

INTERNATIONAL MONETARY FUND

# REGIONAL ECONOMIC OUTLOOK

## SUB-SAHARAN AFRICA

COVID-19: An Unprecedented Threat  
to Development

**2020**  
**APR**



World Economic and Financial Surveys

Regional Economic Outlook

**Sub-Saharan Africa**  
**COVID-19: An Unprecedented Threat to Development**

**APR 20**

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A team led by Seung Mo Choi and supervised by Pritha Mitra prepared chapter 2, which benefited from the guidance of David Owen. The main authors are Maria Coelho, Eric Pondi Endengle, Wei Guo, Kadima Kalonji, Andresa Lagerborg, Jiakun Li, Giovanni Melina, Edna Mensah, Alun Thomas, Manchun Wang, Jiaxiong Yao, and Genet Zinabou, with contributions from Sebastian Acevedo, Thomas Baunsgaard, Thomas Benninger, Frederico Lima, Alpa Shah, and Harold Zavarce.

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The following conventions are used in this publication:

- In tables, a blank cell indicates “not applicable,” ellipsis points (. . .) indicate “not available,” and 0 or 0.0 indicates “zero” or “negligible.” Minor discrepancies between sums of constituent figures and totals are due to rounding.
- An en dash (–) between years or months (for example, 2009–10 or January–June) indicates the years or months covered, including the beginning and ending years or months; a slash or virgule (/) between years or months (for example, 2005/06) indicates a fiscal or financial year, as does the abbreviation FY (for example, FY2006).
- “Billion” means a thousand million; “trillion” means a thousand billion.
- “Basis points” refer to hundredths of 1 percentage point (for example, 25 basis points are equivalent to  $\frac{1}{4}$  of 1 percentage point).



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# Executive Summary

## The April 2020 Sub-Saharan Africa Regional Economic Outlook at a Glance

- The COVID-19 pandemic threatens to exact a heavy human toll, and the economic crisis it has triggered can upend recent development progress.
- Growth in sub-Saharan Africa in 2020 is projected at  $-1.6$  percent, the lowest level on record.
- The policy priority is to ramp up health capacity and spending to save lives and contain the virus outbreak.
- Support from all development partners is essential to address the sizable financing needs, including debt relief for the most vulnerable countries.
- Fiscal, monetary, and financial policies should be used to protect vulnerable groups, mitigate economic losses, and support the recovery. Once the crisis subsides, fiscal positions should return to sustainable paths.

Sub-Saharan Africa is facing an unprecedented health and economic crisis. One that threatens to throw the region off its stride, reversing the development progress of recent years. Furthermore, by exacting a heavy human toll, upending livelihoods, and damaging business and government balance sheets, the crisis could retard the region's growth prospects in the years to come. No country will be spared.

The rapid spread of the virus, if left unchecked, is threatening to overwhelm weak healthcare systems. The number of confirmed cases of COVID-19 in sub-Saharan Africa is growing rapidly. As of April 9, more than 6,200 cases have been confirmed across 43 countries in the region, with South Africa, Cameroon, and Burkina Faso being the most affected.

As in the rest of the world, the health crisis has precipitated an economic crisis in the region reflecting three large shocks to economic activity:

- The strong containment and mitigation measures that countries have had to adopt to limit the spread of the COVID-19 outbreak will disrupt production and reduce demand sharply;
- Plummeting global economic growth together with tighter global financial conditions are having large spillovers to the region; and

- The sharp decline in commodity prices, especially oil, is set to compound these effects, by exacerbating challenges in some of the region's largest resource-intensive economies.

As a result, the region's economy is projected to contract by  $-1.6$  percent this year—the worst reading on record, a downward revision of 5.2 percentage points from our October 2019 forecast. Across countries, the less diversified economies will be hit the hardest, reflecting the impact of lower commodity prices and containment efforts. Among the non-resource-intensive countries, those that depend on tourism are expected to witness a severe contraction because of extensive travel restrictions, while emerging market and frontier economies will face the consequences of large capital outflows and tightening financial conditions.

The large adverse shocks will exacerbate social conditions and aggravate existing economic vulnerabilities. The measures that countries have had to adopt to enforce social distancing are certain to imperil the livelihoods of innumerable vulnerable people. Given the limited social safety net available, people will suffer. Moreover, the pandemic is reaching the shores of the continent at a time when budgetary space to absorb such shocks is limited in most countries, thus complicating the appropriate policy response.

In this context, decisive measures are urgently needed to limit humanitarian and economic losses and protect the most vulnerable societies in the world:

- **People first.** The immediate priority is for countries to do whatever it takes to ramp up public health expenditures to contain the virus outbreak, regardless of fiscal space and debt positions.
- **Fiscal policy.** Sizable, timely and temporary fiscal support is crucial to protect the most affected people and firms, including those in the informal sector. Policies could include cash or in-kind transfers to help people under strain (including through digital technologies) and targeted and temporary support to hard-hit sectors. Once the crisis has subsided, countries should revert fiscal positions to paths that ensure debt sustainability.
- **International solidarity.** The ability of countries to mount the required fiscal response is highly contingent on ample external financing, on grant and concessional terms, being made available from the international financial community. This is all the more critical given the highly disrupted state of global capital markets. The absence of adequate external financing risks turning temporary liquidity issues into solvency problems, resulting in the effects of the COVID-19 crisis becoming long-lived.
- **Monetary policy.** A more supportive monetary stance and injection of liquidity can also play an important role in sustaining firms and jobs by supporting demand. Financial sector supervision should aim to maintain the balance between preserving financial stability and sustaining economic activity. For countries with floating regimes, exchange rate flexibility can help cushion the external shocks, while some drawdown of reserves to smooth disorderly adjustment may mitigate potential financial implications from foreign exchange mismatches. For countries facing sizable and disorderly capital outflows, temporary capital flow management measures could be considered as part of a wider policy package.

Economic forecasts at this juncture are subject to higher-than-usual degrees of uncertainty. Subject to the decisive actions laid out above, growth in the region is projected to recover in 2021 to about the 4 percent mark. However, the depth of the slowdown in 2020 and the speed of recovery will depend on several factors, including how the pandemic interacts with weak local health systems, the effectiveness of national containment efforts, and the strength of support from the international community.

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As a result, the region's economy is projected to contract by  $-1.6$  percent this year—the worst reading on record, a downward revision of 5.2 percentage points from our October 2019 forecast. Across countries, the less diversified economies will be hit the hardest, reflecting the impact of lower commodity prices and containment efforts. Among the non-resource-intensive countries, those that depend on tourism are expected to witness a severe contraction because of extensive travel restrictions, while emerging market and frontier economies will face the consequences of large capital outflows and tightening financial conditions.

The large adverse shocks will exacerbate social conditions and aggravate existing economic vulnerabilities. The measures that countries have had to adopt to enforce social distancing are certain to imperil the livelihoods of innumerable vulnerable people. Given the limited social safety net available, people will suffer. Moreover, the pandemic is reaching the shores of the continent at a time when budgetary space to absorb such shocks is limited in most countries, thus complicating the appropriate policy response.

In this context, decisive measures are urgently needed to limit humanitarian and economic losses and protect the most vulnerable societies in the world:

- **People first.** The immediate priority is for countries to do whatever it takes to ramp up public health expenditures to contain the virus outbreak, regardless of fiscal space and debt positions.
- **Fiscal policy.** Sizable, timely and temporary fiscal support is crucial to protect the most affected people and firms, including those in the informal sector. Policies could include cash or in-kind transfers to help people under strain (including through digital technologies) and targeted and temporary support to hard-hit sectors. Once the crisis has subsided, countries should revert fiscal positions to paths that ensure debt sustainability.
- **International solidarity.** The ability of countries to mount the required fiscal response is highly contingent on ample external financing, on grant and concessional terms, being made available from the international financial community. This is all the more critical given the highly disrupted state of global capital markets. The absence of adequate external financing risks turning temporary liquidity issues into solvency problems, resulting in the effects of the COVID-19 crisis becoming long-lived.
- **Monetary policy.** A more supportive monetary stance and injection of liquidity can also play an important role in sustaining firms and jobs by supporting demand. Financial sector supervision should aim to maintain the balance between preserving financial stability and sustaining economic activity. For countries with floating regimes, exchange rate flexibility can help cushion the external shocks, while some drawdown of reserves to smooth disorderly adjustment may mitigate potential financial implications from foreign exchange mismatches. For countries facing sizable and disorderly capital outflows, temporary capital flow management measures could be considered as part of a wider policy package.

Economic forecasts at this juncture are subject to higher-than-usual degrees of uncertainty. Subject to the decisive actions laid out above, growth in the region is projected to recover in 2021 to about the 4 percent mark. However, the depth of the slowdown in 2020 and the speed of recovery will depend on several factors, including how the pandemic interacts with weak local health systems, the effectiveness of national containment efforts, and the strength of support from the international community.

# COVID-19: An Unprecedented Threat to Development

Sub-Saharan Africa is facing an unprecedented health and economic crisis. One that threatens to throw the region off its stride, reversing the encouraging development progress of recent years. Furthermore, by exacting a heavy human toll, upending livelihoods, and damaging business and government balance sheets, the crisis threatens to slow the region's growth prospects in the years to come. Previous crises tended to affect countries in the region differentially, but no country will be spared this time.

Consequently, we project the region's economy to contract by -1.6 percent this year—the worst reading on record. This reflects the multiple shocks that will weigh on economic activity heavily:

- The strong containment and mitigation measures that countries have had to adopt to limit the spread of the coronavirus disease (COVID-19) outbreak will greatly disrupt production and reduce demand sharply;
- Plummeting global economic growth and tighter global financial conditions are having large spillovers to the region; and
- The sharp decline in commodity prices, especially oil, is set to compound these effects, exacerbating challenges in some of the region's largest resource-intensive economies, notably Angola and Nigeria.

These large adverse shocks will interact with existing vulnerabilities to exacerbate social and economic conditions. The measures that countries have had to adopt to enforce social distancing and keep people from circulating are certain to imperil the livelihoods of innumerable vulnerable people. Given the limited social protections in place to offset the income losses, people will suffer. For the public sector in many countries in the region, the crisis could not have come at a worse time. The pandemic is reaching the shores of the continent when budgetary space to absorb the effects of the shocks is limited in most countries, thus complicating the appropriate policy response.

In this context, decisive measures are urgently needed to limit humanitarian and economic losses and protect the most vulnerable societies in the world:

- **People first.** The immediate priority is for countries to do whatever it takes to ramp up public health expenditures to contain the virus outbreak, regardless of fiscal space and debt positions.
- **Fiscal policy.** Timely and temporary fiscal support is also crucial to protect the most affected people and firms, including those in the informal sector. Given the one-off nature of the shock, some discretionary fiscal support is warranted, even in countries with limited space. Policies could include cash transfers to help people under strain (including through digital technologies) and targeted and temporary support to hard-hit sectors. Once the crisis has subsided, countries should revert fiscal positions to paths that ensure debt sustainability.
- **International solidarity.** The ability of countries to mount the required fiscal stance, is however, highly contingent on ample external financing, on grant and concessional terms, being available from the international financial community and to a higher degree than usual, given the highly disrupted state of global capital markets. The absence of adequate external financing risks turning temporary liquidity issues into solvency problems, resulting in the effects of the shock becoming long rather than short-lived.
- **Monetary policy.** A more supportive monetary stance and injection of liquidity can also play an important role in supporting demand. Financial market supervision should aim to maintain the balance between preserving financial stability and sustaining economic activity. For countries with floating regimes, exchange rate flexibility can help cushion external shocks, while some drawdown of reserves to smooth disorderly adjustment may mitigate potential financial implications from foreign exchange mismatches.



For countries facing sudden reversals of external financing and a resulting imminent crisis, temporary capital flow management measures could be considered as part of a wider policy package.

Economic forecasts at this juncture are, of course, subject to a much higher-than-usual degree of uncertainty but subject to the decisive actions laid out above, we expect growth to bounce back in 2021 to about the 4 percent mark. However, the depth of the slowdown in 2020 and the speed of recovery, will depend on several factors, including how the pandemic interacts with weak local health systems, the effectiveness of national containment efforts, and the strength of support from the international community.

The rest of the report describes developments in the region, the growth outlook, and risks and elaborates on policies needed for countries to weather the current crisis.

## GROWTH PROSPECTS IN 2020: THE COVID-19 PANDEMIC AND THE OIL PRICE SLUMP

### A Global Recession

The world economy is expected to enter a recession, reflecting widespread disruptions from the COVID-19 pandemic. Global growth is projected to plummet from 2.9 percent in 2019 to -3.0 percent in 2020, far lower than during the 2008–09 global financial crisis. Among the sub-Saharan African region's key trading partners, the euro area is expected to contract (from 1.2 percent in 2019 to -7.5 percent in 2020), and growth in China is to slow considerably (from 6.1 percent to 1.2 percent).

Oil prices have plunged by about 50 percent, reaching 18-year lows, reflecting a slump in global growth and the breakdown of the Organization of Petroleum Exporting Countries and other major oil producers (OPEC+) agreement regarding production cuts (Figure 1.1). Most other commodity prices are also lower—one exception is precious metals, such as gold, which have benefited from the risk-off sentiment.

Global financial conditions have tightened sharply in 2020. Investors have pulled out over \$90 billion

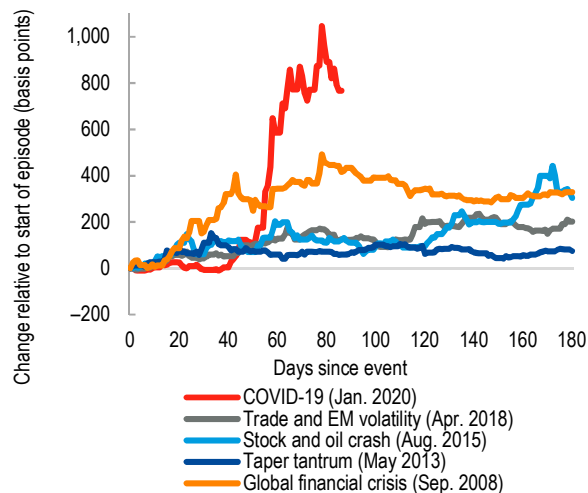
Figure 1.1. World Oil Prices, in Real Terms



Sources: IMF, Primary Commodity Price System; and IMF, Global Assumptions database.

Note: Nominal oil prices deflated using US consumer price index (index 1982–84 = 100).

Figure 1.2. Sub-Saharan Africa: Emerging Market Bond Index Spreads



Source: Bloomberg Financial LP; and IMF staff calculations.

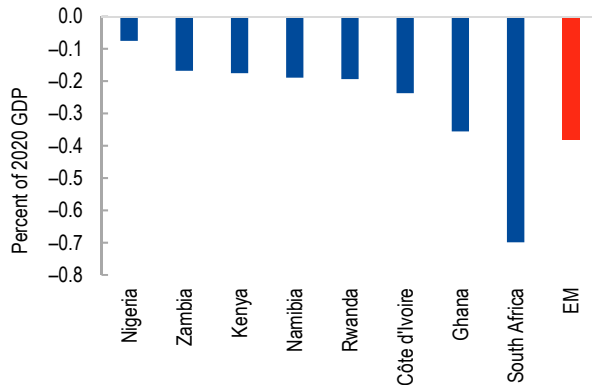
Note: EM = emerging market economies.

from emerging markets since the beginning of the crisis, the largest capital outflow on record. Financial markets in sub-Saharan Africa have also come under pressure: sovereign spreads in the region have increased by about 700 basis points since February 2020, reaching all-time highs, with the largest rise seen in oil exporters (Figure 1.2); bond issuances have stopped, and large capital outflows have also been recorded from the region's frontier and emerging markets (Figure 1.3).

