

1. Dealing with the Gathering Clouds

Economic activity in sub-Saharan Africa has weakened markedly. To be sure, growth—at 3¾ percent this year and 4¼ percent in 2016—still remains higher than in many other emerging and developing regions of the world. Still, the strong growth momentum evident in the region in recent years has dissipated in quite a few cases.

To understand the slowdown, it helps to consider three key factors that have supported the high growth in the region over the past decade. Perhaps the most dominant of these factors has been the vastly improved business and macroeconomic environment that policymakers have put in place, supporting higher investment. Another important factor has been high commodity prices, which played a particularly central role in the region's eight oil exporters (notably, Nigeria and Angola) but also in several hard metals exporters (for example, Guinea, Sierra Leone, South Africa, and Zambia). The third factor has been the highly accommodative global financial conditions, which have boosted capital flows to many countries in the region, facilitating higher private and public investment.

Of late, though, two of the three factors have become much less supportive—commodity prices have fallen sharply and financing conditions have become more difficult. The upshot is a deceleration in economic growth in the region. Within this overall difficult picture, however, there is considerable variation across the region.

- In most low-income countries, growth is holding up, as ongoing infrastructure investment efforts continue and private consumption remains strong. The likes of Côte d'Ivoire, the Democratic Republic of the Congo, Ethiopia, Mozambique, and Tanzania are projected to register growth of 7 percent or more this year

and next. But even within this group, some countries are feeling the pinch from lower prices for their main export commodities, even as lower oil prices ease their energy import bill. On average, activity for this group is now projected to expand by 6 percent in 2015, some three-quarters of a percentage point lower than foreseen a year ago.

- The region's eight oil-exporting countries, conversely, are being hit hard by the continued weakness in oil prices. Falling export incomes and resulting sharp fiscal adjustments are taking their toll on activity, now expected to expand by 3½ percent this year, down from the 7 percent expected before oil prices started falling. Headwinds are particularly strong in Angola and Nigeria, but also among oil exporters in the Central African Economic and Monetary Community (CEMAC).
- Several middle-income countries are also facing unfavorable conditions. A combination of supply shocks (for example, curtailed electricity production in Ghana, South Africa, and Zambia), more difficult financing conditions in a context of large domestic imbalances (Ghana and Zambia), and weaker commodity prices (Botswana, South Africa, Zambia) are set to lower growth.

Moreover, there is a risk of still lower growth if the external environment continues to weaken. Existing vulnerabilities, especially on the fiscal front, could also come to a head if the external environment were to turn even less favorable, via further declines in commodity prices, stronger growth deceleration in China, or a disorderly global asset reallocation. In that context, some countries would be forced into a sharp adjustment of policies, further adding to the growth slowdown currently at play. Finally, security-related challenges still prevail in a number of countries.

This chapter was prepared by a team led by Céline Allard, comprising of Jorge Iván Canales Kriljenko, Joannes Mongardini, Marco Pani, Francisco Roch, and Juan Treviño. Research assistance was provided by Emily Forrest.

The policy implications are threefold.

- On the fiscal front, for the vast majority of the countries in the region, there is only limited scope to counter the drag on growth. For oil exporters, the sharp, and seemingly enduring, decline in oil prices makes fiscal adjustment unavoidable; and while a few can draw on buffers or borrow to smooth the adjustment, such room for maneuver is increasingly becoming very slim. For most other countries, including both those that are slowing down and those that are still growing at a fast clip, policies need to continue to be guided by medium-term spending frameworks, paying heed to debt sustainability considerations, on the one hand, and to addressing development needs, on the other. As such, there is very limited case for deviating from these policies to support near-term growth. Only among countries where public debt is low and the initial fiscal position comfortable, perhaps in the case of Botswana and the Seychelles, does there seem to be room for countercyclical policies if growth were to slow down markedly.
- On the monetary front, wherever the terms-of-trade decline has been large and the exchange rate is not pegged, it is appropriate to allow for exchange rate depreciation to absorb the shocks. Resisting downward pressures on the currency not only risks depleting reserves, but also means that the adjustment to the shock would instead have to be borne via import compression and lower growth. But even countries that are not heavily reliant on commodity exports have seen their currency come under pressure of late. Here too, given the strong global forces behind them, resisting these pressures risks losing scarce reserves. Accordingly, interventions should be limited to disorderly movements of the exchange rate. Monetary policy should only respond to second-round effects, if any, of exchange rate pass-through and other upward shocks to inflation.
- Risks to the financial sector from the commodity price declines, especially in

oil-exporting countries, and from exchange rate depreciation require careful monitoring. Supervision should be stepped up to contain balance sheet effects from these shocks and mitigate potential risks from currency mismatches.

In the rest of Chapter 1, we first elaborate on how recent global developments are creating powerful headwinds for sub-Saharan Africa. Second, we look at the domestic environment in which the countries in the region are entering this period of external headwinds and how these macroeconomic conditions, most notably large fiscal deficits, create additional vulnerabilities. Against this backdrop, a third section presents the near-term outlook and the risks associated with the forecasts, and a final section explores options to create fiscal space by improving domestic revenue mobilization.

In subsequent chapters, we turn to two other aspects essential for longer-term growth in the region:

- Chapter 2 asks whether sub-Saharan Africa is sufficiently competitive to sustain its recent robust growth pattern as external tailwinds fade. A range of indicators suggest that competitiveness has deteriorated for the region as a whole, but with heterogeneity across countries. The chapter also finds a strong connection between competitiveness and the ability of countries to sustain growth, and highlights policies to boost competitiveness in the long term.
- Chapter 3 documents the extent to which high levels of income and gender inequality in the region weigh on macroeconomic performance. While these high levels of inequality might partly reflect an earlier stage of development compared with other regions, the chapter shows that reducing inequality to levels observed in some fast-growing Asian emerging market economies could yield significant growth payoffs. It highlights targeted fiscal and financial policies, as well as the removal of gender-based legal restrictions, as tools to facilitate access to opportunities for low-income households and women.

STRONG HEADWINDS FROM THE EXTERNAL ENVIRONMENT

Global growth is expected to decline from 3.4 percent in 2014 to 3.1 percent in 2015, before picking up to 3.6 percent in 2016. Yet, even this modest overall recovery masks a generally difficult external environment for many sub-Saharan African economies.

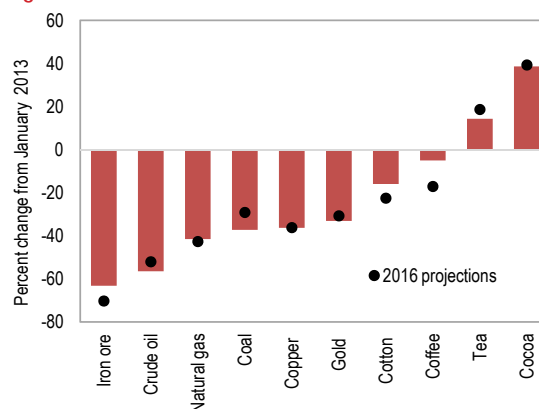
Commodity Prices Set to Remain Weak

After a steady rise in prices since the early 2000s, the decade-long commodity cycle seems to have come to an end. This represents a formidable shock for many of the sub-Saharan African countries that are still substantial commodity exporters, as it cuts into export values and fiscal revenues.¹ As was described in the April 2015 issue of this report, oil exporters are particularly affected, as their fiscal and external positions tend to be the most dependent on extractive activities. But even among oil importers, which are benefiting from cheaper energy imports, a wide range of countries have seen the price of their main commodities plummet over the last two years by some 40 to 60 percent (Figure 1.1). Moreover, most commodity prices are projected to remain low, if not decline further, throughout 2016. Such prospects have already triggered a scaling down of existing activities in some countries (Botswana, Democratic Republic of Congo, Guinea, Sierra Leone, South Africa, Zambia) or of new projects in others (Côte d'Ivoire).

The decline in commodity prices has been underpinned by the rapid and likely persistent decrease in global demand for raw materials, in some cases combined with higher supply (such as for oil or copper). As explained in the October 2015 *World Economic Outlook*, emerging market economies—which have over the last few years been a significant source of demand for commodities—are experiencing their fifth consecutive year of moderation in activity in 2015 (IMF 2015f). Most importantly,

¹ Beyond the eight oil-exporting countries, the region also has 15 countries where nonrenewable resource exports represent more than 25 percent of goods exports—and in nine of those, that share exceeds 50 percent. For an extensive discussion of the channels through which such terms-of-trade shocks are transmitted to the economy, see Chapter 2 of the October 2015 *World Economic Outlook* (IMF 2015f).

Figure 1.1. Selected Commodity Prices, January 2013–August 2015



Sources: IMF Commodity Price System; and IMF Global Assumptions.

Note: Besides oil, some of the main export commodities in the region are copper (Democratic Republic of Congo and Zambia), iron ore (Liberia and Sierra Leone), coal (Mozambique and South Africa), gold (Burkina Faso, Ghana, Mali, South Africa, and Tanzania), and platinum (South Africa).

China, the largest single trade partner of sub-Saharan Africa, is rebalancing its growth away from manufacturing, construction, and exports—where production inputs are highly skewed toward raw materials—toward the services sector and consumption.² For countries where exports to China account for a very significant share of total exports, such as Angola, the Democratic Republic of Congo, the Republic of Congo, Sierra Leone, South Africa, and Zambia, this represents a particularly strong shock (Figure 1.2).

Financing Environment Turning Less Favorable

Adding to these adverse trends for those countries relying on international sources of financing, global financial conditions are gradually tightening. The expected monetary policy normalization in the United States and the reassessment of global risks since mid-summer have already altered the environment of abundant liquidity and low borrowing costs experienced by emerging and frontier market economies over the last few years. Even though

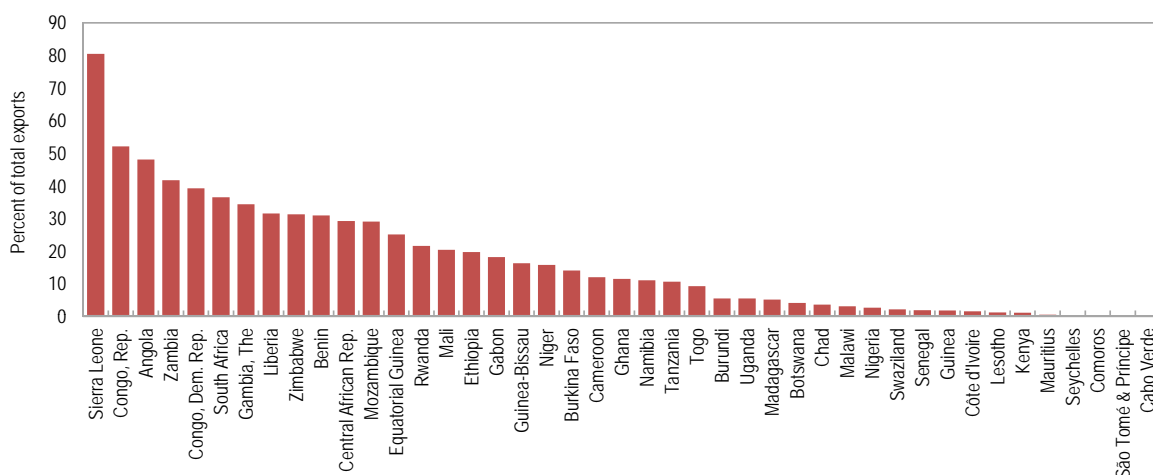
² While China's slowdown and rebalancing has unequivocal negative spillovers in the short term, as they feed into weaker demand for commodities, their medium- to long-term effect is less clear-cut. In particular, the region could benefit from China's rebalancing over time, if it were to be accompanied by a relocation of low-end manufacturing activities to sub-Saharan Africa (Anderson and others, forthcoming).

sub-Saharan Africa remains relatively less financially integrated than other parts of the world, this trend is also visible in the region. After two years of record Eurobond issuances in 2013–14, fewer sovereigns have tapped the international markets so far this year; when they did, it was at higher yields than in previous issuances (Figure 1.3). More broadly, sovereign spreads in the region’s frontier market economies have increased across the board since October 2014—often surpassing the general risk retrenchment in emerging markets (Figures 1.4 and 1.5).

MORE DIFFICULT DOMESTIC CONDITIONS

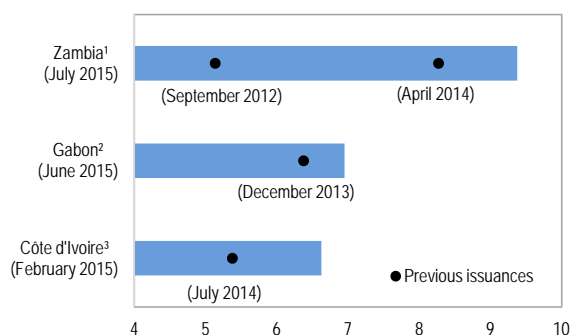
This adverse external backdrop is compounded by the generally limited buffers that countries have to offset the drag on activity. In many cases, savings from the recent period of rapid growth have been small, and the borrowing room is rapidly decreasing. Moreover, countries in the region are mostly entering this period with larger fiscal and external deficits than at the onset of the 2008–09 global financial crisis—the last time the external environment turned unsupportive for the region.

