

Executive Summary

This paper assesses and disseminates experiences and lessons from low-income countries (LICs) in sub-Saharan Africa that were selected by the African Department in 2015–16 as pilots for enhanced analysis of macro-financial linkages in Article IV staff reports. The paper focuses on the common characteristics across the pilot countries and highlights the tools used in the analysis, the challenges encountered, and the solutions deployed in overcoming them. It draws on the IMF's institutional view on addressing macro-financial linkages in surveillance and demonstrates their relevance to financial inclusion, poverty, and macroeconomic stability. The main findings follow.

Financial systems in the pilot countries are largely bank-based, ranging from 61 percent of financial system assets in Malawi to 98 percent in São Tomé and Príncipe. While the financial systems have deepened over time, they lag behind those in the Middle East, East Asia, and Latin America and the Caribbean. Pilots in East Africa found that the use of technology, especially mobile banking and payments, has improved financial inclusion and depth while upgrading efficiency. The gender gap in financial access is substantial and is reinforced by wide-ranging barriers such as financial literacy, weak property rights, the absence of credit registries, and a high degree of informality. Policy advice to improve financial development in LICs included strengthening the legal, regulatory, and institutional framework to increase the supply of credit. Increased bank competition and improvements in physical infrastructure (power supply and internet services) would reduce the costs of participation in the financial sector. Fostering financial literacy through increased awareness of financial services is critical to enhancing access. This paper evaluates how the pilots assessed financial deepening and inclusion and their impact on the effectiveness of macroeconomic policy.

Fiscal dominance and the lack of economic diversification were key drivers of shocks to the financial sector. Transmission channels from the real to the financial sector were through corporate and household balance sheets. Fluctuations in commodity prices (external to real) were another transmission channel that affected borrowers in export sectors. In all countries, fiscal dominance (fiscal to financial) had a significant adverse effect on shallow financial markets through (1) indirect exposure of banks to government arrears, (2) direct exposure of banks to ailing state-owned enterprises, and (3) government demand for credit. Financial to macro linkages arose from the impact of changing financial conditions on the economy and interplayed with monetary to financial links through higher nominal interest rates.

The stress-testing framework provided insights in quantifying how macro-financial linkages affect banks. Concentration risk—involving the failure of the largest borrowers—posed the greatest risk to banking systems among pilot countries. Sovereign risk arising from the exposure to government debt was found to generate negative feedback to the banking system. Looking ahead, improvements in banking supervision through capacity development would help reduce risks to financial stability.

Introduction

Macro-financial links have important implications for economic outcomes in sub-Saharan African countries. This situation is underscored by the prominent role the public sector plays in driving developments in the financial sector, as well as impediments to policy transmission arising from shallow and undiversified financial markets. While many sub-Saharan African countries face this common limitation, there is considerable variation in the degree of financial deepening and consequently the ability of these economies to manage and transfer risk. Issues of financial sector surveillance gained prominence in the aftermath of the global financial crisis, which underscored the need for deeper analysis of financial stability and vulnerabilities.

Assessing these macro-financial links in low-income countries (LICs), while challenging, is relevant in view of their potential to stimulate growth. Financial sector development in LICs is constrained by the lack of capital and institutional capacity, including poor availability of data. The shallow financial sector constrains credit to the private sector as well as transmission of fiscal and monetary policy, and weakens the ability of these policies to play their role in establishing the macroeconomic conditions that support growth. Addressing these constraints would significantly increase growth. Bringing financial development in an average sub-Saharan African country up to its potential level, estimated on the basis of country characteristics, could raise GDP growth by about 1.5 percentage points (IMF 2016d)

This paper takes stock of experiences with sub-Saharan African LIC pilot countries that explored macro-financial analysis in Article IV consultations.

The paper focuses on the common characteristics found in these sub-Saharan African country cases and describes the tools used in the analyses, the challenges encountered, and innovative solutions to overcome the challenges. The topics (which included some aspects of financial inclusion and financial stability) were chosen on the basis of country teams' views of the most relevant dimensions of macro-financial links in their respective countries during the Article IV review. The importance of macro-financial links during periods of economic stress (for example, periods of low growth or external shocks) is also reviewed.

The first phase of the pilot in 2016 included the following countries at different income levels: Benin, Chad, Côte d'Ivoire, Malawi, Mauritius, Namibia, Tanzania, and Uganda. Since then, five more countries (Democratic Republic of the Congo, Republic of Congo, Guinea, Sierra Leone, and South Africa) have integrated macro-financial issues into their Article IV consultations. Because this paper focuses on the specific needs of macro-financial analysis in LICs, the three most financially advanced pilot countries (Mauritius, Namibia, and South Africa) are not included. The analysis also does not include the additional pilots conducted during 2017–18.

The main themes covered in the paper are how financial development and inclusion affect growth and poverty and how macro-financial links affect macroeconomic stability and vice versa. The first theme is widely covered in pilot studies (for example, Benin, Malawi, Tanzania, and Uganda). This reflects the fact that the financial sector's size and depth are limited in most sub-Saharan African LICs; therefore, addressing the constraints to financial development yields positive effects on growth and poverty (IMF 2016d). However, despite the early stage of financial sector development in most of these countries, macro-financial links have had a significant impact on macroeconomic stability. For example, such links amplified the adverse effect of fiscal dominance on inflation and the cost of financing in Malawi through recourse to domestic financing, arrears to suppliers, and policy uncertainty that led to high exchange rate volatility. In contrast, the links helped anchor inflation and macroeconomic stability while advancing financial deepening in Uganda when an inflation-targeting framework was implemented. Common challenges to macroeconomic stability can include fiscal dominance and high credit risk, followed by rising debt levels (Benin, Guinea, and Malawi), dollarization (Democratic Republic of Congo and Uganda), profitability, inflation, and excess liquidity.

The paper also explores challenges and the new approaches employed in the various pilots. Chapter 1 discusses key characteristics of the pilot cases. Chapter 2 describes different types of financial links and their relevance in the pilot countries, including the nexus between growth and the financial sector. Staff used diverse approaches to assess the impact of financial sector imbalances

on growth despite data shortcomings. Chapter 3 explores issues in financial deepening and inclusion. Chapter 4 examines why financial stability is relevant for sub-Saharan African countries by assessing stress test results (Benin, Chad, Malawi, and Uganda), including macroeconomic factors responsible for identified risks. Concluding remarks are presented in Chapter 5.

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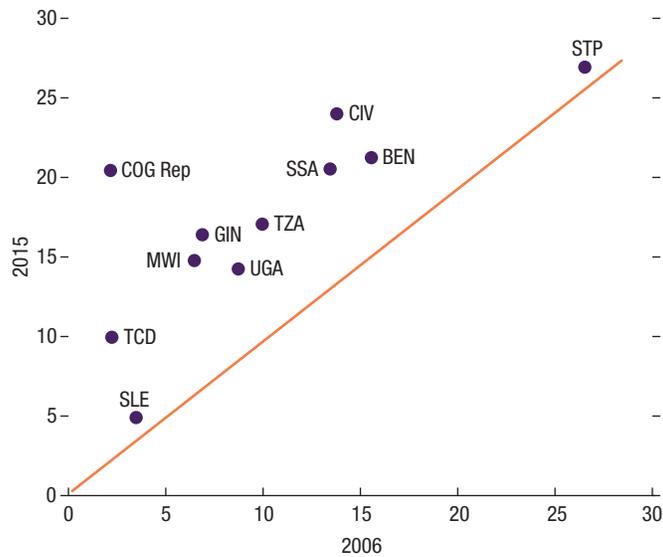
Key Financial Characteristics of the Pilot Countries

Available financial indicators for the sub-Saharan African pilot countries reveal the following characteristics:

- Financial systems are largely bank-based. Banks are the main players in the chain of payments, money, and foreign exchange markets, and they play an important role in the government securities market. For instance, the banking sector accounted for 61 percent of financial system assets in Malawi, 71 percent in Tanzania, and 98 percent in São Tomé and Príncipe. Microfinance institutions have grown significantly, but they account for less than 5 percent of the financial sector's assets in most pilot countries.¹ Nonbank financial institutions have helped ease access to deposit and credit services but are far from filling the gaps observed in the use of banking services.
- Financial systems have deepened over the past decade but lag behind advancements in other regions. The median of the credit-to-GDP ratio in sub-Saharan Africa was 14.8 percent in 2015, compared with 7.8 percent in 2006 (Figure 1), but this is only about half the level achieved in the Middle East and North Africa, East Asia, and Latin America and Caribbean (IMF 2016d; Figure 1). In terms of the traditional metrics of financial depth (namely, the ratios of bank credit to the private sector and bank deposits to GDP), Figures 2a and 2b show that many of the pilot countries still fall below the sub-Saharan African median and these countries' estimated statistical benchmark (measured using the World Bank's FinStats database). There is, however, substantial variation among countries. For instance, the ratio of private credit to GDP in Benin and Côte d'Ivoire is more than twice that in Sierra Leone. Despite progress made in raising financial access in most of the pilots, disparities by gender, income group,

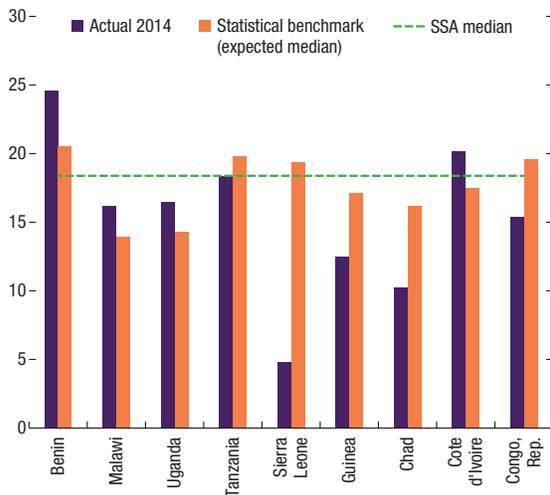
¹Microfinance institutions account for 5 percent of the financial sector's assets in Benin and 3 percent in Malawi.