### COVID-19 in Sub-Saharan Africa

The number of confirmed COVID-19 cases in sub-Saharan Africa is growing rapidly. While the path of new cases in the region initially mirrored the experience in most other countries, with a doubling

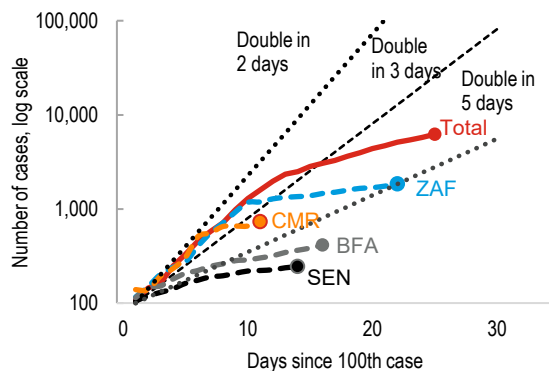
**Figure 1.3. Sub-Saharan African Frontier and Emerging Markets: Cumulative Portfolio Flows**



Source: EPFR Global/Haver Analytics.

Note: Last update: April 6, 2020. Cumulated flows since January 21, 2020. EM is the simple average of: Brazil, India, China, Indonesia, Korea, Mexico, Philippines, Thailand, and Turkey. EM = emerging market economies.

**Figure 1.4. Selected Sub-Saharan African Countries: Cumulative Number of COVID-19 Cases**



Sources: Johns Hopkins University, Center for Systems Science and Engineering website; and IMF staff calculations.

every 3 days, the daily growth of cases has eased somewhat since the first week of April (Figure 1.4) amid strict containment and mitigation measures in several countries. As of April 9, more than 6,200 cases have been confirmed across 43 countries in the region, with South Africa, Cameroon, and Burkina Faso being the most affected (Figure 1.5).<sup>1</sup>

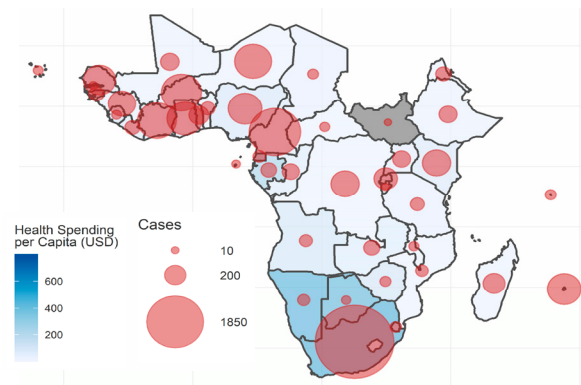
### Triple Shock

The COVID-19 pandemic will have substantial economic effects on sub-Saharan Africa. The key channels include:

- **Economic disruptions from the domestic health shock:** In addition to the rising humanitarian costs, large disruptions in production

<sup>1</sup> As in other regions, some active cases may not have been reported due to constraints on testing capacity.

**Figure 1.5. Sub-Saharan Africa: COVID-19 Cases and Health Spending**

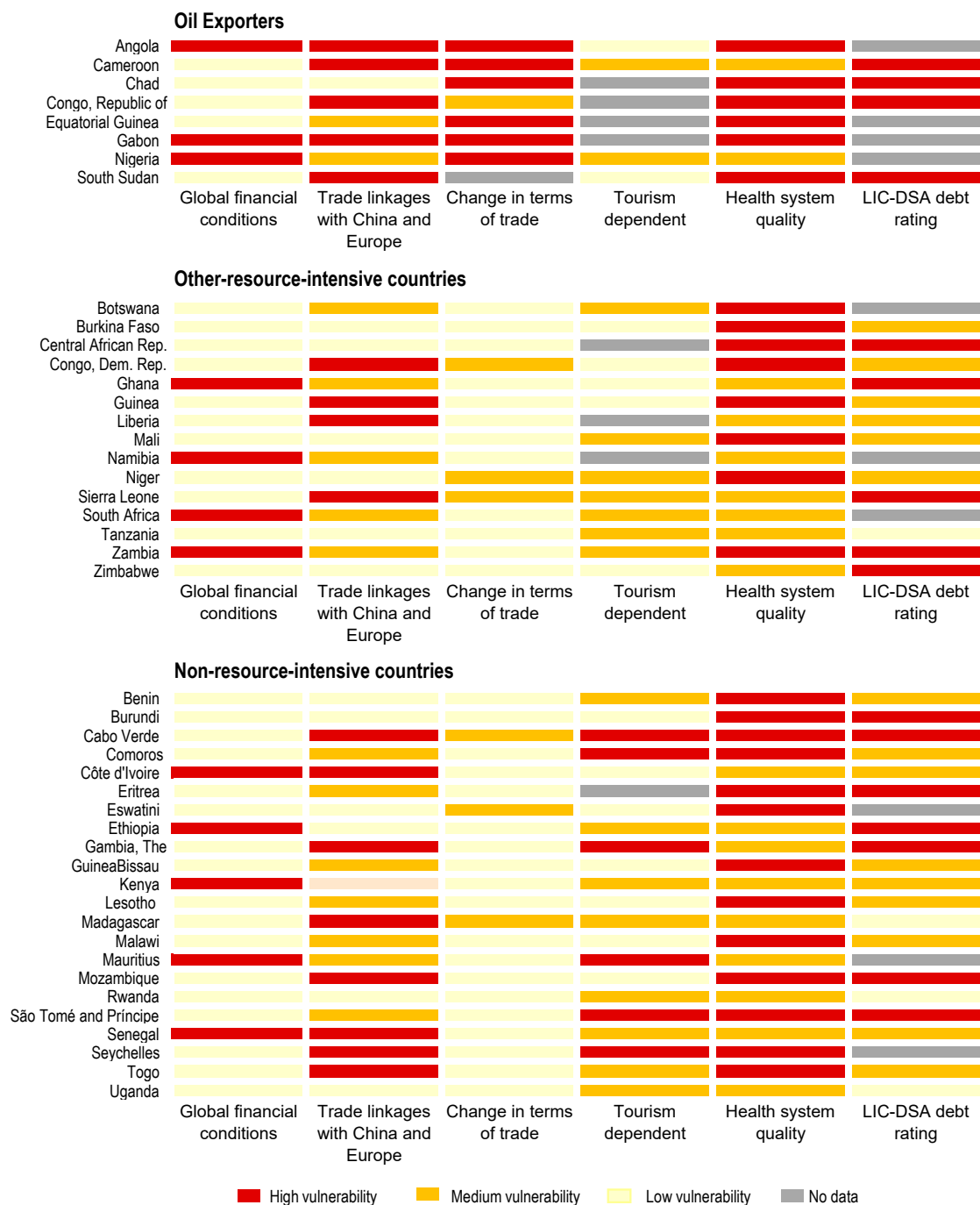


Sources: World Bank, World Development Indicators; Johns Hopkins University, Center for Systems Science and Engineering website; and IMF staff calculations.

can be caused by workplace closures, disruption of supply chains, and reduction in labor supply because of sickness or death. Furthermore, a lockdown can have devastating effects (for example, food insecurity) on vulnerable hand-to-mouth households with limited access to social safety nets. Meanwhile, the loss of income, fear of contagion, loss of confidence, and heightened uncertainty all reduce demand.

- **Spillovers from the global fallout of COVID-19:** The region also faces several external shocks—including trade and tighter global financial conditions—with sub-Saharan African countries exposed to different degrees (Figure 1.6). On trade, a sharp growth slowdown among key trading partners reduces external demand, while disruptions of supply chains lower the availability of imported goods, potentially adding inflation pressure. In addition, the sharp tightening of global financial conditions reduces investment flows to the region and hampers its ability to finance spending needs to deal with the health crisis and support growth. This may result in either a cut in government spending, a buildup in arrears, or an increase in government borrowing in local markets, with attendant consequences on domestic credit and growth. For frontier economies, the sudden stop and capital outflows are exerting exchange rate pressures and can result in a large current account adjustment through domestic demand compression and further balance sheets pressures in countries with large foreign exchange mismatches.

Figure 1.6. Sub-Saharan Africa: Vulnerability of Countries to COVID-19 Shock



Note: Global financial conditions: all frontier and emerging markets with Eurobond issuances classified as highly vulnerable, others are classified as having low vulnerability. Trade linkages with China and Europe: highly vulnerable if exports and imports from China and Europe exceeds 20 percent of GDP in 2018, medium vulnerability if measure lies between 10 and 20 percent, and low vulnerability if below 10 percent. Change in terms of trade: highly vulnerable if expected decline in terms of trade in 2020 is greater than 10 percent, low vulnerability if terms of trade expected to improve, medium vulnerability otherwise. Tourist dependent: highly vulnerable if tourism contributes more than 5 percent of GDP and 30 percent of exports, low vulnerability if contribution to GDP is less than 2 percent and contribution to exports is less than 5 percent, medium vulnerability otherwise. Health system quality: based on Global Health Security Index with high vulnerability corresponding to an index value of less than 33.3, medium vulnerability for scores between 33.3 and 66.6, and low vulnerability for scores greater than 66.6. LIC-DSA debt rating: based on latest IMF-World Bank Debt Sustainability Analysis with high vulnerability if country is in debt distress or at high risk of debt distress, medium vulnerability if country is at medium risk of debt distress, and low vulnerability if country is at low risk of debt distress. LIC-DSA = low-income countries debt stability analysis.

Remittance flows may also decrease as global growth slows, reducing disposable income and adding to external pressures. Furthermore, travel restrictions can severely hit particular sectors like tourism, hospitality, and transport.

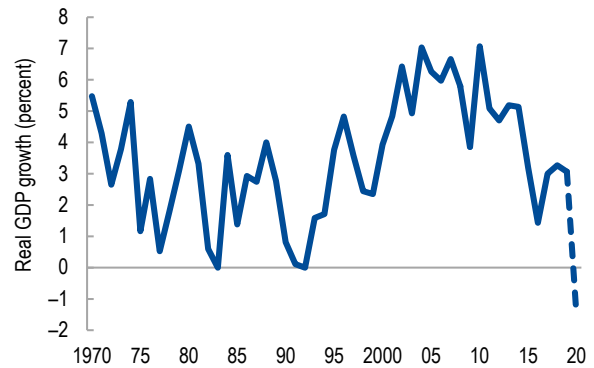
- **The commodity price shock:** The sharp decline in commodity prices is an additional shock for the region’s resource-intensive countries, further compounding the impact of the pandemic. The negative terms of trade shock will weigh on growth and add to fiscal and external vulnerabilities. More importantly, low commodity revenues would significantly constrain their resources to combat the virus outbreak and shore up growth.

These shocks are compounding an already challenging economic situation in the region. Economic activity in resource-intensive countries has been tepid in recent years because most countries were still adjusting to the 2014 commodity shock. At the same time, the high growth in non-resource-intensive countries has often been supported by public sector investment and accompanied by elevated debt and external vulnerabilities. In addition, the security situation in the Sahel remains difficult, and the continent has been battered by multiple weather-related shocks, including cyclones, droughts in southern and eastern Africa (especially in Mozambique, Zambia, and Zimbabwe), and severe locust swarms (particularly in Ethiopia, Kenya, South Sudan, and Uganda).

### Growth Outlook in the Region

Real GDP in sub-Saharan Africa is projected to contract by -1.6 percent in 2020, the lowest level of growth on record (Figure 1.7). This is about 5.2 percentage points lower than envisaged in the October 2019 *Regional Economic Outlook for Sub-Saharan Africa*. The sharp downward revision largely reflects the fallout from the spread of COVID-19 and lower-than-expected commodity prices. In addition, idiosyncratic factors, such as continued structural constraints (South Africa), policy adjustment (Ethiopia), and climate and other natural shocks (such as the locust invasion in eastern Africa) have also contributed to the downward revisions.

**Figure 1.7. Sub-Saharan Africa: Real GDP Growth, 1970–20**

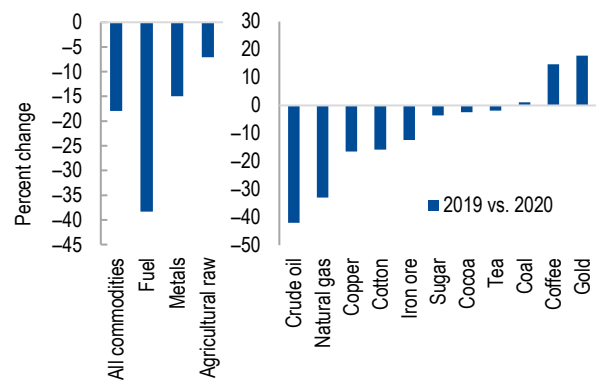


Source: IMF, World Economic Outlook database.

The economic fallout from the COVID-19 outbreak and low commodity prices (Figure 1.8) is expected to be the largest in less diversified economies (Figure 1.9).

- Growth in **oil exporters** is projected to decline from 1.8 percent in 2019 to -2.8 percent in 2020 (a downward revision of 5.3 percentage points from the October 2019 *Regional Economic Outlook for Sub-Saharan Africa*). In Nigeria, the largest economy in the region, GDP is expected to contract by -3.4 percent, mainly reflecting the large drop in oil prices and the impact of containment and mitigation measures on economic activity.

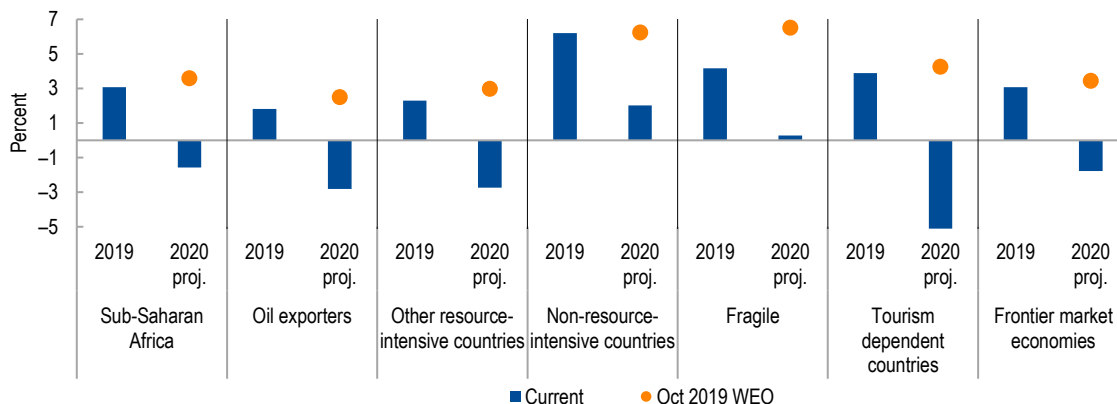
**Figure 1.8. Projected Changes in Commodity Prices**



Sources: IMF, Primary Commodity Price System; and IMF Global Assumptions database.

