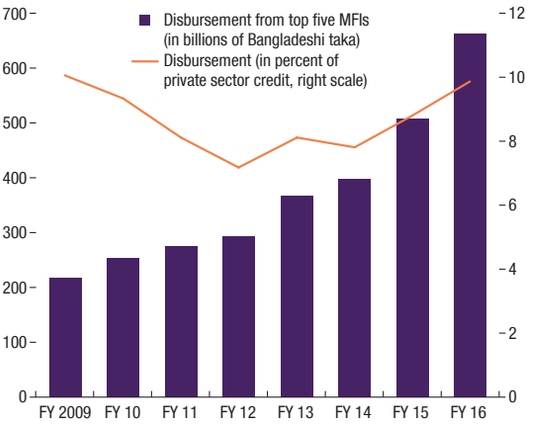
Financial inclusion is not new to Bangladesh. Historically, the intent to financially include the underserved was addressed with microcredit which aimed to provide financial services where the reach of formal finance was limited. Grameen's success in reducing poverty and promoting economic growth has drawn wide acclaim, including the award of the Nobel Peace Prize to its founder in 2006. Committing to the Maya Declaration and following it up by setting up the Financial Inclusion department in Bangladesh Bank (BB) are steps the authorities have taken to stress that Financial Inclusion continues to be a high-priority goal. BB's current Strategic Plan (2015–19) continues to include goals, with action plans and key performance indicators following its policy stance while promoting financial inclusion along with maintaining inclusive growth and financial stability.

Microcredit has helped boost financial inclusion but recent measures focus on enhancing all aspects—access, usage and quality—of financial inclusion. Microcredit has been an essential fabric of Bangladesh's effort towards financial inclusion. It has been taken up by micro-finance institutions (MFIs), nongovernment organizations (NGOs), commercial banks, and specialized programs of different ministries. Outstanding disbursements by the top five MFIs in FY16 compares to a substantial 10 percent of private sector credit extended by the banking system.[1] Along with the strides made by microfinance, financial inclusion has also benefitted from the multifaceted efforts made by the authorities inclusive of all aspects of financial inclusion. Some of these efforts are the introduction of no frill accounts, agent based banking and mobile financial services; the requirement that banks open at least

Prepared by Jayendu De, Cormac Sullivan (both APD) and Muhammad Imam Hussain (IMF RRO, Dhaka).

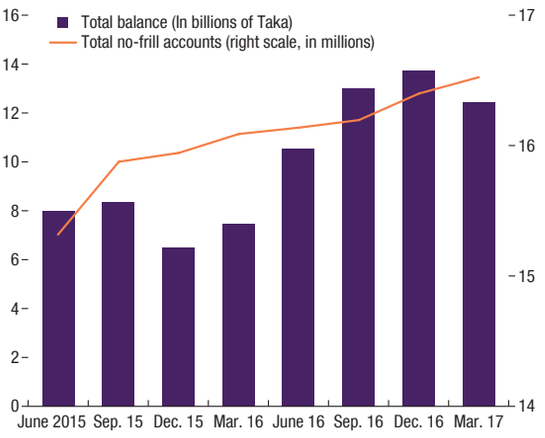
[1]The Microcredit Regulatory Authority oversees transparency, accountability and efficiency of MFI operations. As of June 2016, there were 680 licensed MFIs (an additional 191 with provisional licenses) catering to over 26 million clients.

Disbursements: Five Largest Micro-Finance Institutions (MFIs)



Source: Bangladesh Bank (2016).
Note: FY refers to "fiscal year". Bangladesh fiscal year runs from July–June.

Balance in No-Frill Accounts



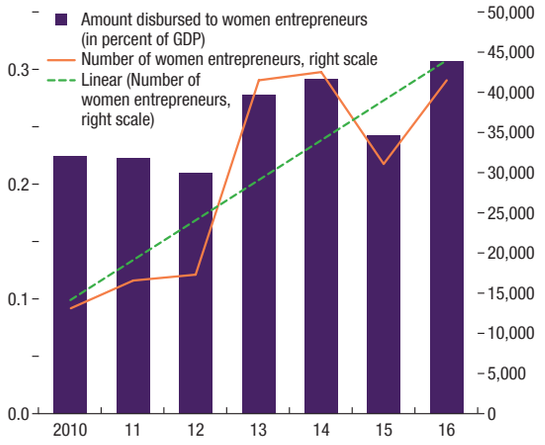
Source: Bangladesh Bank, *Annual Report*, 2015–16.

fifty percent of new branches in rural areas; floors on credit to the agricultural and rural sectors backed by credit refinancing lines on concessional terms; support to SMEs and women entrepreneurs.

Amongst these measures, no-frill accounts provide one of the most affordable pathways to formal finance. Introduced in 2010, the no-frill Taka 10 accounts targeted farmers to enable them to receive government transfers increasing processing speeds, reducing corruption and administrative costs. Workers from the garment, small footwear and leather industry, city corporation cleaning workers, and the physically challenged were later included as part of this effort. To encourage participation from previously unbanked groups, these accounts come without fees or minimum balance requirements. Similarly, banking services via no-frill accounts were also introduced for school children which also offered competitive interest rates, zero service charges and allows for the use of ATM or debit cards. To be further inclusive, in 2014, banks were instructed to provide similar services to children from impoverished backgrounds under the guidance of NGOs working with them. Because of these measures, access to formal finance has improved over the years as indicated by the growth in the number of accounts including the deposits held in them.

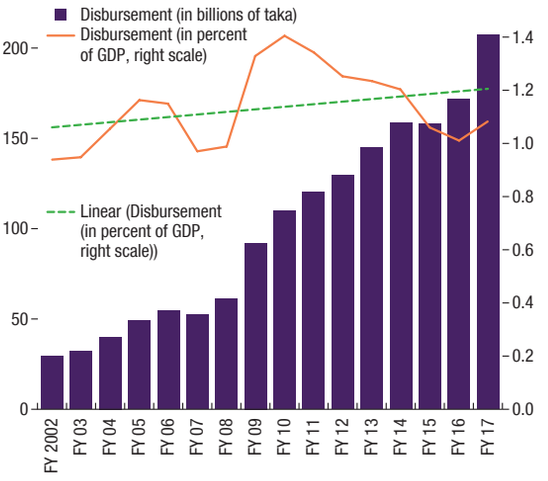
Other measures target SMEs, women entrepreneurs and priority sectors. The authorities along with development partners have eight refinance facilities for banks and NBFIs through which they are expected to provide personally guaranteed uncollateralized loans to women entrepreneurs, new entrepreneurs and cottage and agro-based industries at preferential rates. In addition, they are encouraged to offer SMEs (minimum 20 percent of their lending), and especially women entrepreneurs a minimum amount of credit (at least fifteen percent of the total SME funding). These efforts have led to an increase in disbursements to women entrepreneurs from a little over 0.2 percent of

Women Entrepreneurs



Source: Bangladesh Bank, *Annual Report*, 2015–16.

Agriculture and Rural Credit

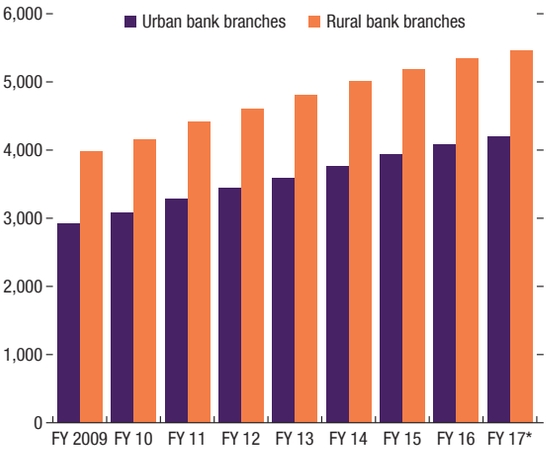


Source: Bangladesh Bank, *Annual Report*, 2015–16.

GDP in 2010 to close to 0.3 percent of GDP in 2016. Similarly, BB's Agricultural and Rural Credit Policy and Program sets disbursement targets along with interest rate ceilings (currently 10 percent) for agricultural and rural credit from banks including specialized and state owned banks. The interest rate on credit provided for certain import heavy crops like pulses, oilseed, spices and maize or in certain areas like the Hill Tract districts is further subsidized by the government. While disbursements under this program, on average, have been increasing in nominal terms exceeding the set targets, they have however been decreasing more recently as share of GDP. To incentivize more lending in these priority sectors, since July 2015, BB has stopped the practice of compensating banks on the blocked undisbursed amounts held in BB's accounts.

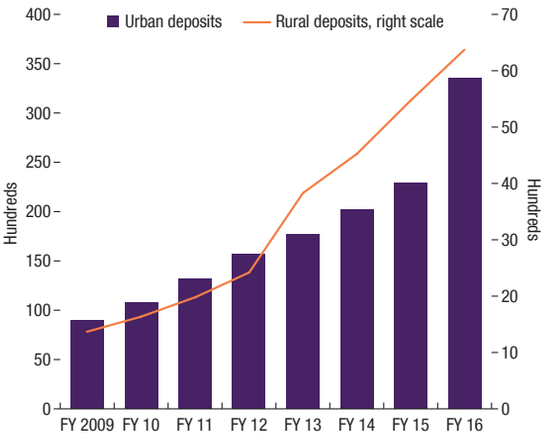
Mobile financial services, agent based banking, bank branch policies and upgrading financial architecture have bolstered access and usage in geographically difficult locations. Mobile financial services and agent based banking, introduced in 2011 and 2013, have grown very rapidly with five mobile operators and eighteen banks providing mobile financial services and twelve banks offering agent based banking. These services combat the traditional brick-and-mortar approach to banking helping overcome geographical difficulties and reaching a larger audience. Collecting relevant documents needed for financial operations, accepting and disbursing small amounts of cash, monitoring loans disbursed, receiving and sending remittances or cash transfers are now easily achieved with these two services operating hand in hand. In addition, policies such as mandating banks to open fifty percent of their branches in rural areas or the launching of the National Payment

Urban Bank/Rural Bank Branches



Source: Bangladesh Bank, *Annual Report*, 2015–16.

Urban/Rural Deposits
(In billions of taka)



Source: Bangladesh Bank, *Annual Report*, 2015–16.

Switch Bangladesh, have also improved the access to finance tremendously. Because of these efforts, number of agents who provide mobile banking services increased from 51,000 in 2012 to 772,109 in 2017, while the number of active mobile money accounts increased from 0.5 million to 28 million over the same period. Agents who provide agent based banking have grown from 1,646 in December 2016 to 1,847 in June 2017.[2] The number of bank branches in the rural areas (with growing deposits) now exceed those in the urban areas and more than 9,000 ATMs exist around the country along with close to 36,300 point of sales machines.

However, there still is the need for the right mix of financial inclusion and macroprudential measures. While their financial inclusion efforts have yielded positive results, the authorities are tackling some of the downsides. For example, while non-performing loans (NPLs) have decreased in the agriculture sector from three years ago, there has been a sharp increase in the SME sector during the same period. The authorities are now planning on revisiting the set targets after consulting with the creditor institutions. They are also implementing better Know Your Customer (KYC) policies which allows for better monitoring of borrowers' credit quality. These include, mandatory national identity card for accessing credit, or setting up a dedicated window / desk for women and SME entrepreneurs in the creditor institutions which serve not only as a helpdesk but also help with KYC regulations.

[2]Authorized agents under the agent based banking scheme include NGOs, MFIs, cooperative societies, post offices, agents of mobile networks amongst others.

[2]bKash (a subsidiary of BRAC Bank) and Dutch Bangla Mobile are the more popular mobile banking services currently in use in Bangladesh.

Table 7.1. Gross Nonperforming Loans Ratio
(In percent of total loans outstanding in that sector)

	2013	2014	2015	2016
Agriculture	22.8	23.4	14.3	17.9
SME	9.9	9.2	18.7	13.2
Other sectors	7.8	8.9	8.3	8.6

Source: Bangladesh Bank, *Annual Report* (2015–16).