Figure 1. Credit to the Private Sector, 2006 vs. 2015
(Percent of GDP)



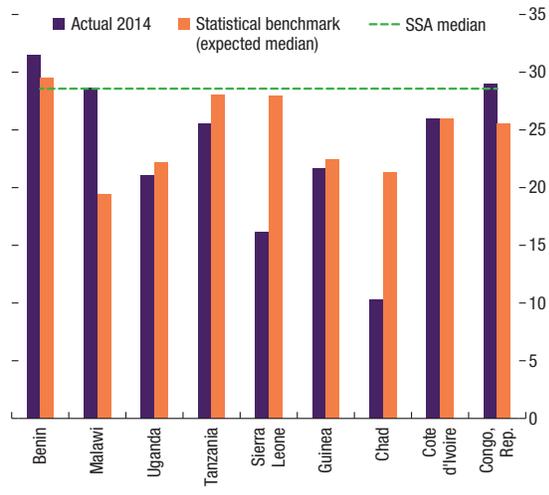
Source: IMF, African Department database. ISO country abbreviations are used.

Figure 2a. Private Credit/GDP in 2014
(Percent)



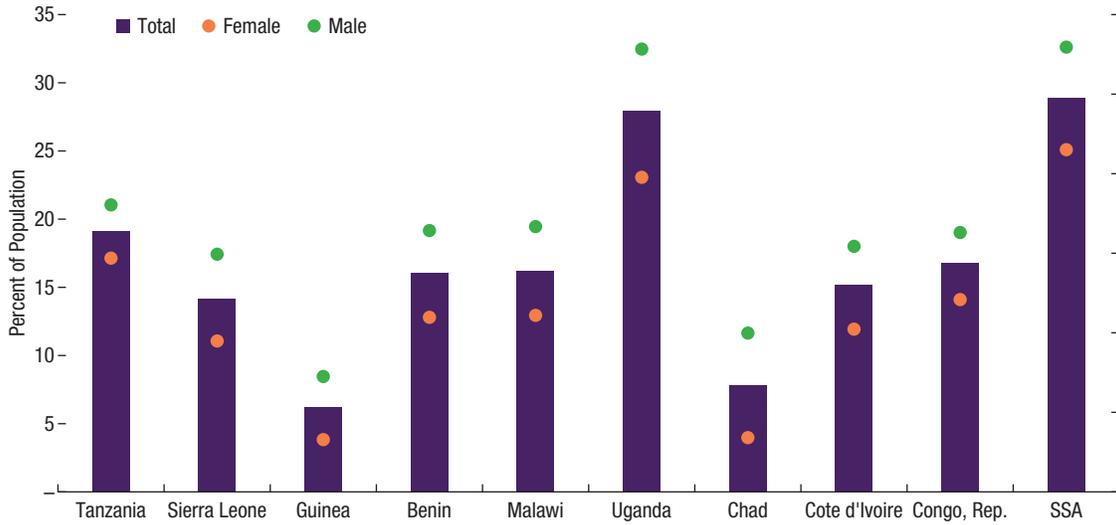
Source: World Bank, FinStats database 2016.
Note: SSA = sub-Saharan Africa.

Figure 2b. Domestic Bank Deposits/GDP in 2014
(Percent)



Source: World Bank, FinStats database 2016.

Figure 3a. Account at a Financial Institution, 2014

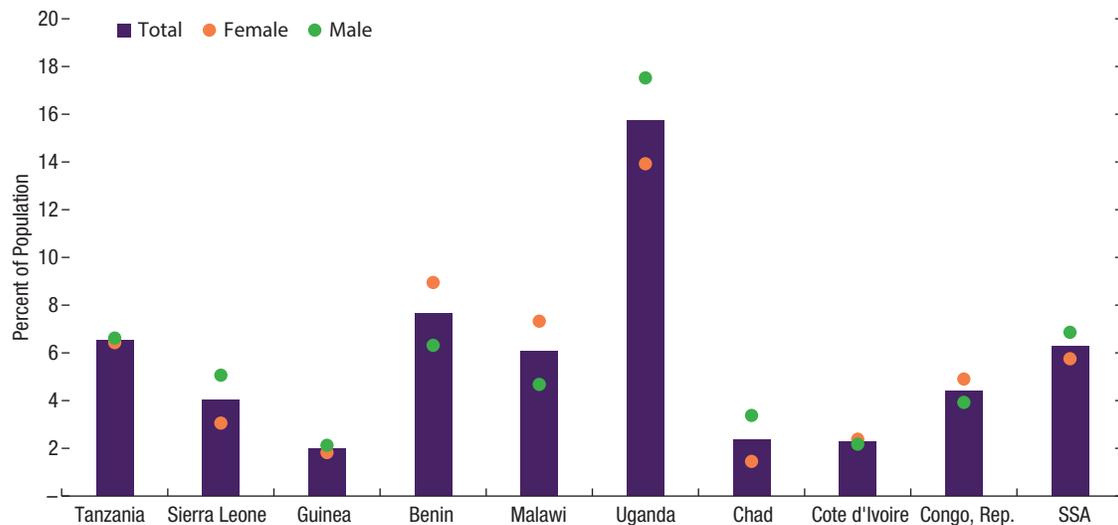


Source: World Bank, Findex.

education level, and geographic region have persisted and were noted in almost all the pilot countries.

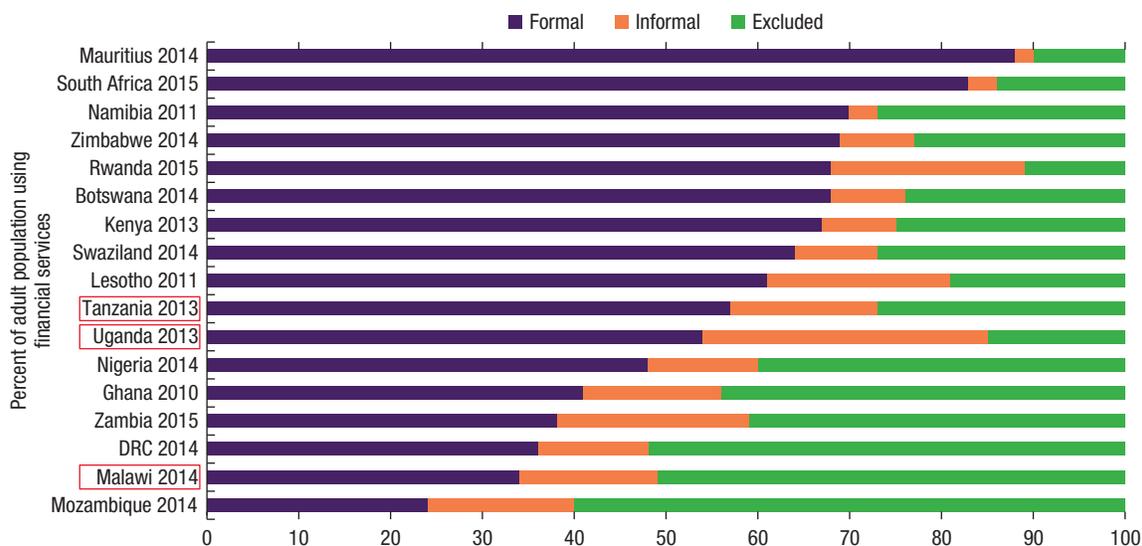
- The pilot countries show substantial heterogeneity in the level of financial inclusion (access) by households and enterprises. Indicators of access for households are highest in Benin, Tanzania, and Uganda (Figures 3a, 3b,

Figure 3b. Borrowed from a Financial Institution, 2014



Source: World Bank, Findex.
Note: SSA = sub-Saharan Africa.

Figure 4. Sub-Saharan African Countries: Financial Inclusion

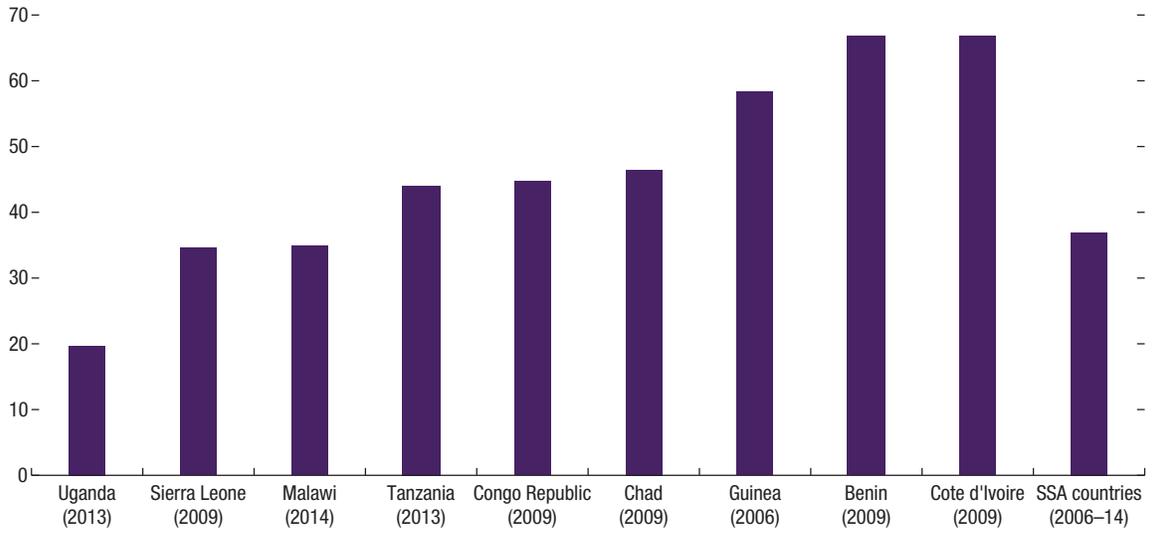


Source: Finmark Trust, Finscope Survey.
 Note: DRC = Democratic Republic of the Congo.

and 4) and lowest in Guinea. However, Benin is also among three pilots in which more than 50 percent of firms identified access to finance as a major constraint (Figure 5). All the pilots trail the sub-Saharan African average for accounts held at a financial institution, and the difference in financial access between men and women (the gender gap) is prevalent in almost all the pilots (Figures 3a and 3b). The pilot studies show wide-ranging barriers to financial access, including high participation and intermediation costs, gaps in the regulatory framework, weak financial market infrastructure, and lack of financial literacy in a large segment of the population.