Figure 1.2. Sub-Saharan Africa: Exports to China, 2014



Source: IMF, Direction of Trade Statistics.

Figure 1.3. Sub-Saharan Africa: Recent Eurobond Issuances (Yield-to-maturity at issuance and comparison with previous issuances)



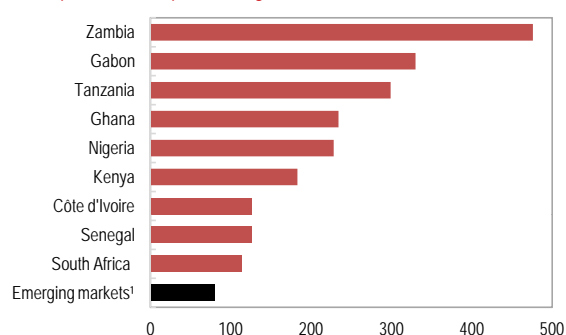
Sources: Country authorities; and IMF staff estimates.

¹ Zambia issued bonds with an average maturity of 11 years in 2015, and 10-year bonds in 2014 and 2012.

² Gabon issued a 10-year bond in 2015, and an 11-year bond in 2013.

³ Côte d'Ivoire issued a 13-year bond in 2015, and a 10-year bond in 2014.

Figure 1.4. Sub-Saharan African Emerging and Frontier Market Economies: Sovereign Bond Spreads (EMBIG spreads, basis point change since October 2014)

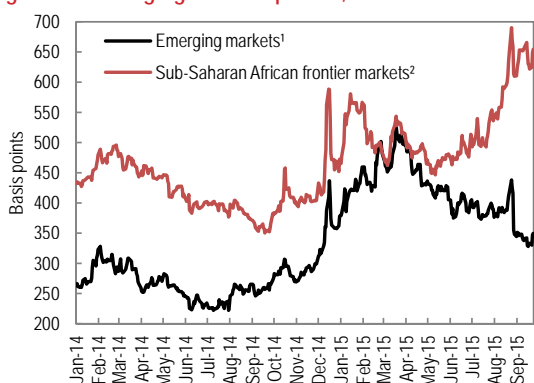


Source: Bloomberg L.P.

Note: Data as of September 23, 2015.

¹ The emerging market average includes the Emerging Market Bond Index Global (EMBIG) spreads of Argentina, Brazil, Bulgaria, Chile, Colombia, Hungary, Malaysia, Mexico, Peru, Philippines, Poland, Russia, South Africa, Turkey, and Ukraine.

Figure 1.5. Emerging Market Spreads, 2014–15



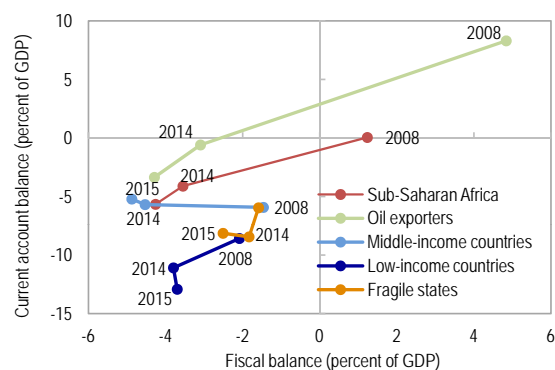
Source: Bloomberg L.P.

Note: Data as of September 23, 2015.

¹ The emerging market average includes the Emerging Market Bond Index Global spreads of Argentina, Brazil, Bulgaria, Chile, Colombia, Hungary, Malaysia, Mexico, Peru, Philippines, Poland, Russia, South Africa, Turkey, and Ukraine.

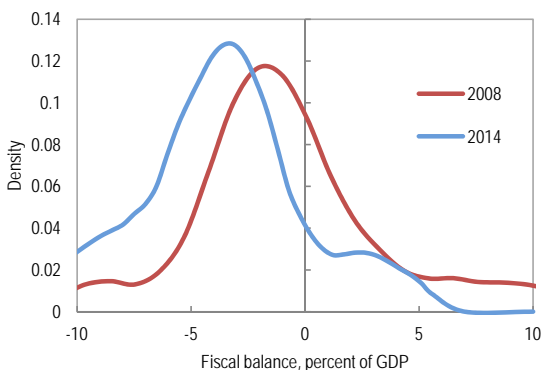
² The frontier markets spread includes the spreads of Côte d'Ivoire, Ghana, Kenya, Nigeria, Rwanda, Senegal, Tanzania, and Zambia.

Figure 1.6. Sub-Saharan Africa: Current Account Balance and Fiscal Balance, 2008–15



Source: IMF, World Economic Outlook database.

Figure 1.7. Sub-Saharan Africa: Distribution of Countries' Fiscal Balances, 2008 and 2014



Sources: IMF, World Economic Outlook database; and IMF staff calculations.

Deteriorating External and Fiscal Positions

External and, even more so, fiscal positions are significantly weaker than in 2008, especially for oil exporters and frontier markets (Figure 1.6). More specifically, in 34 of the 45 countries in the region, the fiscal balance was weaker at the end of 2014 than it was in 2008, despite robust growth in the last few years; and in 21 of them, the external balance was also weaker (Figure 1.7).³

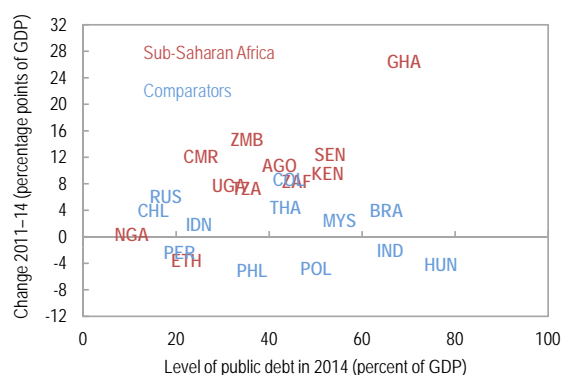
- To some extent, and especially for low-income countries, this reflects welcome efforts to upgrade infrastructure capital in recent years. The concern now, though, is that, with gross external financing needs in excess of 10 percent of GDP in many of the larger economies (Ethiopia, Ghana, Kenya, Senegal, South Africa, Tanzania), it might at best become increasingly difficult and expensive to cover these needs, and at worst, impossible to do so, forcing an abrupt adjustment.
- In others countries, especially oil-exporting countries, financing needs are rapidly increasing in the wake of the commodity price shock, as the fiscal adjustment to lower revenue flows is being smoothed over time (Nigeria, Angola).
- Where fiscal deficits are particularly large and external costs have already risen substantially, recourse to domestic markets is also becoming increasingly difficult, as in Ghana and Zambia. This has pushed domestic borrowing costs up—crowding out the private sector in the process and restraining the emergence of new, more diverse, domestic sources of growth.

With lower growth and higher interest rates, the positive dynamics that had so far put a relative lid on public debt increases could rapidly reverse in some countries.⁴ Where, as in the frontier market economies, debt levels are now increasingly at

³ Similarly, the median fiscal position shifted from -1 percent of GDP in 2008 to -3.6 percent in 2014, and the median current account position from -7.7 percent in 2008 to -8.8 percent in 2014.

⁴ The October 2014 *Regional Economic Outlook: Sub-Saharan Africa* showed that strong economic activity had been instrumental in supporting the relatively stable debt-to-GDP ratios during 2010–13, masking already weakening fiscal positions and gradually less favorable borrowing conditions.

Figure 1.8. Emerging and Frontier Market Countries and Comparators: Total Public Debt Ratio



Source: IMF, World Economic Outlook database.

Notes: Comparators are the following emerging market economies: Brazil, Chile, Colombia, Hungary, India, Indonesia, Malaysia, Peru, Philippines, Poland, Russia, and Thailand. See page 78 for country acronyms.

par with those of emerging market economies, debt headroom to finance necessary development needs will soon have disappeared (Figure 1.8). The increase in yields of recent Eurobond issuances and widening spreads on secondary markets also indicate, in part, that investors are repricing bonds to account for these growing vulnerabilities.

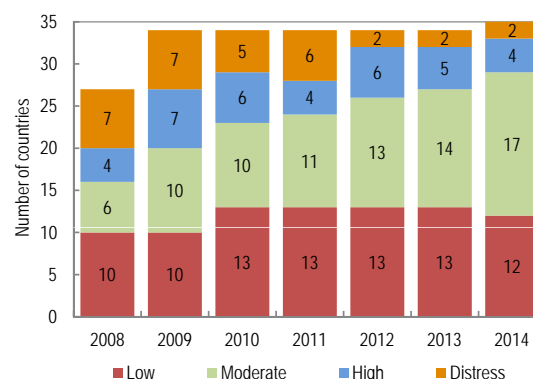
It should be noted, though, that in others, especially low-income countries, debt vulnerabilities are far less prevalent, with the risk of debt distress still relatively moderate (Figure 1.9). In addition, because a large share of the existing stock of debt remains at concessional terms, these countries are less exposed to sharp increases in risk premiums at the global level.

Pressures on Currencies

In the face of the large terms-of-trade shocks and strong appreciation pressures on the dollar, most countries have allowed the exchange rate to adjust. This has been most notable among oil exporters whose currencies are not pegged to the euro, with the Angolan kwanza and Nigerian naira having declined by 26 and 17 percent, respectively, against the U.S. dollar since October 2014.⁵ But large exchange rate movements have not been limited to commodity-reliant countries. The large majority

⁵As measured as the change in the value of one unit of domestic currency in U.S. dollars.

Figure 1.9. Sub-Saharan Africa: Debt Risk Status for Low-Income Countries, 2008–14



Source: IMF, Debt Sustainability Analysis Low-Income database.

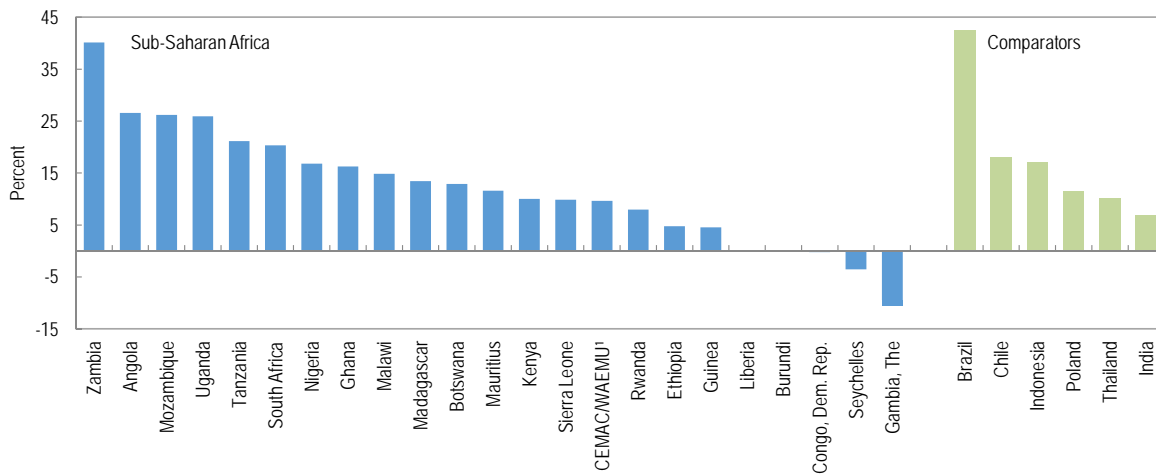
Notes: Excludes Angola as it is no longer classified as a low-income country. Debt risk ratings for Burundi, Chad, The Gambia, Lesotho, Rwanda, São Tomé and Príncipe, and Zimbabwe begin in 2009, and for Cabo Verde in 2014.

of frontier market economies' currencies have experienced depreciations of similar or higher magnitude, including in Ghana, South Africa, Tanzania, Uganda, and Zambia—reflecting existing or rising domestic vulnerabilities in some cases (Ghana, South Africa, Zambia), but also increasing overall risk aversion, as in many other frontier and emerging market economies around the world (Figure 1.10). In some other countries in the region, severe pressures on the exchange rates have also been triggered by growing macroeconomic imbalances, compounded by lower tourism receipts (The Gambia) or a poor harvest (Malawi).

Partly as a result of the exchange rate pass-through, inflation has risen somewhat in some of the largest economies of the region, triggering monetary policy responses.