Bangladesh has made steady progress on FI over time and the momentum needs to persevere. Compared to other LIDCs, Bangladesh does relatively well in some areas of financial inclusion on important indicators like accounts held or saved at or borrowed from a financial institution. However, it needs to keep up the momentum of reforms to catch up regionally and with other middle income countries, an income status that it aspires to reach. As part of the Maya commitment, a rich policy tapestry is being laid out in the forthcoming National Financial Inclusion Strategy jointly formulated by the Ministry of Finance, BB and Department for International Development (DFID, U.K.). This strategy chalks out an overarching framework detailing definition, products, extent, time frame, prioritization, and the needed coordination for implementation. Credit growth in priority sectors, SME financing, gender priority, promoting access to finance in rural areas, green financing, a life-cycle approach toward inclusion and insurance remain prerogatives. Leveraging technology by building a digital ecosystem to connect the first and last mile of inclusion is also in the works.

Looking ahead, Bangladesh could also benefit from experiences in other countries. For example, while Bangladesh does very well in using mobile phones to make payments in South Asia, it lags when compared to other Asian countries like Malaysia or LICs like Kenya and Uganda. Challenges like this or others like the persistence of high level of informal finance or the low use of credit and debit cards needs investigating given that while access to informal finance (credit from friends, family, or a store) is easier, it typically is more expensive and less reliable than formal channels. No-frill accounts have helped reduce reliance on informal financing but further a boost to use channels of formal finance will come from building confidence in the formal financial sector such as by strengthening the process of the legal and regulatory framework or including a financial ombudsman (as was done in Malaysia). Innovative ideas such as requiring the payment of providing cheap energy via a bank account as was piloted in Papua New Guinea should also be considered as a means of expanding the access to formal finance. Conducting periodic surveys should continue as surveys shed light on the issues at hand and the strategies that can be formulated. Additionally, accountability by tracking progress and impact of these efforts with tools like a financial inclusion index should be developed. And finally, the finalized draft Financial Inclusion strategy should be implemented as planned to continue making progress and achieving set targets.

Appendix 8. Cambodia: Balancing Financial Inclusion and Stability

Financial deepening has improved inclusion, including through access to microfinance credit and mobile accounts. However, large gaps in financial access remain. Meanwhile, rapid credit expansion, heavily reliant on external funding within a dollarized system raises financial stability concerns. Further efforts are needed to safeguard financial stability while advancing financial inclusion.

Background[1]

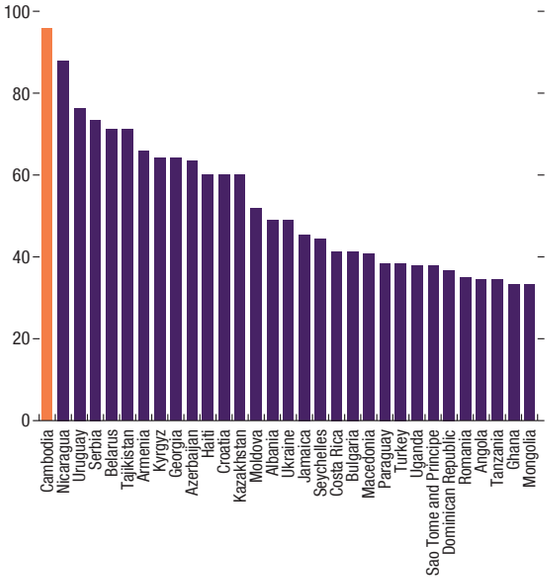
Cambodia has experienced strong economic growth and rapid financial deepening. With an average growth rate of 7.7 percent, Cambodia is among the top ten fastest growing economies in the world in the past two decades. Credit expansion has been high in recent years, averaging around 30 percent for commercial banks and 45 percent for microfinance institutions (MFIs).[2] This sustained financial deepening episode has driven total credit-to-GDP ratio to 86 percent by end-2016, exceeding the median emerging market level and more than double the median for low-income countries (LICs). Rapid credit growth has been supported by fundamental demand factors such

By Tadaaki Ikoma and Yong Sarah Zhou (both IMF), with contributions from Long Vipichbolreach, Uch Reaksmey, San Sopheawattey, and Nam Vissoth (all NBC). The team benefited substantial discussions with Jarkko Turunen and Yongzheng Yang.

[1]The focus of this case study is on the financial stability risks related with financial inclusion, especially those in the MFI sector given its importance in financial inclusion. See *Cambodia—Staff Report for the 2017 Article IV Consultation* for background of general financial risks related with rapid financial deepening in Cambodia.

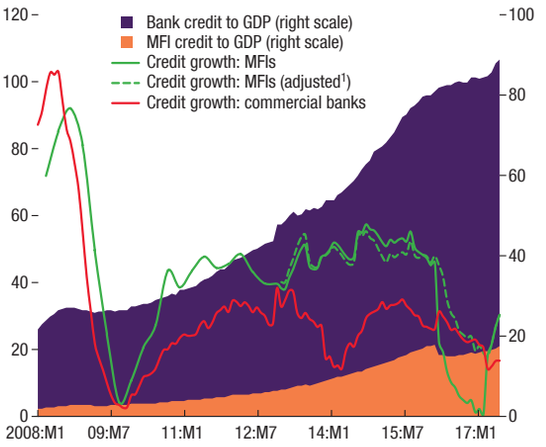
[2]For more background see *Cambodia—Staff Report for the 2017 Article IV Consultation*. Credit growth slowed in late 2016, due in part to policy measures including higher minimum capital requirements and phased implementation of the Liquidity Coverage Ratio, as well as election-related uncertainties. Lower MFI credit growth in 2016 also reflected the second-largest MFI's merger with a commercial bank.

Cambodia: Dollarization
(In percent; the share of foreign currency deposits in total deposits; data as of 2015)



Source: IMF staff estimates.

Private Sector Credit: MFIs and Commercial Banks
(In percent)



Sources: NBC; and IMF staff estimates.
[1]Excludes credit of the second-largest MFI, which was reclassified into a commercial bank in 2016.

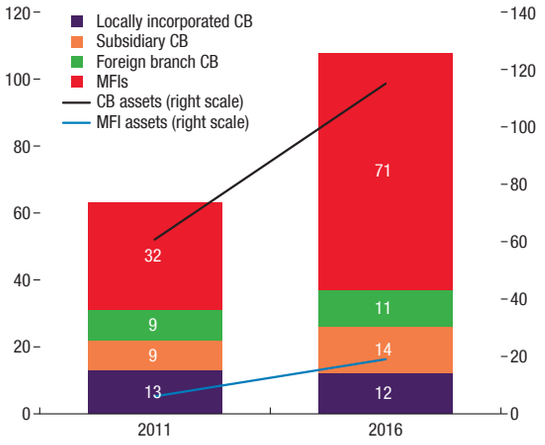
as large housing and consumption needs from Cambodia's young population and emerging middle-class. However, Cambodia's highly dollarized financial system (95 percent of deposits are denominated in U.S. dollars) has relied heavily on external U.S. dollar borrowing rather than on mobilizing domestic currency (riel) savings.[3]

Financial Inclusion

Rapid growth of the MFIs has contributed to improving financial inclusion. Cambodia's financial system is dominated by banks, accounting for 90 percent of total assets. But banks are mostly clustered in urban areas and target big corporates and high-income groups. The MFIs, on the other hand, offer financial products that are more customized towards the need of the rural and low-income population. The number of MFIs has almost tripled and MFIs assets-to-GDP ratio expanded from 4 percent to 20 percent between 2011 and 2016, extending formal financial services to the previously unbanked, especially in rural areas. As of 2016, MFIs provided loans to over 2 million borrowers (20 percent of adult population), more than three times as many clients as commercial banks served.

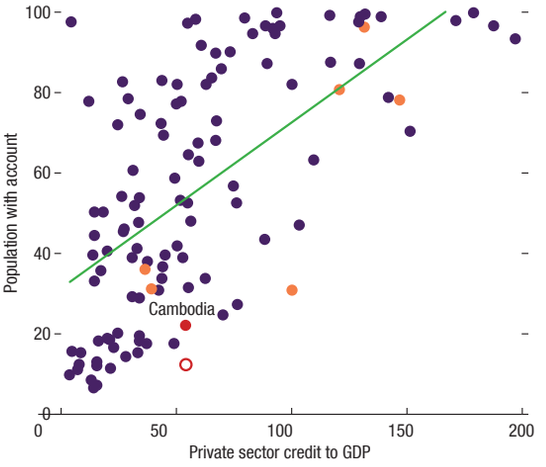
[3]Average loan-to-deposit (LTD) ratio of commercial banks reached 100 percent by end-2016, from 79 percent in 2010.

Cambodia: Number of Institutions and Assets to GDP
(In percent)



Sources: National Bank of Cambodia, *Annual Supervision Report 2011–2016*; and IMF staff estimates.
Notes: CB refers to commercial banks, MFIs refers to micro-finance institutions.

Financial Depth and Access
(In percent)



Source: Global Financial Development database.

Mobile financial services also grew rapidly, contributing to financial access. Mobile money accounts have increased rapidly in recent years, in terms of number of mobile accounts as percentage of population, Cambodia is the highest among regional peers. This is supported by strong demand from domestic migrant workers for low cost money transfer services as well as rising mobile phone penetration. Mobile technology (financial innovation) helps lowering costs and broadening access to payments services to otherwise under-served segments of the population (e.g., in rural areas).

Financial inclusion nevertheless remains relatively low and uneven. Share of Cambodia's adult population holding accounts (including mobile accounts), an important measure of financial inclusion,[4] is lower than the level suggested by its level of income and financial depth. In addition, improvements in financial inclusion are uneven, with credit access progressing much faster than other forms of inclusion. For example, Cambodia has one of the highest rates (around 28 percent) of adult population borrowing from a financial institution but one of the lowest rates (only 4 percent) of adults saving at a financial institution.[5]

[4]Based on the latest available internationally comparable data from the World Bank's Global Findex database (from 2014). Based on the definition in Finscope 2015, Cambodia has a moderate level of access to financial services with 59 percent of adults formally included, higher than that of Laos and Myanmar. Owing to continued financial deepening, financial inclusion is likely to have improved further over the past few years.

[5]Based on World Bank's Global Findex database (from 2014). Finscope Survey data also shows that use of financial services is skewed to credit, with relatively less usage of savings, transactions, and insurance, despite recent rapid growth from a low base.

Use of Financial Products
(In percent of those financially included)

Source: FinScope Surveys.