- Several countries, mainly in Anglophone Africa, demonstrated the expanding role of mobile payments and banking services in boosting access to financial services. In Tanzania, the nominal value of mobile money transactions and their importance relative to broader monetary aggregates has risen exponentially since 2010, boosting financial access for previously excluded segments of the population. Mobile money platforms are also serving as a gateway to more sophisticated financial products and services; for example, banking in Uganda. The rapid growth of these novel financial services has benefited from efforts to strengthen the regulatory environment (IMF 2016). Those few pilot cases also highlighted some of the challenges raised by mobile money services in terms of appropriate regulations and financial sector supervision.

Figure 5. Firms in Sub-Saharan African Pilot Countries That Identified Access to Finance as a Major Constraint (Percent)



Source: World Bank, Enterprise Survey.
Note: SSA = sub-Saharan Africa.

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The State of Macrofinancial Linkages

Context

Improving the understanding of the links among the financial sector, other sectors of the economy, and, ultimately, economic growth is critical for comprehensive macroeconomic analysis. The literature highlights several mechanisms that affect the financial sector's impact on macroeconomic performance (for example, Rajan and Zingales 1998; Levine 2005, World Bank 2014, and IMF 2016d). First, the financial sector mobilizes domestic and foreign savings and reduces the information and transaction cost to fund efficient investments and innovation. Second, it eases the exchange of goods and services and enables better risk management to support more production and consumption. One particular aspect of financial development—financial inclusion—reduces the inequality of opportunity and mitigates the adverse effects of inequality on the level and durability of growth. Furthermore, financial inclusions affects the effectiveness of monetary and fiscal policies in supporting growth. These mechanisms serve as guideposts in analyzing the links.

In most country studies, a two-step approach was used to assess links and transmission channels between the financial sector and the other sectors of the economy, as well as feedback loops across sectors and policies. This approach involves (1) examining how macro shocks and policies affect the financial sector (links from fiscal, external, and real sectors to the financial sector), and (2) assessing how developments in the financial sector magnify or dampen the impact of macro shocks or policies and feed back to the rest of the economy (links from financial to macro).

Tables 1 and 2 present the key macro-financial channels identified in the country cases for these two steps. As examples, Figures 6 and 7 illustrate

Table 1. Linkages from Macro to Financial

	Benin	Chad	Rep. Congo (COG)	Côte d'Ivoire	Equatorial Guinea	Guinea	Liberia	Malawi	Sierra Leone	Tanzania	Uganda
From real sector through:											
Loan concentration risks	X	X	X		X	X		X	X	X	X
increase in NPLs			X		X			X	X		
Private sector balance sheets										X	
High dollarization							X		X		X
From external sector through:											
Commodity price shocks		X	X		X			X	X		X
foreign capital market conditions											X
Spillovers from parent banks					X						
From fiscal sector through:											
Fiscal dominance	X							X	X		
Crowding out of bank credit to the private sector	X	X	X		X			X			
Domestic payment arrears	X	X	X		X			X	X		
Holdings of government debt (sovereign-financial linkage)	X							X			

macro-financial links and feedback loops identified for Malawi and for São Tomé and Príncipe.

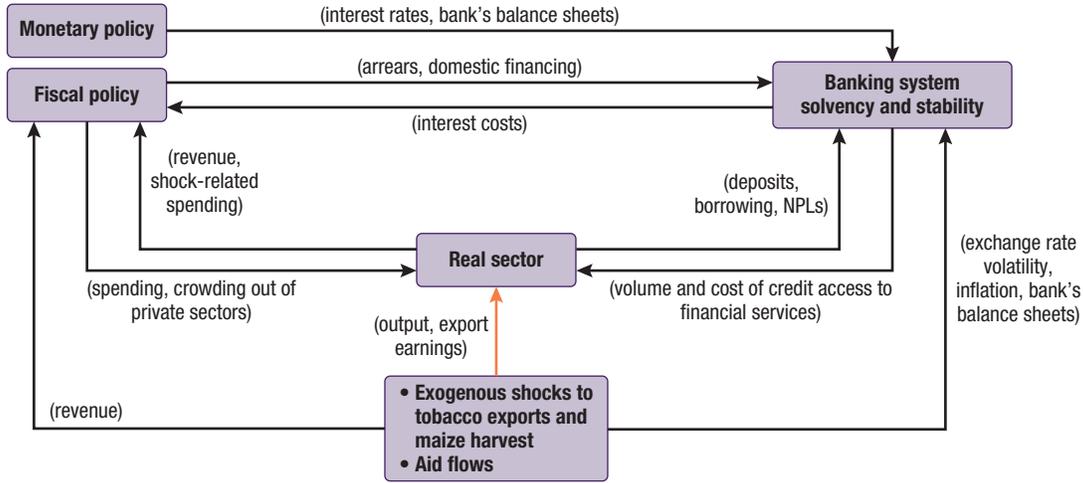
Macro to Financial Linkages

Lack of economic diversification and fiscal dominance in the economy (driving forces in the countries analyzed) have important repercussions for financial sector development and stability. Shocks mainly originate in the external sector, predominantly in the form of commodity price fluctuations, or in the real sector, where adverse weather conditions can reduce agricultural growth. External financial flows are a less common source of shocks, reflecting limited integration with banking markets, but the dependence on and volatil-

Table 2. Linkages from Financial to Macro

	Benin	Chad	Republic of Congo	Côte d'Ivoire	Equatorial Guinea	Guinea	Liberia	Malawi	Sierra Leone	Tanzania	Uganda
To real sector through:											
Asset prices	X							X			X
Credit growth and allocation	X	X	X		X			X			X
Financial deepening and inclusion	X	X	X	X	X	X	X	X	X		X
Banks' balance sheet	X		X								X
To external sector through:											
Exchange rate volatility											
To fiscal sector through:											
Recapitalization				X					X		
Contingent liabilities				X					X		

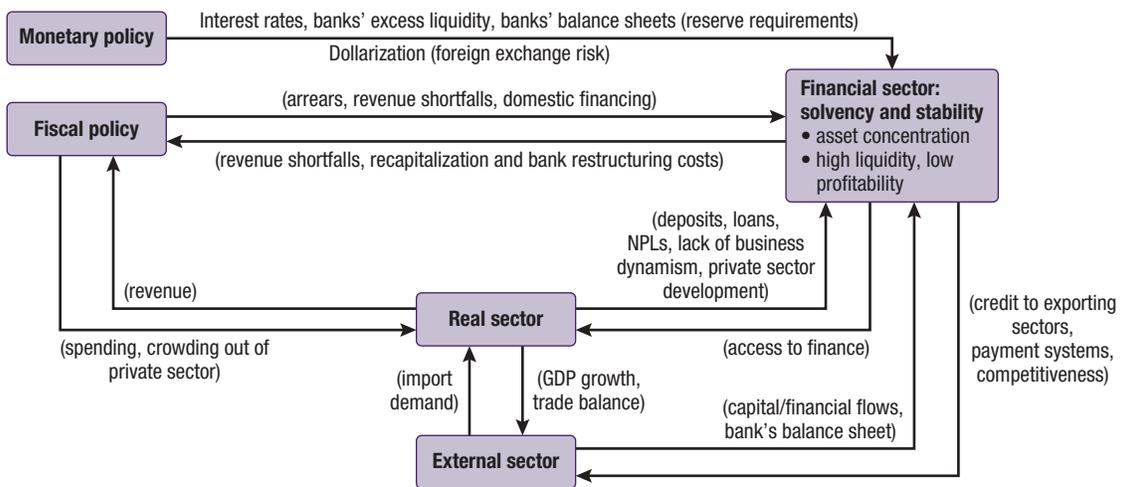
Figure 6. Malawi: Snapshot of Macro-Financial Linkages



Sources: Malawi authorities' data; and IMF staff estimates.
 Note: NPL = nonperforming loan.

ity of donor financing has had repercussions on financial systems in several countries. The clustering of identified macro to financial links in the selected countries reflects the commonality of economic challenges (Table 1).

Figure 7. São Tomé and Príncipe: Snapshot of Macro-Financial Linkages



Sources: São Tomé and Príncipe authorities' data; and IMF staff estimates.
 Note: NPL = nonperforming loan.

Real to Financial

Identified transmission channels from the real to the financial sectors were mostly through corporate and household balance sheets.

- Weather-related shocks negatively affect corporate and household balance sheets, potentially reducing the private sector's bank deposits and the demand for credit, while increasing nonperforming loans (NPLs), which affects banks' balance sheets. As shown in Table 1, this is one of the most prominent transmission channels in the country group.
- The low level of economic diversification amplifies this vulnerability. Banks in pilot countries typically exhibit high concentration in lending to a few borrowers, whose business problems could trigger significant adverse systemic impact, particularly in small financial systems, such as Benin or São Tomé and Príncipe. Legal and administrative weaknesses (lack of collateral, title registry, or efficient methods of settling commercial disputes) also constrain lending (Benin). Some countries suffer from high deposit concentration, particularly from the public sector, which can raise vulnerabilities if large amounts can be withdrawn suddenly. Further, the deposits tend to be concentrated in the largest (often state-owned) banks, resulting in an asymmetric distribution of liquidity and poor price discovery owing to inadequately developed interbank markets (Tanzania). Similarly, a shallow and concentrated financial sector cannot sufficiently diversify risks for firms and individuals, particularly when the real economy is not well diversified. Further progress in economic diversification would provide more opportunities for financial development and improved financial sector stability.
- Infrastructure bottlenecks in electricity and telecommunication have a direct impact on banks through high operational costs. For example, electricity costs contributed to about 40 percent of operational expenses in São Tomé and Príncipe, and high operating cost was identified as a major driver of the lending spread in Uganda. Removing constraints in critical infrastructure and the business environment would enhance financial depth and promote a more salutary feedback between the real and financial sectors.