- Unlike in other regions of the world where lower commodity prices and large output gaps have kept inflation rates at record-low levels, inflation is now inching up in some of the largest sub-Saharan African economies, in contrast with the trend of recent years. Average inflation in the region is expected to reach 7 percent this year and 7¼ percent next year. In some countries, specific factors such as electricity tariff hikes (South Africa), the elimination of fuel subsidies (Angola), and rising food prices

Figure 1.10. Selected Countries: Depreciation of National Currency Against U.S. Dollar Since October 2014
 (+ indicates depreciation)



Source: Bloomberg L.P.

Note: Data as of September 23, 2015.

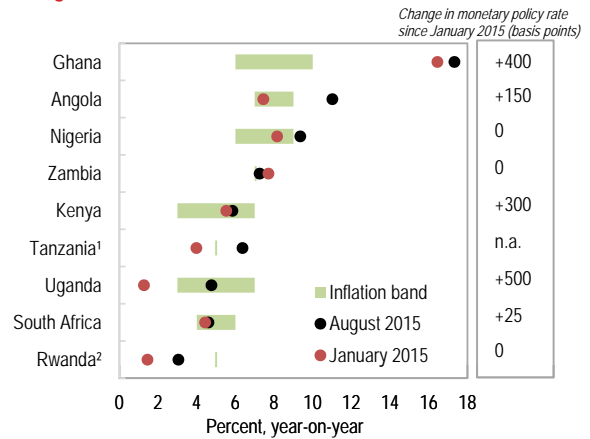
¹ The CFA franc is pegged to the euro. Other countries with fixed exchange rates (Cabo Verde, Comoros, Eritrea, Lesotho, Namibia, São Tomé and Príncipe, South Sudan, Swaziland) are omitted. CEMAC = Central African Economic and Monetary Community; WAEMU = West African Economic and Monetary Union.

(Ethiopia, Tanzania) have also pushed inflation up. However, inflation in most other countries remains contained, particularly in the CFA franc zones, where it ranges from 1 to 3 percent.

- Central banks in a growing number of countries have started tightening monetary policies, concerned that these developments may affect inflation expectations where inflation rates are near or even surpass the highest point of established bands (Figure 1.11). Except where inflation has been far above the target for an extended period, most notably in Ghana, these concerns may be premature, as inflation remains near historic lows in most countries and there are no signs that these one-off shocks are giving rise to second-round effects.

Meanwhile, some central banks have intervened in the market to contain exchange rate volatility, and others, most notably oil exporters, have drawn on their external buffers to smooth the adjustment to lower commodity prices (Figure 1.12). Some countries, including Angola and Nigeria, have also introduced administrative measures to stem the demand for foreign currency, significantly hampering the conduct of private sector activities in the process.

Figure 1.11. Inflation, Inflation Bands, and Monetary Policy Changes

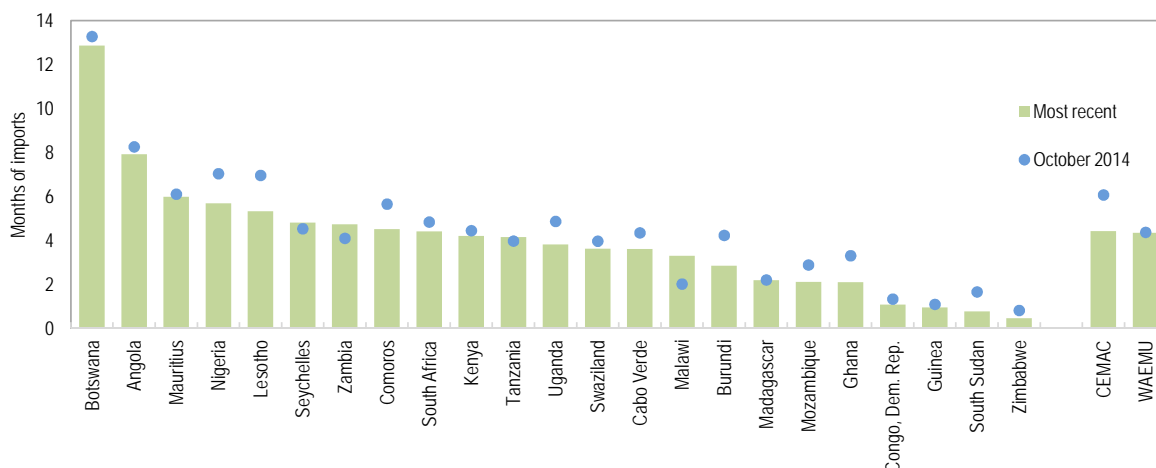


Sources: Country authorities; and Haver Analytics.

Note: n.a.= not available.

¹ Although the Central Bank of Tanzania did not raise policy rates, it nonetheless tightened its policy through foreign exchange sales and increases in the required reserves ratio.

² Reflects urban Consumer Price Index inflation, which is the inflation that the National Bank of Rwanda targets.

Figure 1.12. Sub-Saharan Africa: Reserves


Sources: Country authorities; and IMF, World Economic Outlook and International Financial Statistics databases.

Note: Countries for which no data more recent than February 2015 are available were omitted. CEMAC = Central African Economic and Monetary Community; WAEMU = West African Economic and Monetary Union.

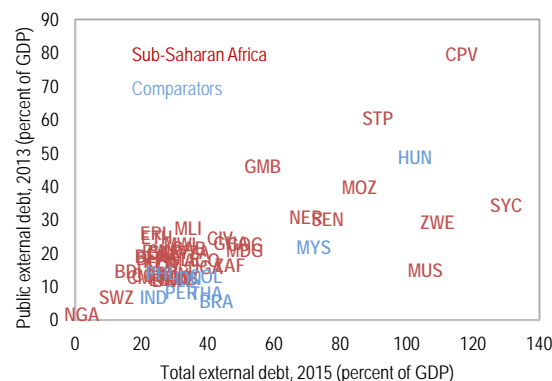
Financial Stability Implications

Given the strong headwinds to activity in commodity-exporting countries, banks could well see a worsening of the quality of their assets. Recent analysis suggests that financial stability indicators in natural-resource-rich countries, such as bank profitability or nonperforming loans, tend to deteriorate and the probability of systemic banking crises tends to increase in the wake of negative commodity price shocks (see Box 1.1). Such spillovers to the financial sector are likely to weigh on credit supply and the process of financial deepening witnessed over the last few years, especially in oil-exporting countries, where credit growth had been particularly strong—with detrimental effects on both growth and economic diversification (see Box 1.2).⁶

In a few highly dollarized economies, the recent exchange rate depreciation could also increase financial sector vulnerabilities. There, the recent depreciation will increase the value in local currency of dollar-denominated liabilities, and hence the debt service burden for unhedged borrowers, potentially exposing banks to losses—even though banks themselves generally have only limited currency

⁶ Event studies of long commodity price cycles prior to 2000 also show that factors supportive of domestic demand, such as credit to the private sector, tend to expand more strongly during upswings than during downswing (see Chapter 2, *World Economic Outlook*, October 2015 (IMF 2015f)).

mismatches.⁷ Relatively high external debt stock—at least by emerging market standards—would compound these negative effects for some countries, including where mining and energy firms have been contracting debt in external currencies (Figure 1.13).

Figure 1.13. Sub-Saharan Africa and Comparators: External Debt


Sources: IMF, World Economic Outlook database; and World Bank, World Development Indicators.

Note: Comparators are the following emerging market economies: Brazil, Chile, Colombia, Hungary, India, Indonesia, Malaysia, Peru, Philippines, Poland, Russia, and Thailand. See page 78 for country acronyms.

⁷ Dollarization remains high in Angola, the Democratic Republic of the Congo, Liberia, São Tomé and Príncipe, and to a lesser extent in Tanzania, Uganda, and Zambia (Mecagni and others 2015). In dollarized economies, private agents typically hold both assets and liabilities in foreign currencies. But the hedge from foreign-currency income flows may not be complete, especially in commodity exporters where firms will see their dollar revenue drop.

Infrastructure Bottlenecks

Despite substantial investment efforts throughout the region, infrastructure bottlenecks have long been an impediment to attracting new activities and fostering trade integration.⁸ These bottlenecks have come to the forefront even more acutely recently for a wide range of countries. Load shedding and electricity shortages, triggered by delays in upgrading aging power plants and filling the power generation gaps, have become a regular occurrence in Ghana and South Africa, with particularly acute effects in the manufacturing sector. Worsening conditions in electricity supply have also been severely hampering activity in a few other countries (Comoros, Madagascar, Nigeria, and Zambia).

These difficulties are in stark contrast with encouraging progress made elsewhere in the region, as past investment is now bearing fruit. In Kenya, the doubling of geothermal generation capacity in the second half of 2014 led to a 20 percent increase in overall capacity and a 25 percent decline of electricity cost (IMF 2015b). The coming onstream of new hydropower plants in Ethiopia is contributing to a further increase in electricity availability for the entire east African region, and will do so even more in the next few years—supporting the emergence of new activities. In west Africa, a new dam put in service in Guinea in the summer of 2015 will also allow electricity exports to neighboring countries.

LOWER GROWTH AMID PERSISTENT RISKS

Outlook

Against the backdrop of these global and domestic headwinds, the outlook for the region is clearly much less favorable than in the recent past. Activity in sub-Saharan Africa is projected to decelerate from 5 percent in 2013–14 to 3¾ percent in 2015, before strengthening somewhat to 4¼ percent in 2016 on the back of the gradual pickup in global activity (Table 1.1). The growth performance

⁸ For an illustration of how infrastructure gaps are holding back sub-Saharan Africa's regional and international trade integration, see Chapter 3, *Regional Economic Outlook: Sub-Saharan Africa*, April 2015.

this year will be lower than in 2009, when the region was reeling from the aftermath of the global financial crisis—and will hardly be enough to create much-needed jobs to absorb the growing young population and make significant progress on poverty and inclusion.

As noted previously, however, this aggregate picture masks considerable heterogeneity across the region. While oil-exporting countries are facing the strongest headwinds, many low-income countries will continue to grow at a fast clip, supported by continuous investment efforts—facilitated in most cases by still substantial capital inflows—and growth in the services sector. It is nonetheless revealing that a majority of countries, both oil exporters and importers, have seen their 2015 growth forecasts revised down since external conditions started turning less supportive in October 2014 (Figure 1.14).

- Growth among oil-exporting countries—which represent about half of sub-Saharan Africa's GDP—is expected to decelerate sharply, from 6 percent in 2014 to 3½–4¼ percent in 2015–16, under the combined effects of lower export income and sharp fiscal adjustment. In Nigeria, activity slowed markedly in the first half of the year as uncertainties surrounding the elections and subsequent political transition, fuel and power shortages, increases in import costs, and fiscal consolidation weighed on non-oil sectors. Growth in 2015 is now forecast at 4 percent, some 2¼ percentage points lower than in 2014. Similarly, in Angola, the sharp retrenchment in public sector investment projects is having a substantial impact on the economy, causing growth to further decelerate to 3½ percent.
- Meanwhile, despite lower oil prices, prospects continue to be mixed for middle-income countries. In South Africa, regular electricity load shedding, job cuts in the steel and potentially in the mining sectors, and broader implications of low commodity prices, along with a tighter policy mix, continue to keep a lid on growth, projected to remain below

Table 1.1. Sub-Saharan Africa: Real GDP Growth
(Percent change)

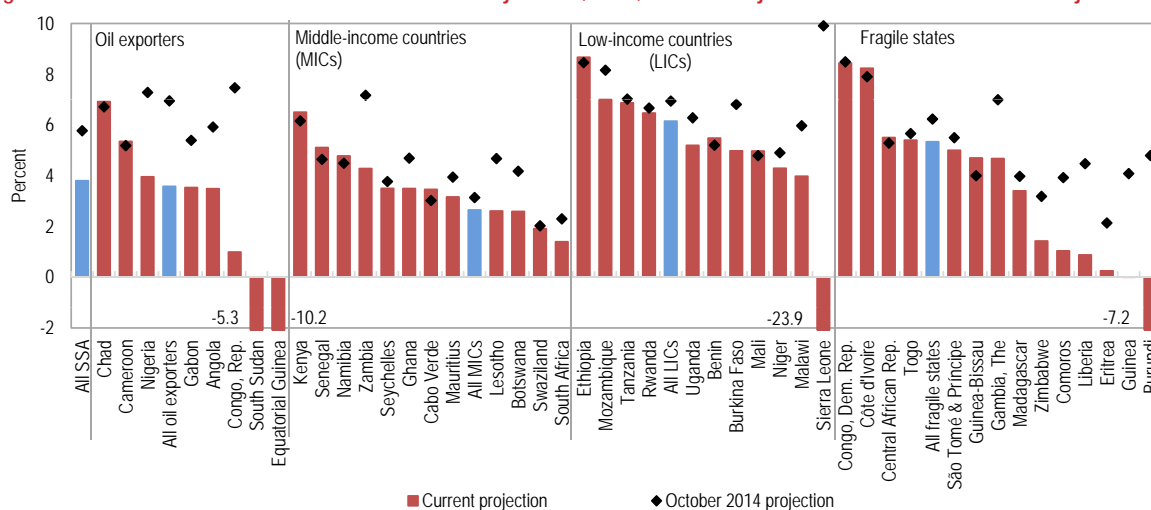
	2004–08	2009	2010	2011	2012	2013	2014	2015	2016
Sub-Saharan Africa	6.8	4.1	6.7	5.0	4.3	5.2	5.0	3.8	4.3
<i>Of which:</i>									
Oil-exporting countries	9.2	7.0	8.5	4.6	3.8	5.7	5.9	3.6	4.2
<i>Of which: Nigeria</i>	8.6	9.0	10.0	4.9	4.3	5.4	6.3	4.0	4.3
Middle-income countries ¹	5.0	0.2	4.6	4.7	3.5	3.7	2.7	2.6	2.9
<i>Of which: South Africa</i>	4.8	-1.5	3.0	3.2	2.2	2.2	1.5	1.4	1.3
Low-income countries ¹	8.0	6.6	7.8	8.1	6.6	7.5	7.4	6.2	6.8
Fragile states	2.8	2.6	4.4	2.9	6.9	5.6	5.8	5.2	5.9
Memorandum item:									
World economic growth	4.9	0.0	5.4	4.2	3.4	3.3	3.4	3.1	3.6
Sub-Saharan Africa resource-intensive countries ²	6.9	3.9	6.7	4.7	3.8	4.9	4.5	3.0	3.6
Sub-Saharan Africa frontier and emerging market economies ³	6.7	4.8	7.1	5.1	4.3	4.9	5.0	4.0	4.3

Source: IMF, World Economic Outlook database.