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

**Figure 1.9. Sub-Saharan Africa: Real GDP Growth, 2019–20**



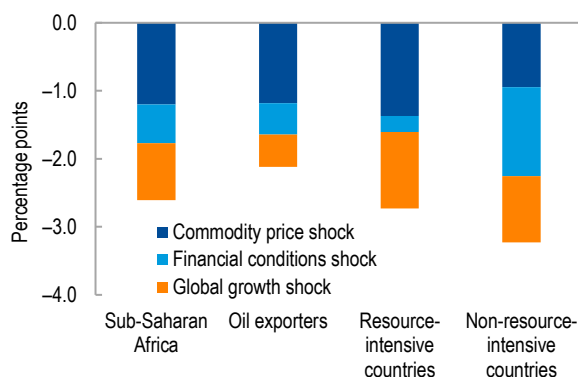
Source: IMF, World Economic Outlook database.

- **Other resource-intensive countries** are expected to see a decline in growth of about 5.0 percentage points, from 2.3 percent to -2.7 percent. In South Africa, disruptions caused by containment and mitigation measures and lower external demand are expected to compound existing structural constraints, with growth expected to fall from 0.2 percent in 2019 to -5.8 percent in 2020.
- **Non-resource-intensive countries** are expected to see growth decline from 6.2 percent to 2.0 percent. Within this group, **tourism-dependent countries** (Cabo Verde, Comoros, The Gambia, Mauritius, São Tomé and Príncipe, Seychelles) are expected to experience a severe downturn, with real GDP contracting by -5.1 percent in 2020 (Figure 1.9) after growing by an average of 3.9 percent in 2019.

The baseline projections assume that disruptions caused by containment and mitigation measures are concentrated in the second quarter of 2020. Both the regional and global economies are assumed to start recovering in the second half of 2020 as containment measures ease and significant economic stimulus in advanced and several emerging economies help prop up economic activity. However, commodity prices, especially oil, are expected to remain low through the medium term. In this scenario, growth in the region is projected to recover to about 4 percent in 2021. Even assuming that this relatively quick projected recovery transpires, the COVID-19 pandemic will entail persistent, large output losses, with the level of real per capita GDP expected to be about 4½ percent lower by 2024 compared with the pre-COVID-19 projections.

The growth projection for the region is subject to unusually large uncertainty because the economic fallout depends on several factors that are hard to predict. These include how the pandemic interacts with weak local health systems and existing health vulnerabilities; the effectiveness of containment efforts and the risk of the virus outbreak continuing beyond 2020 Q2; the impact of trade disruptions including closure of key ports (Southern African Customs Union countries); and uncertainty regarding the outlook for oil prices. A more protracted outbreak that leads to a deeper global contraction in 2020 and a shallower recovery, lower commodity prices, and tighter financial conditions than in the baseline could result in growth in the region falling by an additional 2.5 percentage points (Figure 1.10).

**Figure 1.10. Downside External Risk Scenario: Deviation from Baseline GDP Growth, 2020**



Sources: IMF, World Economic Outlook; and IMF staff calculations. Note: IMF staff calculations based on vector autoregression (VAR) analysis. The commodity price shock corresponds to a 30 percent decrease in commodity prices, controlling for global growth. The financial conditions shock corresponds to a 2 percentage point tightening of the fiscal balance. The global growth shock assumes a decrease in world GDP growth by 1.5 percentage points.



## POLICY PRIORITIES

Policymakers in the region and around the world face an unprecedented health and economic crisis, which requires a commensurate and timely policy response. As a first priority, policymakers should do whatever it takes to ramp up public health expenditure to cope with the surging need for health services and to slow the spread of the virus. Beyond that, an effective macroeconomic policy response is essential to limit economic losses, protect the most vulnerable groups, and ensure a swift recovery as the pandemic wanes. Given the large but temporary nature of the shock, some discretionary fiscal support is warranted, even in countries with limited space. The focus should be on targeted measures that alleviate liquidity constraints of firms (to ensure that they survive the crisis) and households (to ensure continued provisions of basic necessities like food). However, for oil exporters who face a more long-lasting shock, their room for discretionary fiscal stimulus is more limited—the aim here should remain to fund priority health spending and undertake well-paced, growth-friendly spending adjustments that seek to protect and create space for social spending, while mobilizing additional financing from international financial institutions (IFIs) and the donor community.

Monetary stimulus can play an important role in containing the economic fallout. Exchange rate flexibility in countries with floating regimes, and some drawdown of reserves where levels are adequate, can help cushion part of the external shock. For countries facing sudden reversals of external financing and a resulting imminent crisis, temporary capital flow management measures could be considered as part of a wider policy package. Finally, broad-based support from development partners is essential to help the region prepare health systems and raise much-needed financing.

The crisis response policies are temporary and should be implemented transparently, with effective communications to assure stakeholders that the increase in fiscal deficits and public debt will be reversed after the crisis. Such an approach will ensure that the region stays on track to meet its medium-term objectives, which include building resilience, restoring growth to create jobs, and achieving other sustainable development goals.

## Managing the Health Crisis

Minimizing the humanitarian cost of the health crisis by ramping up the preparedness of health care systems is the priority for all countries. Health systems in the region are underequipped to deal with increased demand for critical services, posing challenges in tackling the outbreak. Furthermore, failure to prevent the spread of the virus in sub-Saharan Africa can have negative spillovers for the rest of the world. In this regard, essential health expenditures should be accommodated, irrespective of fiscal space or debt positions. Priorities identified by the World Health Organization include procuring essential medical supplies for effective treatment (including for intensive care), setting up test labs to allow rapid case identification, implementing effective contact tracing and quarantining, and supporting frontline health workers. In countries where limited fiscal space and financing constraints are preventing adequate health spending, mobilizing grants or zero-interest loans should be a priority.

Countries will need to make difficult decisions regarding containment and mitigation measures aimed at limiting the spread of the disease and minimizing the strain on already fragile health systems. Many countries in the region have decisively adopted various travel and movement restrictions—lockdowns, border closures, bans on public gatherings, school closures, and so on—and often at an earlier stage of the outbreak than in several advanced economies (Figure 1.11). As the experience of some Asian countries (China, Japan, Korea, Singapore) and knowledge from the

**Figure 1.11. Sub-Saharan Africa: Measures Implemented to Combat COVID-19**

	Measure	Number of countries
Containment	Quarantine and self-quarantine	44
	Travel restrictions and border closure	43
Mitigation	Cancellation of public gatherings	42
	Closing of schools and universities	36
	Shelter in place and lockdown	34
	Remote work	25

Source: IMF country desk survey.

Note: As of April 3, 2020.

Ebola outbreak show (Box 1.1), social distancing measures—together with testing and isolating those exposed to the virus—can be effective in slowing the spread of the disease. In this regard, public education campaigns to ensure that people are implementing distancing measures can help, although implementing such measures may be more difficult in low-income countries because of large informal sectors and crowded housing in poor urban areas.

### Providing Fiscal Support to Aid People and Firms

Fiscal space for several countries in the region was limited going into the crisis. While large adjustment, especially in oil-exporting countries, had helped stabilize debt levels in 2018–19, the average level of sub-Saharan African debt was about 57 percent of GDP in 2019. Seven low-income countries were in debt distress, and an additional nine were at high risk of debt distress, while several middle-income countries also had high levels of debt. In addition, the increased reliance on borrowing from commercial sources had raised debt servicing costs, increased exposure to tighter global financial conditions, and reduced room for much needed spending on health and social outlays.

Despite the limited space, **timely fiscal support is crucial** to contain the spread of the virus, protect vulnerable firms and households, mitigate the overall economic impact, and promote a quick recovery to prevent the economic losses from becoming permanent. Beyond essential health and social spending, the scope for additional discretionary fiscal easing will depend on country-specific circumstances:

- **For oil-importing economies**, fiscal accommodation to support growth is warranted, given the large and temporary nature of the shock. Automatic stabilizers, though usually small in developing countries because of the presence of a large informal sector, should be allowed to operate, with the decline in revenues translating into higher deficits and not offset by expenditure cuts. Several oil importers may also consider additional discretionary fiscal easing where financing is available. Any discretionary measures will be more effective at mitigating economic hardship if they target the most-affected sectors and people.

- **For oil exporters**, the fiscal situation is more complex because persistently low oil prices beyond 2020 are expected to result in low revenues for an extended period. The priority for oil exporters should be to accommodate essential health spending and combine well-paced, growth-friendly spending adjustments that protect social spending and public investment with additional financing from IFIs and the donor community. Fiscal easing could be an option for those oil exporters with low levels of debt and more fiscal space.

When undertaking discretionary fiscal easing, countries should focus on **targeted fiscal measures** to the most affected sectors and households with the aim of alleviating liquidity constraints while ensuring transparency and accountability in managing spending related to COVID-19. Although the presence of a large informal sector can make targeted policies difficult to implement, several options are available.

- Temporary tax relief can be considered, including reducing rates on turnover and payroll taxes, extending tax deadlines, and expediting value-added tax refunds.
- Preventing arrears accumulation is also essential to avoid cashflow problems for businesses.
- Tax and customs exemptions on health products can be considered.
- Public support—including government guarantees and subsidized loans—could address firms' liquidity needs for particularly hard-hit sectors (airlines and hospitality) and encourage them to preserve employment and wages. However, all firm-specific support should be done transparently to ensure good governance.
- On the expenditure side, priority should be given to scaling up and facilitating access to existing social programs, possibly through broader targeting (for example, child and elderly benefits). Cash transfers should be prioritized when possible. One-off transfers through mobile money could be considered to reach people at scale, particularly in the informal sector, provided that recipients can be identified based on readily available socioeconomic information.



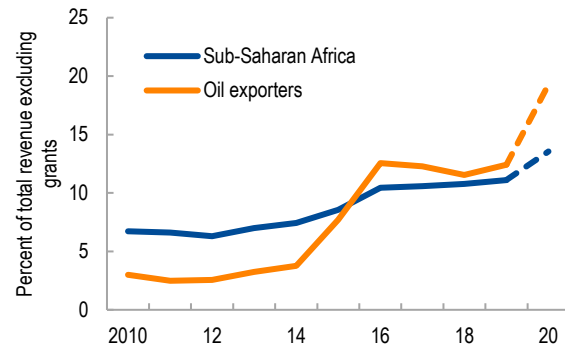
If cash transfers cannot be implemented quickly, governments could provide liquidity relief through food subsidies, payment of utility bills, support for managing rent and debt repayment, and continuity of in-kind programs (for example, free school meals programs).

- Governments can consider reducing fuel subsidies to create fiscal space for essential health spending, taking advantage of the recent drop in fuel prices.
- Digital technologies, where available, could help enhance the effectiveness of fiscal measures by expanding digital filing and payment of taxes and facilitating better targeting and coverage of public benefits (for example, Togo).

Given the rising share of revenues being taken by interest payments (Figure 1.12), financing the fiscal response to the crisis may be challenging for some countries. In this regard, **mobilizing concessional financing** is essential to ensure that necessary fiscal steps can be taken, including for countries in debt-distress that have no access to market financing. This will require coordinated support from IFIs, the G20, and other development partners.

As with health measures, several countries have proactively announced fiscal packages, including Botswana (1.9 percent of GDP), Côte d'Ivoire (4.7 percent of GDP), Mauritius (0.8 percent of GDP), Namibia (4.25 percent of GDP), Niger (7.4 percent of GDP), Rwanda (1.5 percent of GDP), and Senegal (5.1 percent of GDP). Specifically, revenue measures include temporary tax reduction (Botswana, Madagascar, Mauritius, Senegal), acceleration of tax refunds (Botswana, Cabo Verde, Eswatini, Kenya, Namibia, South Africa), extension of tax payment deadlines (Cabo Verde, Eswatini, Senegal), and exemption or deferral of social contribution (Botswana, Cabo Verde, Madagascar). On the expenditure side, the announced measures include cash transfers to households (Madagascar, Mauritius, Namibia, South Africa, Zimbabwe), wage subsidies (Botswana, Namibia, Seychelles), utility subsidies (Namibia, Senegal) and in-kind transfers (Rwanda, Senegal). Furthermore, other measures include loan guarantees (Botswana, Cabo Verde) and

**Figure 1.12. Sub-Saharan Africa: Interest Payments as a Share of Revenues, 2010–20**



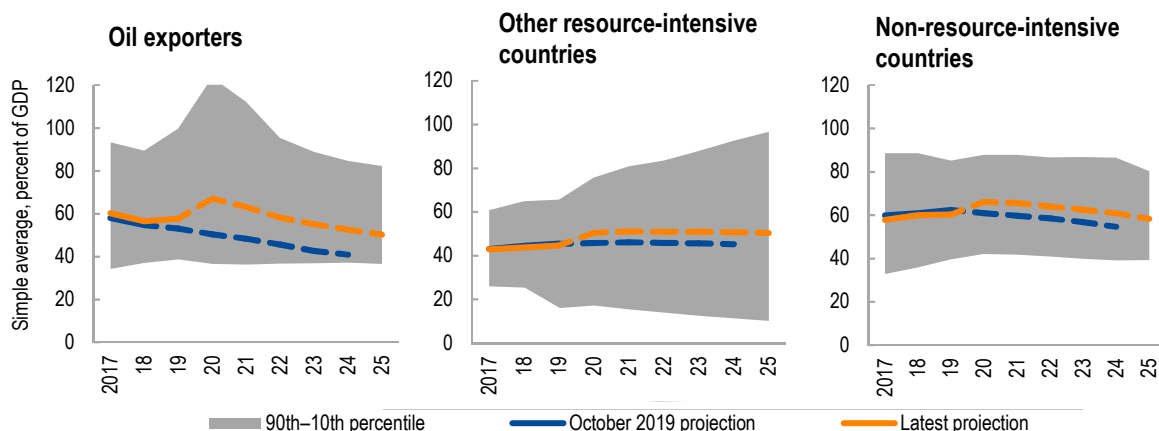
Source: IMF, World Economic Outlook database.

subsidized loans (Rwanda) for companies in distress, and payment holiday for individual borrowers (Botswana, Mauritius, Namibia).<sup>2</sup>

As with growth, **considerable uncertainty remains around budget forecasts** for 2020 as more countries put together emergency fiscal measures and commodity exporters adjust to recent price drops. On average, current projections suggest that for oil-importing countries, fiscal deficits in 2020 could be about 2.5 percent of GDP higher than in 2019, driven mainly by an increase in expenditures reflecting greater health spending and discretionary stimulus in some cases. For oil exporters, the deficits could be 3 percent of GDP higher, driven by a decline in revenues. The increase in expenditures in oil-exporting countries is expected to be less than for oil importers, given limited fiscal space, and mainly targeted at the health sector.

The evolution of debt levels will depend on a number of factors that are difficult to predict. Additional fiscal stimulus, realization of contingent liabilities, lower than expected growth, and currency depreciation caused by external pressures can all affect debt dynamics significantly. Current baseline projection suggests that, on (simple) average, **debt levels will rise temporarily** from 58 percent in 2019 to 64 percent in 2020 (compared with a projected decline to 56 percent in the October 2019 *Regional Economic Outlook for Sub-Saharan Africa*) but decline thereafter as fiscal adjustment plans are implemented (Figure 1.13). This picture masks considerable heterogeneity because several countries are expected to see increases in debt levels ranging from 10 percent of GDP to 25 percent of GDP,

<sup>2</sup> For details, please see the policy tracker on the IMF website: <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>.

**Figure 1.13. Sub-Saharan Africa: Public Debt to GDP, 2017–25**

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

reflecting lower output, larger fiscal deficits, and exchange rate depreciations.