External to Financial

- As mentioned earlier, fluctuations in commodity prices and, to a lesser extent, foreign financial flows are the main sources of shocks in the low-income countries analyzed in this study (see Table 1). Lower export revenues push borrowers involved in the affected sector into financial distress and increase NPLs, thus negatively affecting the health of the financial sector.

- Countries with high dollarization are particularly vulnerable to exchange rate fluctuations triggered by the volatile external environment. A high level of dollarization (Liberia, Sierra Leone, and Uganda) amplifies the negative effects of exchange rate volatility to the financial sector.
- While foreign ownership of commercial banks is quite common in many countries in the sample, it has not been a major source of concern for the countries reviewed. However, the need to contain the risk by improving consolidated supervision and by monitoring cross-border transactions is discussed (Uganda).

Fiscal to Financial

In all countries, fiscal dominance has had a significant adverse effect on shallow banking markets, triggering negative feedback on growth. This dominance had a cyclical component, as many countries in the sample experienced inadequate fiscal adjustment when commodity price shocks hit (pilots in oil-producing countries and Sierra Leone) or when external financial assistance dropped (Malawi). Structural factors have had an effect as well, including governments' needs for extended financing. The following are the most prominent links:

- Indirect exposure of banks to domestic government arrears. Government arrears have been an important source of risk to financial sector stability and a deterrent to the supply of credit. Government arrears to suppliers and contractors has led to rising NPLs and a tightening of banks' lending conditions. Case studies in oil-producing countries (Chad, Equatorial Guinea, and Republic of Congo) illustrated how oil price slumps can increase government domestic arrears, which translates into a deterioration of banks' balance sheets, reducing private credit and weakening economic growth. This cycle then feeds back into additional fiscal revenue shortfalls. Non-oil producers that are vulnerable to price fluctuations for agricultural products (such as Malawi), have shown similar patterns. The government of Malawi's domestic arrears of about 5.5 percent of GDP in 2015 contributed to a higher inflation premium, higher NPLs, and a tightening of banks' lending conditions (IMF 2015b).
- Direct exposure of banks to ailing government entities or financially weak and overindebted state-owned enterprises. This link appeared in the pilots for Tanzania and Côte d'Ivoire.
- Large government demand for bank credit. Governments in the pilot countries frequently relied on domestic financing to fund fiscal expansion or to sustain expenditures in the face of revenue shortfalls (Benin, Malawi, Sierra Leone, Tanzania, and Uganda). Government securities are attractive to banks for their relatively high yield, their often tax exempt status, the ease with which they can be used as collateral for refinancing needs, and

the zero weighting of sovereign risk in the computation of bank solvency. Rising government financing reduces the amount of credit available to the private sector, increases interest rates, fuels inflation, and undermines confidence and private investment. The increased costs to the government of financing can further raise deficit financing needs and thus trigger a vicious cycle that undermines the financial sector's role in efficient resource allocation.

The case of Malawi is a good example of these links. Government securities represented 24 percent of banking system assets in Malawi, and bank lending rates were positively correlated with Treasury bill rates. Increased recourse to domestic financing in the context of ongoing external financial shortfalls crowded out the private sector, raised bank and nonbank exposures to government, and indirectly led to higher interest rates. Higher domestic financing to address fiscal slippages increased inflationary pressures and policy uncertainty, which undermined sentiment and contributed to greater exchange volatility. Higher interest rates, reflecting the inflation premium and the impact of devaluations on the balance sheet, increased credit and market risks.

In many countries in the sample, weaknesses in economic policy coordination and policy institutions hampered the financial sector's stability and development and, consequently, its impact on growth. In Benin, the accommodative refinancing policy of the regional central bank (Banque Centrale des Etats de l'Afrique de l'Ouest (BCEAO)) facilitated government borrowing. Banks relied on lending to the government as a major source of profit because government bonds offered an attractive interest margin over the BCEAO refinancing rate. The banks had less incentive to supply credit to the private sector and increased their sovereign exposure. In Tanzania, the money-targeting policy regime, coupled with the central bank's role in financing the government, resulted in volatile short-term interest rates. The lack of policy communication and transparency in the auction of Treasury securities further undermined the private sector's perception of the monetary policy stance in guiding interbank transactions and business investment decisions. In Malawi, tight monetary conditions to offset loose fiscal policies resulted in high real interest rates, crowding out private sector credit and, consequently, dampening growth.

Financial to Macro

Financial to macro links were assessed by looking at the channels through which changes in financial conditions affect the rest of the economy. Financial sector shocks could be generated by spillover from the other sectors of the economy as described earlier or by a pure monetary policy shock,

such as a change in the central bank policy rate or in reserve requirements. Direct transmission of these shocks to the rest of the economy could operate through changes in asset prices (interest rates) and volumes (credit), or might come from the potential need for recapitalization of state-owned banks and contingent liabilities from problem banks. The magnitude of the transmission would depend on the country's financial depth.

Financial to real sector links are primarily through the credit channel. A tightening in financial conditions owing to an exogenous shock or a monetary policy change hampers the financial sector's ability to expand private sector credit at affordable rates that leave space for generating private sector returns, thus adversely affecting the real sector. In this case the financial sector reinforces the impact of a nonfinancial shock on the real sector.

Direct financial-fiscal sector links could arise from bank public ownership and contingent liabilities, as illustrated in two pilots (Côte d'Ivoire and Sierra Leone). For example, restructuring the weak public banks with negative book values in Côte d'Ivoire would incur significant fiscal cost, while the potential bank recapitalization and resolution in Sierra Leone could result in high fiscal costs.

Monetary to Financial

Identifying monetary-financial links is important to assess the transmission of monetary policy to the financial sector and ultimately to the real and other sectors. In Malawi, high nominal interest rates (reflecting a tight monetary policy) as well as the inflation, credit, and market risk premiums stymied growth in private sector credit and real sector activity. Shallow financial markets also pose challenges for the conduct of monetary policy. In the case of Uganda, spillovers from potential external shocks and changes in monetary policy were explored in the context of the structural features of the economy, including shallow financial markets (IMF 2015b, d, and 2017).

Methodological Approaches to Circumvent Data Issues

Data constraints often limit the ability to analyze transmission channels and quantify how financial sector developments affect growth. In addition, frequent shocks and structural breaks complicate the estimation of business and financial cycles in sub-Saharan Africa (see Annex 2 for a description of the data sources). Consequently, it was rather difficult to integrate the analysis on financial sector issues in a systematic and coherent way in the macroeconomic framework.

Staff used diverse approaches to assess the impact of financial sector imbalances on growth despite data shortcomings. In Benin, the analysis built on the West African Economic and Monetary Union (WAEMU) regional surveillance (IMF 2015e) for cross-country benchmarking and relied on a microfounded model simulation that required limited firm-level data to analyze how specific financial sector reforms affect growth. In Malawi, staff relied on time-series analysis to link lower credit growth to unfavorable inflation dynamics driven by fiscal dominance. Vector autoregression (VAR) analyses were also used to assess the links between credit and growth (Uganda). The short-term responses were weak, but the long-term impact was more robust (Tanzania and Uganda). In addition, in Uganda, staff applied an Excel-based tool¹ to generate credit growth projections consistent with other sector forecasts. When data were available, balance sheet analysis and stress tests were used (Benin, Malawi, São Tomé and Príncipe, and Tanzania) to describe financial institutions' risk exposures and the vulnerabilities that affect sustainable credit provision and growth. However, there was limited discussion on how these stress test results would affect the macroeconomic aggregates. For Uganda, a simple structural VAR was used to assess the impact of domestic and external shocks on the economy, which provided valuable insights into the macro-financial links. This innovative approach to integrate financial sector issues into the macroeconomic framework in a coherent manner despite data shortages is discussed in more detail in Annex 1.

¹This tool, developed by the IMF Research Department, provides a consistency check between real and financial sector forecasts by comparing country-level forecasts with the distribution of real variables conditional on the realizations of critical financial measures based on cross-country data.

Financial Sector Development and Inclusion

Context

The focus on financial development and inclusion was motivated by the following factors:

- Improvements in financial sector development have been linked to higher growth, greater stability, and poverty reduction (Levine 2005). Functions provided by the financial systems contribute to pooling savings, allocating capital to productive investment with positive effects on total productivity, promoting better sharing of information, and facilitating risk management. In addition, financial development reduces output volatility by providing a variety of instruments and information to households and firms to cope with adverse shocks through consumption and investment smoothing (Obstfeld 1994).
- The literature has found a strong correlation between financial developments and macroeconomic outcomes. Financial inclusion—particularly greater access to payment services and, to some extent, insurance—has a positive effect on poverty reduction (World Bank 2014). When a well-regulated and supervised financial system is in place, improving access to credit helps reduce poverty and strengthen growth. However, credit expansion at all costs can be detrimental to the goal of improving welfare if it causes a financial crisis (Sahay and others 2015b).
- Financial development has the potential to strengthen the efficiency and effectiveness of macroeconomic policies. Strengthening the monetary transmission mechanism by implementing operational reforms can reduce interest rate volatility and strengthen monetary policy signals. Key reforms include making open market operations more predictable and transparent, improving communication with market participants, deepening government debt markets, and encouraging long-term investors to channel savings