¹Excluding fragile states.²Includes Angola, Botswana, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Republic of Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Liberia, Mali, Namibia, Niger, Nigeria, Sierra Leone, South Africa, Tanzania, Zambia, and Zimbabwe.³Includes Côte d'Ivoire, Ethiopia, Ghana, Kenya, Mauritius, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Uganda, and Zambia.

1½ percent in 2015–16. Fiscal retrenchment, high inflation, reduced electricity supply, and a disappointing cocoa harvest are also weighing on Ghana's growth, while Zambia's economic activity is being held back by depressed copper prices, high interest rates, and severe electricity shortages. Conversely, growth is forecast to accelerate in Kenya, supported by public investment in transport and power generation, and in Senegal, supported by dynamic private sector activities.

- A majority of low-income countries and fragile states will continue to experience solid growth, as infrastructure investment efforts continue, especially in the energy and transport sectors, and as private consumption remains strong, with continued large foreign direct investment (FDI) inflows in many of them. Countries such as Côte d'Ivoire, the Democratic Republic of the Congo, Ethiopia, Mozambique, and Tanzania are still expected to register growth of 7 percent or more this year and next.

Figure 1.14. Sub-Saharan Africa: Real GDP Growth Projections, 2015, Current Projections versus October 2014 Projections

Source: IMF, World Economic Outlook database.

Note: SSA = sub-Saharan Africa.

Table 1.2. Sub-Saharan Africa: Other Macroeconomic Indicators

	2004–08	2009	2010	2011	2012	2013	2014	2015	2016
				(Percent change)					
Inflation, average	8.8	9.8	8.2	9.5	9.4	6.6	6.4	6.9	7.3
				(Percent of GDP)					
Fiscal balance	1.7	-4.6	-3.4	-1.1	-1.8	-3.1	-3.5	-4.3	-3.6
Of which: Excluding oil exporters	-0.6	-4.1	-4.3	-3.7	-3.7	-3.9	-4.0	-4.2	-3.9
Current account balance	2.1	-2.8	-0.9	-0.7	-1.9	-2.4	-4.1	-5.7	-5.5
Of which: Excluding oil exporters	-4.3	-4.9	-3.9	-4.8	-7.1	-7.5	-7.3	-7.5	-7.8
				(Months of imports)					
Reserves coverage	5.1	5.2	4.2	4.7	5.2	5.0	5.4	4.8	4.2

Source: IMF, World Economic Outlook database.

But even as lower oil prices ease their energy import bill, other low-income countries, including Burkina Faso and Sierra Leone, are feeling the pinch from lower prices for their main export commodities. In Sierra Leone, the economy is expected to contract by more than 20 percent as the closure of the two main iron ore operators exacerbated the impact of the Ebola outbreak. However, as the acute toll of the disease fades, the economies of Guinea, Liberia, and Sierra Leone are expected to resume growth in the coming years. Floods and erratic weather in southern Africa are also reducing agricultural output in many countries, most notably in Malawi and Zimbabwe.

In that context, the region is expected to witness a further worsening of its fiscal position (Table 1.2). The overall fiscal balance (including grants) is projected to widen to -4.3 percent of GDP from -3.5 percent in 2014—the largest deficit in the region since 2009. Oil-exporting countries will drive most of that deterioration, as planned fiscal retrenchments, however severe, will not totally offset the substantial shortfall in oil-activities-related fiscal revenue, allowing for some smoothing of the adjustment. Elsewhere, the fiscal deficit is expected to remain particularly large, and above 7 percent in some countries, on the back of large investment projects (Kenya), high subsidies and arrears clearance (Zambia), or increased security spending (Niger). Ghana, conversely, is embarking on a multiyear fiscal consolidation, and its double-digit deficit in 2014 is projected to be cut to 5.9 percent.

Likewise, with sharply lower proceeds from commodity exports, the external position is forecast to deteriorate further, especially among oil exporters. The current account deficit is expected to widen from 4.1 percent in 2014 to 5.7 percent in 2015, the largest current account deficit since the early 1980s, increasing the urgency to improve competitiveness and jumpstart new export streams, as discussed in Chapter 2. While the lower energy bill will help oil importers and softer growth will keep a lid on consumption imports, these effects will often be offset by lower prices for exported commodities and the continuation of substantial investment projects with high import content.

Downside Risks

Notwithstanding the realization of several adverse external factors embedded in the forecasts, risks to the outlook remain tilted to the downside.

Some domestic risk factors...

Security-related issues still prevail in a number of countries. The civil war continues to take a heavy toll on South Sudan, while the violence sparked by the general elections in Burundi and the recent developments in Burkina Faso are reminders that political cycles can still cause turmoil. Acts of violence by Boko Haram and other insurgency groups have increased in a region spanning Cameroon, Chad, Niger, and Nigeria, but also in Kenya and Mali. Beyond the tragic loss of human lives and widespread suffering, these acts of violence weigh on economic activity, strain fiscal budgets, and diminish the prospects for FDI. The negative impact on economic growth and the potential for regional political instability would be exacerbated if they were to persist or escalate.

The negative impact on domestic economies of the commodity price slump could also prove more pronounced than anticipated, especially among oil exporters. On the one hand, the planned spending cuts are sharp, and the impact on activity will reach widely across sectors—not only extractive activities but also sectors that had so far benefited from the commodity income windfall, such as the construction and services sectors. On the other hand, if the enacted fiscal adjustment were to fail to materialize, the macroeconomic deterioration would be even more tangible, with risks of arrears accumulation, crowding out of private activities by domestic borrowing, and intensifying pressures on the external position. Policy missteps could also further rattle investors' confidence.

... could potentially be exacerbated if external headwinds intensify

Commodity prices have fallen sharply over recent months, but they could still fall further in a context of subpar global growth and if rebalancing from existing overcapacity were to prove weaker than currently forecast. Slower-than-expected global growth would also weigh further on the region. In particular, a more rapid slowdown in China as it transitions to its new growth model—or even potentially a hard landing—would intensify the strains on the region, in particular as they would put additional downward pressures on commodity prices. Finally, further risk retrenchment from emerging markets or a sharp reallocation of financial assets around the globe could lead to rapid capital outflows from sub-Saharan African emerging and frontier market economies and exacerbate current exchange rate pressures.

In that context, existing domestic vulnerabilities in some countries would come even more to the forefront, as financing would either rapidly become very expensive or totally unavailable—forcing a highly procyclical fiscal policy adjustment, and a much more rapid deceleration of growth. Concomitant exchange rate pressures, to the extent that they would feed into higher inflation, could also trigger a tighter monetary policy stance, adding headwinds to growth. More broadly across the region, countries that have been running large

current account deficits, including the fastest-growing ones, would be particularly vulnerable to external financial shocks, even as reliance on FDI—a more stable source of financing—could provide some cushion in the short run.

SPECIAL FOCUS: CREATING FISCAL SPACE VIA BETTER DOMESTIC REVENUE MOBILIZATION

In this difficult macroeconomic context, preserving fiscal soundness in the short term and boosting fiscal buffers over the next few years take on renewed importance. Borrowing costs are on the rise for a number of countries, as overall financial conditions tighten, but also because, down the road, many countries in the region will graduate from concessional sources of financing—a welcome development by itself. All these factors converge to turn the spotlight more squarely on improving domestic revenue mobilization as a medium-term objective.⁹ With domestic revenue mobilization the most durable way to create fiscal space, finance much-needed infrastructure and other development needs, and reduce reliance on public debt, this final section reviews advances since 2000 and offers options for the future.

While not the focus here, strengthening public financial management is of course also critical. Efforts to improve revenue mobilization need to be made in combination with measures to further optimize public spending, in particular by prioritizing investment projects with the highest economic return and streamlining expensive and not well-targeted energy subsidies—as some countries (Angola, Cameroon, Ghana) have started doing. By working on improving the quality of spending, the authorities will also demonstrate that they are making the most efficient use of fiscal revenues, helping to increase taxpayers' acceptance.

⁹The topic of better domestic revenue mobilization was also at the center of the discussions during the July 2015 Addis Ababa UN conference on Financing for Development. See “Financing for Development: Revisiting the Monterrey Consensus” (IMF 2015c).

The Big Picture: Good Progress to Date

With the notable exception of Nigeria, the amount of resources devoted to public spending in sub-Saharan Africa has expanded strongly over the last 15 years, by some 5 percentage points of GDP on average (Figure 1.15).

- Public spending remains overwhelmingly financed via domestic tax revenue, which increased from 18 to 21 percent of GDP for sub-Saharan Africa excluding Nigeria between 2000–04 and 2011–14—with the improvement witnessed not only in oil exporters (on the back of strong oil prices), but also among low-income countries and fragile states. Space for additional spending was also created in part by the decline in the interest bill associated with debt relief granted in the second half of the 2000s, and increased recourse to borrowing.
- Excluding Nigeria, more than half of the increase in the spending envelope (some 3¼ percentage points of GDP) was accounted for by capital expenditure, evidence of the authorities' effort to fill the large infrastructure gaps across the region. Capital expenditure now represents a quarter of the spending envelope (and some 7 percent of GDP), up from about a sixth in the early 2000s. The civil service wage bill—which also includes human capital spending in

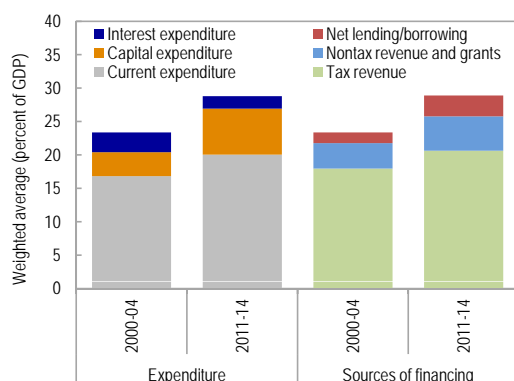
the form of teachers' and health care workers' compensation—expanded by some 1½ percentage points of GDP.

Zeroing in on Tax Revenues

The increase in tax revenue in the region has been broad-based (Figure 1.16). With a few exceptions (Botswana, Nigeria, Zambia, and a few fragile states), all sub-Saharan African countries managed to lift their tax-to-GDP ratio, notwithstanding downward pressures on trade tax revenue as countries engaged in trade liberalization to support regional and international integration (Keen and Mansour 2009). Both direct and indirect tax ratios generally improved, although progress on the latter was not always as strong, underscoring outstanding challenges in keeping up with the taxation of new sectors, especially those where the informal economy plays a large role.

Putting these results into perspective, international comparisons show that the region experienced the largest increase in tax revenue across the globe since the turn of the century (Figure 1.17). The median country in sub-Saharan Africa managed to boost its tax ratio by some 5 percentage points of GDP since the mid-1990s, over a period when elsewhere in the world, the same ratio was flat or only marginally increasing (the Commonwealth of Independent States, Latin America, emerging Asia), if not declining (emerging Europe, the Middle East).