Cambodia government has made financial inclusion a strategic priority. Financial inclusion objectives have been included in the *Financial Sector Development Strategy 2016–2025*. The government plans to develop a National Financial Inclusion Strategy, led by the National Bank of Cambodia (NBC). Moreover, the government plans to take lead to draft laws and regulations to establish a credit guarantee scheme that will facilitate increased access to credit and further increase financial inclusion in the country.[6]

Financial Stability

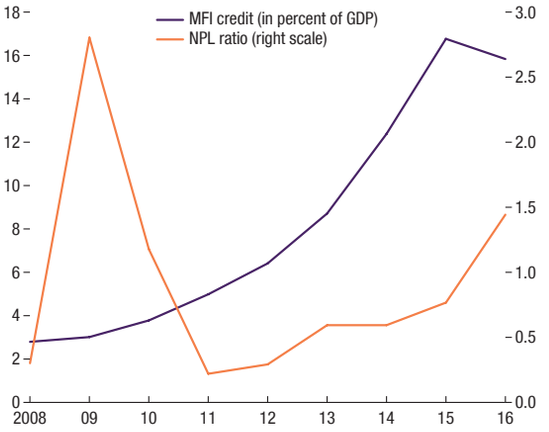
While critical for improving financial inclusion, the systemic role of MFIs also poses financial stability risks. MFI credit stock and flows account for about 20 percent of those in the financial system. As a result, some deposit-taking MFIs (MDIs)[7] are now larger than some mid-sized commercial banks. Although predominantly funded through foreign borrowing[8], MFIs also borrow from domestic banks, increasing interconnectedness risks. Other stability risks stemming from MFI growth include:

- Liquidity risks. MFIs rely largely on external sources of funding (in some cases from institutions with development purposes) and the average loan-to-deposit (LTD) ratio for MDIs is over 200 percent. MFIs that rely on commercial borrowing from overseas may face rollover risks or higher interest rates if global financial conditions tighten .
- Foreign exchange risks. Explicit currency mismatch in MFIs' balance sheet is not significant with around 90 percent of loans denominated in U.S. dollars. However, changes in the riel/ U.S. dollar exchange rate can impact unhedged borrowers' debt servicing capacity. This is particularly relevant for MFIs with their high level of exposure to borrowers in rural areas where income is mostly denominated in riel.
- Credit risks. Cambodia's low level of economic diversification and other vulnerabilities (such as the large share of the population engaged in agriculture, which is vulnerable to natural disasters) makes it susceptible to

[6]UNCDF, MAP Cambodia, Financial Inclusion Country Report (2017).
[7]As of 2016, there are seven MDIs out of 71 MFIs.
[8]MFIs' funding largely comes from their parent companies, and from international or bilateral development financial institutions, which the authorities consider to be a stable form of funding.

shocks. MFIs are expanding loans at a fast pace, especially in the rural areas, to maintain growth targets in the context of a highly-saturated industry and ensuing competition. As a result, both the average MFI loan size and NPL ratio have increased, suggesting an upward trend in credit risks.[9]

Microfinance Credit
(In percent)



Sources: NBC; and IMF staff estimates.

MFIs are subject to less stringent regulation than banks. Less stringent regulation has allowed the MFI sector grow, thus improving financial inclusion, in the past. However, despite growing systemic importance as well as similarity in roles and risks, MFIs are still subject to looser capital and reserve requirements than banks. Current regulations exempt MFIs from having provisions for restructured loans and impose looser asset classifications.

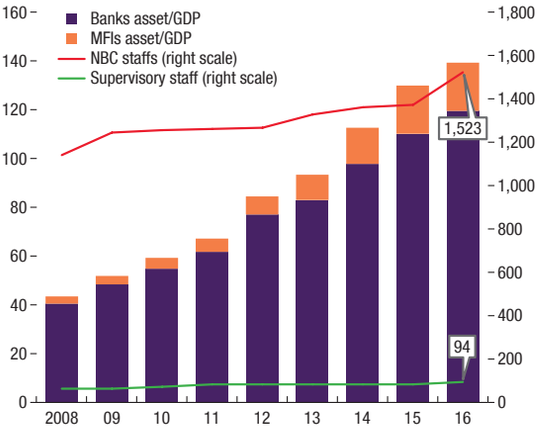
How to Safeguard Stability while Allowing Further Financial Inclusion?[10]

Increased risks in the MFI sector calls for strengthening regulation and supervision, with a view to eliminating regulatory arbitrage. Policies should standardize assets classification, unify accounting and provisioning standards between MFIs and banks, adjust reserve requirements for MDIs to be in line with banks and improve monitoring of systemic linkages. Asset classifications should be standardized for all banks and MFIs. Standardize asset classifications will also reduce unnecessary costs when the NBC supervises both simultaneously within the same departments. Solvency ratio for MFIs as well as for commercial banks needs to be more in line with the Basel II and Basel III principles.

[9]The average loan size has almost doubled in three years, from around US $800 in 2013 to almost US $1600 in 2016 (exceed the GDP per capita). Mimosa report, 2016.

[10]The recommendation listed here places the primary focus on the MFI sector and mobile financial services. See *Cambodia—Staff Report for the 2017 Article IV Consultation* for recommendations for the overall financial system.

Financial Sector Development and Staffing
(In percent)



Source: National Bank of Cambodia.

Further prudential measures to factor in dollarization risks can improve local currency use, promote financial inclusion while reducing vulnerabilities. The NBC has taken welcome measures to promote riel use, including through Liquidity-Providing Collateralized Operations, established in October 2016 to provide lower-cost riel liquidity. The NBC should monitor unhedged exchange rate risk exposure in banks and MFIs' clients and ensure that they remain in prudent limits via maximum debt-servicing to income ratio. The supervisory framework should also apply different prudential treatment to riel and U.S. dollar intermediation in line with the different risk profiles.

Ensuring adequate regulation and supervision is key to balancing financial inclusion and stability. Constraints on human resources and capacity, with largely unchanged number of the NBC staff over time, impedes adequate and effective supervision of the fast-growing financial sector. Alleviating strains on supervisory capacity and resources need to be prioritized.[11] There is also need to shift towards more risk-based supervisory approach away from compliance-based approach.

[11]IMF (2015) argues that the trade-off between financial inclusion and stability depends upon the quality of supervision. When the quality of supervision is strong, broadening access to credit increases stability as proper capital and profit buffers are built up.

Appendix 9. Financial Inclusion in India

Greater financial inclusion and enhanced access to credit have been a long-standing policy priority in India. Broader availability of financial services has been seen as critical for curbing poverty and inequality, and boosting domestic growth. In previous decades, financial inclusion efforts focused predominantly on channeling credit to weaker segments of the economy, rural areas and underserved populations via various schemes, including minimum priority-sector lending (PSL) requirements for commercial banks.[1,2] Various policy initiatives have also focused on bolstering institutional credit to the agricultural sector.[3] Most recently, the crop insurance scheme, *Pradhan Mantri Fasal Bima Yojana (PMFBY)*, launched in February 2016, subsidizes farmers' insurance premiums. In addition, India relied heavily on specialized development financial institutions (DFIs), intended to support industrial growth via project finance funding until the 2000s. Established in the 1950s and 1960s, these institutions—funded by domestic bond markets; multina-

Prepared by Silvia Iorgova, Purva Khera, and Sonali Das.

[1]The Reserve Bank of India's (RBI's) policy on priority-sector lending (PSL) requires banks to allocate a minimum of 40 percent of assets to priority sectors, which include agriculture; micro, small and medium enterprises; export credit, education, housing, social infrastructure, and renewable energy.

[2]Other notable schemes were the *Lead Bank Scheme (LBS)*, with a principal bank designated to coordinate banks' activities and the availability of credit to priority and other sectors within each district, initially only in rural areas and as of 2014 all across India; a *Service Area Approach (SAA)* under which banks provide credit within specific rural and semi-urban areas; and a *Self-Help Group (SHG)*-Bank Linkage Programme to channel delivery of microfinance solutions, including credit, to self-help, mostly rural groups. Alongside commercial banks, regional rural banks (RRBs) played a pivotal role in these schemes.

[3]These include: (i) the *Kisan Credit Card (KCC)* for farmers launched in 1998–99 which provides subsidized loans to farmers for meeting production needs (cultivation expenses), as well as contingency expenses, and expenses related to ancillary activities.; (ii) an initiative to double the volume of credit to agriculture over three years (by 2006–07 relative to the 2004–05 base); (iii) the *Agricultural Debt Waiver and Debt Relief Scheme (ADWDRS)*, introduced in 2008 in response to the persistent problem of indebtedness faced by farmers; and (iv) the interest rate subvention, introduced in 2010–11 to provide incentives for prompt loan repayments, following the failure of the *ADWDRS* which undermined farmers' debt repayment capacity.

tional institutions; the RBI finance window; and budgetary provisions—were deemed unviable by the 1990s. Thus, most were converted into commercial banks in the early 2000s and current DFIs—including the National Bank for Agriculture and Rural Development (NABARD) and the Small Industries Development Bank of India (SIDBI)—mostly focus on refinancing for rural economic activity, and micro, small, and medium enterprises (MSMEs).

However, many of these undertakings only had a limited success in achieving the desired outcomes. For example, while the PSL requirement has been in part effective in increasing the flow of credit to priority sectors, banks often circumvent targets by investing in other eligible instruments including NABARD- and SIDBI-issued bonds. The share of long-term credit flows to the agricultural sector, hence, declined to 39 percent in 2011–12, from 55 percent in 2006–07.[4] Thus, the agricultural sector continues to rely heavily on informal finance, which accounts for nearly 40 percent of loans to the sector, 26 percent of which is sourced from moneylenders. Marginal and small farmers are most affected, with only 15 percent having access to formal finance (from institutional sources such as the government, cooperatives and banks), compared to 79 percent for larger, better-off farmers (with land more than 10 hectares).

Recent policy efforts have taken a more holistic approach to financial inclusion. Steps have broadly followed three key dimensions: (i) rapidly expanding access to formal bank accounts; (ii) creating incentives for boosting transactional volumes of financial products and expanding add-on products; and (iii) making further efforts to expand the availability of credit to underserved sectors via the setting up of Micro Units Development Refinance Agency (*MUDRA Bank*) in FY2016. This approach relies on the integration of key enablers, including access to formal accounts (*Jan Dhan Yojana*); unique biometric identification of each citizen (*Aadhaar*); and reliance on mobile technologies (*Mobile*), or the *Jan Dhan Yojana-Aadhaar-Mobile (JAM) trinity*.

The rest of this chapter will identify the key factors for the rapid expansion of access to financial services in India. It will also identify critical aspects that should be addressed to deepen access, including ensuring better transactional use of financial services.

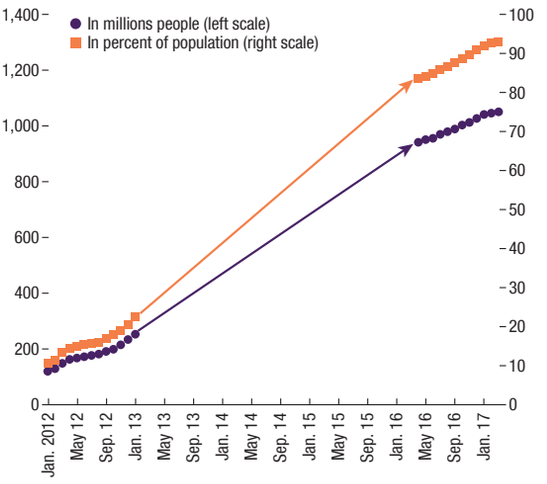
The Critical Role of *Aadhaar*

The inability to reliably identify customers had been a longstanding impediment to financial access in India, prompting the introduction of unique iden-

[4]Based on 70th-round data from the National Sample Survey Organisation (NSSO; 2013). See http://mospiold.nic.in/national_data_bank/ndb-rpts-70.htm.

tification numbers in 2010. Prior to the introduction of the unique identification numbers (*UID* or *Aadhaar*), the inability or complexity of proving one's identity accounted for considerable loss of public benefits for many Indian citizens, and made access to financial services costly or unavailable. To address this challenge, India's Unique Identification Authority (UIDAI) initiated issuance of *Aadhaar* to residents in August 2010. In *Aadhaar*, identity is determined via the collection of basic demographic information and biometric data, including fingerprints and an iris scan. Registration accessibility across localities, and even during power shortages, has supported steady expansion of *Aadhaar* registrations. While signing up is voluntary and the Supreme Court has ruled that *Aadhaar* identification cannot be made mandatory for welfare schemes, having a UID facilitates participation in such schemes and is becoming mandatory for certain non-welfare services such as applying for a driver's license and filing tax returns. As of March 2017, over 1.1 billion Indians (90 percent of the population) had *Aadhaar* identification, a close to a nine-fold increase relative to January 2012.[5]

Aadhaar Accounts

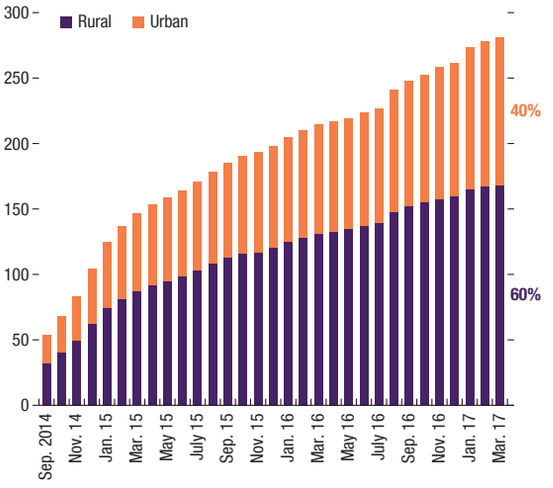


Source: Unique Identification Authority of India (UIDAI).