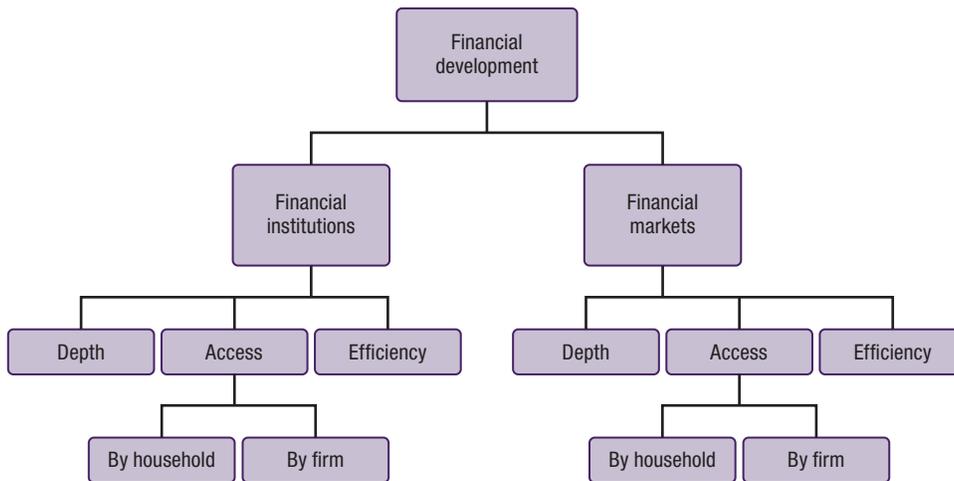
into longer-dated bonds. These improvements also increase the ability of the government to finance deficits at reasonable costs, reduce refinancing and rollover risks, pursue countercyclical policies, and finance public investment. Countries with underdeveloped financial systems appear to be able to simultaneously enhance economic growth and improve their resilience to exogenous shocks by enhancing financial development across various dimensions (Sahay and others 2015a).

Generally, the pilot studies focused on (1) assessing the country’s position on a subset of the multiple dimensions of financial development, (2) benchmarking the country’s position relative to peer countries, (3) identifying barriers to the demand for and provision of financial services, (4) examining to what extent financial deepening could enhance macroeconomic policy effectiveness, and (5) formulating country-specific reform priorities to address the constraints to financial deepening and inclusion.

Dimensions and Measurement of Financial Development

Financial development is a multidimensional concept that requires an overarching framework encompassing depth, access, and efficiency (Figure 8). First, a distinction is made between financial institutions and financial markets. Financial institutions include banks and nonbank financial institutions (microfinance institutions, insurance companies, mutual and pension funds, and others). Financial markets are exchanges in which financial assets are

Figure 8. Financial Development Index Pyramid



Source: IMF staff.

traded—primarily stock and bond markets. Second, both institutions and markets are assessed on the basis of depth (size of the financial system and liquidity of markets), access (ability of individuals and companies to access financial services), and efficiency (ability of financial institutions to provide financial services at low cost and with sustainable revenues). The third level of analysis involves differentiating between individuals/households and firms in assessing financial access. In general, the pilot studies focused on a subset of these three dimensions.

A set of indicators was used in the pilot studies to measure the three dimensions of financial development (Figure 9). The most-used indicators are listed first, although most of the indicators are closely related. For example, a high loan-to-deposit ratio (an indicator of efficiency) is likely to be found in an economy with a high credit-to-GDP ratio (an indicator of depth).

Multidimensional indices have recently been constructed to better capture the different angles of financial development (Sahay and others 2015a; Svirydenka 2016).¹ A number of pilot studies have used these composite indices to rank their study against those in peer countries. The index pulls together the various indicators of financial development and permits a comprehensive assessment of features of a country's overall level of financial development. This helps in benchmarking the country pilot against benchmark groups. A few pilot cases (for example, Tanzania) used customized financial development indices to assess progress of financial development over time and to benchmark these indices relative to those of peer countries. The Tanzania study also used the composite index to assess the gap between the expected and observed levels of financial development, using the predicted level of financial development estimated in the April 2016 *Regional Economic Outlook for Sub-Saharan Africa* (IMF 2016).²

How Do Pilots Assess Financial Deepening and Inclusion?

Much of the empirical work has focused on assessing where the pilot countries stand relative to their peers and their expected benchmark level. Financial depth is evaluated, in most cases, using standard metrics; namely, the

¹The index developed by Sahay and others (2015a) combines 21 indicators to assess three dimensions (depth, access, and efficiency) for both financial institutions and markets. The underlying series and subindices are combined in a linear manner, with weights determined by principal component analysis. Financial depth has a relatively large weight in the financial institutions and market subindices; however, for the overall index, financial markets and institutions have equal weight. Dabla-Norris and others (2015a) constructed a less-comprehensive index encompassing only indicators of financial inclusion and access.

²The predicted level of financial development is estimated in the *Regional Economic Outlook* on the basis of key economic and demographic characteristics such as per capita income, population size and density, age dependency ratio, and country characteristics.

Figure 9. Financial Inclusion and Depth Indicators

Financial Inclusion		
Use of Financial Services		Access to Financial Institutions
By Households	By Firms	
<ul style="list-style-type: none"> Account at a formal financial institution (percentage age 15+) ATM is main mode of withdrawal (percentage with an account, age 15+) Depositors with commercial banks per 1,000 adults (percentage) Outstanding deposits with commercial banks (in percent of GDP) Depositors with credit unions and financial cooperatives per 1,000 adults (percentage) Debit card (percentage age 15+) Borrowers from commercial banks (per 10,000) Loan from a financial institution in the past year (percentage age 15+) Saved at a financial institution in the past year (percentage age 15+) Credit or debit card (percentage age 15+) Loan accounts with commercial banks (per 1,000 adults) Loan accounts with credit union and cooperatives (per 1,000 adults) Active number of mobile money accounts (per 1,000 adults) Accounts used to receive wages or government payments (in percent of respective groups) Number of mobile money accounts (per 1,000 adults) Borrowers from commercial banks (per 1000 adults) 	<ul style="list-style-type: none"> Percentage of SME firms with a checking or savings account Percentage of SME firms with bank loans/line of credit Percentage of SME firms using banks to finance investments Proportion of working capital financed by banks Proportion of investment financed by banks Value of collateral needed for a loan (percentage of the loan amount) Percentage of SME firms not needing a loan Percentage of SME identifying access to/cost of finance as a major constraint Proportion of working capital/investment financed by banks 	<ul style="list-style-type: none"> Number of ATMs per 1,000 sq km or per 100,000 adults Number of branches of ODCs per 1,000 sq km Commercial bank branches per 100,000 adults Credit union and cooperative branches per 100,000 adults Credit union and cooperative branches per 100,000 adults Mobile banking, agent outlets per 100,000 adults Mobile banking, agent outlets per 1,000 sq km Active number of mobile money accounts per 10,000 adults Accounts used to receive wages or government payments (in percent of respective group) Proportion of commercial bank branches located in rural areas
Financial Depth		
Financial Institutions		Financial Markets
<ul style="list-style-type: none"> Private sector credit to GDP M2 to GDP Bank deposits to GDP Pension fund assets to GDP Mutual fund assets to GDP Insurance premiums, life and non-life to GDP 		<ul style="list-style-type: none"> Stock market capitalization to GDP Stocks traded to GDP International debt securities of government to GDP Total debt securities of financial corporations to GDP Total debt securities of nonfinancial corporations to GDP
Financial Efficiency		
Financial Institutions		Financial Markets
<ul style="list-style-type: none"> Net interest margin Spread between lending and deposit rates Non-interest income to total income Overhead costs to total assets Return on assets Return on equity 		<ul style="list-style-type: none"> Stock market turnover ratio (stocks traded to capitalization)

Source: IMF staff.

Note: SME = small and medium sized enterprises; ODC = other depository corporations; M2 = broad money

ratios of credit to private sector, domestic bank deposits to GDP, and broad money to GDP. Financial inclusion is typically assessed using available information on accounts in financial institutions, distribution of bank accounts by income group, gender, education level, geographic region, and mobile money

accounts (see Annex 2 for a list of data sources). A few teams also present factors that could explain the relative position of the pilot countries in terms of financial deepening and inclusion.

In terms of financial deepening, the low-income pilots can be grouped into two categories. The first category includes countries for which the standard metrics of financial deepening are at or above their expected median, such as Malawi and Tanzania. Malawi's financial depth has steadily increased since the mid-1990s, and its ratio of private credit to GDP is above the expected median, although it lags the average of a few neighboring countries. Tanzania's credit-to-GDP and deposits-to-GDP ratios are at about their expected median levels and above those in most of the other East African Community (EAC) countries. The second category includes countries for which financial deepening has been improving in recent years and is close to the regional level but still below the average for the peer group and the average for sub-Saharan Africa overall. These include Côte d'Ivoire, Liberia, Republic of Congo, and Uganda. Financial deepening in Côte d'Ivoire has been growing at a fast pace in recent years and is close to the WAEMU average but still below that of other frontier economies. The depth of the financial system of the Republic of Congo is comparable to that of Central African Economic and Monetary Community (CEMAC) countries, but it lags well behind the average depth for sub-Saharan Africa and for low- and middle-income countries. Financial deepening has increased significantly in Uganda but remains lower than the average level in sub-Saharan Africa and in other EAC countries.

The role of microfinance institutions (MFIs) in increasing financial access has been mixed among the country cases. MFIs provide services to the poor and to small enterprises by replacing traditional collateral and creditworthiness requirements with community-based mechanisms such as women's group guarantees. MFIs contributed strongly to increasing financial inclusion in Liberia and even more so in Benin, where the access rate for microfinance is triple that for banks, with especially better reach in rural areas. However, challenges in supervision and low financial literacy need to be addressed for MFIs to generate a sustainable impact on financial inclusion to support growth (Cui and others 2016). In Chad, Guinea, Tanzania, and Uganda, the role of MFIs was limited owing to geographic concentration, low savings mobilization, and weak loan repayment performance.