Figure 1.15. Sub-Saharan Africa Excluding Nigeria: Public Expenditure and Sources of Financing

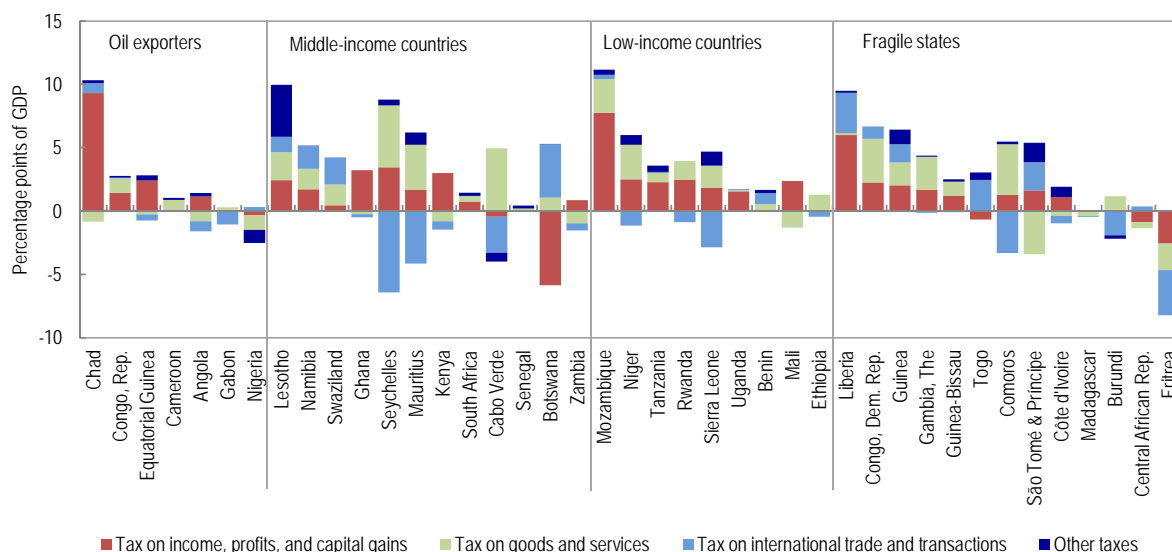


Source: IMF, World Economic Outlook database.

Note: Nigeria is excluded, as unlike the rest of the region its tax- and spending-to-GDP ratios declined substantially over the period.

- In part, this reflects the fact that the starting point was relatively lower in sub-Saharan Africa, signaling more potential for progress than in other regions where revenue mobilization efforts had already been implemented. There is, however, more than a catch-up process in the region's progress: the median low-income sub-Saharan African country entered the century with a higher tax-to-GDP ratio and also saw a larger improvement in revenue mobilization than the median low-income country elsewhere in the world.

Figure 1.16. Sub-Saharan Africa: Change in Tax Revenue, Average for 2000–04 and 2011–14

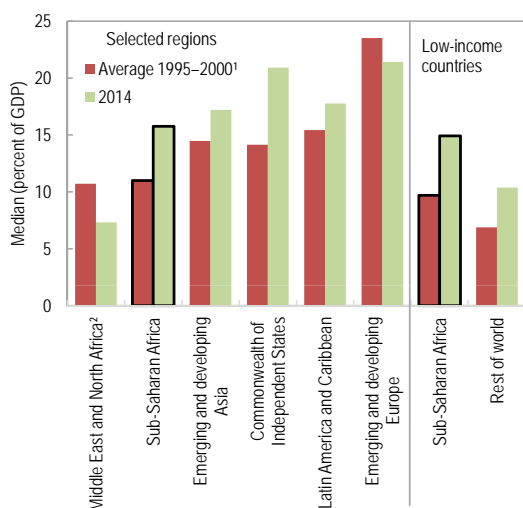


Source: IMF, World Economic Outlook database.

- In addition, while many sub-Saharan African countries have increasingly relied on commodity exports over that period, this does not account by itself for the entire extent of the increase in tax revenue: the increase in the tax ratio since the mid-1990s for the median commodity-rich country in the region was

6 percentage points of GDP, versus 3¾ percentage points of GDP for the median in the rest of the region, and for both, the tax-to-GDP ratio is now around 15 percent of GDP. In fact, most resource-related fiscal revenues accrue through non-tax revenue, such as royalties and fees. However, to the extent that commodity activity also boosts tax receipts from corporate income and profit in the extractive sector, and indirectly tax revenue from stronger activity in nonextractive sectors, part of the increase in the tax ratio can indeed have been driven by commodity-related activities.

Figure 1.17. Selected Regions: Total Tax Revenue, 1995–2000 and 2014



Source: IMF, World Economic Outlook database.

¹ The period 1995–2000 is chosen to smooth the cyclical decline in the tax revenue ratio around 2000 in many regions of the world.

² Includes Pakistan and Afghanistan.

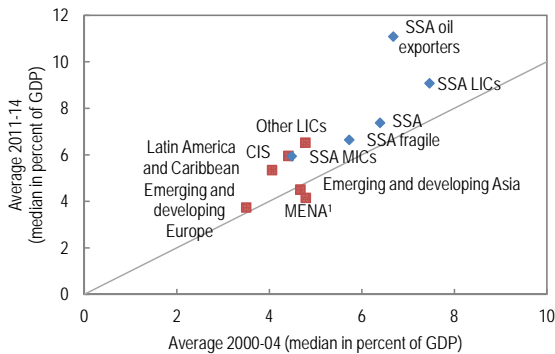
Challenges and Prospects

These results—good progress in domestic revenue mobilization but from a low starting point—raise the question as to how much more improvement can be achieved in the foreseeable future. This is of particular relevance not only given the current urgency in some countries to rebuild fiscal buffers and contain public debt, but also if the warranted and substantial efforts to upgrade infrastructure and human capital currently under way in the region—with one of the highest capital spending ratios in the world over the last 15 years (Figure 1.18)—are to be sustained without jeopardizing public debt sustainability. Finally, robust revenue mobilization

will also be necessary to finance the ambitious Sustainable Development Goals just launched at the UN Summit in New York in September 2015 (Box 1.3).

Cross-country observations can be used to estimate a global “tax frontier,” representing the upper level of tax revenue ratios that can be raised for a given level of economic and institutional development (Fenochietto and Pessino 2013). The distance to that tax frontier for any given country reflects in part tax policy preferences—countries closer to the

Figure 1.18. General Government Capital Expenditure, 2000–04 and 2011–14

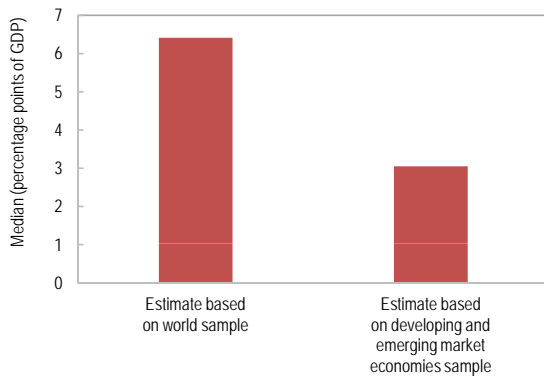


Sources: IMF, World Economic Outlook and International Financial Statistics databases.

Note: CIS = Commonwealth of Independent States; LICs = low-income countries; MENA = Middle East and North Africa; MICs = middle-income countries; SSA = sub-Saharan Africa.

¹ Includes Pakistan and Afghanistan.

Figure 1.19. Sub-Saharan Africa: Tax Revenue Potential Estimates



Source: IMF staff estimates based on Fenochietto and Pessino (2013).

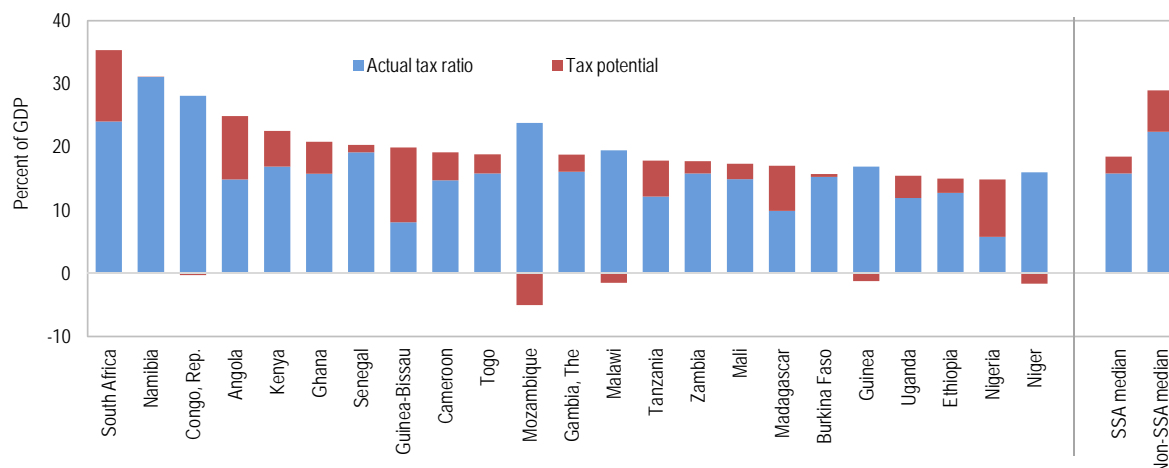
Note: See Annex 1.1 for details on the countries included in each sample.

tax frontier would tend to have a higher preference for the delivery of public services, and hence accept a higher tax burden to finance them—but also tax administration capabilities.

- This methodology allows for assessing the potential for further tax revenue mobilization in sub-Saharan Africa, defined as this distance to the tax frontier (see Annex 1.1 for more details). The analysis suggests that the median country in sub-Saharan Africa might have a potential for another 3 to 6½ percentage points increase in tax revenue (Figure 1.19).¹⁰ Among the largest countries, the unexploited tax potential appears particularly sizable in countries such as Angola, Ghana, Kenya, Nigeria, South Africa, and Tanzania (Figure 1.20). For oil-exporting countries, the need to increase tax revenue mobilization from non-oil sectors will be particularly urgent, as oil-activities-related (tax and non-tax) revenue fall sharply.
- Moreover, a country’s position vis-à-vis the tax frontier is not static. As a country grows, the ability of its government to collect higher revenues and citizens’ acceptance for higher taxes typically rises—and the tax frontier that applies to that country moves up as GDP per capita increases. This means that, over time, as more sub-Saharan African countries reach middle-income status, their potential for higher tax revenue can be expected to expand as well. As an order of magnitude, we estimate that if the region’s GDP per capita were to grow by 2 percent annually over the next 10 years—it grew on average by 3½ percent over the last 10 years—the tax frontier for the median country, and hence the potential for higher tax revenue ratio, would increase by another 6 to 7½ percentage points of GDP in a decade.

¹⁰ Arguably, including advanced economies in the sample, in particular European ones where the tax ratio can reach as much as 35 percent of GDP, can potentially overestimate the tax potential for countries where tax administration capacity remain more modest. However, this order of magnitude—of 3 to 6½ percentage points of GDP of additional potential tax revenue—is robust to restricting the sample to developing and emerging market economies.

Figure 1.20. Selected Countries: Tax Ratio and Potential, 2014



Source: IMF staff estimates.

Note: The estimates are based on the developing and emerging market economies sample. The actual tax ratio corresponds to the 2014 tax-to-GDP ratio for oil importers, and to the non-oil-tax-revenue-to-non-oil-GDP ratio for oil-exporting countries (Angola, Cameroon, the Republic of Congo, and Nigeria). A negative tax potential does not necessarily indicate that there is no room for revenue mobilization in a given country. It reflects that the most recent observation exceeds the time-invariant estimate of the tax frontier, which takes into account the average tax-to-GDP ratio over the entire period. In some countries, this result stems from rapidly rising tax-to-GDP ratios over recent years. See Annex 1.1 for more details. SSA = sub-Saharan Africa.

How can governments tap into this tax potential? In considering different options, country authorities could follow some key general principles.¹¹

- The tax system should be designed to minimize distortions and inefficiencies, but policy decisions should also take into account the constraints arising from limited tax administration capacity, especially in low-income countries and fragile states.¹² In addition, while protection of the poorest is an overarching concern, the fairness of a tax system cannot meaningfully be assessed in isolation of the spending it finances. For instance, in some cases, a regressive tax may be the only way to finance strongly progressive spending; and more generally, the progressivity of specific tax measures should be assessed taking into account the distribution of the benefits of the additional expenditure they finance, as discussed in Chapter 3.

¹¹ For a more detailed discussion, see also “Revenue Mobilization in Developing Countries” (IMF 2011) and “Current Challenges in Revenue Mobilization—Improving Tax Compliance” (IMF 2015a).

¹² On the effects of distortions and inefficiencies, and more broadly the role of growth-friendly fiscal reforms, see also “Fiscal Policy and Long-Term Growth” (IMF 2015d).