The sizable expansion of *Aadhaar* has facilitated financial access. *Aadhaar* availability has streamlined the opening of bank accounts, whose previously high identification costs were a deterrent for potential users. *Aadhaar* has also enabled application of "know your customer" (KYC) norms, with UIDAI working with financial regulators early on to enable electronic (e-KYC) platforms. Importantly, *Aadhaar*-leveraged technology has been critical for curtailing misuse, including fraudulent access to subsidy rolls and financial accounts via multiple identities. The *Aadhaar* platform has, thus, provided a unique opportunity to streamline the delivery mechanism of welfare programs, and support transparency and good governance. *Aadhaar* has also enhanced the coverage and, hence, usefulness of the Credit Bureau, thereby facilitating access to financial products for Indian citizens.

[5]See International Monetary Fund (2017), *India—Staff Report for the 2017 Article IV Consultation*, IMF Country Report No. 17/54, and International Monetary Fund (2016), *India—Staff Report for the 2016 Article IV Consultation*, IMF Country Report No. 16/75.

Number and Balances of PMJDY Accounts
(In millions and Indian rupee; unless otherwise indicated)



Source: PMJDY.

Recent Financial Inclusion Policy Steps: Key Aspects

Supported by *Aadhaar*, recent policy initiatives have been successful in enhancing individual access to bank accounts, though use of accounts is still limited. As recently as 2011, a Census survey revealed that only about 59 percent of households had bank accounts, with low access for rural and low-income populations, and women. The launch of the *Pradhan Mantri Jan Dhan Yojana (PMJDY)* in August 2014—backed by the rapid spread of *Aadhaar*—however, has led to the addition of more than 280 million bank accounts by previously unbanked individuals.[6] Importantly, the new accounts are linked to population segments that earlier had minimal access to the formal financial system, with close to half of new accounts opened by females and 60 percent by persons in rural areas. Thus, the penetration of bank deposit accounts in India—at more than 1.5 per adult as of end-2015—is now high relative to comparator countries. However, the high share of accounts per adult obviates continued constraints in the use of financial services, as certain individuals have multiple banks accounts; average balances are small (at less than Rs. 2,500); and transactional volumes are still limited. This in part reflects infrastructure constraints, such as a relatively low density of bank branches and ATMs, and limited mobile money transactions across India (Table 9.1).

The linking of delivery of subsidies and social spending to PMJDY accounts has supported more targeted and efficient government social transfers. To also incentivize higher transactional volumes through PMJDY accounts, there has been a channeling of add-on services, including debit cards and digital direct benefit transfers (e.g., direct cash payments for social programs, certain food and fertilizer subsidies, and health insurance); bundling with free life and accident insurance, and pension products; and the offering of incentives, such as overdraft facilities.[7] More extensive channeling of transfers and

[6]PMJDY accounts are largely channeled through public banks, which account for 80 percent of enrolment. Transactions are facilitated by fixed-point agents (*Bank Mitra*) that act on behalf of banks.

[7]These include *Aadhaar*-enabled micro-ATMs and RuPay debit cards to replace cash transactions, *Pradhan Mantri Suraksha Bima Yojana* (PMSBY) on accidental death insurance; *Pradhan Mantri Jeevan Jyoti Beema Yojana* (PMJJBY) on life insurance; *Atal Pension Yojana* (APY) on defined pension for citizens in the unorganized sector.

Table 9.1. Access to and Use of Financial Services, End-2015

	India	Vietnam	Kenya	Pakistan	Bangladesh	Ghana	China	Indonesia	Malaysia	Philippines	Thailand
Automated Teller Machines (ATMs) per 100,000 adults	20	24	10	9	7	10	76	53	51	25	114
Branches of commercial banks per 100,000 adults	14	4	6	10	8	7	8	18	11	9	13
Deposit accounts with commercial banks per 1,000 adults	1,542	854	1,316	367	681	685	31	934	2,310	560	1,537
Outstanding deposits (in percent of GDP)	66	124	40	30	53	29	157	38	114	47	77
Loan accounts with commercial banks per 1,000 adults	154	. . .	231	26	89	. . .	. . .	221	718	. . .	429
Mobile money transactions: number per 1,000 adults	193	920	41,650	3,050	10,182	15,876	. . .	2,876	70	4,775	. . .
Mobile money transactions: value, in percent of GDP	1.0	0.8	45.2	6.8	10.3	25.3	. . .	0.1	0.1	3.5	. . .

Source: IMF, *Financial Access Survey*.

subsidy payments through *Aadhaar*-linked bank accounts can yield additional fiscal savings.

The strong policy impetus to foster digitalization of financial services is critical for expanding financial access, reducing transaction costs and achieving efficiencies. The Government of India's flagship *Digital India* initiative, expected to give India's digital economy a considerable push by 2019, coupled with technology-led improvements in payments infrastructure via the *Unified Payments Interface (UPI)* platform, if successful, should lower barriers for financial inclusion.[8] The *UPI* platform—an instant, smartphone-based electronic payment system introduced in 2016—permits digital linkage of multiple accounts to banking services, including person-to-person transfers and merchant payments, and should hence improve the speed and traceability of the payments process.

Efforts to expand the availability of credit to underserved sectors have continued and are critical for supporting the funding needs of the economy. The setup of *MUDRA Bank* and the *Pradhan Mantri MUDRA Yojana (PMMY)* scheme in 2015 was meant to bridge the gap in the availability of funding for micro-, small- and medium-sized enterprises (MSME) that

[8]The *Digital India* initiative was adopted in 2015. For more on the initiative, see *Digital India Book*, 2016, Department of Electronics and Information Technology, Government of India http://meity.gov.in/content/digital-india-book accessed April 20, 2017.

have no access to the formal financial system. *MUDRA Bank* provides refinancing to micro-finance and nonbank financial institutions, which then on lend to enterprises at different growth stages and with varying funding needs, including to enterprises led by women, scheduled castes (SCs), scheduled tribes (STs) or other backward classes (OBC). The *PMMY* scheme specifically targets micro enterprises.[9] A *Stand-Up India* scheme, launched in 2016, targets the provision of bank loans specifically to women entrepreneurs, SCs and STs.

Across the board, financial inclusion initiatives have specifically targeted women. *SHGs* established earlier mostly comprise women, and have hence been important for enhancing women's access to credit and their income-generating capacity. *SHG* loans to women are also set at preferential rates.[10] The *PMJDY scheme* has explicitly targeted women, providing overdraft facilities and other benefits on a priority basis to the wife in a family. The support for new business undertakings by women under the *PMMY scheme* has enabled an expansion in the access of women-led businesses to collateral-free finance. Overall, credit to women-led businesses accounted for about half of the total amount lent under *PMMY scheme* and about 80 percent of the number of loans.

Emphasis on increasing financial literacy has been an integral part of Indian policymakers' financial inclusion agenda. Efforts have been spread across institutions, including the Reserve Bank of India (RBI), the Securities Exchange Board of India (SEBI), and the Insurance Regulatory and Development Authority (IRDA). Notable initiatives, include RBI's *Project Financial Literacy*, which provides guidance, including on the setup of banks' financial literacy centers, and the conduct of financial literacy camps; and SEBI's cooperation with *Sanchayan*, an investor association conducting financial literacy programs, and the setup of a panel of qualified *Resource Persons* to disseminate knowledge across India.

Economic and Financial Stability Impact

Empirical analysis suggests that better access to affordable formal finance is associated with higher output and improved gender equality. Estimation of a two-sector general equilibrium model for India, incorporating formal and informal sources of finance, has showed that policies that enhance women's access to formal finance also improve gender equality in entrepreneurship.

[9] *MUDRA Bank* and PMMY thus target India's small firms, 90 percent of which are estimated not to have access to bank services (per estimate of the Mor Committee, 2014).

[10] SHG loans to women are currently set at the preferential rate of 7 percent with banks compensated through interest subventions. There are also cases when such loans are interest-free, such as funding for 78,000 women-run SHGs in Maharashtra, which are covered by a 100 percent subvention from the state government.

The overall increase in entrepreneurship in turn increases investment, labor force participation and employment, and thus strengthens GDP growth.[11] The considerable positive effect on output is found to be mostly linked to the relaxation of collateral constraints, while the reduction in income inequality is primarily related to the associated decline in funding costs.

However, there are certain trade-offs between financial inclusion and financial stability that necessitate careful monitoring. Counterfactual policy analysis for India shows that in the past, PSL has boosted financial inclusion and enterprises' access to credit, but has led to a slight uptick in NPLs.[12] As more firms have gained first-time access to funding from financial institutions or have further raised borrowing levels, their investment levels have increased, as have aggregate output and productivity. The impact on inequality has also been favorable. However, the expansion in entrepreneurs' access to credit has had side effects, notably in terms of rising NPLs, which warrants close monitoring of borrowers' credit quality and the need for careful balancing of financial inclusion prerogatives and macroprudential measures.

Risks and the Road Ahead

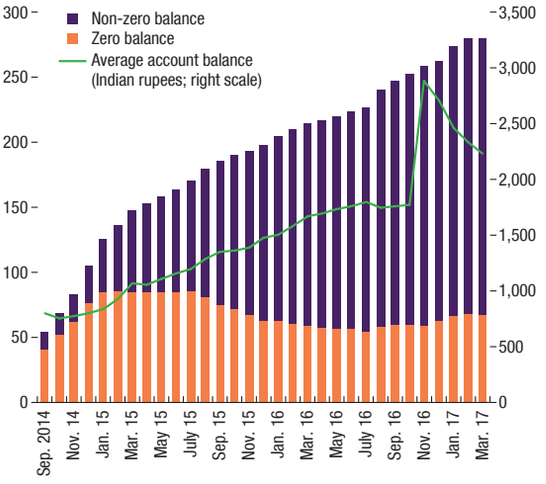
While account dormancy has declined, use of services and access to credit still need to be boosted. Propelling further financial inclusion hinges on encouraging higher transactional volumes on existing accounts, enabling digitalization, and more extensive financial literacy. The channeling of subsidies and social payments, and usage incentives have boosted use of PMJDY accounts, but transactional volumes and average account balances remain small. Expanding points-of-access, via broadening of ATM availability or further digitalization and mobile banking, and greater usage of direct benefit transfer schemes should stimulate use of accounts, and offer efficiency gains through better integration of financial services, ease of use and cost reduction.[13] Importantly, to support customers' confidence and the use mobile banking and UPI solutions, the authorities need to put emphasis on enhancing data security. In addition, further (particularly geographic) expansion of micro-finance schemes would provide needed funding to underserved populations, but should be carried out under tight regulatory oversight to avert

[11]See P. Khera, 2017, "Macro-Linkages between Gender Gaps in Access to Finance and Labor Market Outcomes," *India—Selected Issues,* IMF Country Report No. 17/55, pp. 63–70.

[12]See E. Dabla-Norris, S. Jain-Chandra, D. Filiz Unsal and E. Van Leemput, 2015, "Financial Inclusion and Access in India: Analysis using a Structural Model," *India, Selected Issues*, *IMF Country Report No. 15/62,* pp. 57–65.

[13]While the volume of mobile money transactions in India is still small relative to other countries, industry estimates suggest that India's mobile transactions are expected to grow very rapidly (12-fold in 2015–2020). See CISCO, VNI Forecast Highlight tool, http://www.cisco.com/c/m/en_us/solutions/service-provider/vni-forecast-highlights.html# accessed April 20, 2017.