Once the health crisis abates, ensuring that fiscal policy **reverts to its medium-term path** will reduce debt vulnerabilities. The size and pace of the adjustment should be guided primarily by long-term objectives for fiscal sustainability and stabilization and the availability of adequate financing. The composition of fiscal consolidation should rely mainly on domestic revenue mobilization to minimize the effects on growth and focus on efficiency gains in current spending. Such an approach, if communicated transparently, would help smooth the negative and temporary effect on economic activity arising from the shock without compromising fiscal sustainability, and thus contain potential volatility in sovereign debt markets.

### Easing Monetary Stance to Support Growth

Given the limited fiscal space, monetary stimulus can play an important role in containing the economic fallout from the COVID-19 shock by reducing borrowing costs and providing vital liquidity to households and firms. Three key areas are:

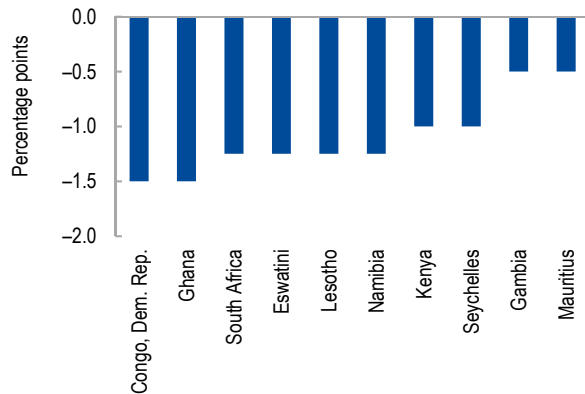
- **Easing monetary policy stance:** There has been a slight uptick in inflation in recent months, often caused by higher food prices following droughts. Lower oil prices and slower growth are expected to ease inflationary pressures, creating room to loosen monetary policy, though central banks may need to be vigilant regarding inflationary pressures arising from scarcity of essential goods caused by supply disruptions.

Furthermore, the aggressive easing of monetary policy by several advanced economies could also provide more space for central banks in the region to ease their stance.

- **Providing adequate liquidity:** Liquidity provision by central banks can help alleviate stress in the financial system. Central banks should provide ample liquidity to banks and other financial institutions, particularly to the banks that lend to small- and medium-sized enterprises (SMEs), which may be less equipped to tackle large temporary shocks.
- **Meeting credit needs of SMEs:** Sub-Saharan African countries could also consider scaling up existing initiatives to ensure credit supply for SMEs. For example, the West African Development Bank is exploring ways to leverage a special window for refinancing credit granted to SMEs. Public guarantees on debt taken by solvent firms may also be considered. However, such measures would need to be taken in a transparent, well-targeted way that contains fiscal risks as much as possible.

Several countries in the region have already undertaken steps in this direction, joining the global easing cycle by cutting interest rates (Eswatini, The Gambia, Ghana, Kenya, Mauritius, Namibia, South Africa—see Figure 1.14). Some central banks have also stepped in to support financial systems by providing additional liquidity. For example, the South African Reserve Bank provided intraday liquidity support to clearing banks and increased the size of weekly refinancing operations, while the central bank of the West African Economic and

**Figure 1.14. Sub-Saharan Africa: Changes in Monetary Policy Rates since the End of 2019**



Sources: Haver Analytics; and IMF, International Financial Statistics.

Monetary Union increased liquidity provided to banks and widened the range of accepted collateral. The central banks of Ghana, Kenya, and Rwanda eased reserve requirements to release liquidity into the banking system.

**Preserving Financial Stability while Ensuring Adequate Credit Provision**

The COVID-19 outbreak is expected to hit banking systems across the region. The largest threat to banks is related to their loan portfolios, where many borrowers across sectors are facing a sharp collapse in their income, and therefore are having difficulty repaying their obligations as they come due. This could lead to a sharp increase in nonperforming loans in coming months, from already high levels (11 percent on average in 2019).

Financial market supervisors should aim to maintain the balance between preserving financial stability, maintaining banking system soundness, and sustaining economic activity. Banks should be encouraged to use flexibility in existing regulations and undertake prudent renegotiation of loan terms for stressed borrowers, especially SMEs that lack resources to withstand a sharp temporary shock. Supervisors should provide clear guidance on loan restructuring and work closely with banks to ensure that such actions are both transparent and temporary. Furthermore, banks should draw upon existing buffers to absorb the costs of restructuring, while enhanced supervisory reporting, including

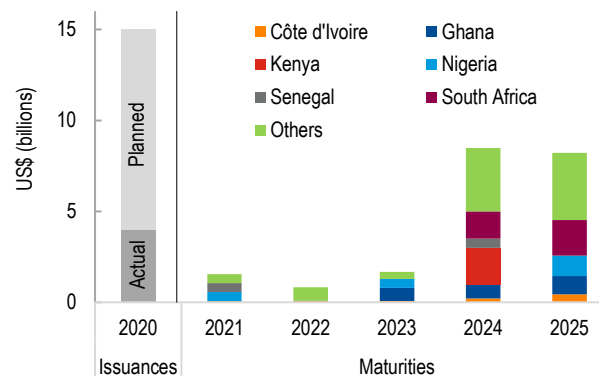
the exchange of information with other supervisors in the region, could be introduced to monitor liquidity strains.

**Tackling External Sector Pressures**

The regions’ vulnerability to external shocks has increased in recent years because sustained financial inflows have resulted in the buildup of large external liability positions. As such, lower global demand, sharp declines in oil prices, and tightening financial conditions will put external positions under strain.

The (simple) average current account deficit is expected to deteriorate from -6.2 percent of GDP in 2019 to -8.4 percent of GDP in 2020, with the largest decline seen in oil exporters and countries that rely heavily on tourism. While these larger deficits are expected to be financed from different sources, including greater borrowing from IFIs, they could pose mounting challenges to countries that rely heavily on external financing. These countries face the risk of disorderly market conditions, difficulty in rolling over debt obligations (Figure 1.15), substantial current account adjustment through domestic demand compression, and large reserve losses. Recent high-frequency data show the effects of tightening global financial conditions, with outflows of cross-border bond and equity flows from the regions’ frontier and emerging economies exceeding \$4.2 billion since the end of February, the fastest rate of withdrawal on record.<sup>3</sup>

**Figure 1.15. Sub-Saharan Africa: Eurobond Issuances and Maturities, 2020–25**



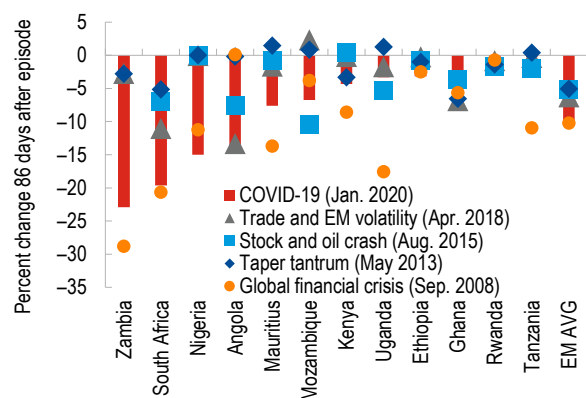
Source: Bloomberg Finance L.P.

<sup>3</sup> EPFR Global compiles weekly data on cross-border bond and equity inflows by exchange traded funds and mutual funds to a selected group of sub-Saharan African countries (Angola, Côte d’Ivoire, Gabon, Ghana, Kenya, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Tanzania, Uganda, Zambia). The database does not cover all portfolio flows.

The recent downgrade of South Africa to below investment grade may exacerbate this trend. These outflows have and are likely to continue to put heightened pressure on exchange rates (Figure 1.16).

The appropriate policy responses will depend on country-specific circumstances and can comprise a variety of measures, including exchange rate adjustment, foreign exchange intervention, temporary capital flow management measures, and external financial assistance. In countries with flexible regimes, the exchange rate should be allowed to adjust and act as a shock absorber, especially when facing terms-of-trade shocks. For countries with adequate reserves, foreign exchange intervention can counter disorderly market conditions to smooth exchange rate volatility and to limit financial stress caused by currency mismatches in balance sheets. For countries facing sudden reversals of external financing and a resulting imminent crisis, capital flow management measures could be considered as part of a wider policy package, with clear communications to emphasize their temporary nature. Furthermore, to ease strains and bridge financing gaps caused by large external shocks, countries should proactively seek external concessional financing, including from IFIs.

**Figure 1.16. Sub-Saharan Africa: Exchange Rates**  
(US\$ to national currency)



Sources: Bloomberg Financial LP; and IMF staff calculations.

Note: EM = emerging market economies. EME AVG = emerging market economies average.

## Broad-Based Support from Development Partners

Given the nature and scale of the health and economic shock and the elevated vulnerability of low-income countries, a timely, comprehensive, and coordinated effort by all development partners—IFIs, the G20, the World Health Organization, philanthropists—is essential to effectively respond to this crisis. On the health front, multilateral cooperation to avoid trade restrictions on medical supplies will be critical to avoid shortages in the region. For financially constrained countries with limited health capacity, mobilizing grants and zero-interest emergency loans to provide medical equipment and expertise should be a priority.

On the economic front, IFIs and the G20 need to play a key role in easing financing constraints and helping countries smooth the shock. The IMF is making \$100 billion available through rapid-disbursing emergency facilities. In addition, the IMF's Catastrophe Containment and Relief Trust can provide grants to the poorest countries to pay off debt to the Fund. The IMF Managing Director and the World Bank Group President have urged official bilateral creditors to suspend debt repayment for International Development Association countries (that is, those with gross national income per capita below \$1,175 in 2020) that request forbearance.

Moreover, the World Bank Group is providing a \$14 billion package of fast-track financing to assist countries coping with the crisis, in addition to helping countries beef up health systems capacity. The African Development Bank sold a record \$3 billion three-year Fight COVID-19 Social Bond to raise financing to help combat the fallout from the virus outbreak. Coordinating across IFIs and bilateral creditors will be essential to ensure adequate and timely support for the countries in the region.

**Box 1.1. Evidence and Lessons from the 2014–15 Ebola Outbreak in West Africa**

*Ebola and COVID-19 are very different diseases (Ebola is deadlier but less contagious), but they have prompted similar public health responses, so the experience from the 2014-15 crisis remains relevant today. Once Ebola spread to crowded urban areas, public health systems quickly became overwhelmed, with scarce resources redirected to fight the outbreak. The economic impact of disease containment and mitigation efforts was very large, driven by the strong decline in labor supply. A rapid scaling up of international support was critical to contain the spread of Ebola and mitigate its impact. As fiscal revenues collapsed, budget financing proved essential to sustain crucial government operations, including health care, education, and security.*

**The largest recorded Ebola outbreak took a devastating toll on the people of Guinea, Liberia and Sierra Leone.** Ebola virus disease infected more than 28,000 people, caused more than 11,000 deaths, and took an enormous human toll through suffering, social dislocation, food insecurity, and disruptions to normal daily life. With resources diverted to fight the epidemic, entire health systems essentially shut down, affecting health care provision, including diagnostic and treatment of other infectious diseases.

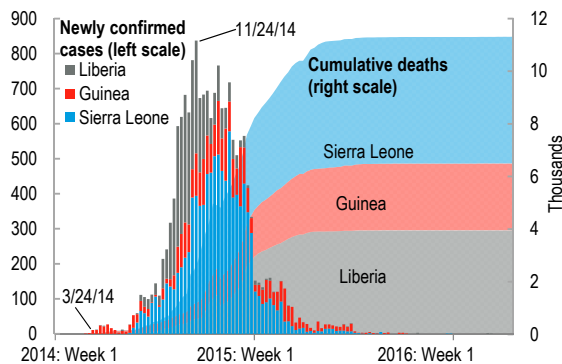
**Growth declined 9 percent in the affected countries, on average, mainly through lower labor supply (Wane and others, 2019).<sup>1</sup>** Nonessential government operations stopped, and months long school shutdowns disrupted daily life and caused permanent

loss of human capital. Travel restrictions affected tourism and trade severely, agricultural production and markets were disrupted, and food insecurity increased. Businesses under strain laid off workers, and rising nonperforming loans created problems for domestic banks. Labor supply declined drastically, especially in areas where shutdowns were more extensive and prolonged. The health crisis also had significant regional spillovers, particularly through tourism and travel flows.

**Fiscal positions worsened as tax revenues collapsed and spending needs increased dramatically.** The revenue collapse was especially pronounced for corporate and indirect taxes. Health, security and social spending needs increased while investment projects were stopped. The implementation of hazard pay for health workers was particularly challenging, with low compensation, unreliable payments, and gender disparities making it difficult to hire and retain frontline staff.

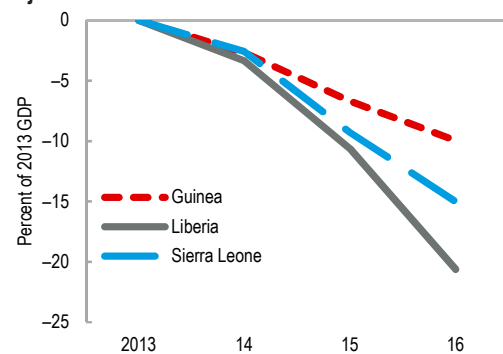
**A coordinated international response was critical to contain the disease and limit its health and economic impact.** In addition to the international health response, donors provided massive financial assistance, committing \$5.9 billion in aid. The IMF provided budget support, disbursing \$378 million to the affected countries between September 2014 and March 2015, of which \$100 million was in debt relief (Cangul and others, 2017).

**Figure 1.1.1. Selected Countries: Evolution of the Ebola Outbreak, Cases and Deaths**



Source: World Health Organization.

**Figure 1.1.2. Selected Countries: Cumulative Difference in Government Revenue between Actual and October 2013 Projection**



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

Prepared by Frederico Lima.

<sup>1</sup> Some countries were particularly hard hit. For example, Sierra Leone’s economy shrunk by more than 20 percent in one year.

Wane, Abdoul, Chu Wang, Mehmet Cangul, Komla Agudze, and Iyabo Masha. Forthcoming. “Growth under Ebola.” IMF Working Paper, International Monetary Fund, Washington, DC.

Cangul, Mehmet, Carlo Sdravovich, and Inderjit Sian. 2017. “Beating Back Ebola.” *Finance & Development*, 54(2), 54–57.

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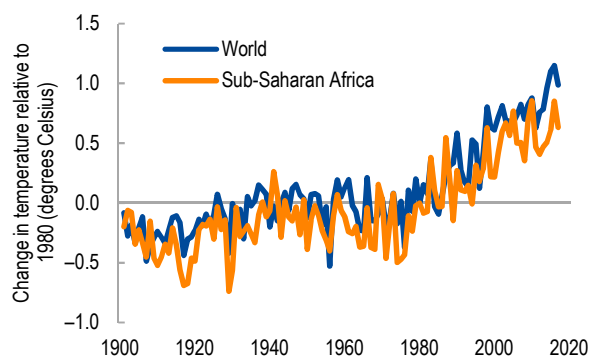
## 2. Adapting to Climate Change in Sub-Saharan Africa

### INTRODUCTION

The intrinsic links between climate change and the COVID-19 pandemic have elevated global calls for policymakers to take immediate action on both fronts. Fiscal stimulus supporting recovery from the pandemic can be designed to simultaneously address climate change. In turn, this could help reduce the spread of future pandemics as climate change is a threat multiplier for pandemics. Destruction of the environment and biodiversity makes pandemics more likely while pollution and other man-made factors driving climate change weaken the health of human beings, raising their vulnerability to viruses and other diseases.