Even in countries with a vibrant MFI sector, this sector was not as dynamic as mobile banking, especially in East Africa. Mobile banking is in its infancy in Francophone West Africa. The rapid development of mobile banking services is opening new avenues for the financial sector to affect growth by facilitating transactions and providing access to deposits (Côte d'Ivoire,

Liberia, Tanzania, and Uganda). Drawing on the World Bank's Findex data, positive but varied progress was confirmed in many pilots, ranging from a penetration rate of 2 percent of adults in Benin to over 30 percent in Tanzania and Uganda in 2014. Mobile banking has mitigated infrastructure bottlenecks to financial development. As a result, the number of mobile accounts has risen quickly and even exceeded that of traditional bank accounts in some places (Tanzania and Uganda). Evidence suggests that mobile banking has a dynamic impact on raising the money multiplier and thus is likely to improve the financial sector's efficiency to boost growth over time (Raman and others 2016).

The analysis of sample countries revealed the following key structural constraints to financial development:

- Many countries observed that low income levels are associated with poor literacy and financial illiteracy, which creates a severe barrier to financial services.
- Most countries reported that weak property rights, owing to lack of land registration and titles, reduced firms' and households' ability to provide collateral to borrow. Unreliable land titles also weakened banks' ability to assess creditworthiness, thus hampering access to financial services.
- Many countries still do not have public credit registries. Even where they exist, they are of limited benefit in reducing banks' information costs, because identifying borrowers is complicated by insufficient national identification systems.
- Deeply rooted problems in the judiciary, related to both efficiency and governance, weaken lender protection, including the ability to repossess collateral in the event of loan defaults.
- High informality in many pilot countries reduces the number of bankable firms, while poor business environments further constrain the creation of new businesses and the access to and cost of finance despite strong demand for borrowing (Benin and São Tomé and Príncipe). Private credit tends to be concentrated in a few well-established formal players for whom bank information costs are lower.
- Countries with unstable macroeconomic conditions had a higher cost of funds as well as costs of opening and maintaining an account in financial institutions. Consequently, demand for financial services suffered (for example, Malawi).
- High operating costs and limited access to basic infrastructure make it difficult to expand banking services across sporadically populated rural areas, leading to the concentration of financial institutions in the capital city. This was identified as the most constraining barrier for Guinea.

These constraints have contributed to resource misallocation by the financial sector and, consequently, lower growth. For example, a significant mismatch between sectoral contributions to GDP and credit allocations among the sectors was noted in the São Tomé and Príncipe Selected Issues Paper (SM/16/174). In contrast, the establishment of a credit reference bureau in Uganda has facilitated access to finance and private credit growth.

Policies to Improve Financial Development

The financial sector's impact on growth also depends on the binding constraints in a country. The effect of relaxing specific financial sector constraints differs by country characteristics. A microfounded Computable General Equilibrium model (Dabla-Norris and others 2015b) calibrated by country-specific survey data provides a useful tool to compare the benefits of relaxed participation cost, relaxed collateral constraints to ease borrowing, and enhanced monitoring to improve intermediation efficiency on GDP. For example, while reducing collateral constraints has had the highest growth benefits in Benin, Uganda, and most CEMAC and WAEMU countries, reducing participation cost in Mozambique and Nigeria has been most beneficial (Cui and others 2016; Dabla-Norris and others 2015b; IMF 2016d).

Each country pilot formulated policy advice to enhance financial deepening and inclusion, in most cases by focusing on a subset of financial development. The recommended policies primarily centered on creating an enabling environment for financial development, fostering the supply of a wide variety of financial services, and mitigating stability risks to the financial sector. The following were the main recommendations, including direct and supporting measures.

- Strengthening the legal, regulatory, and institutional framework for the supply of financial services by improving laws that protect property and creditor rights, ensuring that these laws are enforced, and streamlining procedures to reduce entry costs. In the case of Chad, developing appropriate frameworks was considered to be the first key step to improve financial deepening and inclusion. The Tanzania pilot recommended a reassessment of the regulatory and supervisory framework for electronic payments, including mobile money. The Côte d'Ivoire pilot stressed the need to issue regulations that facilitate the use of bank agents and correspondent banking. Benin's pilot found that relaxing collateral constraints had the most favorable impact among several reform options on access to credit and reducing inequality. The Guinea pilot emphasized the need to designate a central agency responsible for coordinating financial deepening efforts across agencies.

- Most pilots recommended reducing the cost of participating in the financial sector by increasing bank competition, setting standards for disclosure and transparency, promoting credit information systems and collateral registries, upgrading trading and settlement systems, making the electronic payment system efficient, and optimizing the use of mobile and agent banking. The Uganda pilot stressed the importance of requiring banks to disclose information on the terms and conditions of financial products as key to ensuring consumer protection. A few pilots (Guinea, Liberia, Malawi, and Uganda) pointed to the need to expand enabling physical infrastructure, including mobile phone coverage, power supply, reliable internet services, and roads.
- Restoring or preserving macroeconomic stability would contribute to enhancing financial deepening and inclusion by lowering uncertainty and the cost of funds, reducing the costs of opening and maintaining an account in financial institutions as well as bank net interest margins, and expanding the demand for financial services. This was a key recommendation in the case of Malawi, where inflation was stuck above 20 percent after 2012 but has recently stabilized to single digits.
- Fostering financial literacy, particularly for rural or uneducated populations and small enterprises, is important to raise awareness and knowledge of financial services and products. Benin, Côte d'Ivoire, Guinea, Malawi, and Uganda pilots stressed the need to step up or broaden ongoing actions on this front.
- Enhancing supervision of all the segments of the financial system. A few pilots (Malawi, Republic of Congo, Tanzania, and Uganda) cited evidence of the trade-offs and synergies between financial inclusion and financial stability and stressed the need to strengthen the supervision of all segments of the financial system (banks, MFIs, insurance companies, and pension systems) in parallel with the expansion of financial inclusion. The Benin pilot stressed the urgency of increasing staff resources for supervision and enforcing regulations governing the microfinance sector.

Financial Sector Stability: Zooming in on Stress Testing

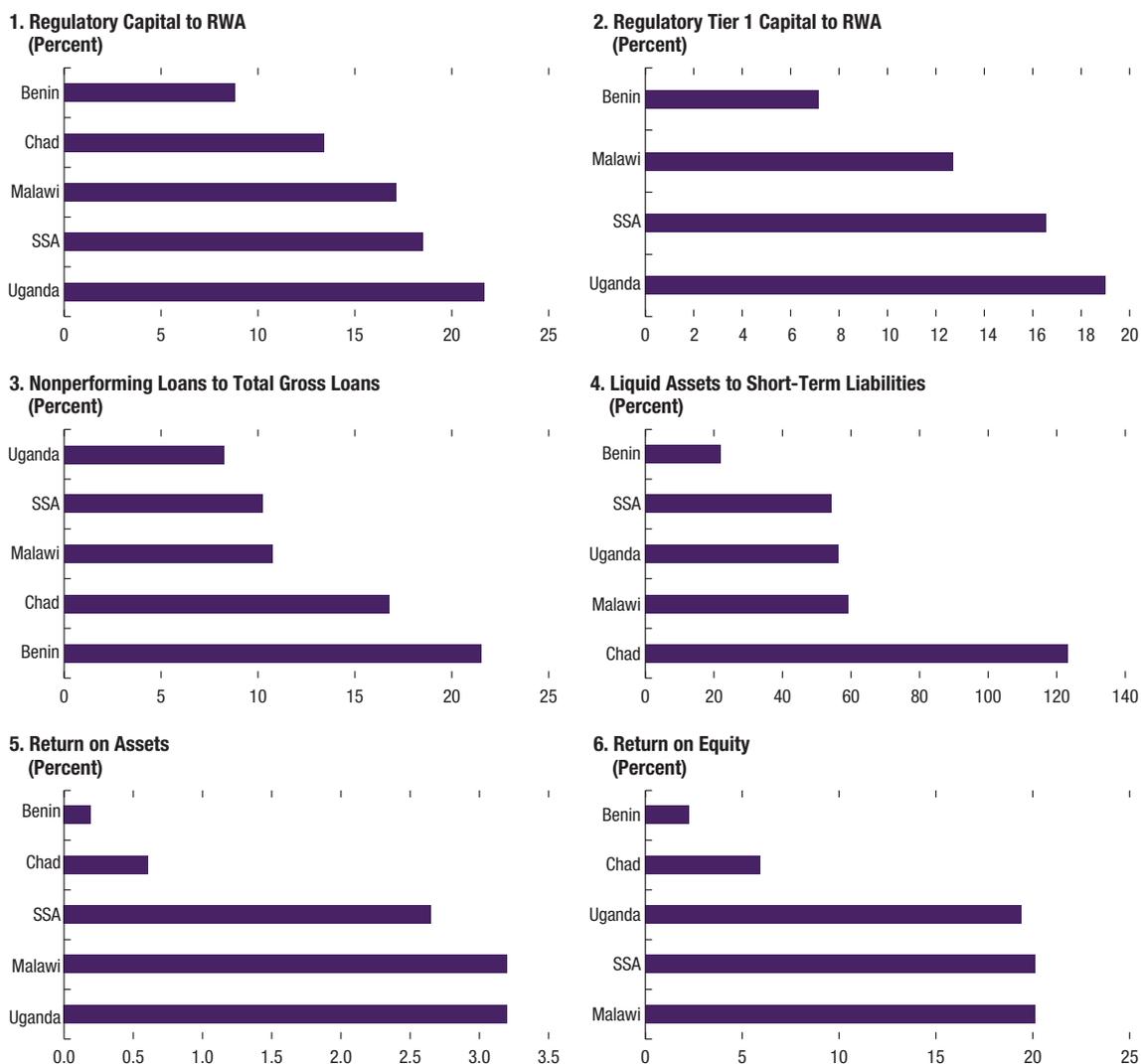
Context

Data availability has often constrained the scope, coverage, and quality of assessments of banks' sensitivity to exceptional and plausible shocks. Although stress tests are useful to formulate policy recommendations, the quality and reliability of quantitative estimates of shocks depend heavily on access to data, including granular information across sectors (households, firms, nonbank institutions) and supervisory data for individual entities. For less-developed countries, these data can be difficult to obtain, hindering the objective of making risks more transparent by estimating potential losses in abnormal circumstances.