Number and Balances of PMJDY Accounts
(In millions of Indian rupee; unless otherwise indicated)



Source: PMJDY.

overly aggressive growth and risk buildup. Finally, policy efforts should continue to put emphasis on facilitating healthy demand for formal finance via the strengthening of financial literacy programs, including workshops aimed at building rural communities' trust with the banking system, and conduct of surveys to understand the costs and barriers to usage of formal financial services.

Expansion of women's access to finance and economic opportunities hinges on the implementation of key structural policies to address gender disparities. Empirical work suggests that relaxation of the funding constraints faced by females in India is considerably more effective when accompanied by policies to alleviate labor market rigidities which account for gender gaps in labor market outcomes.[14] The government should measure the success of policy interventions by the pace of improvement in female labor market participation, the extent of rise in formal female entrepreneurship, and the mobility of female-led firms from small to medium or large sizes.

The various schemes meant to enhance the provision of credit to the agricultural sector have helped boost the flow of funding to the sector, but need to be rationalized. Specifically, the lack of proper coordination among the center and state governments have accounted for implementation inefficiencies. The high share of overdue loans in the sector also continues to pose a concern. Importantly, addressing inherent long-term structural bottlenecks and improving productivity in the agricultural sector should be given a priority to ensure the success of these schemes.

[14]See P. Khera, 2017, "Macro-Linkages between Gender Gaps in Access to Finance and Labor Market Outcomes," *India—Selected Issues,* IMF Country Report No. 17/55, pp. 63–70.

Appendix 10. Myanmar: Digital Leapfrog and Mobile Finance

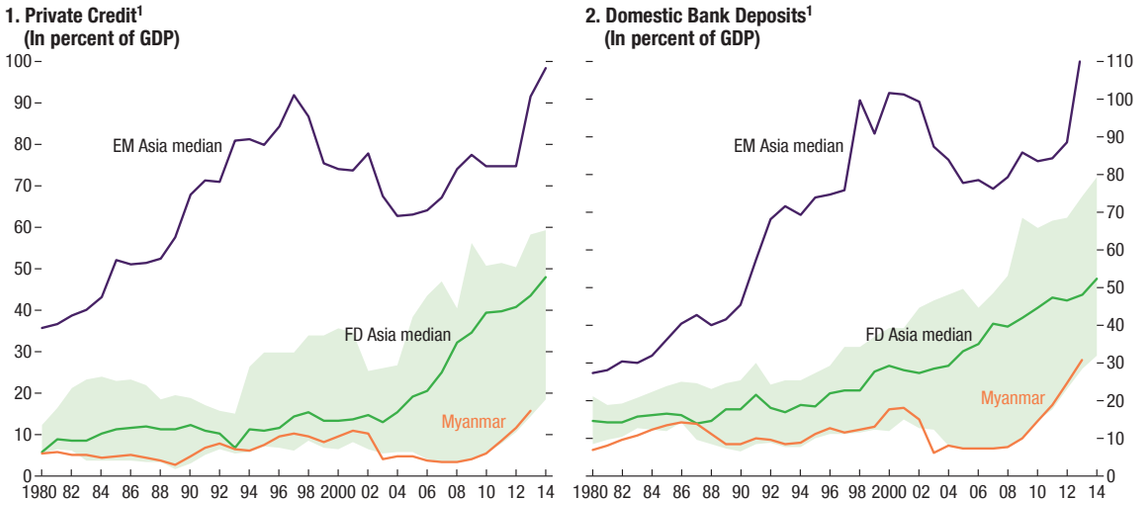
Myanmar's financial sector is in the early stages of development compared to countries in the region. The banking system has grown rapidly after a period of stagnation following a banking crisis in 2003, but due to a low base, financial depth, as measured by credit-to-GDP and deposit-to-GDP ratios, remains well low those in frontier and developing Asia (FD Asia) and emerging Asia (EM Asia)[1] (Figure 1). Access to basic financial services in Myanmar is also limited compared with its peers, in terms of bank accounts, savings and credit card usage (Figure 2).

Access to financial services in Myanmar is also uneven. The latest financial access survey (2013 FinScope) reported that only 30 percent of adults used at least one financial service from a regulated financial service provider (Figure 3). Access for farmers is better, with 43 percent of farmers enjoying formal financial services mainly provided by the Myanmar Agriculture Development Bank (MADB), a state-owned bank. Micro Small and Medium Enterprises (MSME) in Myanmar also face challenges in access to formal finances. Only about 30 percent of them are able to borrow from formal financial institutions in part owing to: i) narrow collateral base (mainly land and buildings); ii) an inadequate credit guarantee system; iii) limited availability of financial products (e.g., fractional term loans, leasing and factoring finance); and iv) underdeveloped risk management skills (e.g., premature credit-scoring system). In general, consumers rely on informal financial services for most financial activities—about 30 percent of adults make use of unregulated services.

Prepared by Yasuhisa Ojima, IMF Resident Representative in Myanmar.

[1]Frontier and developing Asia (FD Asia) includes Bangladesh, Bhutan, Cambodia, Lao P.D.R., Maldives, Mongolia, Myanmar, Nepal, Papua New Guinea, Sri Lanka, Timor-Leste, and Vietnam (IMF, 2015). Emerging Asia (EM Asia) includes other ASEAN countries (Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand), China, Hong Kong SAR, Korea, India, and Sri Lanka.

Figure 1. Banking Size—Myanmar Versus Peers



Source: IMF staff estimates based on the 2016 FinStat database.
[1]Shaded area represents FD Asia's 90th and 10th percentiles.

Against this background, the Myanmar government has made financial inclusion an integral part of inclusive growth strategy. A Financial Inclusion Roadmap, adopted by the authorities in 2015, aims to bring the population into the formal financial market with access to modern financial products and services. The roadmap sets out several targets on the access to financial services towards 2020, including that more than 50 percent of farmers, around 40 percent of MSME, and about 30 percent of low income households will use at least one financial service from a regulated financial service provider (Table 1).

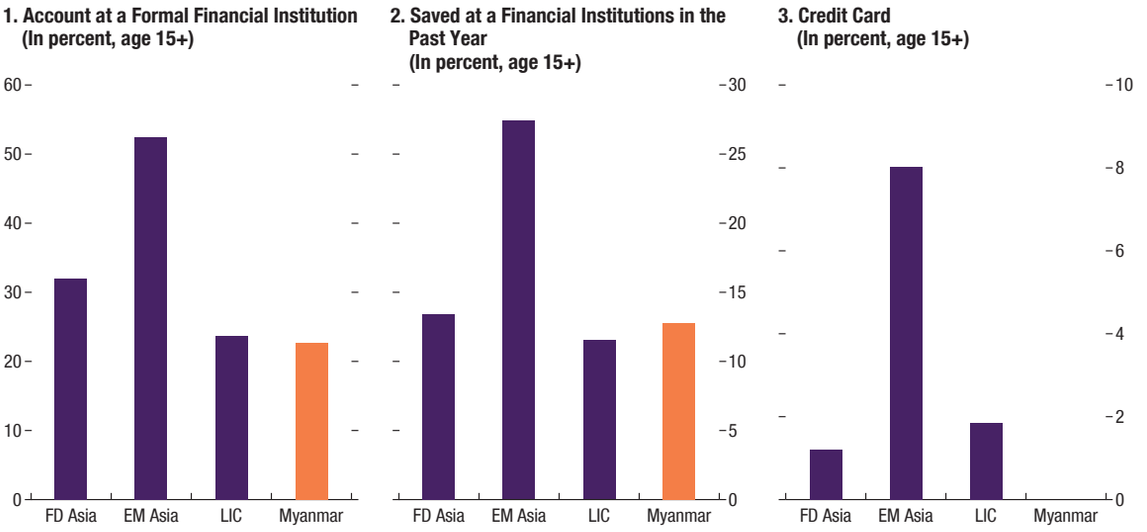
A major strategy in Myanmar's financial inclusion roadmap is to take advantage of the rapid development of mobile telecommunication technology. Myanmar's physical infrastructure for the traditional mode of financial services is underdeveloped due to an uneven distribution of bank branches

Table 10.1. Targets for Priority Markets

	Size	Access in 2014	Target in 2020
	(In millions)	(In percent)	
Agriculture (farmers)	12.1	43	51
MSME (micro, small, and medium enterprise)	7.2	30	40
Low-income household	7.5	15	28
Other	13.0	27	36
Total	39.8	30	40

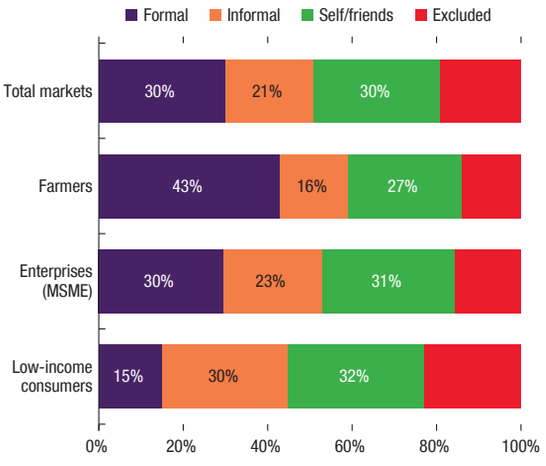
Source: Myanmar authorities.

Figure 2. Financial Inclusion—Myanmar Versus Peers[1]



Source: The Global Financial Inclusion (Global Findex) database; and Demirguc-Kunt and Klapper (2014).
[1]The income group classifications are those used by the World Bank. FD Asia data are available from Bangladesh, Cambodia, Lao PDR, Mongolia, Nepal, and Vietnam. EM Asia data comprise China, India, Sri Lanka, Thailand, Philippines, Malaysia, Indonesia, Singapore, and Korea.

Figure 3. Financial Inclusion by Segments in Myanmar

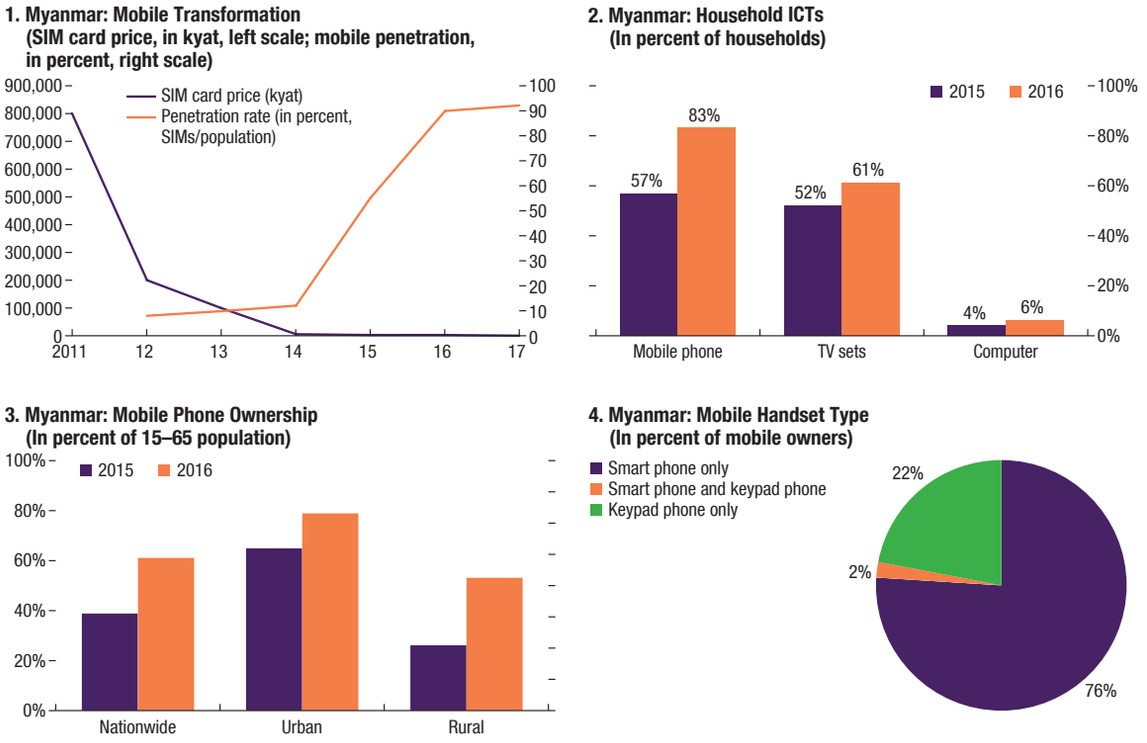


Source: IMF staff estimates based on the 2013 FinScope database.

hampered by poor electricity and road networks. Financial technology (fintech) based on mobile telecommunication networks provide a substitute for traditional infrastructure, albeit an imperfect one. It has the potential to bring many benefits in terms of financial access, especially for low-income groups and the rural population. These benefits include: i) easier access through saving time and transportation costs without visiting financial service providers; ii) lower remittance costs; iii) less cash use which reduces the central bank's printing costs; and iv) more transparent transactions which reduce the risk of money laundering and financing of terrorism.