Sub-Saharan Africa is the region in the world most vulnerable to climate change. Rising temperatures, rising sea levels, and rainfall anomalies are increasing the frequency and intensity of natural disasters and are markedly transforming the region's geography (Figure 2.1; IPCC 2018; October 2017 *World Economic Outlook*, Chapter 3). Recent natural disasters include the devastating cyclones Idai and Kenneth; ongoing locust outbreaks in eastern Africa and droughts in southern and eastern Africa that threaten the lives of millions; and the Sahel's desertification, which is contributing to conflicts and mass migration (Rigaud and others 2019).

**Figure 2.1. World and Sub-Saharan Africa: Change in Temperature Relative to 1980, Celsius**



Sources: Harris and others (2014); and IMF staff calculations.

A team led by Seung Mo Choi and supervised by Pritha Mitra prepared this chapter of the April 2020 *Regional Economic Outlook: Sub-Saharan Africa*, which benefited from the guidance of David Owen. The main authors are Maria Coelho, Eric Pondi Endengle, Wei Guo, Kadima Kalonji, Andresa Lagerborg, Jiakun Li, Giovanni Melina, Edna Mensah, Alun Thomas, Manchun Wang, Jiaxiong Yao, and Genet Zinabou, with contributions from Sebastian Acevedo, Thomas Baunsgaard, Thomas Benninger, Frederico Lima, Alpa Shah, and Harold Zavarce.

<sup>1</sup> Indicators on vulnerabilities, including the World Risk Index (Radtke and Weller 2019) and Notre Dame Global Adaptation Index, suggest that most sub-Saharan African countries have low adaptive capacities, including a lack of economic, governance, and social readiness needed for adaptation.

Economic development has brought considerable progress in recent decades, but resilience and coping mechanisms across sub-Saharan Africa remain limited, reflecting structural factors restricting countries' ability to respond to and recover from shocks. In particular, heavy reliance on rain-fed agriculture increases humanitarian, social, and macroeconomic vulnerabilities to rising temperatures and extreme weather shocks, which most heavily affect the poorest segments of the region's rapidly growing population.<sup>1</sup>

Adapting to climate change is critical to safeguarding and further advancing hard-earned improvements in incomes and education and health outcomes across sub-Saharan Africa over the past three decades. However, adaptation will be especially challenging given countries' limited capacity and financial resources. Several studies have clearly shown the importance of advancing economic development in raising resilience to climate change and improving coping mechanisms (IMF 2017; IMF 2019a; Hallegatte and others 2017). Policy recommendations range from building buffers (such as international reserves) and social safety nets to strengthening institutions and frameworks that foster structural transformation. However, implementing all of these recommendations while managing competing development needs is beyond the region's human and financial capacity. In some cases, additional challenges arise from political uncertainty and security issues. Given these constraints, which reform areas should sub-Saharan African policymakers prioritize? This is the subject of mounting policy debates across the region, especially with youth pressing policymakers for more immediate action.

This chapter examines policies and structural areas that could help the region make strides in adapting to climate change by building resilience and improving coping mechanisms. The first section applies big data, econometric analysis, and



event studies to provide an overview of how climate change affects sub-Saharan African countries, focusing on the consequences for economic growth and inequality. The second section highlights the key policy areas most effective in building resilience and coping mechanisms, relying on econometric analysis of macro-level data, household surveys, and case studies. The third section concludes with an analysis of financing implications.

## Main Findings

Financing adaptation to climate change will be more cost-effective than frequent disaster relief. For sub-Saharan Africa, adaptation will be expensive—estimated at US\$30–50 billion (2–3 percent of regional GDP) each year over the next decade—but less costly than frequent disaster relief. This chapter’s analysis finds that savings from reduced post-disaster spending could be many times the cost of upfront investment in resilience and coping mechanisms. Adaptation to climate change would also benefit other development areas, such as resilience to pandemics, and ultimately boost growth, reduce inequalities, and sustain macroeconomic stability.

Stepped up financial support from development partners, beyond disaster relief, targeting resilience building and bolstering coping mechanisms will be critical. Containing and managing the COVID-19 pandemic is taking a toll on already limited fiscal space and raising debt vulnerabilities in sub-Saharan Africa. A green recovery from the pandemic will ultimately boost economic growth and resilience but, in the interim, support of the international community will be paramount as securing other sources of financing can be challenging. For example, macroeconomic insurance, such as climate funds and state-contingent bonds, have been difficult for the region’s countries to access so far, given large risk premiums—partly reflecting governance issues in much of the region that raise investors’ risk aversion.

Climatic change in sub-Saharan Africa is especially pronounced with intensified temperature extremes, precipitation anomalies, and natural disasters that annually leave millions in peril, injured, homeless, or food insecure, and cause serious and costly economic damage. One-third of the world’s droughts occur in sub-Saharan Africa, and the frequency of storms and floods is growing fastest in this region.

The potential impact of rising temperatures and extreme weather events on growth is larger and longer lasting in sub-Saharan Africa than in the rest of the world, reflecting the region’s lower resilience and coping mechanisms, and its dependence on rain-fed agriculture. The resulting amplification of inequalities and scarcity of fertile lands, combined with high population growth, risk contributing to mass migration and conflict.

- The analysis in this chapter suggests that economic activity in a given month can shrink by 1 percent when the average temperature is 0.5°C above that month’s 30-year average. This impact is 60 percent larger than the average for emerging market and developing economies in other regions, reflecting sub-Saharan Africa’s agricultural dependence and the temperature sensitivity of its crops.
- The analysis also finds that climate-induced natural disasters have a lasting impact, especially droughts, possibly reflecting their prolonged nature. For example, medium-term annual economic growth can decline by 1 percentage point with the occurrence of one additional drought. This impact is about eight times that in emerging market and developing economies in other regions.

Climate change is threatening food security of the poor in both rural and urban areas. Reducing this risk requires improving the resilience of agricultural production and households, partly by prioritizing the necessary measures in government budgets (outlined in the section on adaptation strategies), and closer coordination across various ministries (Finance, Agriculture, Education, Environment, and Health) and across development partners. Targeted social assistance and insurance are key to helping populations cope after a shock. The empirical investigation of household surveys in this chapter suggests:

- Improved seeds, insecticide, fertilizer, anti-erosion measures, irrigation, and access to finance are critical for building resilience in agricultural production.
- Better access to finance and telecommunications (which improve accessibility to early warning systems), robust housing, sanitation, and education (which improves decision-making

and incomes) boost the resilience of rural and urban households to climate change shocks and could reduce the chances of post-shock food insecurity by 30 percentage points.

More broadly, adaptation strategies will depend on the types of climate change effects a country is facing. Strong macroeconomic, institutional, and structural policies are a must, but cross-country regression analysis finds that the following combinations of structural reform areas need to be prioritized:

- For droughts, increasing access to finance, irrigation, drinking water, and electricity (which powers irrigation and pumps) is essential for minimizing economic damage.
- For storms and floods—which can also contribute to the spread of pandemics—accelerating progress in improving health and education outcomes,<sup>2</sup> access to finance, telecommunications, and the use of machines and weather-resilient infrastructure limits economic damage and supports recovery efforts.

## ECONOMIC IMPACT OF CLIMATE CHANGE

### What Does Climate Change Mean for Sub-Saharan Africa?

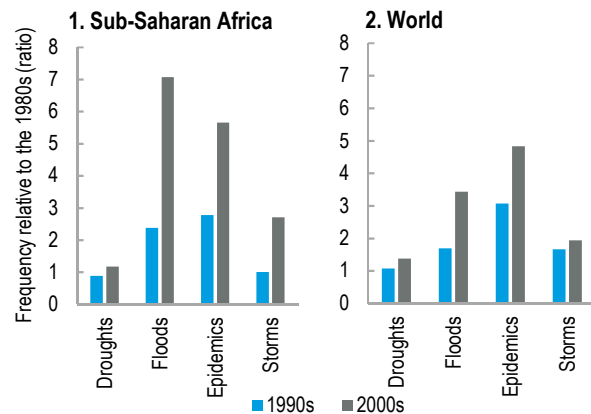
Recent increases in global temperatures are unprecedented and expected to accelerate. Even extreme restraint of greenhouse gas emissions can only slow the pace of temperature increases, given that past emissions remain in the atmosphere (IPCC 2018). The 0.7°C rise in global temperatures over the past 30 years (or 1°C over the past 50 years) is significantly higher than in any equivalent period during the last 10,000 years (Marcott and others 2013). This aggregate figure masks substantial heterogeneity across seasons and geographic locations. Natural disasters have always been present, but there is clear evidence that rising temperatures and changes in precipitation lead to more frequent droughts, desertification, climbing

sea levels, and higher vapor pressure—much of which fuels more frequent floods and storms such as hurricanes and tropical cyclones (IPCC 2018; October 2017 *World Economic Outlook*, Chapter 3).

Climatic change in sub-Saharan Africa is especially pronounced with intensified temperature extremes, precipitation anomalies, and natural disasters—annually responsible for at least 1,000 deaths, 13 million people seriously affected (injured, left homeless, food insecure, or lacking water and sanitation), and US\$520 million in direct economic damages since the turn of the century. One-third of the world’s droughts occur in sub-Saharan Africa, and the frequency of storms and floods is growing fastest in this region (Figure 2.2).<sup>3</sup>

- Temperature increases are starkest in eastern Africa—having risen almost 1°C over the past 30 years—where daily summer temperature highs average 28°C (Figure 2.3). The increases in southern and western Africa, spanning some of the hottest locations on the planet, are not far behind. By contrast, some central African countries (including Angola and the Democratic Republic of the Congo) are benefiting from modest temperature declines.

**Figure 2.2. Sub-Saharan Africa and the World: Frequency of Natural Disasters Relative to the 1980s**



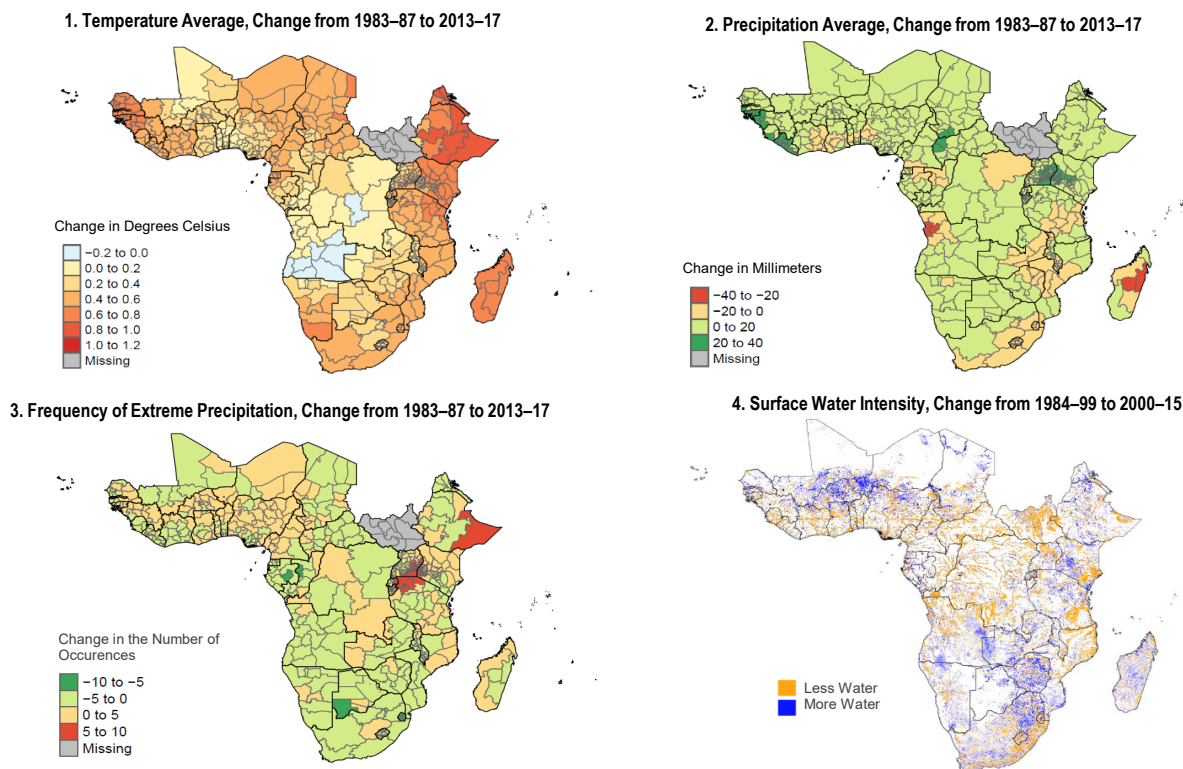
Sources: Centre for Research on the Epidemiology of Disasters, Emergency Events Database; and IMF staff calculations.

Note: The bars in this chart can be interpreted as multiples of the sum of disasters that occurred during 1980–89. For example, all the floods in sub-Saharan Africa during 2000–09 were about seven times the floods during 1980–89.

<sup>2</sup> Improved health outcomes reduce out-of-pocket health care spending and facilitate a quicker return to work; improved education outcomes increase productivity, decision-making, and incomes.

<sup>3</sup> The chapter relies on the Emergency Events Database maintained by the Centre for Research on the Epidemiology of Disasters, including for the definition of events. The database includes all disasters meeting one of the following criteria: 10 people killed, 100 people affected, a declaration of a state of emergency, or a call for international assistance. Although part of the observed increase in frequency might reflect an improvement in reporting, it is believed that similar reporting standards have been applied since the 1980s.

**Figure 2.3. Sub-Saharan Africa: Temperatures, Precipitation, and Water Intensity, 1983–2017**

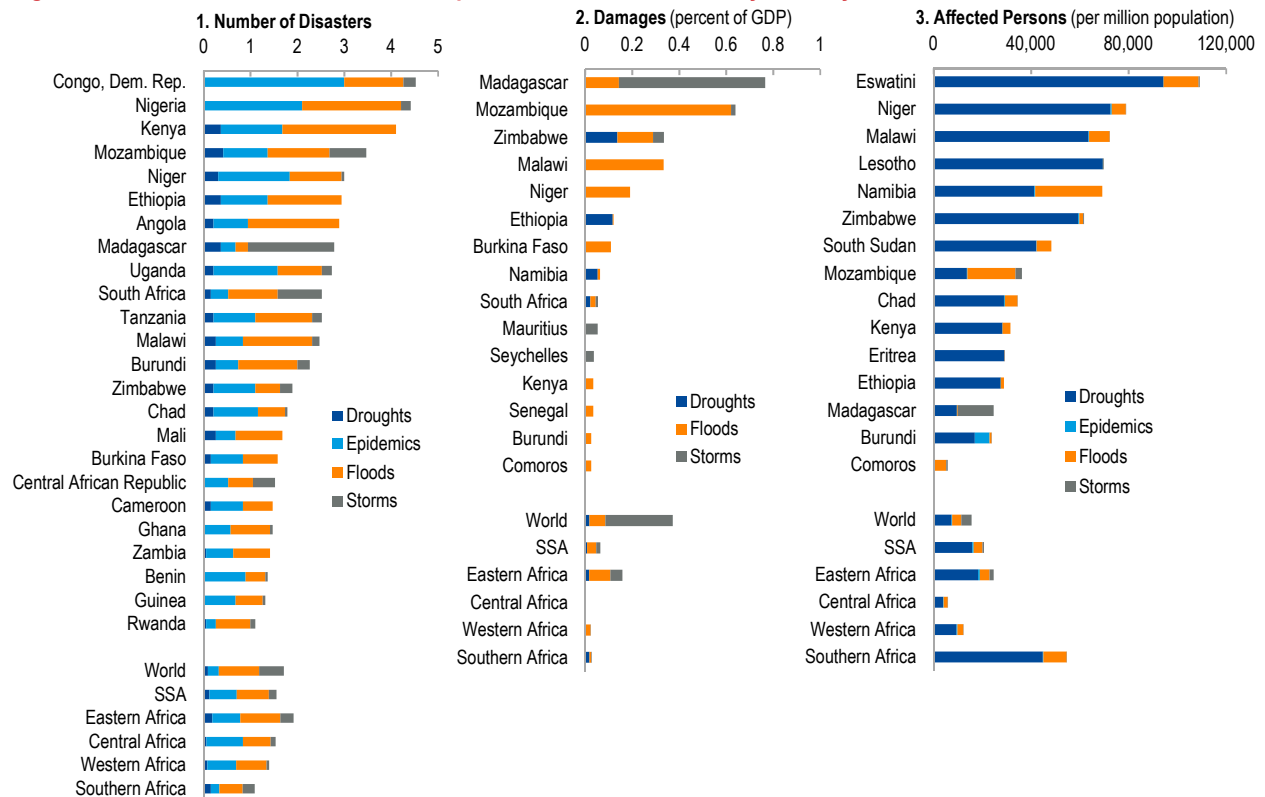


Sources: University of East Anglia Climate Research Unit; and IMF staff calculations.