- In that respect, in the shorter term, implementing a broad-based value-added tax (VAT) with a fairly high threshold (not to overburden small businesses), and a single or limited number of rates (to preserve simplicity and limit opportunities for rent-seeking) still has more revenue potential than other tax instruments in many sub-Saharan African countries, in particular as it helps reduce tax leakages compared with sales taxes, which are only collected at the end of the distribution chain—an important consideration in a region with large informal sectors. Meanwhile, establishing a broad-based corporate income tax remains a longer-haul objective for many countries in the region. Those steps should go hand-in-hand with continuous efforts to improve public finance management and tax administration capacity.
- Efforts to expand both the tax base and tax compliance should also be explored, as it would allow for raising higher revenues without burdening any existing single taxpayer group, therefore reducing distortions, improving economic efficiency, and supporting income and job creation. Doing so would involve (i) limiting exemptions that jeopardize revenue

and good governance, and are hard to reverse, (ii) better mobilizing information from the increasing number of transactions done via financial institutions and mobile banking to improve compliance, and (iii) making greater efforts to ensure tax compliance from high-income individuals and companies, as they account for a large share of the taxable income. In many countries, setting up a dedicated large taxpayers' office has proved an effective measure to achieve that objective. Strengthening real estate taxes—minimal in many countries in the region—also offers some potential.

- Finally, fiscal regimes for extractive industries deserve specific attention. There is significant scope in the region, especially for new producers, to improve the yield and stability of the revenue base from extractive industries (IMF 2012). Although country circumstances

differ, combining a modest ad valorem royalty, a corporate income tax, and a separate resource rent tax has considerable appeal for low-income countries. Moreover, special attention needs to be paid to international tax treaties to avoid base erosion and profit shifting, which have a detrimental impact on producer countries (IMF 2014b).

The progress achieved in mobilizing domestic revenue over the last 15 years is certainly encouraging. But as external sources of financing become less forthcoming, authorities in the region will need, more than ever, to tap into the additional revenue potential if they want to maintain their development efforts in a sustainable way. Beyond a stable macroeconomic environment, this will critically define the region's ability not only to weather the strong current headwinds but also to preserve the path of strong growth in the medium term.

Box 1.1. Commodity Price Shocks and Financial Sector Fragility

The recent sharp declines in commodity prices are not unprecedented and their frequent occurrence has led to a large number of studies analyzing the impact of lower commodity prices on economic growth (Deaton and Miller 1995; Dehn 2000), debt (Arezki and Ismail 2013), and conflict (Brückner and Ciccone 2010). However, the literature lacks a systematic empirical analysis of the impact of commodity price shocks on the financial sector of commodity exporters.

The analysis presented here attempts to fill this gap by investigating the impact of commodity price declines on financial sector fragility. In the recent past, countries such as Ecuador, Malaysia, Nigeria, and Russia suffered considerable financial sector dislocation following sharp commodity price declines. Financial fragility can be defined as the increased likelihood of a systemic failure in the financial system, for which the most obvious indicator would be a systemic banking crisis. A less dramatic definition would capture the sensitivity of the financial system to relatively small shocks. The study is based on a panel study of 71 commodity exporters among emerging market and developing economies over 1997–2013, including 22 sub-Saharan Africa countries.¹

Commodity price shocks can contribute to financial fragility through various channels. First, a decline in commodity prices in commodity-dependent countries results in reduced export income and fiscal retrenchment to deal with lower revenue, all of which can adversely impact economic activity and agents' (including governments') ability to meet their debt obligations, thereby potentially weakening banks' balance sheets. Second, a surge in bank withdrawals following a drop in commodity prices may significantly reduce banks' liquidity and potentially give rise to a liquidity crisis. Third, if the authorities fail to curtail public spending in the face of declining revenues, payment arrears might start to accumulate, putting suppliers in a difficult financial situation and potentially at risk of defaulting on their bank loans. Fourth, if large enough, commodity price shocks can also put downward pressure on the domestic currency. The currency depreciation can then lead to bank losses in the presence of net open foreign exchange positions in their balance sheets, or if unhedged borrowers are unable to service their loans.

Periods of declining commodity prices tend, indeed, to be associated with more deteriorated financial sector conditions, including higher nonperforming loans (NPLs) and a greater number of banking crises. This result holds for both the full sample and for sub-Saharan African countries (Figure 1.1.1).² The empirical investigation therefore focuses on periods of commodity price declines and relies on two econometric models.

- The financial fragility analysis is based on the following equation:

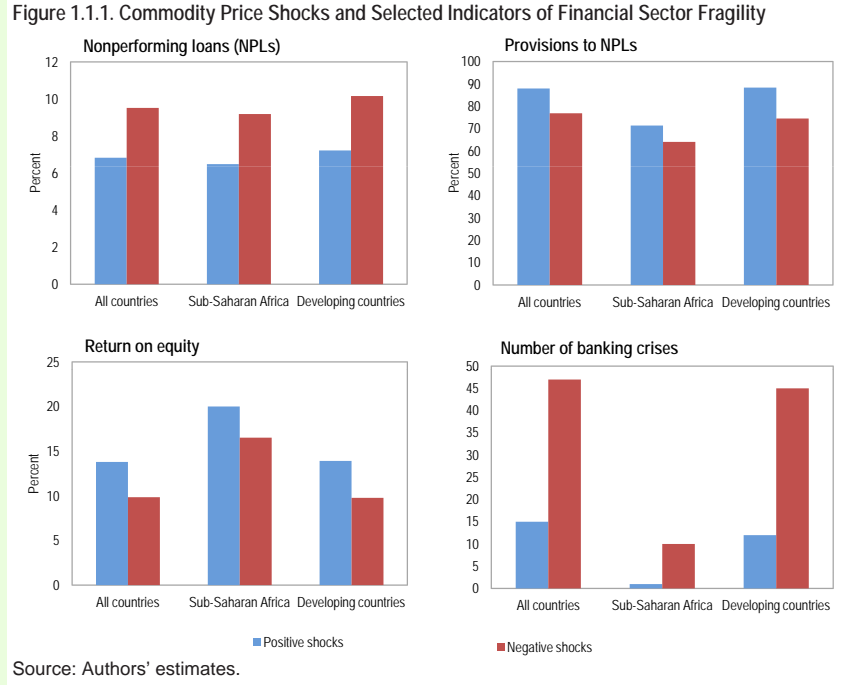
$$FSI_{i,t} = \alpha + \beta PriceShocks_{i,t} + \sum_{m=1}^M \gamma_m X_{mit} + \omega_{it} \quad (1)$$

where $FSI_{i,t}$ is one of seven financial soundness indicators: (1) share of bank NPLs, (2) provisions to NPLs, (3) return on assets, (4) return on equity, (5) cost-to-income ratio, (6) liquid assets to deposits and short-term funding, and (7) regulatory capital to risk-weighted assets. We also develop a synthetic index of the various indicators—computed as the mean of the seven indicators, each normalized to take a value between 0 and 1 (with higher values corresponding to more stability of the financial sector).

This box was prepared by Tidiane Kinda, Montfort Mlachila, and Rasmané Ouedraogo and draws on Kinda and others (forthcoming).

¹ Countries included in the sample are net exporters of a nonrenewable commodity, where that commodity represents at least 10 percent of the country's total exports in 2005, the base year, and for which sufficient financial sector data are available. Sub-Saharan African countries are Angola, Burundi, Botswana, Côte d'Ivoire, Cameroon, Ethiopia, Gabon, Ghana, Guinea, Equatorial Guinea, Mali, Mozambique, Namibia, Niger, Nigeria, Sudan, Togo, Tanzania, Uganda, South Africa, Zambia, and Zimbabwe.

² The mean comparison test (t-test) shows that the differences are statistically significant for NPLs, provisions to NPLs, return on equity, and banking crises.



$PriceShocks_{i,t}$ represents commodity price shocks, computed as the residual of an econometric model that regresses the logarithm of commodity prices on its lagged values (up to three) and a quadratic time trend. This measure removes the predictable elements from our shock measure, ensuring that we only capture unforeseen price movements. The variable is rescaled to be 0 in case of positive shocks, and range from 0 to 1 in case of negative shocks—as a consequence, the variable only represents negative shocks, and a positive (negative) sign in the regressions presented thereafter means that negative commodity price shocks tend to increase (decrease) the indicator under study.

X_{mit} denotes control variables such as inflation, credit growth, and income per capita; and ω_{it} stands for the error term including a country-specific fixed effect and an idiosyncratic term. Equation (1) is estimated using the panel fixed effects estimator.

- The banking crisis analysis is based on the following equation:

$$Bcrisis_{i,t}^{est} = \beta PriceShocks_{i,t} + \sum_{m=1}^M \gamma_m X_{mit} + \omega_{it}, \quad (2)$$

$$Bcrisis_{i,t} = 1 \text{ if } Bcrisis_{i,t}^{est} > 0, \text{ and, } Bcrisis_{i,t} = 0 \text{ if } Bcrisis_{i,t}^{est} \leq 0 \quad (3)$$

where $Bcrisis_{i,t}$ is the banking crisis dummy from Laeven and Valencia (2013), and $Bcrisis_{i,t}^{est}$ is the estimated value from the regression. As above, X_{mit} denotes the control variables and ω_{it} the error term. Equation (2) is estimated using the conditional logit fixed effects estimator.

The results show evidence that declines in commodity prices are indeed associated with higher financial sector fragility, as measured by a wide range of indicators (Table 1.1.1). Drops in commodity prices are associated with higher NPLs and bank costs, while they reduce bank profitability (return on assets and return on equity), liquidity, and provisions to NPLs. As a result of this fragility, commodity price downturns tend to increase the likelihood of banking crises. While these results are found across regions, sub-Saharan African countries seem to be more affected, both via a higher impact on NPLs and a higher likelihood of banking crises following price declines. For instance, a 50 percent decline in commodity prices (similar to the order of magnitude experienced over the last 12 months,

(continued)

Box 1.1. (continued)

and equivalent to a 3.6 standard deviation) results in an increase in NPLs of 3.5 percentage points for the whole sample and 4.5 percentage points in sub-Saharan Africa. In addition, the results are robust to a battery of robustness checks, including: (1) an alternative measure of commodity price shocks; (2) a differentiation between hydrocarbon and other nonrenewable commodities; (3) a focus on shocks lasting more than one year; and (4) a focus on large shocks.³

The recognition that declines in commodity prices are an important source of financial fragility raises questions about the appropriate framework to ensure financial stability in face of these shocks. While there is not much that macroeconomic policy can do to prevent commodity price shocks, the analysis shows that the impact of these shocks on the banking system depends on the economic, financial, and institutional conditions in place when the shocks occur. Indeed, the adverse effects of commodity price shocks on financial fragility tend to occur more severely in countries with poor quality of governance, in those with weak fiscal space, as well as in those that do not have a sovereign wealth fund, do not implement macroprudential policies, and do not have a diversified export base. In addition, stronger public finance management capacity can help prevent the occurrence of domestic arrears in the wake of negative commodity price shocks. Addressing these weaknesses could reduce financial sector fragility and the probability of banking crises.

Table 1.1.1. Impact of Declines in Commodity Prices and Financial Sector Fragility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NPLs	Provisions to NPLs	ROA	ROE	Cost	Reg. Capital	Liq. Assets	Index	Crisis
Price shocks	2.2840*** (0.52)	-16.0300*** (3.69)	-0.5810*** (0.13)	-6.5350*** (1.58)	1.5370* (0.90)	-0.3440 (0.37)	-1.9730** (0.93)	-0.0083*** (0.002)	1.8750** (0.78)
Exchange rate, t-1	4.7850*** (1.34)	-16.6900 (12.09)	-1.1000 (1.35)	-22.0800 (26.51)	4.9110 (11.71)	-2.7760 (3.54)	-0.6880 (3.74)	-0.0133 (0.01)	-0.6720 (1.12)
Real interest, t-1	0.1160** (0.05)	-0.8220*** (0.24)	-0.0223 (0.01)	-0.2310 (0.18)	0.1380* (0.07)	0.0009 (0.02)	-0.0502 (0.05)	-0.0005** (0.0002)	0.0977*** (0.04)
M2/reserve, t-1	0.0500 (0.19)	-0.7010 (2.23)	0.0099 (0.01)	0.1010 (0.29)	0.0828 (0.34)	-0.0013 (0.10)	-0.0980 (0.48)	0.0002 (0.00)	0.3730** (0.15)
Inflation, t-1	0.0001 (0.04)	0.0523 (0.28)	0.0051 (0.02)	0.1510 (0.40)	0.0058 (0.16)	0.0388 (0.04)	0.0300 (0.09)	0.0001 (0.00)	0.0855** (0.04)
Credit growth, t-1	-5.0090 (3.19)	14.0000 (17.88)	-0.2430 (0.30)	-5.8580 (3.85)	-0.3940 (3.12)	-5.3770*** (1.55)	-6.7660 (4.17)	-0.0140** (0.01)	0.0444 (2.98)
Log(GDPPC), t-1	-1.5950 (1.50)	-3.6980 (6.45)	-0.1660 (0.24)	0.0153 (2.55)	-2.0160 (1.76)	-0.1780 (0.68)	-6.4890** (2.73)	-0.0132** (0.00)	-3.4290** (1.55)
Debt, t-1	0.1070** (0.04)	0.0298 (0.17)	-0.0053* (0.00)	0.0100 (0.05)	0.0696*** (0.02)	0.0218 (0.03)	0.0026 (0.05)	-0.00004 (0.00)	-0.0225* (0.01)
Constant	40.9800 (37.96)	185.1000 (159.60)	6.0470 (5.92)	15.6500 (63.20)	99.5600** (42.68)	20.9800 (17.50)	195.5000*** (65.68)	0.8470*** (0.16)	
Observations	457	426	691	691	693	454	697	697	191
Countries	45	45	58	58	58	45	58	58	15
R-squared	0.3470	0.1290	0.0580	0.0460	0.1230	0.1290	0.0920	0.0520	

Note: Fixed effects are included. Robust standard errors in parentheses. ***denotes significance at the 1 percent confidence level; **significance at the 5 percent confidence level; and *significance at the 10 percent confidence level. NPLs = nonperforming loans; ROA = return on assets; ROE = return on equity.