However, for most countries in the analysis, the stress-testing framework was helpful in quantifying how macro-financial links would affect banks. Stress testing has become a useful and routine method of analyzing the resilience of financial systems to adverse events in low-income economies in sub-Saharan Africa. Some country pilots (Benin, Chad, Malawi, and Uganda) used stress testing to fine-tune findings from other analytical tools, such as financial soundness indicators (Figure 10) and supervisory early warning systems. The country cases also include qualitative analyses of the impact of macro shocks on the financial and corporate sectors; for example, analysis of the impact of credit cycles and nonperforming loans on banks' abilities to offer credit.

The country analyses differed in terms of the extent of their focus on stress testing. Given the large initial investment required to develop a full-fledged stress-testing framework, the Malawi and Uganda country teams built on existing frameworks used by the respective countries' central banks. (Both teams carefully analyzed the methodologies supporting the stress analyses before using the test output to formulate policy recommendations.) Benin and São Tomé and Príncipe country teams drew on the Cihak (2007) frame-

Figure 10. Comparative Indicators of Banking System Soundness



Sources: Country authorities; and IMF staff calculations.
 Note: Latest data from 2015–16. RWA = Risk-weighted assets; SSA = sub-Saharan Africa.

work, adjusted for specifics of the country banking sector. Chad’s country team relied on stress tests prepared by the IMF’s Monetary and Capital Markets Department during the 2016 Article IV consultation with CEMAC. In São Tomé and Príncipe, stress tests are not part of the central bank’s supervisory framework, although the authorities are experimenting with these tests to complement surveillance of the financial sector.

How Were Stress Tests Conducted in Pilots?

Two predominant approaches are used to translate macroeconomic shocks and scenario analyses to financial sector variables. They are (1) the “bottom-up” approach, in which the impact is estimated using data from banks’ individual portfolios, and (2) the “top-down” approach, which refers to centrally conducted tests in which the impact is estimated using aggregated data (Jones, Hilbers, and Slack 2004). While the top-down approach cannot capture concentration of exposures and contagion at the level of individual institutions or links among the institutions, it is relatively less demanding on data and less prone to computational problems when assessing large and complex financial systems. Countries in the pilots have used top-down stress tests.

Most macroprudential stress tests in the sample countries combine both approaches, often using the Stress Tester 3.0. The Stress Tester 3.0, designed by Martin Cihak, covers basic solvency and liquidity risks, contagion, reverse stress testing, and links between stress tests and early-warning systems (Cihak 2007). It focuses on the bottom-up implementation of stress tests in a relatively small, noncomplex banking system, using institution-by-institution data. The spreadsheet can be complemented by a top-down approach. Many financial sector authorities in the region complement the bottom-up approach with a top-down approach by estimating a model on the basis of aggregate data that they use to identify how a combination of shocks to macroeconomic variables can translate into an increase in NPLs.

To the extent possible, the analysis in the sample countries built on stress tests prepared as part of regional consultations in currency unions or regular tests prepared by national central banks. All tests were limited to banks, owing to the lack of data and the dominance of banks in the financial systems. The following are examples of how the analysis was conducted.

- Chad. Stress tests were based on the analysis during the 2016 CEMAC consultations, using data from the end of 2015 provided by La Commission Bancaire de l’Afrique Centrale (regional regulator).
- Malawi. Building on the Stress Tester 3.0 framework, the Reserve Bank of Malawi prepared regular stress tests. The test assesses the impact of minor, moderate, and major shocks on four categories of risk: credit risk, liquidity risk, market risk (including interest rate and foreign exchange risks), and income risk. Individual banks are required to run their own stress tests each quarter. The tests assumed a 100 percent provisioning of NPLs and were based on banking sector data from the end of 2014.
- Uganda. Based on the Stress Tester 3.0 framework, the Bank of Uganda conducts regular stress tests to measure credit and liquidity risks in the

banking sector. The latest exercise included the assessment of single-factor shocks on the basis of bank-by-bank data at the end of 2014. The Bank of Uganda and IMF staff carried out ad hoc stress tests to assess foreign exchange risk and test the system's sensitivity to a combined set of shocks.

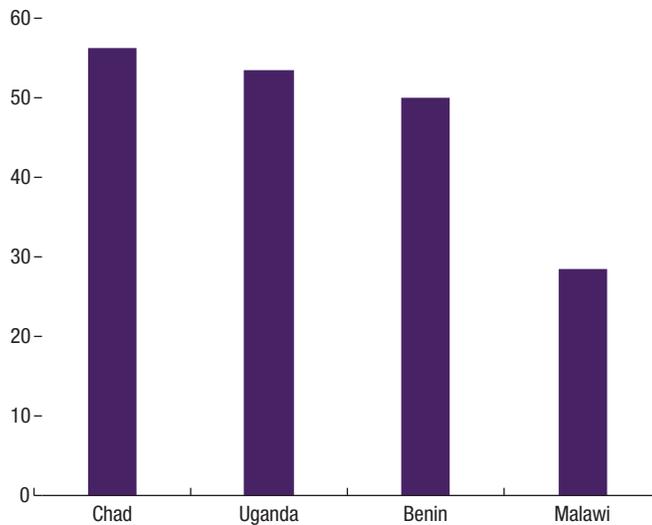
- Benin. Stress tests assessed the sensitivity to single-factor shocks on the basis of June 30, 2015, institution-by-institution data. Owing to the lack of granular data, stress tests were conducted using large shocks to the main aggregates, including credit default risk (increase in NPLs and category shift), concentration risk (both sectoral and single large exposures), and liquidity risk.

Stress tests in the sampled countries often report cases in which data did not properly reflect the value of assets, especially owing to insufficient provisioning. The deteriorating macroeconomic environment caused by swings in commodity prices has put considerable strain on the financial conditions of many banking systems in the pilot countries. The following are some interesting features of the situation:

- Although banking systems have proved to be remarkably resilient, some banks have been weakened considerably and are prone to further deterioration in light of the significant risks. At the individual bank level, a major shock usually leaves some banks with capital asset ratios below the minimum threshold.
- While loan classification and provisioning standards in sub-Saharan Africa are broadly adequate, they were not well enforced in many country cases.¹ Therefore, reported high capital adequacy ratios were found to be overstated because of insufficient provisioning. For example, provisioning coverage in Malawi is relatively low compared with that of other countries in the pilot (Figure 11).
- Data should be carefully assessed and, if necessary, adjusted to get a better picture of the beginning economic situation of individual banks. Data adjustments are needed to comply with international reporting standards. In particular, a bank's economic value may differ from its reported regulatory capital owing to the inclusion of items that, in fact, are not capital and should be treated as something else (for example, long-term loans).

¹Regulations usually prescribe the following loan provisioning rules: 1 percent general provision for past loans, 5 percent general provision for special mention loans, 20 percent specific provision for substandard loans, 50 percent specific provision for doubtful loans, and 100 percent for loss loans.

Figure 11. Provisioning Ratio for Nonperforming Loans
(Percent)



Source: IMF country staff reports.

Main Risks to Banking Systems in Pilots

Credit Risks

The stress tests revealed that concentration risk poses the greatest risk to banking systems in the pilot cases.² Because lending is the core of the traditional banking business in sub-Saharan Africa, credit risk assessment is critical for financial stability.³

- Concentration risk occurred in the form of name concentration (risk cannot be perfectly diversified because of large exposures to individual borrowers relative to the portfolio size) and sector concentration (the portfolio is not well diversified across sectoral factors, corresponding to systematic components of risk) (Grippa and Gornicka 2016).

²This test involves testing for the failure of the largest counterparties of individual banks. Technically, the test is conducted by assuming a specific number of failures per institution or by assuming provisioning rates from those failures.

³Much improvement is needed in the area of credit risk. Marchettini and Maino (2015), argue that the assessment of systemic risk associated with rapid credit growth should be conducted with different tools at different levels of financial development. When the level of financial development is low, the most-used leading indicator of banking crisis (namely, the credit-to-GDP gap) is a poor predictor of performance, as it is unable to distinguish episodes of financial deepening from bubble-like credit booms. In contrast, indicators that take into consideration countries' structural limits have a good capacity to correctly predict financial crises.

- This result reflects the structure of the real economy that leads to loan concentration in specific sectors. For example, Benin is heavily exposed to commerce linked to Nigeria, and Malawi is greatly dependent on tobacco exports. In Chad, concentration risks arise from the dependence of the construction, public works, transport, and communication sectors on public sector contracts, which often accumulate arrears.

Simulations of a deterioration in loan quality revealed stresses in most banking systems. In Malawi, four banks would become undercapitalized in the event of a moderate shock to NPLs (for example, NPLs increasing by 40 percent and a provisioning rate of 100 percent), but the system in general would remain resilient. The entire banking sector is exposed to concentration risk through large exposures, as the aggregate Tier 1 capital ratio would fall below 10 percent after the default of the largest borrower of each bank. In the case of Benin, solvency tests suggested that, owing to the current high level of NPLs, banks' balance sheets would significantly deteriorate with any further deterioration in the quality of their loan portfolios. In Chad, if NPLs increased by only 25 percent (to more than 20 percent of total loans), the solvency ratio would fall below the regulatory threshold. Uganda's financial system can withstand shocks such as increased NPLs, suggesting that capital buffers are sufficient to absorb the impact of a shock.

Sovereign Risks

Stress tests confirmed that rising exposure to government debt creates sovereign financial links that could generate negative feedback in response to fiscal troubles or tightened liquidity conditions. The nexus between government debt (including state-owned enterprises and the banking system) seems to have recently intensified and could increase fiscal and financial stability risks in countries if repayment pressures occur. Capital buffers are generally inadequate to cover potential sovereign risks.⁴ In Benin, stress tests revealed that banks' capital adequacy would fall below the statutory minimum if there were a partial default in rapidly increasing sovereign bonds. The use of refinancing through the regional central bank, which exceeded the WAEMU average, resulted in a tightening of bank-sovereign links in a shallow financial market and amplified risks under tight liquidity. In Chad and Malawi, bank balance sheets show a rising allocation of credit to the government. In Chad, the central government, public agencies, and nonfinancial public enterprises accounted for about 28 percent of banks' total credit as of December 2015.