Note: Extreme precipitation events occur when precipitation is more than two standard deviations away from the same-month average. Surface water intensity is the frequency with which water was present on the surface.

- The impact of climate change on precipitation is more complex. Western and southern Africa, including some of sub-Saharan Africa’s driest locations, are experiencing marked precipitation declines (Figure 2.3). Madagascar, Malawi, South Africa, and Zimbabwe stand out, with some provinces rapidly drying out while others face massive rainfall increases. Across the rest of sub-Saharan Africa, increased episodes of extreme rainfall, which hurt agricultural production, often outweigh the benefits from more precipitation. Surface water—critical for farming, fishing, and hydroelectricity—is shrinking, particularly in central Africa.
- Droughts spurred by prolonged heat and dryness are taking the largest toll on people’s lives and livelihoods and threaten to undo the past three decades’ progress in raising life expectancy and reducing infant mortality and malnutrition (Figure 2.4). The Sahel and southeastern Africa are most affected, with a particularly large impact in Eswatini, Lesotho, and Niger.
- Floods and storms, the most common natural disasters in sub-Saharan Africa, are seriously damaging infrastructure (Figure 2.4). Comoros, Madagascar, Malawi, and Mozambique are particularly susceptible to tropical cyclones from the Indian Ocean. Similarly, Guinea Bissau and Sierra Leone are susceptible to storms from the Atlantic Ocean. Large coastal cities (Abidjan, Accra, Dakar, Dar es Salaam, and Lagos) are vulnerable to floods from rising sea levels. Floods can also spread diseases because they create breeding grounds for mosquitoes and contaminate drinking water (October 2016 *Regional Economic Outlook: Sub-Saharan Africa*, Chapter 3), creating challenges to safeguarding recent years’ achievements in reduced incidences of malaria and improved access to drinking water.

**Figure 2.4. Sub-Saharan Africa: Annual Impacts of Natural Disasters by Country, 2000–18**



Sources: Centre for Research on the Epidemiology of Disasters, Emergency Events Database; and IMF staff calculations.  
 Note: Actual damages are likely higher as some disasters are missing data on damage. SSA = sub-Saharan Africa.

### Climate Change Matters for Economic Growth and Inequality

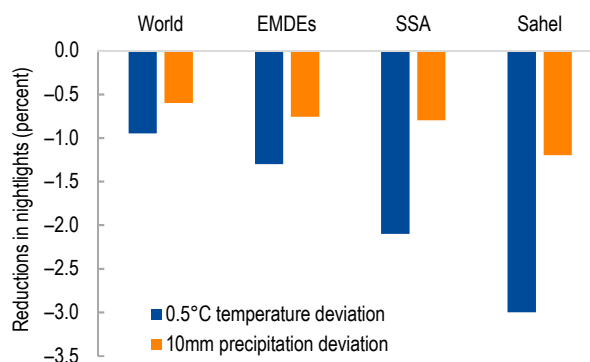
Climate change weighs on economic growth by taking lives, depressing productivity (including deteriorated worker health and education), destroying housing and physical infrastructure, and dampening hydroelectric production (October 2017 *World Economic Outlook*, Chapter 3; Burke and others 2009; Hsiang, Meng, and Cane 2011). Agricultural output suffers the most through shrinking yields and a reduction in arable lands, and this puts food security at risk. Spillovers from agriculture; reduced productivity; slowed investment; and damage to capital, the environment, and biodiversity hurt manufacturing, wholesale and retail trade, and tourism (October 2017 *World Economic Outlook*, Chapter 3; Jones and Olken 2010; Garcia-Verdu and others 2019).<sup>4</sup>

Combined, these pressures can contribute to mass migration and conflict; and can also result in poor nutrition and health care outcomes which reduce populations’ resilience to pandemics.

### Growth Impact is Larger and Lasts Longer in Sub-Saharan Africa

Rising temperatures and precipitation anomalies are affecting economic activity more in sub-Saharan Africa than elsewhere (Figure 2.5), reflecting the region’s limited resilience and coping mechanisms and its reliance on rain-fed agriculture. Using satellite-recorded nightlights as a proxy for economic activity, this chapter’s empirical analysis of provincial-level data reveals that in sub-Saharan Africa for a given month, a 0.5°C increase in temperature from that month’s 30-year average corresponds to a 2.1 percent reduction of

<sup>4</sup> Additional potential channels include negative wealth effects from stranded assets and increased growth volatility (due to greater frequency and intensity of weather-related disasters). Studies measuring the impact of climate change on financial markets in sub-Saharan Africa or comparable regions are limited, but for more advanced economies, the May 2020 *Global Financial Stability Report* finds no significant effect of disasters on aggregate equity prices except when they are very large.

**Figure 2.5. Selected Economies: Impact of Weather Anomalies on Nightlights**

Sources: National Oceanic and Atmospheric Administration; University of East Anglia Climate Research Unit; and IMF staff calculations.

Note: Anomalies occur when the temperature or precipitation for a given month is at least 0.5°C or 10 millimeters higher than the 30-year average for that month. Data cover January 2013 through December 2017. EMDE = emerging market and developing economies; mm = millimeter; SSA = sub-Saharan Africa.

nightlights.<sup>5</sup> This translates into a 1 percent decline in monthly real GDP for that province (applying elasticity estimates from Hu and Yao 2019), although the effects may not persist through the year and may be offset by other factors, including a moderation of temperatures in subsequent months.<sup>6</sup> This impact is broadly double the global average and 1.6 times the emerging market and developing economy average.<sup>7</sup> Similarly, a 10-millimeter deviation in precipitation relative to the 30-year average for that month could reduce nightlights in sub-Saharan Africa by 0.8 percent, implying a reduction in real GDP of 0.4 percent. If the precipitation shock hits during peak growing season, the effect could persist for more than a year.

More than half the provinces across sub-Saharan African countries already experience these magnitudes of temperature or rainfall fluctuations in a given month. Although the impact in most subregions (with sufficient electrification for this analysis) are near the sub-Saharan African average,

the Sahel is the striking exception, highlighting its weak resilience and coping mechanisms and already high average temperatures (October 2017 *World Economic Outlook*, Chapter 3; Burke, Hsiang, and Miguel 2015). For example, a temperature increase from 35°C to 36°C will have a direct, adverse impact on the well-being of a farmer in weak health who has to walk an extra kilometer to get water. The farmer's productivity and income earning potential will also decline.

Natural disasters, especially droughts, have lasting adverse economic consequences. Foreign financial assistance, remittances, and reconstruction often offset the negative near-term impact on economic activity, which is substantial for droughts and extreme storms like cyclones (Figure 2.6). Over the medium-term, from an economic perspective, it is possible to offset some losses to physical capital (for example, with upgrades to damaged infrastructure). However, the human capital loss from deaths, malnutrition, or lower school enrollment after a disaster is unrecoverable. This chapter's analysis of country-level panel regressions of five-year GDP growth on the frequency and intensity of natural disasters finds the following (Figure 2.7):<sup>8</sup>

- A significant negative impact of natural disasters on medium-term growth—especially droughts, possibly reflecting their prolonged nature. The occurrence of one additional drought in a sub-Saharan African country can reduce its medium-term annual economic growth by one percentage point, in addition to any lasting level effects. Each additional flood takes about half the toll on medium-term growth.<sup>9</sup>
- Climate-induced natural disasters weigh substantially more on growth in sub-Saharan Africa, reflecting the region's limited resilience

<sup>5</sup> Nightlights are generated mostly by human activity. They are visible from outer space and recorded by satellites. Nightlights are positively correlated with economic activity and have often been used as a supplementary measure of real GDP (Hu and Yao 2019). For example, when higher temperatures reduce economic activity, businesses and households react to lower incomes by reducing their electricity consumption.

<sup>6</sup> With annual data, the October 2017 *World Economic Outlook*, Chapter 3 finds that a 1°C rise in temperature lowers per capita GDP by 1–1.5 percent. Based on the estimations in this *Regional Economic Outlook* chapter, the larger reduction in sub-Saharan Africa's economic activity holds even after controlling for differences in initial temperatures in other regions of the world. However, these results are subject to important caveats. First, climate change could affect economic activity through channels other than changes in temperature and precipitation, such as rising sea levels, increased frequency and intensity of weather-related disasters, changes in ecosystem, mass migration, and conflicts. Second, households, businesses, and governments could adapt their behaviors as climate change continues, reducing the effects of climate change on economic activity.

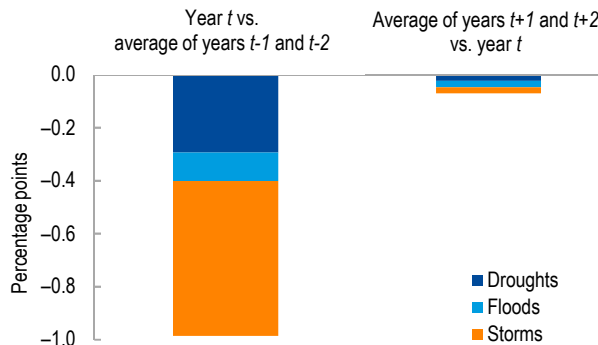
<sup>7</sup> The results are robust to limiting the comparison to emerging market and developing economies at similar latitudes.

<sup>8</sup> The analysis in this chapter follows the estimation strategy in Loayza and others (2012). The frequency is the average five-year death rate. The intensity is the proportion of disruptive disasters out of all disasters in a five-year window. Here, a disaster is "disruptive" when fatalities plus 0.3 times the affected persons exceeds 0.01 percent of the population.

<sup>9</sup> Floods include the aftereffect of extreme storms such as cyclones.



**Figure 2.6. Sub-Saharan Africa: Evolution of Real GDP Growth around Disruptive Droughts, Floods, and Storms, 1990–2018**



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

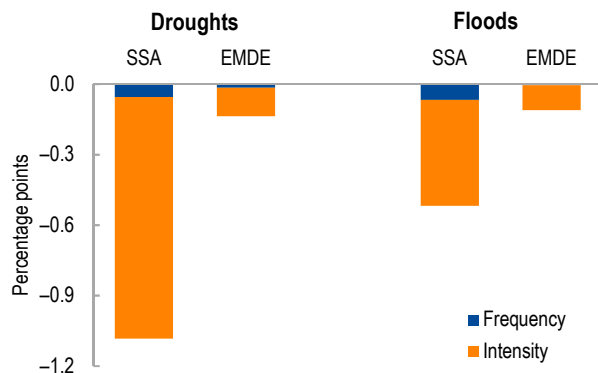
Note: A disaster is “disruptive” when fatalities plus 0.3 times the affected persons exceeds 0.01 percent of the population. The charts illustrate the averages. *t* = the year of a disaster, *t-1* is one year before the disaster, *t-2* is two years before the disaster, *t+1* is one year after the disaster, and *t+2* is two years after the disaster.

and coping mechanisms and its dependence on rain-fed agriculture. This impact is about eight times that in other emerging market and developing economies for droughts.

- A disaster’s intensity matters much more than its frequency (consistent with the findings of Cavallo and others 2013 and Fomby, Ikeda, and Loayza 2013).<sup>10</sup>

Challenges to economic growth are compounded by widening fiscal and current account deficits and

**Figure 2.7. Selected Economies: Medium-Term Impact of Frequency and Intensity of One Additional Natural Disaster on Growth**

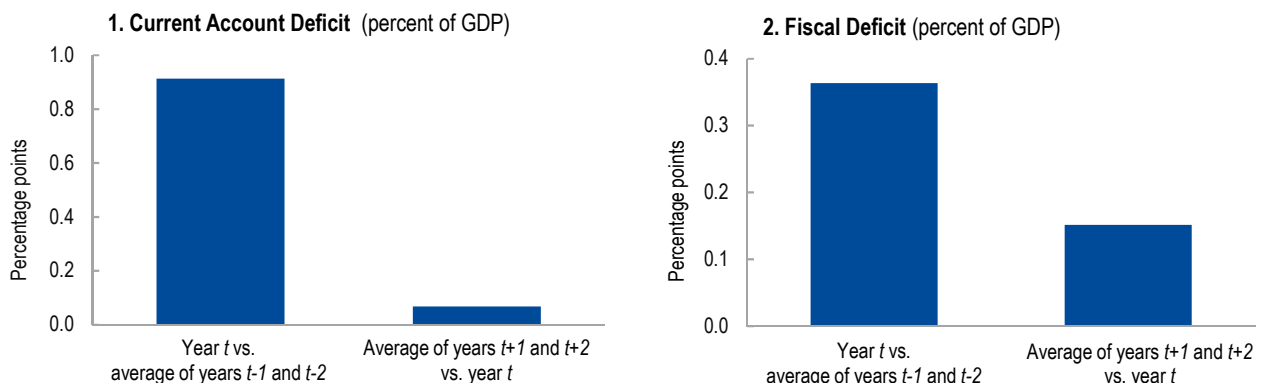


Sources: Centre for Research on the Epidemiology of Disasters, Emergency Events Database; IMF International Financial Statistics; World Bank World Development Indicators Database; and IMF staff calculations.

Note: Disaster intensity is the fraction of disruptive disasters out of all disasters within a five-year window. A disaster is “disruptive” when fatalities plus 0.3 times the affected persons exceeds 0.01 percent of the population. EMDE = emerging market and developing economies; SSA = sub-Saharan Africa.

corresponding pressures on public debt and international reserves after a natural disaster (Figure 2.8). Reduced economic activity translates into lower tax revenues while spending needs accelerate with the demands of post-disaster relief and rebuilding damaged infrastructure (IMF 2016). Post-disaster foreign financial assistance or remittances seldom fully offset strains on external positions from reduced agricultural exports and increased imports for reconstruction. Setting aside natural disasters,

**Figure 2.8. Sub-Saharan Africa: Evolution of Macroeconomic Indicators around Disruptive Droughts, Floods, and Storms, 1990–2018**



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

Note: A disaster is “disruptive” when fatalities plus 0.3 times the affected persons exceeds 0.01 percent of the population. Charts illustrate the averages. *t* = the year of a disaster, *t-1* is one year before the disaster, *t-2* is two years before the disaster, *t+1* is one year after the disaster, and *t+2* is two years after the disaster.