With the liberalization of the telecom industry over the past few years, mobile penetration and smartphone adoption have increased rapidly, making it possible for Myanmar to "leapfrog" in the delivery of financial services. Before the liberalization, only 1 percent of the population had access to fixed lines, while mobile subscription rates stood at around 10 percent. With the entry of two (soon three) foreign

Figure 4. "Digital Leapfrog" in Myanmar



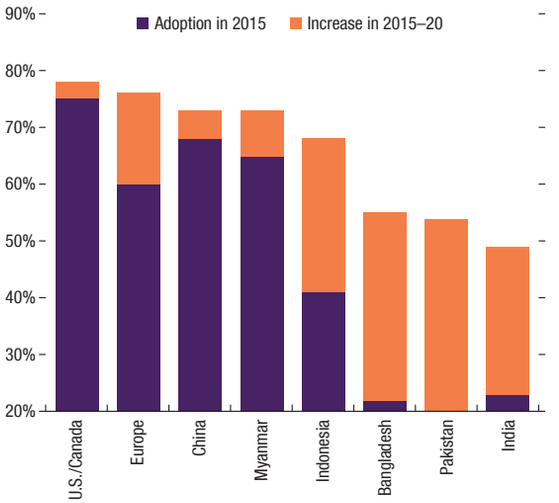
Sources: Cihon & Galpaya (2017); and Telenor (2016); LIRNEasia; and MIDO (2016).

telecom operators since 2014, competition has reduced the cost of SIM cards dramatically, falling from around 1,500 USD to around 1 USD in 5 years. Mobile penetration exceeded 90 percent in 2016, from around 10 percent in 2012 (see the chart upper left). A national survey (LIRNEasia and MIDO, 2016) found that household ownership of mobile phones jumped to 83 percent in 2016 from 57 percent a year ago, making mobile phones the dominant form of household access to ICTs (see the chart upper right). Mobile phone ownership (as percent of population aged 15–65) also increased significantly from 39% to 61% nationwide over the year, with a narrowing gap between urban and rural areas (see the chart bottom left). Around 80 percent of mobile phones are smartphones (LIRNEasia and MIDO, 2016) (see the chart bottom right), helped by the strong growth of more affordable low-end smartphones and an operator focus on driving data usage in the country's rapidly expanding subscriber base (GISMA, 2016).

The wide use of smartphones in Myanmar implies considerable potential for innovations in the provision of mobile financial services. Myanmar is likely to enjoy around 80 percent of smartphone adoption in near term (see

the chart), which makes it possible to introduce, for instance: i) biometric passwords; ii) camera-integrated payment systems (e.g., QR Code scan & pay); iii) social networking-integrated payment system (e.g., Viber); and iv) social network-integrated virtual savings groups (Pwint and others, 2017). These innovative options could expand financial services to every segment of societies if appropriately designed and introduced.

Figure 5. Smartphone Adoption by 2020
(In percentage of connections)



Source: GMSA Intelligence (2016).

To reap these benefits, the Central Bank of Myanmar (CBM) has established a basic regulatory framework for mobile financial services. The framework is underpinned by a 2013 Directive on Mobile Banking (bank-based model) which allows an agent to partner with a bank to sign up customers for cash transactions (albeit in a "closed-loop network"); and a 2016 Regulation on Mobile Financial Services (non-bank-based model) to provide payments and financial services using mobile technology infrastructure, including kyat-denominated cash-in and cash-out transactions, money transfers and domestic payments. The regulation permits mobile network operators (MNOs) to offer those services through their own platforms. The 2016 regulation draws on international good practice and provides a number of improvements over the 2013 directive, including: i) interoperability; ii) agents network (without exclusivity); iii) know-your-customer (KYC) and customer due diligence (CDD); and iv) customer protection.

The regulatory framework has paved the way for mobile network operators in Myanmar to step in the mobile financial service markets. In 2016, the CBM issued the first license to Wave Money, a tie-up between Yoma Bank and Telenor (Norwegian-owned network operator). Wave Money initiated person-to-person transfers (P2P) and airtime top-up for mobile phones, and plans to expand its services to bill payments. Microfinance institutions could use the bill payments system to collect their loans. Other two key telecom operators, Ooredoo (another foreign-owned operator) and Myanmar Post & Telecom (MPT), also lined up for a license, indicating that mobile money would be part of the company's strategy in Myanmar. MPT also aims for

government salary payments and government-to-persons (G2P) transfers, given its history as a state economic enterprise (SEE).

These developments provide great opportunities for leapfrogging in Myanmar's drive for financial inclusion, but may challenges remain. The success of mobile financial services depends on i) a continued expansion of mobile phone network and usage; ii) an adequate branch network run to reach the disadvantaged areas; and iii) an appropriate regulatory framework to ensure system stability and growth. More efforts are also needed in other areas to promote financial inclusion, including:

- Financial literacy and departure from cash-based economy: Many Myanmar consumers have limited understanding of the benefits of mobile money. Given the long history of a cash-based economy, it will take time and effort to change the mindset. Awareness campaigns such as those envisaged under the Mobile Financial Service Providers (MFSPs) would help enlighten customers about the benefits of mobile money.
- Informal sector: Myanmar's informal cash transfer system (e.g., Hundi system) has a long history and it is prevalent and competitive. Mobile network operators may collaborate with the Hundi dealers by nominating them as their agents, though they must be first brought into the formal system.
- Supervision: CBM's supervision team has limited capacity to measure current metrics on the amount of money in the system, transactions per month, number of active users and other basic data. This limits the quantifiable data available from the banks and limits the transparency of the bank-led systems.
- Financial access: It is unlikely that these bank-led options are going to have any incentive to create interoperability or access for the poor and rural people. Microfinance service (MFS) providers led by MNOs have access to wide distribution networks and thus are perhaps better positioned to serve the rural population.

Appendix 11. Financial Inclusion in Samoa

Access to financial services for households and individuals is comparable to other economies in the region, with an important role played by money transfer operators. However, pressures on correspondent banking relationship could undermine access to financial services for some customers. Small and medium enterprises—an important part of Samoa's economy—face challenges obtaining access to credit.

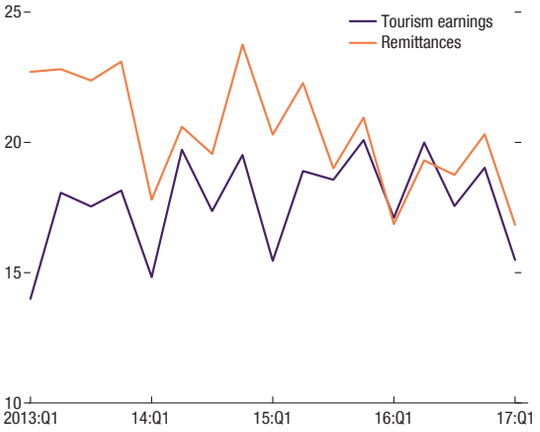
Context

Samoa is small, remote Pacific island country with a population of about 190,000, spread over two islands. Annual per capita GDP is about US$4,000. Economic growth has lagged over the last decade, held back by the impact of the global financial crisis and two devastating natural disasters in 2009 and 2012. Agriculture and tourism are important economic activities. Agriculture is the main employment source and serves as a safety net although its share of GDP is small and declining. Tourism earnings amount to about 20 percent of GDP and along with remittances are the main sources of external earnings. Remittances, largely from Australia and New Zealand, are about 18 percent of GDP, but survey data indicates that 56 percent of the population received remittances in the previous year.[1]

Financial system assets are about 120 percent of GDP, of which about half are commercial banks. There are two subsidiaries of foreign banks (one Australian and one Papua New Guinean) and two local banks, although the foreign banks are considerably larger and hold about two-thirds of assets. Total credit to GDP is about 80 percent, with about half provided by the com-

[1]Pacific Financial Inclusion Program, 2016, *Benchmarking financial inclusion in Fiji, Samoa, and Solomon Islands.*

Tourism and Remittances
(In percent of GDP)



Source: Central Bank of Samoa.

mercial banks and targeted at construction, trade and tourism sectors. Non-banks are also important providers of credit, reflecting the active role of public financial institutions (PFIs).[23]The share of microfinance institutions and credit unions in private sector credit provision is very small, but they serve a large number of clients.

The National Financial Inclusion Strategy 2017–2020 (NFIS) was launched in January 2017, as part of the Government of Samoa's commitment to promote inclusive growth. The strategy details the assessment of financial inclusion, the priorities and measures to promote financial inclusion. There are three strategic priorities: making a wide range of financial products and services accessible to all, especially low-income segments; ensuring that financial service products are appropriately designed and priced so as to be widely used; and achieving strong partnership and collaboration amongst private and public sectors to ensure a cohesive approach. The overall approach is designed to be market-driven with a regulatory oversight by CBS. A National Financial Inclusion Taskforce will oversee these efforts, encourage collaborate and monitor progress.

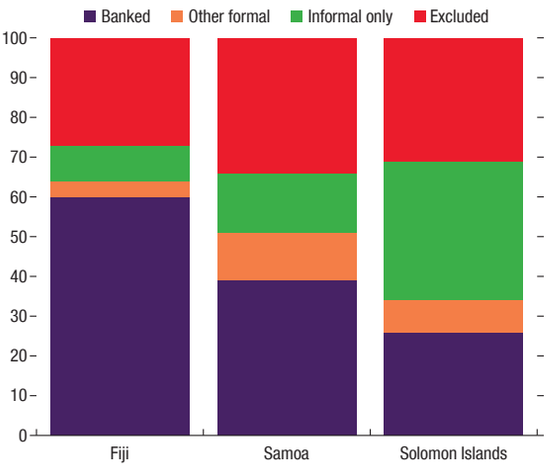
Households: Access to Financial Services and Credit

Levels of financial access appear to be broadly in line with peers, although Fiji performs slightly better. Survey data indicates that about half the population have access to either banking services or other formal services (at 39 percent and 12 percent, respectively) while about 15 percent have access to other informal. This implies that the unbanked share of the population is about one-third, slightly higher than in both Fiji or Solomon Islands. Other measures of access, such as the number of bank accounts per adult and the number of ATMs, suggest broadly similar availability of financial services.