⁴Favorable interest rate conditions, taxation, and regulations for government bonds offer an advantage compared with private credit. In particular, government securities benefit from (1) a tax exemption on interest, and (2) no capital requirement (zero percent weighting of sovereign securities risk in the computation of bank solvency, which requires no extra capital provisions and becomes a critical factor in buttressing profitability).

In Malawi, government securities represented 24 percent of banking system assets, and the exposure has risen from 14 percent of GDP in 2012 to a projected 24 percent of GDP in 2016.

Interest Rate and Exchange Rate Risks

Stress tests confirmed risks arising from interest rate changes, while exchange rate risk is negligible in Benin and Chad. Credit to the private sector in Benin and Chad is mostly allocated in domestic currency—bank credit to the public sector, including through the regional market of public securities, is also in domestic currency. However, foreign exchange risk is present in both Malawi and Uganda.

- Malawi. Banks are quite resilient to interest rate risk. The provision rate for the resulting NPLs is set at 100 percent. Against these assumptions, most Malawian banks would be resilient to major foreign exchange risk.
- Uganda. The Bank of Uganda and IMF staff have analyzed the impact on the net open foreign exchange position from a depreciation of the shilling against the US dollar by up to 50 percent; the results show that both the net open position in foreign currency and the system's capital adequacy ratio would remain within the required thresholds after the shock.

The Work ahead in Country Cases

Improvements in banking supervision are complementary to efforts to reduce risks to financial stability and enhance banks' efficiency. Malawi, with IMF technical assistance, adopted a prompt corrective action framework to respond to distressed banks. In Benin, Chad, and Uganda, the growing presence of pan-African banks underscored the need for consolidated supervision, as these banks could pose systemic risks. Exercising collateral in the event of nonperforming loans is a challenge in all pilots because of lengthy legal procedures. In Chad, the interaction between the regional and national authorities has not been fully effective. In Benin, supervision and enforcement (including enhanced training in commerce and finance for judges) are necessary to sustain the microfinance institutions' positive role in facilitating access to financial services and to realize their full potential in promoting more inclusive growth. In Uganda, the approval of the Financial Institutions Act and the Microfinance Development Institutions Act could help prevent regulatory arbitrage; while in Malawi, the update of e-money regulations will soon be contributing to strengthening financial inclusion.

Table 3. Pilot Cases: Key Findings from Stress Tests, 2015

Country	Credit Risk	Concentration Risk	Sovereign Risks	Exchange Rate Risk	Interest Rate Risk	Liquidity Risk	Source	Data Coverage
Benin	High. Solvency tests suggest that due to the current high level of NPLs, banks' balance sheets would significantly deteriorate in case of further deterioration in their loan portfolio quality.	High. Due to the lack of economic diversification and the high large exposure prudential limit, banks in Benin are highly vulnerable to default in large exposures, to specific economic sectors or a single counterparty. Complicating the concentration risk further, the non-observance of the concentration limit is becoming increasingly frequent for some banks in a context of limited loan demand and a dearth of viable projects.	High. Banks' capital adequacy ratio could fall below the minimum 8 percent in case of a partial default in sovereign bonds. This underlines the increasing sovereign credit risk exposure in banks' investments.	N/A	N/A	High. Banks are quite vulnerable to a deposit run caused by a loss in confidence in the economy. By day five, seven banks would become illiquid, two large local banks and two foreign banks. Foreign banks and medium-sized banks are most exposed to liquidity shocks.	Benin: 2015 Article IV Consultation, SIP	End-June 2015
Chad	High. Banks' NPL increased to 16.5 percent of total banks' loans as of end-2015 from 9.5 percent in June 2014. A further increase in NPLs would deteriorate the solvability ratio, which stood at 14.6 percent at end-2015.	Moderate. Low direct exposure to the oil sector (less than 4 percent of banks credit portfolio), but exposure to sectors (construction and public works, transport and communications) largely dependent on public contracts.	High. Commercial banks have a significant credit and liquidity exposure to the public sector + the government's needs for additional domestic financing, including to repay part of the stock of domestic arrears, can place a burden on banks, despite recent measures of the BEAC to strengthen their liquidity position.	Low. Credit to the private sector is in domestic currency. Bank credit to the public sector, including through the regional market of public securities, is also in domestic currency.	N/A	Moderate. The proportion of sight deposits is particularly high in Chad (85 percent of total deposits, the highest ratio among CEMAC members), making banks vulnerable to a withdrawal of deposits.	IMF-CEMAC team's assessment on CEMAC. Stress tests were done by MCM.	End-2015
Malawi	Moderate. Tier 1 capital ratio could decline from 12.6 percent to 11.0 percent and 7.3 percent, in the minor and major shock scenario, respectively.	High. Tier 1 capital ratio of the banking sector falls from 12.6 percent to 8.4 percent when the two largest borrowers default and falls to 5.6 percent when all five borrowers default.	N/A	N/A. In two minor shock cases, 20 percent appreciation and 20 percent depreciation against currencies of major trading partners, the Tier 1 ratio will increase from 12.6 percent to nearly 16 percent and 16.5 percent, respectively. In the event of a 50 percent depreciation, the Tier-1 capital would increase slightly to 13.3 percent.	Low. The Tier-1 capital ratio falls from 12.6 percent to 12.1 percent when the interest rate increases by 1,000 basis points under the assumption both the impact of interest rate changes affects equally the asset and the liability side of banks.	Low. The liquidity ratio of the banking sector declined from 57.8 percent (pre-shock) to 47.3 percent when the major shocks scenario, a 30 percent drop of deposits. At this level, the liquidity ratio was still above the minimum regulatory requirement of 30.0 percent.	Financial Stability Report Dec. 2015 by Reserve Bank of Malawi	As of June 2015

São Tomé and Príncipe	High. Credit risk is the most relevant given the limited debt instruments, excess liquidity, and currency peg. Vulnerabilities come from of the accumulation of NPLs and high concentration of credit exposure.	High. In 2015, credit to the construction sector was provided mainly by one bank, and to a large degree the same is true for lending to tourism and manufacturing; this credit concentration by sector at the individual bank level increases banks' vulnerability to sector-specific shocks.	Low. The share of credit to the public sector, including the local government and public nonfinancial corporations, is miniscule—1 percent of gross claims in 2015.	Low. Foreign exchange risk is quite limited in the presence of a currency peg.	Low. Banks are not sensitive to changes in bond interest rates and do not face any significant interest rate risk.	Low. The risk of drying-up of liquidity in interbank operations is negligible.	São Tomé and Príncipe 2016 Article IV Consultation, SIP	As of June 2015
Uganda	Moderate. Credit risks associated with possible currency mismatches in borrowers' balance sheets.	Low. A proportional increase in NPLs to large borrowers was found to be not significant.	Low. The share of government securities as share of net domestic bank financing remains low at 13 percent in 2015.	Low. Foreign exchange risks are well contained.	The Bank of Uganda does not stress test banks' resilience to lending rate hikes due to insufficient data availability.	Low. Most banks continue to meet the threshold of 20 percent even under extreme scenarios.	4th PSI Review SR published in June 2015	As of June 2015

Source. Authorities estimates and IMF estimates

NPL	Nonperforming loans
BEAC	Banque des Etats de l'Afrique Centrale
CEMAC	Central African Economic and Monetary Community
MCM	IMF's Monetary and Capital Markets Department
SR	IMF's Staff Report
PSI	IMF's Policy Support Instrument
SIP	IMF's Selected Issues Paper

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Conclusions

While financial markets among the country pilots have deepened over the past decade, they lag those of the Middle East and North Africa, Latin America and the Caribbean, and East Asia. A common characteristic among the country pilots was that their financial systems are largely bank-based, and the degree of financial access varied owing to wide-ranging barriers such as high intermediation costs. However, a growing trend toward an expanded role for mobile banking payments has boosted access to financial services.

These country studies sought a better understanding of macro-financial links and their implications for economic outcomes. Policy recommendations focused on improving financial development by improving access and inclusion and ultimately stimulating growth. Strengthening the legal, regulatory, and institutional framework would enhance the supply of financial services by improving laws that protect property and creditor rights. Increasing bank competition and promoting credit information and collateral registries were cited among other reforms as being critical to reducing the cost of participating in the financial sector. Increasing awareness and knowledge of financial services by fostering financial literacy would broaden access and inclusion. A stable macroeconomic environment, characterized by sustained and inclusive growth and single-digit inflation, is critical to fostering private sector confidence, reducing uncertainty and the cost of funds, and enhancing financial deepening.

Country studies uncovered feedback loops across sectors and policies through two principal channels and attempted to trace their impact on growth. Some pilots explored how macroeconomic shocks from the external, fiscal, and real sectors were transmitted to the financial sector. Others assessed how developments in the financial sector magnified or dampened the impact of macroeconomic shocks. Weather-related shocks played a key role in negatively affecting corporate and household balance sheets. Fluctuations in commod-

ity prices emerged as an equally important transmission channel from the external to the financial sector. Finally, in all countries, fiscal dominance had an adverse effect on shallow financial markets, which triggered a negative feedback to growth.

The prevalence of shallow and undiversified financial markets in the countries studied limited their ability to absorb external shocks (volatility in aid and commodity prices). This feature of these economies underscored the links between macro-financial stability and financial deepening. Enhancing supervision of all segments of the financial system will help balance the synergies between financial inclusion and stability. Recommendations pointed to the need for a holistic approach to strengthening supervision of all segments of the financial system. This view is underscored by the growing presence of pan-African banks and the fact that stress tests revealed that credit risk and concentration risk pose the greatest risk to banking systems.