³ The alternative measure of commodity price shocks follows Arezki and Brückner (2012) and Brückner and Ciccone (2010), and measures commodity price shocks by changes in prices.

Box 1.2. Rapid Credit Growth in Sub-Saharan Africa: What Does It Portend?

Real credit to the private sector has risen fivefold on average in sub-Saharan African countries over the last 12 years. The ensuing increased financial deepening and inclusion are certainly welcome, but authorities should be mindful of the increased financial risks associated with potentially excessive credit growth where it has been particularly buoyant.

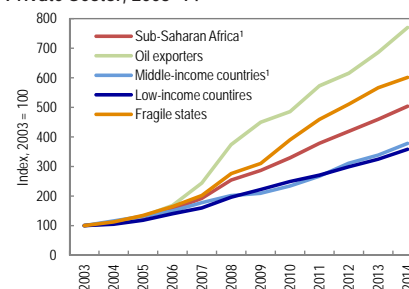
Most sub-Saharan African countries have experienced a decade-long rapid increase in private credit. Real credit to the private sector grew fivefold over the period 2003–14—an average annual progression of 16 percent over 10 years, leading to a doubling of the credit-to-GDP ratio for the region as a whole (Figure 1.2.1). Progression was particularly strong in oil-exporting economies and fragile states, albeit starting from a low base—credit-to-GDP ratios now hover around 15 percent in each of these groups (Figure 1.2.2). Middle-income countries (excluding South Africa) provide larger credit support to the private sector, at 36 percent of GDP, although this remains slightly below the average 40 percent observed in non-sub-Saharan African emerging market and developing economies.

International experience shows that episodes of unusually high credit growth tend to be associated with increased financial risk. The literature identifies rapid credit growth as a key precursor of financial crises, although macroeconomic variables affecting the debt dynamics, such as low real growth and high real interest rates, also play a role (Demirgüç-Kunt and Detragiache 1998; Beck and others 2005). To some extent, rising credit-to-GDP ratios reflect financial deepening and the typical procyclicality of credit associated with terms-of-trade gains, but increases going well beyond those stylized trends have also been identified as an important early warning indicator of banking crises over longer horizons (Drehmann and Juselius 2013). Various credit-to-GDP gap measures have been developed to separate the long-term financial component associated with financial deepening from excessive credit expansion and to identify countries with a higher probability of a banking crisis (Dell’Ariccia and others 2012; Ortiz Vidal-Abarca and Ugarte Ruiz 2015).

However, some factors accompanying the rapid expansion in credit in sub-Saharan Africa are in fact reassuring:

- Increased banking intermediation has been underpinned by a growing deposit base, as per capita incomes and the share of the urbanized population have risen. Banks have been more inclined to lend, with the loan-to-deposit ratio rising steadily since 2009 from 63 to 66 percent (Figure 1.2.3). Finally, the expansion of mobile banking has also played a positive role in fostering financial deepening, especially in east Africa, by reducing transaction costs, notably in rural areas. Banking penetration, defined as total banking assets to GDP, has increased by roughly 50 percent over the last 12 years, and now stands at close to 60 percent of GDP.

Figure 1.2.1. Sub-Saharan Africa: Real Credit to the Private Sector, 2003–14

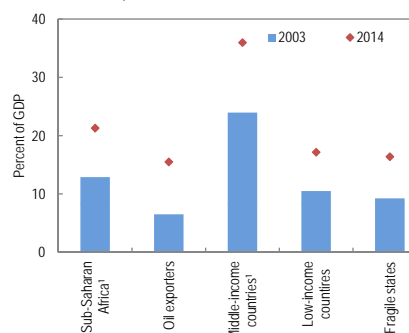


Sources: IMF African Department database; and IMF, World Economic Outlook database.

Note: Deflated by the consumer price index.

¹Excludes South Africa.

Figure 1.2.2. Sub-Saharan Africa: Credit to the Private Sector, 2003 and 2014



Source: IMF, World Economic Outlook database.

¹ Excludes South Africa.

(continued)

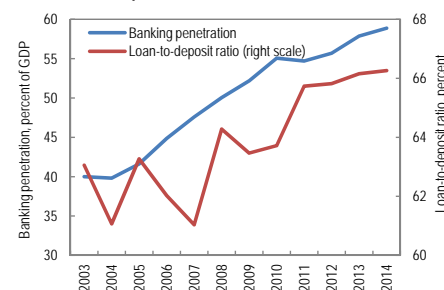
Box 1.2. (continued)

- More broadly, financial soundness indicators (FSI), where available, indicate that sub-Saharan African banks are on average healthy and profitable. A total of 20 out of 45 countries in the region regularly publish FSI indicators, although in some cases with a lag. For these countries, returns on equity are generally high, nonperforming loan ratios are low, and capital and liquidity buffers are strong (Table 1.2.1, Statistical Appendix Tables 27 and 28). Nonperforming loans are, however, sizable in Burundi, Cameroon, Ghana, and Sierra Leone. At the same time, capital adequacy ratios are relatively high in all countries except Cameroon. Sierra Leone experienced a significant increase in nonperforming loans in 2014 (33 percent), partly related to the Ebola epidemic; however, capital buffers there still remain relatively strong at 20 percent.
- Credit expansion for the region as a whole has not been unusually strong by international comparison. Sub-Saharan African low-income countries still have lower credit-to-GDP ratios than do their peers in other regions and the increase in their credit-to-GDP ratios has been slightly lower than that in other regions (Figure 1.2.4). Moreover, the region still has one of the lowest credit-to-GDP ratios in the world, suggesting some potential for further financial deepening. And while its percentage point increase has been substantial, it is well below that seen in emerging and developing Europe and Commonwealth of Independent States (CIS) countries (Figure 1.2.5).

Nevertheless, in a few countries, credit expansion may have gone beyond what is warranted by financial deepening—we highlight seven of them. Disentangling the degree of financial deepening from excessive credit growth is not straightforward.¹ A proper assessment requires being able to determine the right level of credit warranted by country-specific circumstances, something beyond the scope of this box. Instead, we identify a number of countries in the region in which credit has grown much faster than GDP over the last decade, relying on the threshold of a 20 percentage point increase in credit-to-GDP ratio in a single year used by Dell’Ariccia and others (2012) combined with whether countries experienced an increase in credit that was far above the region’s average. Based on these criteria,

¹ Marchettini and Maino (2015), in particular, highlight that, when the level of financial depth is low, traditional leading indicators of banking crises have a lower predictive power. In addition, financial deepening often goes beyond bank credit (Sahay and others 2015).

Figure 1.2.3. Sub-Saharan Africa: Banking Penetration and Loan-to-Deposit Ratio, 2003 and 2014



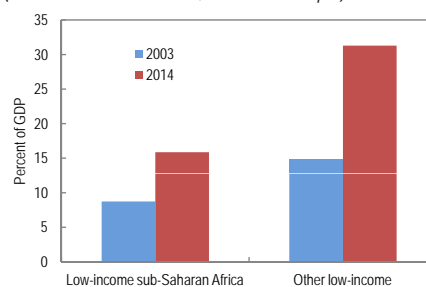
Source: IMF, International Financial Statistics. Note: Excludes South Africa. Banking penetration data excludes Ethiopia, Guinea, Liberia, Rwanda, and Zimbabwe due to data availability. Data on credit-to-deposit ratio additionally exclude Madagascar and Malawi.

Table 1.2.1. Sub-Saharan Africa: Bank Soundness Indicators, 2013

	2013
Capital to risk-weighted assets	18.5
Nonperforming loans to total loans	7.2
Liquid assets to total assets (liquid asset ratio)	26.2
Bank returns on assets	2.7
Bank returns on equity	23.1

Source: IMF, Financial Soundness Indicators database. Note: Simple average across 20 sub-Saharan African countries with available data.

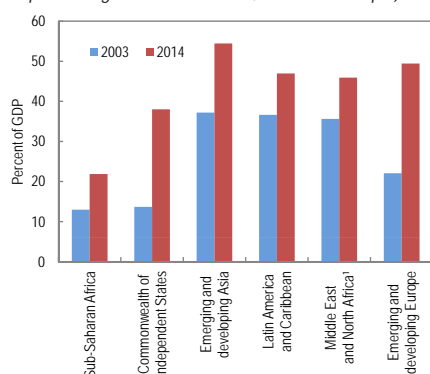
Figure 1.2.4. Credit to the Private Sector, 2003, 2014 (Median across countries, balanced sample)



Sources: IMF, International Financial Statistics; and IMF staff calculations.

seven countries stand out: Angola, the Democratic Republic of the Congo, Guinea, Guinea-Bissau, Ghana, Lesotho, and the Republic of Congo (Figure 1.2.6, Table 1.2.2). These countries therefore warrant close financial surveillance, especially oil-exporting countries, where lower export receipts can trigger a tightening of financial conditions, and as evidence shows that financial stability indicators tend to deteriorate when commodity exporters experience sharp negative terms-of-trade shocks (see Box 1.1).

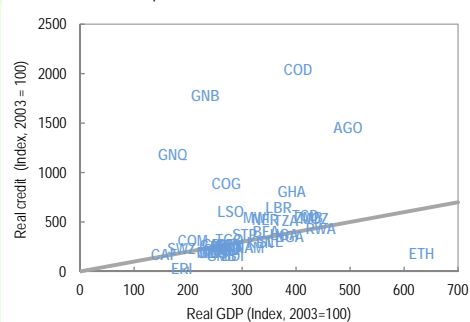
Figure 1.2.5. Credit to the Private Sector, 2003 and 2014
(Simple average across countries, balanced sample)



Sources: IMF, International Financial Statistics; and IMF staff calculations.

¹Includes Pakistan and Afghanistan.

Figure 1.2.6. Selected Countries: Real Private Credit and Real GDP Indices, 2014



Sources: IMF, African Department; and IMF, World Economic Outlook databases.

Note: The gray line indicates the same credit and GDP index, or cumulative growth. See page 78 for country acronyms.

Table 1.2.2. Credit Booms in Sub-Saharan Africa

Past Credit Booms	Start	End	Ongoing Credit Booms	Start	
Angola	*	2006	2009	Chad	2008
Central African Republic		2010	2013	Comoros	2009
Congo, Democratic Republic of the	*	2006	2009	Congo, Republic of	* 2008
Gabon		2012	2013	Equatorial Guinea	* 2013
Ghana	*	2005	2008	Guinea	2013
Lesotho	*	2005	2012	Guinea-Bissau	* 2005
Liberia		2008	2011	Mozambique	2008
Malawi		2008	2012	South Sudan	2011
Niger		2006	2012	Togo	2011
Nigeria		2007	2008		
Rwanda		2008	2008		
São Tomé and Príncipe		2009	2010		
Seychelles		2010	2010		
Sierra Leone		2007	2009		
Zambia		2012	2012		

Note: Credit booms are defined here as an episode of a 20 percentage point increase in one year in the credit-to-GDP ratio, followed by continuous increase in the ratio, as in Dell'Arriccia and others (2012). * Denotes countries where the increase in credit was far above the region's average.