Income level and location are the main drivers of financial exclusion in Samoa. Only about one-third of those in the lower fortieth percentile of

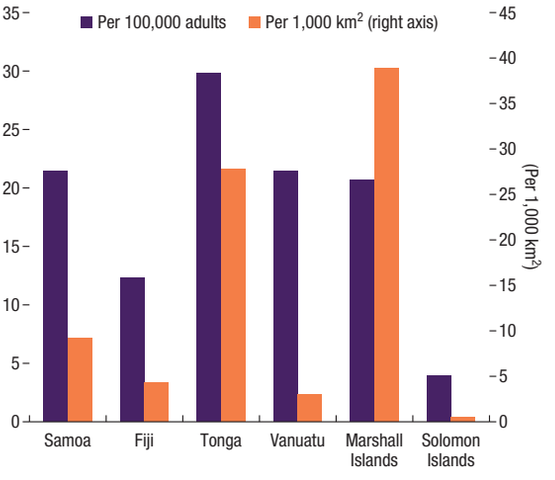
[2]The main non-bank institutions are the Samoa National Provident Fund (SNPF), a social security fund; the Development Bank of Samoa (DBS); the Samoa Housing Corporation (SHC); and the investment fund Unit Trust of Samoa (UTOS) (Box 1). The SNPF and DBS are the largest in terms of assets, but both UTOS and the SHC have been expanding rapidly in recent years.

Financial Inclusion
(In percent of sample)



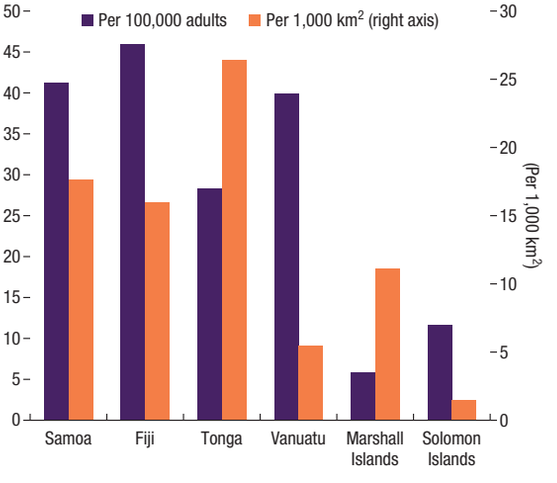
Sources: Benchmarking Financial Inclusion in Fiji, Samoa, and Solomon Islands.

Number of Commercial Bank Branches, 2015
(Per 100,000 adults)



Source: Financial Access Survey.

Number of ATMs, 2015
(Per 100,000 adults)

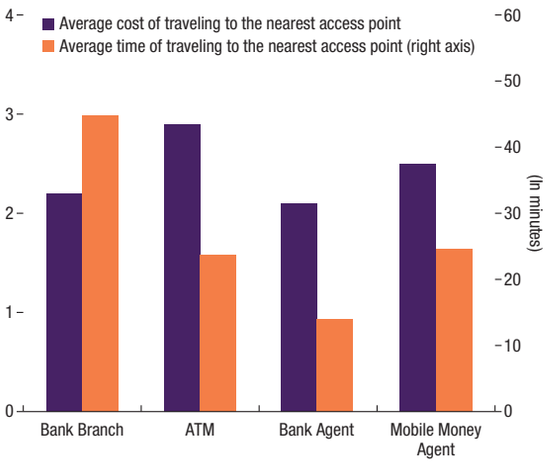


Source: Financial Access Survey.

income have access to formal financial services compared to two-thirds in the top fortieth percentile. Rural populations as well as those working in agriculture are also less likely to have access formal financial services. Youth are also relatively more excluded, with 55 percent estimated to be either excluded entirely or rely on informal sources for financial services, these reflect the high youth unemployment rate (about 16 percent). Other barriers to access include high transaction costs, along with the travel times to formal financial services, especially in rural areas. In addition, a strong cultural preference for cash remains.

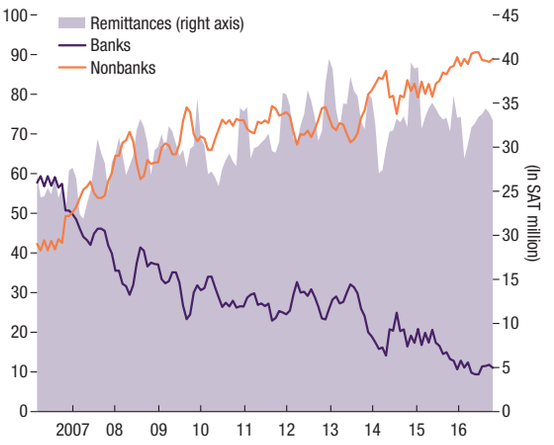
Survey data suggests that slightly more women than men have bank accounts in Samoa (with 40 percent of female respondents compared to 38 percent for male respondents). This finding stands out compared to regional peers

Financial Access, June 2016
(In U.S. dollars)



Source: Pacific Financial Inclusion Programme (PFIP) demand side surveys.

Samoa: Remittances by Share
(In percent, 3-month moving average)



Source: Samoan national authorities.

and also in comparison to other developing countries where the average gender gap is about 9 percentage points, according to World Bank estimates. Samoan women are also more likely than males to have savings or credit in the previous year, in contrast with Fiji and Solomon Islands where these rates are higher for males.

Samoa is heavily dependent on remittances, over 80 percent of which are channeled through money transfer operators (MTOs). However, strains in correspondent banking relationships are contributing to a reluctance by banks to provide financial services in the remittance sector.[3] Money transfer operators (MTOs) in Samoa and their counterparts in Australia and New Zealand face closure of bank accounts and increased difficulty in obtaining access to financial services. As a result, Samoa's remittance sector risks becoming increasingly fragile; the cost of remittances could further increase, and financial access could be undermined, given the role of MTOs especially in remote areas. To stave off these risks, a main priority is to upgrade the effectiveness of the AML/CFT regime, particularly with regard to ensuring compliance by MTOs with AML/CFT requirements and on-site inspections of MTOs. The authorities have made progress in implementing measures to mitigate these risks and are committed to further efforts in this area, including bringing their AML/CFT framework in line with international standards and establishing a database for customer identification and monitoring.

[3]Further information is available in Alwazir, Jamaludin, Lee, Sheridan and Tumbarello, 2017, "Challenges in Corresponding Banking in the Small States of the Pacific," IMF Working Paper No. 17/90.

Several reforms are underway to further improve financial inclusion. The Central Bank of Samoa is working towards establishing an effective financial consumer protection regime; creating an enabling environment for inclusive insurance markets and micro insurance; integrating financial inclusion in the school curricula; and concerted efforts to address risks related to strains in correspondent banking relationships. Other reforms, discussed below in the context of SMEs, such as the recent introduction of a moveable property registry, along with the authorities' commitment to the establishment of a credit bureau and encouraging the economic use of land will also ease constraints on access to credit for individuals.

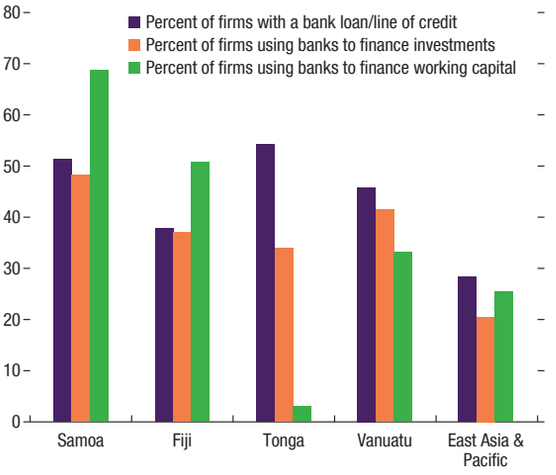
Small and Medium Enterprises: Access to Credit

Impediments to funding for SMEs continues to constrain private sector activity. Over 90 percent of all firms in Samoa are SMEs, reflecting the small size of the economy and limited large-scale economic activity. The authorities are working towards developing a framework for SME policy. There is limited available data on SMEs access to finance but a 2009 Enterprise Survey found that while nearly all SMEs have a checking or savings account at a bank, only 52 percent of interviewed firms had either a loan or a line of credit outstanding. Although 37 percent of interviewed firms indicated that they did not need a loan. An additional indicator of a funding match is the striking—almost tenfold—larger number of SME depositors at commercial banks compared to SME borrowers, although the quality of this is undermined by the lack of a uniform definition of an SME.

Obstacles to credit for SMEs stem reflect several reasons, external as well as structural. SMEs face a challenging economic environment, including Samoa's remoteness, lack of opportunities to avail of economies of scale, and frequent natural disasters. These factors combine to undermine growth potential and increase instability in the SME sector. Against this backdrop, various structural factors further impede access to credit. These include:

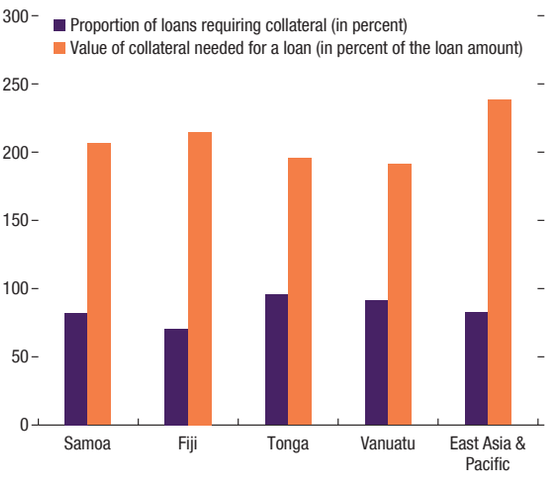
- Over 80 percent of land in Samoa is designated as customary land and is unavailable for collateral. At present, banks for not accept leases on customary land as collateral for loans. Even capital improvements on customary land are rarely accepted as collateral given political sensitivities. Proposed reforms to the legal framework for land leases should help increase clarity about the rights of landowners, leaseholders and lending banks, and should help facilitate access to credit for lease holders.
- Absence of a credit bureau creates information asymmetries and contributes to a reluctance to lend. The authorities have recognized the importance of

Firm's Use of Bank Finance
(In percent)



Source: *Enterprise Surveys*, 2009.

Collateral Requirements
(In Percent)



Source: *Enterprise Surveys, 2009.*

establishing a credit bureau, and although concrete implementation steps stalled in early 2017, establishment of a credit registry remains a priority.

- The lending practices of Samoa's banks are very conservative, and high levels of collateral are regularly required. The 2009 Enterprise Survey indicated that about 70 percent of loans required collateral which on average amounted to about 200 percent of the loan amount.
- The implementation of the Personal Properties Securities Act (amended January 2015) in February 2017 is expected to improve access to finance. With an electronic system for filing, maintaining and searching for notices of interest or liens on movable property, these reforms are expected to make the process of creating and enforcing interest in movable collateral more efficient and, in turn, support use of moveable property as collateral for lending.

The Samoan government provides incentives to banks to increase the volume of credit flowing to SMEs, through the Small Business Loan Guarantee Scheme. This scheme provides a loan guarantee to participating banks, which includes all commercial banks and the development bank of Samoa. The maximum loan size is SAT 50,000 and the total amount of the guarantee is SAT 8.5 million, including a grant from New Zealand of SAT 1.4 million. Established in 2000, the SBLG has provided guarantees to about 1800 loans to date. The scheme is administered by the Small Business Enterprise Center (SBEC) which requires that businesses go through training before submitting a loan application. Although general partial credit risk guarantee schemes

such as these can help increase the risk appetite of financial institutions, careful calibration to country characteristics is important. In the case of SBEC, eligibility criteria are unclear, the coverage ratio is high (up to 100 percent), and the payout for non-performing loans is unusual and very favorable for the participating banks. A thorough review of SBEC is recommended to determine possibilities for strengthening the scheme.