<sup>10</sup> The larger impact of intensity on economic activity relative to that of frequency may reflect the observation that frequent disasters result in increasing intensities. That is, if an economy has not yet recovered from one disaster and is hit with another, then the intensity of the second disaster in deaths and damage becomes higher than the first disaster (keeping all else equal).

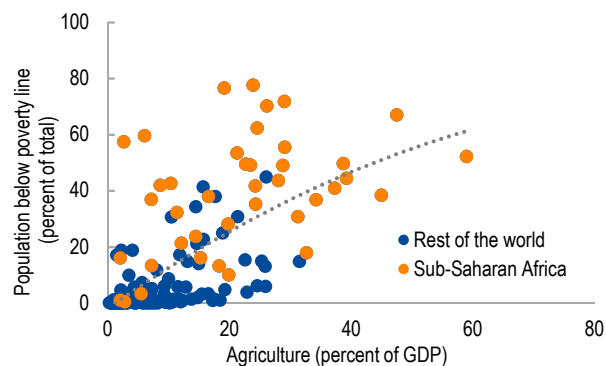
copied with temperature increases and precipitation anomalies can lower exports (Jones and Olken 2010)—ultimately changing trade patterns—and necessitate increased social assistance and public investment. Financial system stability can also be affected, especially through rapid increases in nonperforming loans and deposit withdrawals for banks and deteriorated balance sheets for insurance companies. More broadly, assets stranded because of weather-related disasters could lower collateral values and hurt the soundness of financial institutions.

### Amplified Inequalities

Climate change is exacerbating already large inequalities in sub-Saharan Africa. Almost half of the population lives below the poverty line and depends on weather-sensitive activities such as rain-fed agriculture, herding, and fishing for their livelihoods (Figure 2.9). Limited financial buffers and low levels of education and health care impede their ability to adapt, raising vulnerabilities to food insecurity, income losses, and unemployment. For example, the analysis in this chapter finds that in Ethiopia, Malawi, Mali, Niger, and Tanzania, food insecurity increases by 5–20 percentage points with each flood or drought.<sup>11</sup> Associated deteriorations in health and in children’s school attendance worsen longer-term income and gender inequalities (Shahidul and Zehadul Karim 2015).<sup>12</sup>

Increased urban poverty is a growing risk. Rapid urbanization is likely as rural populations, unable to cope with weather shocks, relocate to cities (often migrating across borders) searching for jobs and shelter, as evidenced in the Sahel. However, sub-Saharan African cities are struggling to accommodate already high population densities and build more climate-resilient infrastructure. The region’s rapid population growth will intensify these challenges. Conflicts spurred by these developments would further depress growth and raise inequalities (Burke and others 2009; Hsiang, Meng, and Cane 2011; April 2019 *Regional Economic Outlook: Sub-Saharan Africa*, Chapter 2).

**Figure 2.9. Sub-Saharan Africa and the World: Agricultural Dependence and Poverty, 2018 or Latest**



Source: World Bank World Development Indicators Database.

Note: The poverty line is measured as the poverty head count at US\$1.90 a day in terms of 2011 purchasing power parity.

## ADAPTATION STRATEGIES

Containing the adverse humanitarian, social, and economic costs of climate change and its role in amplifying pandemics will depend on both adaptation and mitigation strategies (Box 2.1).<sup>13</sup> Their inclusion in the Sustainable Development Goals highlights their criticality. Sub-Saharan Africa can step up mitigation and its contribution to a green economic recovery from the COVID-19 pandemic through carbon taxes, phasing out energy subsidies, transitioning to green energy sources, reforestation which promotes carbon capture (October 2019 *Fiscal Monitor*, Chapter 1; IMF 2019b; Nyiwul 2019), and financial regulations that limit investment in polluting capital. However, adaptation strategies play a greater role for sub-Saharan Africa from several perspectives. First, rapid implementation of adaptation strategies (which will also spur economic development) will generate more jobs in support of economic recovery from the COVID-19 pandemic. Second, sub-Saharan African economies are particularly dependent on climate-sensitive sectors. Third, the region has limited influence on climate compared with advanced and large emerging market economies emitting the bulk of greenhouse gases. How to approach adaptation is the subject of mounting policy debates across the region, especially with youth pressing policymakers for

<sup>11</sup> These results are based on this chapter’s analysis of household surveys for Ethiopia (2015–16), Malawi (2016–17), Mali (2017–18), Niger (2014), and Tanzania (2014–15).

<sup>12</sup> See October 2016 *Regional Economic Outlook: Sub-Saharan Africa*, Chapter 3 for further discussions on inequality and other social indicators.

<sup>13</sup> The 2016 Paris Agreement considers adaptation as a parallel component to mitigation. Most sub-Saharan African countries have submitted some adaptation goals and measures as part of their climate strategies for the agreement. They will revisit these strategies at the 26th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change in November 2020.

more immediate action. This section outlines some key considerations and policy recommendations.

Awareness of the positive synergies across adaptation, the macroeconomy, and development outcomes—creating a virtuous cycle that boosts inclusive growth—will help governments develop comprehensive adaptation strategies. For example, the ability of improved seeds to reduce the weather-sensitivity of crops can benefit agricultural productivity even without climate change. Similarly, strong institutions support economic efficiency and governance, including the enforcement of regulations targeting weather resilience. Access to finance for households and small and medium enterprises helps grow their livelihoods and build resilience to economic shocks, whether climate change–induced or otherwise. Land reforms and effective social protection incentivize ownership among rural households to protect their land and assets against climate change (Kosec and Mo 2017). Good macroeconomic and structural policies—promoting economic diversification, creating fiscal space, building fiscal and reserves buffers, and pursuing exchange rate flexibility—limit the impact of climate shocks and help the economy recover faster. In turn, a quicker rebound frees resources to invest in other development areas.

Regional cooperation will be a key element of adaptation. Climate change transcends international borders. Consider, for example, the drying of Lake Chad and the Volta Basin, jeopardizing the production of food and hydroelectricity across several countries, including Cameroon, Chad, Niger, and Nigeria (for Lake Chad) and Benin, Burkina Faso, Côte d’Ivoire, Ghana, Mali, and Togo (for the Volta Basin). Active sharing of technologies, knowledge, and effective institutional practices, especially through regional initiatives, can make strides in accelerating adaptation (African Union 2014; EAC 2011; Lesolle 2012; Sembiring 2018). Developing regional agricultural markets could lower food prices and help ensure food security.

Resilience and coping mechanisms are the pillars of adaptation. Improving resilience reduces exposure and vulnerability to climate change while coping mechanisms help buffer the impact from them. Accelerating the development of these pillars will be critical to safeguarding food security and shaping broad-based adaptability. To this end, the

next subsections assess the potential impact of key policies. Implementing these policies will require strong coordination within the government (particularly across the Ministries of Finance, Agriculture, Education, Environment, and Health, and those ministries and agencies responsible for specific types of infrastructure) and with development partners. This begins by developing comprehensive adaptation strategies, assessing whether governments’ multiyear expenditure frameworks (from programs supporting improved seeds or social protection to building irrigation infrastructure) already account for key adaptation policies, and reviewing project selection and prioritization criteria to ensure implementation of the most impactful combination of resilience-building projects. Financing challenges (in relation to access to finance for households and businesses and, more broadly, on public financing of adaptation; discussed in the section on financing adaptation) and informational asymmetries will need to be addressed.

### Safeguarding Food Security

Weather-related crop damage can plunge poor households into food insecurity. Subsistence farmers suffer directly while shortages elevate food prices for other households. Tackling this challenge requires strengthening the resilience of households and agricultural output and bolstering post-shock support.

Building household resilience and improving coping mechanisms can reduce the risk of food insecurity significantly. This chapter’s empirical analysis of household surveys for Ethiopia, Malawi, Mali, Niger, and Tanzania finds, on average, that the following factors are likely to have the largest influence, potentially reducing the chance of food insecurity by 30 percentage points (Figure 2.10):

- *Higher incomes coming from diversified sources and access to finance* enable households to buy food even when prices rise and invest in resilience ahead of a shock, and they provide buffers afterward.
- *Solid mobile phone coverage and availability* help address information asymmetries by broadening the reach of early warning systems and information on food prices and weather (even with simple text or voice messages) that inform



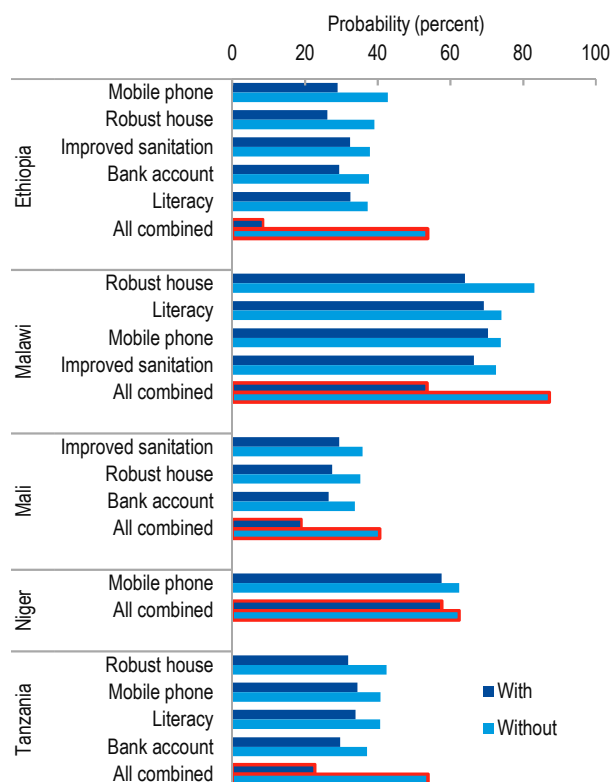
farmers' decisions on when to plant, irrigate, or fertilize, enabling climate-smart agriculture (Ethiopia). Chapter 3 provides an overview of progress in digitalization across the continent.

- More *robust homes* and other structures facilitate food storage. Combined with good *sanitation* and drainage systems, they also preserve earning capacity by preventing injuries and the spread of disease and ensuring safe drinking water (Erman and others 2018; Erman, Obolensky, and Hallegatte 2019). To this end, government programs that widen accessibility to quality building materials for the poor and require high

standards for building codes and regulations, effective land-use planning, and zoning rules are important.

- Improved *health care* and *education*, more generally, raise productivity and income potential and facilitate better-informed decision-making.

**Figure 2.10. Selected Sub-Saharan African Countries: Probability of Food Insecurity for a Household Hit by a Shock**



Sources: World Bank Living Standards Measurement Study; and IMF staff calculations.

Note: The probability of food insecurity is estimated for a household with average values for the explanatory variables other than the one considered. Only estimates that are statistically significant (at the 10 percent level) are illustrated. The regressions control for household wealth. Statistically significant estimates confirm correlation but not necessarily causality.

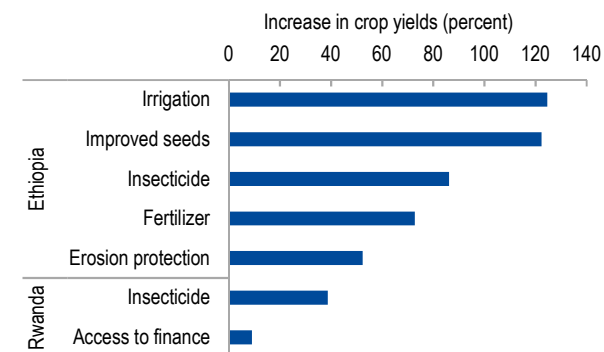
<sup>14</sup> Thomas, forthcoming, provides details.

<sup>15</sup> Beyond erosion, strategies for broader environmental protection, such as preventing land degradation (that is, the productive capacity of soil) and saving water should be considered. IPBES (2018) discusses the ecological intensification of agriculture. Similarly, although better irrigation usually benefits farmers, the supply of free or underpriced water could encourage cultivation of water-intensive crops, which increases vulnerability to drought (Damania and others 2017).

Reducing the weather sensitivity of crops helps protect the food supply. This chapter's empirical analysis of household surveys in Ethiopia and Rwanda finds that the use of improved seeds, fertilizer and insecticide, protection against erosion, irrigation, and access to finance can mitigate crop damage (Figure 2.11).<sup>14,15</sup> In this context, accelerating research and development in engineering improved seeds and livestock to withstand more diverse climate conditions and shifting from monocultures toward diversified agroforestry production can have a sizeable impact (Ethiopia, Sudan; Box 2.2). Raising farmers' awareness and facilitating access to many of these measures will accelerate their implementation.

Social assistance and insurance payouts compensate for lost income and purchasing power in the aftermath of a severe weather shock. For example, Kenya's Hunger Safety Net Program targeting

**Figure 2.11. Selected Sub-Saharan African Countries: Impact of Key Measures on Crop Yields for Households with Crop Damage**



Sources: World Bank Living Standards Measurement Study; and IMF staff calculations.

Note: The impact is relative to households that have not taken these measures. Only estimates that are statistically significant (at the 10 percent level) are illustrated. Statistically significant estimates confirm correlation but not necessarily causality.

drought-prone households (Song and Imai 2018) and Ethiopia's Productive Safety Net Program have supported poverty reduction (Box 2.2). Insurance and disaster risk financing can also be critical (World Bank 2014), but the success of these programs in sub-Saharan Africa often relies on government subsidies and improvements in financial literacy (Giné and Yang 2009; Mobarak and Rosenzweig 2013; Cole and others 2013; Hill, Hoddinott, and Kumar 2013; Hallegatte and others 2017).

### Shaping Broad-Based Adaptability

At an economy-wide level, raising resilience and bolstering coping mechanisms will require combinations of reforms targeted at the types of climate change challenges a country faces. Strong macroeconomic, institutional, and structural policies, along with the measures discussed previously to ensure food security, are necessary. However, beyond that, there are critical combinations of structural reform areas—based on specific climate change difficulties—where improvement could lead to substantial gains in containing the impact of climate change on economic growth and inequality. Ultimately, high resilience and strong coping mechanisms could avoid disastrous results altogether (Acevedo and Noah, forthcoming). This section examines these combinations, while the literature discusses at length the costs and policies to make progress in any individual structural area (IMF 2015; October 2019 *World Economic Outlook*, Chapter 3).

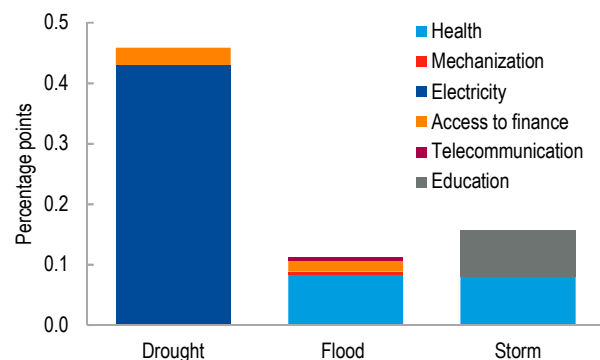
### Droughts

Improved *irrigation systems* and broader *access to drinking water, electricity, and finance* would support higher economic growth and poverty reduction during prolonged dry spells and water shortages. These factors work hand in hand—electricity powers irrigation systems and deep tube-well pumps, and access to finance facilitates the building and maintenance of all three.<sup>16</sup> This chapter's regression analysis finds that the negative impact on per capita annual medium-term growth in sub-Saharan African countries is reduced by almost 0.5 percentage points if gaps are closed relative to the average for emerging market and developing

economies in access to electricity (given existing irrigation and pumping systems) and to finance (Figure 2.12).<sup>17</sup> Although the exact magnitude of this analysis should be interpreted as suggestive, the relative impact of these reform areas is a robust indication of their importance.