Box 1.3. Putting the Sustainable Development Goals into Macroeconomic Perspective¹

The development agenda in sub-Saharan Africa for the next 15 years is set to be shaped by the Sustainable Development Goals (SDGs) launched at the New York UN summit this September. Centered around 17 goals, the SDGs are broader in scope than the Millennium Development Goals endorsed at the turn of the century, and aspire to improve economic and social well being on a sustainable basis. More equitably distributed growth would improve living conditions not only in terms of material goods and services but also in terms of social cohesion. To sustain growth over time, economies must reduce their vulnerability to external shocks and domestic conflicts, encourage the rational use of nonrenewable resources, and minimize social and environmental externalities. While these efforts will specifically target the least-developed countries, they will require collaboration on many fronts among developing and higher-income countries.

Macroeconomic and financial policies have a crucial role to play in achieving these goals. The specific form these take would depend greatly on each country's specificities, including its economic structure, level of economic and human capital development, and institutional capacity. Nevertheless, there are common elements, which are detailed in the remainder of this box.

Macroeconomic stability. One of the main contributions policymakers can make to meet the development goals is to deliver a stable macroeconomic and financial environment that provides the necessary backdrop for individuals to build their skills and invest to make society more productive.

Quality of public spending. Within the overall budgetary envelope, the choice of public spending components can make a significant difference in encouraging economic growth and promoting opportunities and equity. In particular, properly designed and prioritized public spending on infrastructure, public health, and education can contribute to develop human and physical capital and unleash potential for new activities. Spending on these items can also play a redistributive role that reduces inequality and social tensions while increasing basic aspects of human capital in the underprivileged population, who typically do not have the same access to opportunities as do other groups.

- Public investment can contribute to sustainable development by connecting citizens and firms to economic opportunities, serving as a catalyst for private investment. In a context of limited financing resources, efforts at increasing the efficiency of public spending and the quality of public service delivery become even more crucial.
- Public spending on education helps provide the future workforce, including young female adults, with the basic skills needed by more productive and higher technology sectors, hence sowing the seeds for economic diversification and resilience.
- Untargeted subsidies are traditionally expensive and often fail to reach the intended population. The overarching objective should be to replace them with well-targeted schemes that avoid the waste of public resources. Because the public sector in many developing economies is a nontrivial employer, it can also serve as a role model in adopting hiring policies that avoid gender and other types of labor market discrimination, which at the macroeconomic level tend to perpetuate inequality.

Tax policy. The tax structure can play a substantial role in distributing fairly across the population the burden of financing public spending, creating incentives that promote development, and minimizing to the extent possible distortions. Tax systems could be modernized with a view to increasing their progressivity and widening their base (including by reducing exceptions that favor politically influential interest groups), allowing for a lower and more equitable burden on each individual taxpayer. Fairer tax systems can also help improve the investment climate and hence promote economic activity and jobs.

¹ For more details, see Fabrizio and others (2015).

Financial sector development. The first objective of financial policies should be to encourage behaviors that maintain financial sector stability through appropriate supervision and regulation of the financial sector. Macroprudential policies that manage incentives for risk-taking throughout the business and financial cycles can play a crucial role in maintaining stability; so does an institutional setting that properly factors in the interaction between monetary and financial policies. Within that framework, policymakers should also strive to encourage financial deepening and financial inclusion, that is, access to financial services to the largest possible share of the population.

Economic transformation and inclusiveness. Structural reforms, ranging from trade policies to labor markets and the regulatory framework, can go a long way toward promoting economic transformation and inclusiveness. They can help shift resources to the most productive uses and diversify production and exports. They can also play a role in promoting gender inclusion, which tends to deliver significant payoffs in terms of long-term demographic dynamics and private investment in human capital. Well-designed regulations can help strengthen the governance of key institutions and enhance the business climate, promote market competition and innovation, reduce barriers to entry for new products, and enlarge trade networks. In combination with the operation or supervision of public utilities and policies on fiscal subsidies, appropriate regulation can foster the proper pricing policies on energy and water resources, which are critical to achieve environmentally sustainable economic outcomes.

Annex 1.1. Estimating the Tax Frontier¹

Concepts and Definitions

Fenochietto and Pessino (2010, 2013) define the tax frontier—also known as tax capacity—as the maximum tax revenue (usually measured in proportion of GDP) a country can achieve given its economic, institutional, and demographic characteristics (level of development, trade openness, sectoral structure, education, income distribution, and institutional factors). The “distance” between the tax frontier and the actual tax collection is defined as the country’s tax potential (Annex Figure 1.1.1). This distance partially reflects potential gains in tax revenue that can be achieved through increased collection efficiency as well as a relative acceptance for taxation in exchange for public goods and services. As a result, a positive tax potential does not necessarily imply the need to mobilize additional revenue, but may also reflect certain tax policy choices and a preference for low taxation (even if that means fewer public services provided).

Regression Estimation

Following Fenochietto and Pessino (2010, 2013), a model is estimated to determine the tax frontier for a group of 113 countries between 2000 and 2013 (Annex Table 1.1.1). The tax frontier is estimated using Mundlak’s (1978) random effects model, which allows for identifying inefficiency from unobserved heterogeneity across countries—that is, the random effect is correlated with the explanatory variables. The estimated model is as follows:

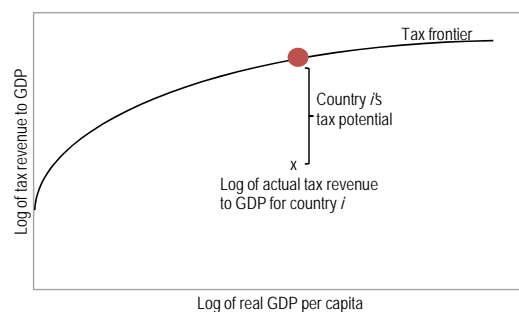
$$y_{it} = \alpha_i + \beta' x_{it} + v_{it} - u_{it}$$

$$\alpha_i = \gamma \bar{x}_{it} + \delta_i$$

$$\bar{x}_{it} = \frac{1}{T} \sum_{i=1}^T x_i \text{ and } \delta_i \sim iid(0, \sigma_\delta^2)$$

where y_{it} is the log of total tax revenue (the sum of tax and social security contributions) in percent of GDP for country i in period t for oil importers and the log of non-oil tax revenue in percent of non-oil GDP for oil exporters;² x_{it} is a vector of variables that affect tax revenue for country i in period t as described below; α_i is a country-specific effect correlated with (the average of) the explanatory variables and δ_i a country-specific random disturbance; v_{it} is a zero-mean normally distributed error term for country i at time t ; and u_{it} is an exponentially distributed (nonnegative) random variable independent of v_{it} . Hence, in this setup, $\beta' x_{it}$ corresponds to country i ’s (deterministic) tax frontier, v_{it} is the noise, and u_{it} represents the tax potential, that is, the extent to which country i is away from its maximum level of tax collection.

Annex Figure 1.1.1. Tax Frontier



Source: IMF staff based on Fenochietto and Pessino (2010).

Annex Table 1.1.1. Country List

Albania*	Estonia*	Latvia*	Portugal
Algeria*	Ethiopia*	Lebanon*	Romania*
Angola*	Finland	Libya*	Russia*
Armenia*	France	Lithuania*	Saudi Arabia
Australia	Gambia, The*	Luxembourg	Senegal*
Austria	Germany	Madagascar*	Serbia and Montenegro*
Bahrain	Ghana*	Malawi*	Singapore
Bangladesh*	Greece	Mali*	Slovak Rep.*
Belarus*	Guatemala*	Mexico*	Slovenia
Belgium	Guinea*	Moldova*	South Africa*
Bolivia*	Guinea-Bissau*	Mongolia*	Spain
Brazil*	Guyana*	Morocco*	Sri Lanka*
Bulgaria*	Honduras*	Mozambique*	Suriname*
Burkina Faso*	Hungary*	Namibia*	Sweden
Cameroon*	Iceland	Netherlands	Switzerland
Canada	India*	New Zealand	Tanzania*
Chile*	Indonesia*	Nicaragua*	Thailand*
China, People's Rep. of*	Iran, Islamic Rep. of*	Niger*	Togo*
Colombia*	Ireland	Nigeria*	Trinidad and Tobago*
Congo, Rep. of*	Israel	Norway	Tunisia*
Costa Rica*	Italy	Oman	Turkey*
Croatia*	Jamaica*	Pakistan*	Uganda*
Cyprus	Japan	Panama*	Ukraine*
Czech Republic*	Jordan*	Papua New Guinea*	United Kingdom
Denmark	Kenya*	Paraguay*	United States
Dominican Rep.*	Korea	Peru*	Uruguay*
Egypt*	Kuwait	Philippines*	Vietnam*
El Salvador*	Kyrgyz Rep.*	Poland*	Zambia*

Note: * Denotes countries with an income below \$20,000.

¹ We are grateful to Ricardo Fenochietto for sharing his database and code and for assisting us in our estimations.

² This differentiated treatment of oil exporters is meant to estimate the potential for revenue mobilization that is not related to oil activities, as these fluctuate substantially with the (externally driven) price of oil.

The vector of exogenous variables x_{it} includes the following, taken from the World Bank, World Development Indicators, IMF statistics, and Transparency International:

lgd: log of real GDP per capita (purchasing power parity constant 2005);

lgd2: square of *lgd*, to account for the nonlinear concave relationship between GDP per capita and tax revenue (the increase in tax revenue as GDP per capita increases becomes marginally smaller).

tr: trade openness, as measured by the sum of imports plus exports in percent of GDP;

ava: value added of agriculture in percent of GDP;

gini: distribution of income, as measured by the GINI coefficient;

gov: dummy variable to control for the fact that central government revenue is used in place of general government revenue in some countries due to data restrictions;

pe: total public expenditure in education in percent of GDP; and

oil: dummy variable for revenue-dependent oil-exporting countries

Two regressions are estimated, the first one with the full sample of countries, and the second one excluding countries with real GDP per capita above \$20,000, to capture only developing and emerging market economies in the subsample (Annex Table 1.1.1). The results, presented in Annex Tables 1.1.2 and 1.1.3, are generally consistent with Fenochietto and Pessino (2010, 2013).

Calculating the Tax Potential

The estimation procedure yields a time-invariant tax effort for country i as $\exp(-u_i)$, which takes values between zero and one. This corresponds to the average ratio for the estimation period (2000–13) of that country's actual tax revenue (in percent of GDP) to the corresponding estimated frontier tax revenue. From that ratio, we derive the average tax potential for country i , that is, the difference in percentage points between the potential tax-to-GDP ratio and the actual tax ratio over 2000–13. We then calculate the remaining tax potential compared to the tax ratio observed in 2014, as presented in Figure 1.20 in the text. A negative tax potential does not necessarily indicate that there is no room for revenue mobilization in a given country. Rather, it reflects that the most recent observation exceeds the time-invariant estimate of the tax frontier, which takes into account the average tax-to-GDP ratio over the entire period, and reflects revenue mobilization progress over the most recent years.

Based on the estimation results, the tax potential for the median sub-Saharan African country is estimated at 6.1 percentage points of GDP using the full set of countries, and at 3.1 percentage points of GDP for the developing and emerging market economies subsample (as shown in Figure 1.19 in the text).

Similarly, using the estimated coefficients for *lgd* and *lgd2*, and assuming that real GDP per capita grows at an average of 2 percent during the next 10 years, while holding all other variables unchanged, we estimate that the tax frontier would shift up by 6.7 percentage points for the median sub-Saharan African country with the full set of countries estimates (Annex Table 1.1.2), and by 7.4 percentage points with the developing and emerging economies subsample estimates (Annex Table 1.1.3).

Annex Table 1.1.2. Mundlack Estimation: Full Sample

Variable	Coefficient	Standard Error
constant	-3.7456	1.57
lgd	1.5483 ***	0.19
lgd2	-0.0781 ***	0.01
tr	0.0013 ***	0.00
ava	-0.0039 **	0.00
gini	-0.0030	0.00
gov	0.1927 ***	0.05
pe	0.0091 **	0.00
oil	-0.0873	0.06
Inefficiency		
sigma_u	0.6912 ***	0.05
sigma_v	0.0898 ***	0.00
lambda	7.6945 ***	0.05

Source: IMF staff calculations.
Note: ***, **, * denote significance at the 1, 5, and 10 percent levels.

Annex Table 1.1.3. Mundlack Estimation: Developing and Emerging Market Economies Sample

Variable	Coefficient	Standard Error
constant	2.3564	1.82
lgd	1.6820 ***	0.22
lgd2	-0.0877 ***	0.01
tr	0.0020 ***	0.00
ava	-0.0032 **	0.00
gini	-0.0042 **	0.00
gov	0.1844 ***	0.04
pe	0.0167 ***	0.01
oil	0.0993 **	0.04
Inefficiency		
sigma_u	0.4800 ***	0.04
sigma_v	0.0927 ***	0.00
lambda	5.1788 ***	0.04

Source: IMF staff calculations.
Note: ***, **, * denote significance at the 1, 5, and 10 percent levels.