Appendix 12. Case Study on Agricultural Insurance

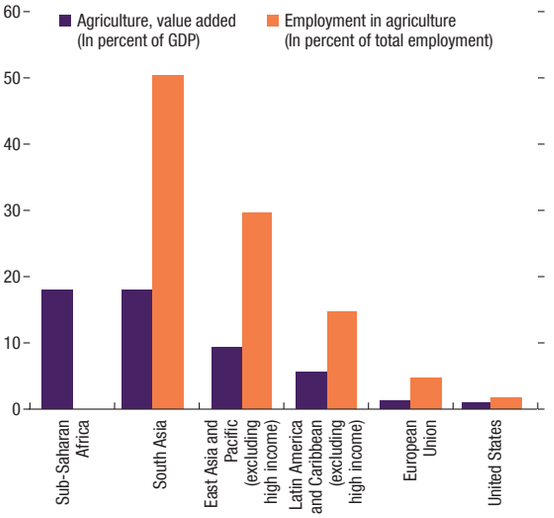
Financial inclusion is not limited to improving the access to bank accounts or ATMs. A genuinely inclusive financial system will provide a wider set of financial services to increase the welfare of residents. For rural populations, financial products that help mitigate agricultural risks can be far more important than other financial services. In this section, we focus on agricultural insurance, a risk-management product that is being rolled out across the region. We demonstrate the fiscal cost associated with the expansion of agricultural insurance. Our study sheds light on the considerations of cost and benefit in promoting financial inclusion.

Agricultural insurance is an important financial instrument that can benefit rural areas which are often not well served by the broader financial system. Adverse climate conditions can be devastating for small-scale farms (Redfern and others, 2012), and agricultural insurance helps farmers hedge against natural disasters by managing risk.[1] This is particularly relevant for Asian countries, given the large share of employment in the agriculture sector. Indeed, about half of the Asian countries have or had their crop insurance schemes. In terms of insurance premium, Asia now represents the second largest market for agricultural insurance in the world, after North America.

China and India have developed two of the largest agricultural insurance schemes in the world. Both countries have indicated they see these programs as financial inclusion policies, which promote the goal of increasing coverage to those who have no access to financial services. China's Agricultural Insurance Program covers $330 billion of agricultural production and receives $6.3 billion in annual subsidies. 50 percent of the premium is paid through subsidies from the national government, and a further 15–30 percent is

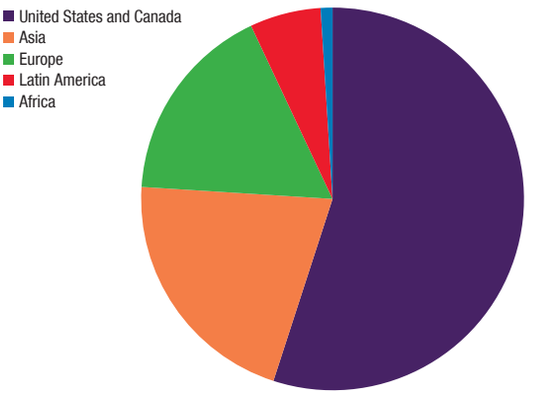
[1]For example, the World Bank's Agriculture for Action Plan (AAP) proposes crop insurance offerings to farmers for poverty alleviation and equity.

Employment and Output of Agriculture



Source: World Bank, *World Development Indicators.*

Agricultural Insurance Premiums, 2011
(Share of world total)



Source: Society of Actuaries (2015).

provided by local governments. In addition, there is further fiscal exposure as 55 percent of these policies are provided by the state-owned People's Insurance Company of China. India's 'Prime Minister's Crop Insurance' Program also contains provisions for public subsidies, with the amount capped at 50 percent of the premium value. The country budgeted $1.4 billion to fund the program in 2017–18.

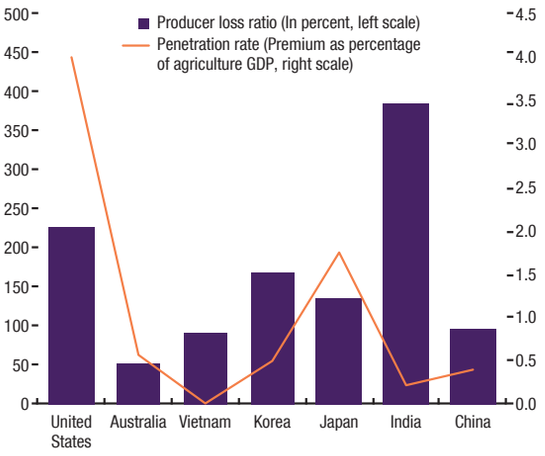
Agricultural insurance is usually not commercially viable, and its expansion typically requires substantial fiscal support. This is clear from the examples of China and India above. Similar results can be seen from the actuarial performance of the agricultural insurance schemes in the United States and a group of Asian countries[2]: the producer loss ratios, defined as total claim divided by total premium collected from farmers, are typically closer to or larger than 1.[3] Considering the operating costs of insurance policies usually amount to over 25 percent of the premium, a larger-than-75 percent loss ratio implies that government subsidies are required to prevent insurers from exiting the market.[4]

[2]Sample period: United States (1999–2015), India (1999–2009), Korea (2001–2009), all other countries (2003–2007).

[3]For example, in the United States, the average loss ratio of crop insurance from 1995 to 20015 was about 2.2. i.e. insurance companies paid $ 2.2 claim for each dollar of premium revenue collected from farmers.

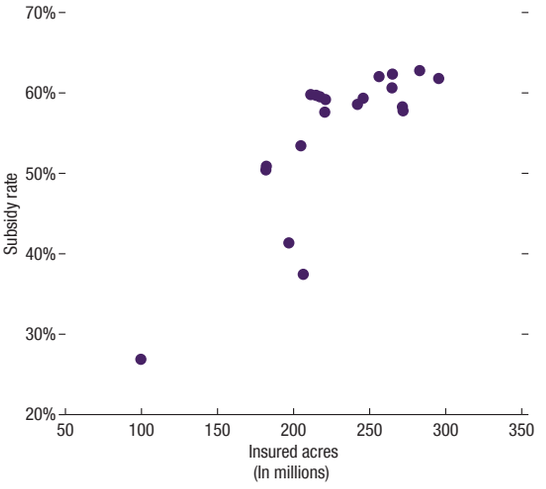
[4]One notable exception is Australia where governments do not subsidize insurers and insurers are still able to make positive profits. However, the size of crop insurance industry is substantially smaller than Europe and the United States. As we will explain later, the required subsidy rates to attract more farmers and insurers to participate the schemes tend to be increasing in coverage.

Selected Agricultural Insurance Scheme: Actuarial Performance



Sources: FAO (2011); Mahul and others (2012); and USDA Risk Management Agency.

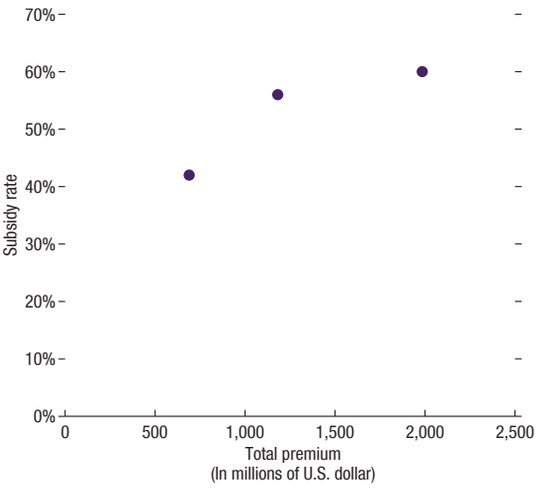
United States: Crop Insurance Subsidy Rate, 1981–2003[1]



Source: United States Department of Agriculture Risk Management Agency.
[1]Each observation represents the premium subsidy rate pair for a given year.

The marginal subsidy required for further expanding the agricultural programs tends to be increasing. This is because farmers' demand for insurance product tend to be inelastic with respect to premium (Coble and Barnett 2013). In order to encourage more farmers to participate insurance programs, governments have to provide exponentially more financial incentives. Indeed, in both the United States and China, the governments increased subsidy rates to achieve larger coverages.

China: Crop Insurance Subsidy Rate, 2007–2009[1]

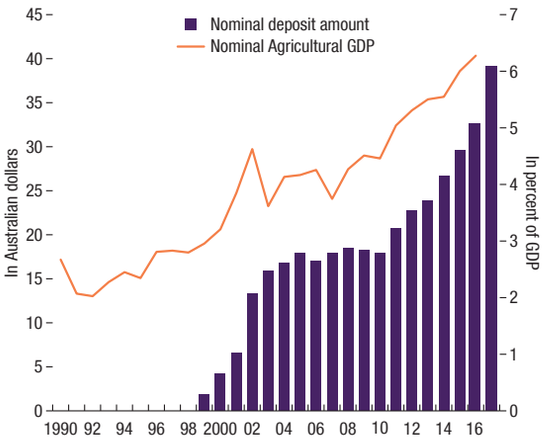


Source: Food and Agriculture Organization (2011).
[1]Each observation represents the premium subsidy rate pair for a given year.

There are several reasons why the sustainability of crop insurance relies on fiscal subsidy.

- *Undiversified Risk*. Unlike health risks which are mainly idiosyncratic, yield risks can be highly correlated across farms. The insurance provider can

Australia: Agricultural Deposit Account Scheme
(In billions of Australian dollar)



Sources: World Bank; and Department of Agriculture and Water Resources (Australia).

hardly eliminate the aggregate risk through cross-sectional risk pooling (OECD 2009).

- *Information cost*. Because yield risks are highly correlated across farms, actuarial analysis is mainly based on cross-time instead of cross-sectional data. The sample size is usually limited. This increases the information cost for actuarial analysis. This is particularly relevant for Asian countries with limited data on historical weather conditions and yields.
- *Adverse selection*. Farmers who have larger exposure to yield risks are more likely to purchase insurance policies (Glauber 2004). Although adverse selection arising from asymmetric information also exists in many other insurance markets (such as car and health insurance), the problem is intensified by the large information cost.
- *Moral hazard*. Farmers may change their behavior (e.g. use of fertilizer, seeds, efforts, choice of plants) after the purchase of insurance policies[5] (Glauber 2004, Young and others 2001).
- *Basis risks.* A typical way of eliminating moral hazard is to design the policy such that the claim is based on an exogenous index such as regional rainfall (weather indexed insurance). However, it has been found that the attractiveness of this kind of policies are dampened by the low correlation between each individual insurer's yield and the exogenous index (Clarke. and others 2012).

Schemes based on self-insurance are deployed in some countries as alternatives to standard agricultural insurance products. The main idea of these schemes is to encourage farmers to accumulate savings to cope with yield risks. For example, in Canada, famers can set up individual special saving accounts for future yield loss. The government provides matching contributions to farmers' saving accounts up to a limit. Farmers can only withdraw from their subsidized saving accounts when yields or income fall below a certain threshold (Coble, 1995). In Australia, famers can claim a tax deduction for the income they deposit to their saving accounts under the farm management deposit (FMD) scheme. Although the income taxes for these savings are due when farmers make withdrawals (typically in years with natural disasters), overall farmers still pay less taxes due to the progressive income tax scheme. In 2016, the total size of FMD savings reached AUD 40 billion.

[5]For example, insured farmers tend to choose to plant more risky crops.

Considering the variations of annual agriculture output in Australia is below AUD 4 billion, the savings under FMD should be able to largely insure against the yield risks.

The main advantage of these schemes is that risk reduction is realized through self-insurance, which is less prone to moral hazard and adverse selection problems. In addition, the cost for managing farmer subsidized saving account programs is usually lower than crop insurance programs (AAFC, 2012), possibly because the assessments of each individual's risk profile are not required. Moreover, subsidizing saving account tends to be less regressive than subsidizing crop insurance.[6] However, the implementation of these self-insurance programs would require some level of financial development (for example, farmers should have bank accounts or tax identification first), which can be challenging for developing countries in Asia.

In theory, agricultural insurance can be a useful financial inclusion instrument that helps farmers mitigate agricultural risks. However, it can be costly. It is important to consider other alternatives (e.g. schemes based on self-insurance) which may be more cost-effective. More broadly, policy makers seeking to promote financial inclusion should be mindful of the potential costs.

[6]Under crop insurance subsidy schemes, rich farmers tend to get more subsidy because they have more acres.

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