A major component in increasing access to electricity will be the *diversification of electricity sources* toward renewable energy sources, such as geothermal, solar, and wind power. Hydropower, which generates one-fifth of sub-Saharan Africa's electricity, is susceptible to droughts (Castellano and others 2015). Building more reservoirs, dams, and power plants are a near-term solution. Over the long term, decentralization of renewable energy sources may be a more sustainable solution while supporting electrification and job creation (Kenya, Box 2.2). Reduced reliance on hydroelectricity also facilitates water management, where improvements in water access, constructing and rehabilitating small dams and boreholes, and setting up solar irrigation programs will be key (Ghana).

**Figure 2.12. Sub-Saharan Africa: Reduction in Impact of Disasters on Per Capita Annual Medium-Term Growth when Structural Factors Improve to the Emerging Market and Developing Economy Average**



Sources: World Bank World Development Indicators Database; and IMF staff calculations.

Note: Based on panel regressions of annual medium-term per capita growth on key structural areas. The bars show the impact when sub-Saharan African countries improve their structural factors to average levels in emerging market and developing economies. Applying an interaction term, the regression identifies the marginal impact of a structural area in improving the resilience of growth. Each bar in the chart illustrates this marginal impact multiplied by the gap between sub-Saharan Africa and the emerging market and developing economy average for that structural area. The impacts illustrated here are separate from each structural area's impact on growth through all other channels, which are also included in the estimation. Variables are included one at a time and only statistically significant estimates (at the 10 percent level) are illustrated. Statistically significant estimates confirm correlation but not necessarily causality.

<sup>16</sup> When access to finance is available but the amount of financing available to a household is limited by its low income level and asset values, targeted government subsidies could fill the gap.

<sup>17</sup> Data limitations on irrigation and drinking water systems precluded their inclusion in the regression analysis.

## Floods and Storms

Policies for containing the impact of floods and storms often overlap given that extreme storms, such as tropical cyclones, also result in severe flooding. *Health care* plays an important role in reducing the medium-term economic growth impact of floods and storms (Figure 2.12)—which can also spread pandemics—by (i) reducing out-of-pocket health care expenditures, which safeguards household savings; (ii) facilitating a quicker return to work; and (iii) along with *education*, improving productivity, income potential, gender inequalities, and better-informed decision-making (Hallegatte, Rentschler, and Rozenberg 2019).

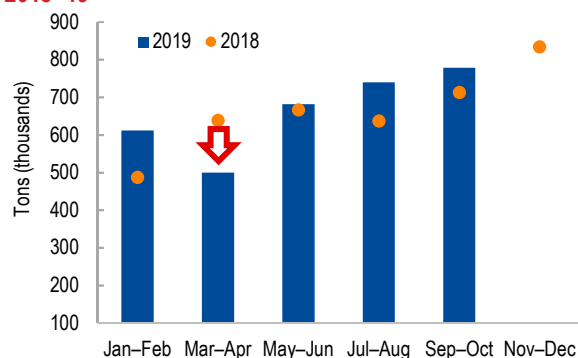
Reinforcing the results of the household survey analysis, *access to finance* helps households and businesses invest in *weather-resilient infrastructure* and provides buffers after a shock (Figure 2.12). In this vein, the *use of machinery* can improve the resilience of agricultural production by facilitating the creation of dikes, erosion protection, and deeper seed planting. Widening the coverage of *mobile networks*, especially in rural areas, supports access to early warning systems.

In an urban context, weather-resilient infrastructure, including extensive drainage and broad beaches, can protect cities from coastal flooding and erosion (Hinkel and others 2012). Because of such efforts, Mozambique’s Beira port—a major regional trade and transportation hub—was able to resume operations three days after being hit by cyclone Idai, and rail and road connections were operational within two weeks (Figure 2.13; Box 2.2).

## Migration and Urbanization

As rural populations seek relief from the consequences of climate change (where agricultural communities are the most adversely affected), many people move to cities, resulting in rapid urbanization, which requires a multipronged approach. Expansion of urban infrastructure (housing, drainage, sanitary facilities, and roads), health care, education, and targeted social assistance programs, in addition to improved labor market flexibility and access to finance, will facilitate this relocation of people and capital across geographic areas and sectors of production.

**Figure 2.13. Beira Port in Mozambique: Total Traffic, 2018–19**



Source: Cornelder de Moçambique.

Note: Cyclones Idai and Kenneth hit Beira Port in March–April 2019.

## FINANCING ADAPTATION

Responding to climate change by financing adaptation measures will be expensive for sub-Saharan Africa—estimated at US\$30–50 billion (2–3 percent of regional GDP) each year over the next decade,<sup>18</sup> but substantially less costly than frequent disaster relief.

- This chapter’s analysis of Post-Disaster Needs Assessments finds that up-front investment in resilience and coping mechanisms results in long-term savings (measured by reduced disaster relief spending) that are almost three times the up-front investment cost for droughts and about 12 times the up-front investment cost for storms (Figure 2.14). Hallegatte and others (2019) have similar findings.
- The broader benefits of building resilience are explored through a dynamic general equilibrium model (Box 2.3). The results highlight that public debt levels rise by less than 25 percent of the scenario where resilience is not built (even when resilient infrastructure is 25 percent more expensive than regular infrastructure), and the post-disaster widening of inequality is markedly contained. Efficiency gains in construction, operations, and management could reduce the cost of building resilient infrastructure (Rozenberg and Fay 2019).
- Some non-infrastructure adaptation measures are more affordable and could be implemented quickly. For example, programs supporting farmers in purchasing improved seeds and

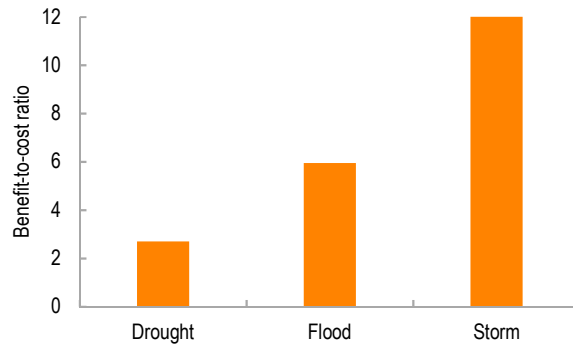
<sup>18</sup> This is derived from Narain, Margulis, and Essam (2011) and UNEP (2016).

other crop-protection measures and those that provide early warnings on weather events show relatively high benefit-to-cost ratios (Hallegatte 2012; GCA 2019). The same applies for swift and targeted social assistance—Ethiopia spent only 1.2 percent of GDP annually and achieved remarkable results for households facing food insecurity (Del Ninno, Coll-Black, and Fallavier 2016).

Despite its benefits, financing adaptation is challenging for sub-Saharan African countries constrained by limited fiscal space. Most of these countries already face moderate to high debt vulnerabilities, which have been further aggravated by the high costs of containing and managing the COVID-19 pandemic. Consequently, before taking on additional debt obligations, countries have to consider competing development needs (notwithstanding some overlap across policies). Countries are actively pursuing reforms to mobilize more revenues (including through environmental taxes) and improve spending efficiency, but their scope is limited, and progress is slow. Oil and coal exporters face the additional challenge of shrinking revenues if global mitigation measures move forward—emphasizing the criticality for these countries to step up economic diversification.<sup>19</sup> In this context, some countries have created disaster funds, including Mozambique, where part of the financing comes from annual budget allocations. Sub-Saharan African countries are also finding ways to support each other—for example, the African Risk Capacity is a regional macroeconomic insurance program with 34 member countries as of March 2020. Using macroeconomic insurance products, such as climate funds and issuing state-contingent bonds, has so far been difficult given large risk premiums, which partly reflect governance issues in many sub-Saharan African countries that raise the risk aversion of investors and development partners.

The international community can make a meaningful difference. Development partners should expand support beyond disaster relief to target resilience building and bolster coping mechanisms (including the provision of international insurance products). It is not only a humanitarian obligation but will help offset the failure of

**Figure 2.14. Sub-Saharan Africa: Post-Disaster Savings Relative to Cost of Building Resilience**



Sources: Post-Disaster Needs Assessment; Centre for Research on the Epidemiology of Disasters, Emergency Events Database; and IMF staff calculations.

Note: The frequency of disasters and the damage at the time of a disaster in the Emergency Events Database are applied to calculate the expected damage for 20 years. Resilience building is assumed to halve the expected damage. The cost of resilience building is inferred from Post-Disaster Needs Assessment estimates of medium-term and long-term financing needs.

those most responsible for climate change to fully internalize the costs of greenhouse gas emissions (October 2017 *World Economic Outlook*, Chapter 3; IMF 2019a). Estimates of financing needs for developing countries far exceed the pledged US\$25 billion of international public finance for adaptation (Puig and others 2016). Moreover, development partner-financed resilient infrastructure achieves the same welfare level as frequent disaster relief, with at least a 30 percent cost savings (Cantelmo, Melina, and Papageorgiou 2019).

International financial institutions can also play an active role (IMF 2019a). They can unlock finance pools for adaptation through a range of instruments (including loans and guarantees) and by reducing the investment risk. The IMF has been increasingly involved in the region's resilience building and ex post execution of recovery plans by providing financial assistance, policy advice, and capacity building. For example, in the aftermath of cyclones Idai and Kenneth, the IMF provided US\$130 million in support to Comoros and Mozambique through the Rapid Credit Facility and US\$40 million to Malawi by augmenting the existing Extended Credit Facility. Efforts to develop policies and capacity in response to climate change challenges include the joint work of the IMF and the World Bank on Seychelles' Climate Change Policy Assessment (IMF 2017).

<sup>19</sup> Full implementation of pledges under the Paris Agreement, which aims to contain global temperature increases to 2°C above pre-industrial levels, would lower the projected crude oil price to US\$113 per barrel by 2040 (October 2019 *Fiscal Monitor*, Chapter 1). However, experts believe a more ambitious climate change mitigation scenario is needed to achieve the “two-degree limit,” which would result in crude oil prices of US\$64 per barrel in 2040 (IEA 2018).

### Box 2.1. What's the Difference between Mitigation and Adaptation?

Responding to climate change generally involves two approaches: mitigation (reducing or stabilizing heat-trapping greenhouse gases in the atmosphere) and adaptation (adjusting to changes in the climate). Chapter 1 of the October 2019 *Fiscal Monitor*, IMF (2019b), and Nyiwul (2019) provide details.

- Mitigation can be achieved by (i) reducing greenhouse gas emissions (examples include transitioning to green energy sources and charging for carbon emissions from fossil fuels through carbon taxation or emissions trading), and (ii) taking existing greenhouse gases out of the atmosphere through reforestation, agricultural practices that sequester carbon in soils, ocean fertilization, and developing technology that captures and sequesters carbon dioxide from the air (still in the early stages of development).

- Adaptation measures include (i) resilience building (reducing exposure and vulnerability to climate change), and (ii) improving coping mechanisms (measures that help buffer the impact from climate change, such as disaster relief).

Mitigation and adaptation measures overlap in some cases. For example, preserving and expanding the Congolese rainforest (one-quarter of the world's remaining tropical forests) would remove carbon dioxide from the atmosphere. At the same time, the forest reduces exposure and vulnerability to climate change by regulating water (for example, forest cover increases rainwater infiltration and replenishes streams), reducing erosion, and allowing the development of forest products that can be alternative sources of income for farmers hurt by climate change (WRI 2011).

### Box 2.2. Case Studies: Adaptation Strategies Taken in Sub-Saharan Africa

Several countries in sub-Saharan Africa have already developed successful adaptation strategies that could serve as models for other countries.

#### Raising agricultural productivity:

- In Ethiopia, countering wheat rust (induced by increased temperatures and rainfall volatility) by developing rust-resistant wheat varieties is increasing yields by 30–40 percent for some farmers (Jaleta and others 2019). Developed by the International Centre for Agricultural Research in the Dry Areas and the Ethiopian Institute of Agricultural Research, the seeds were distributed to smallholder farmers, who accelerated the distribution process by multiplying and distributing the seeds to their neighbors (CGIAR 2013).
- Farmers in Chad are improving water retention through a rainwater harvesting technique called Zaï. This involves digging small pits to capture rainwater and sowing crops in them. They also practice agroforestry, which combines crops and trees in the same patch of land to reduce erosion during heavy rainfalls.

- Ghana has taken a multipronged approach to improve cocoa's drought resistance by distributing improved seed varieties, planting non-cocoa trees to provide shade, improving irrigation systems and cocoa plant fertility, rehabilitating aged and disease-infected farms, and raising farmer awareness about improved cultivation methods.
- Mozambique is beginning a global pilot to test new heat-tolerant bean seeds developed by the International Center for Tropical Agriculture.

**Risk sharing (Ethiopia):** The Productive Safety Net Program, providing cash and in-kind transfers to the food insecure, has helped improve financial inclusiveness by requiring bank accounts for the transfers. Using these transfer systems has helped to improve the efficiency of emergency responses to natural disasters and, combined with improved seeds, has lowered food shortages from 22 percent to 10 percent during 2011–16 (World Bank 2019).

**Renewable energy investment (Kenya):** Kenya is aiming for universal energy access by 2022 using off-grid systems such as mini-grids and stand-alone solar systems (World Bank 2018). The electricity



**Box 2.2 continued**

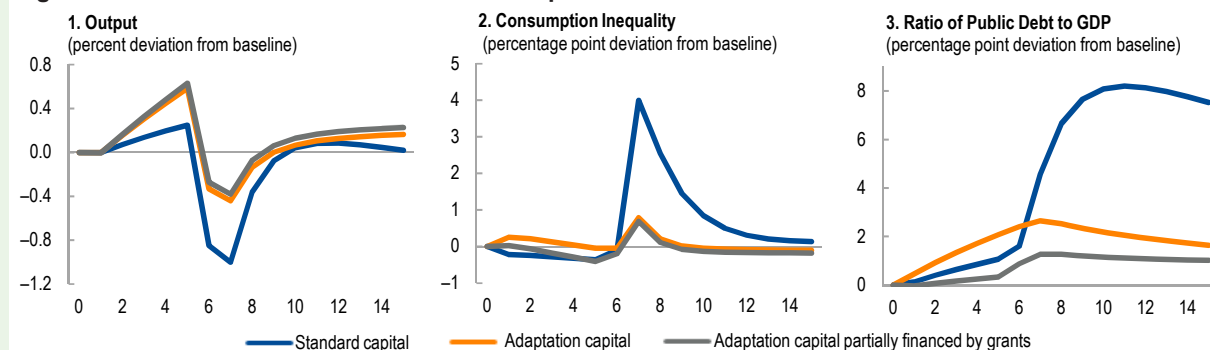
access rate has already increased from about 40 percent to 70 percent during 2012–17 (according to the World Bank World Development Indicators Database). This pay-as-you-go solar energy model receives inputs from decentralized and small-scale, off-grid solar-powered energy plants. It facilitates expansion by using low-cost mobile money technologies for payment. Given the support needed for installation, long-term technical assistance, and customer support, this system is also producing 10 times more jobs than traditional utilities (GOGLA 2018).

**Upgrading infrastructure in coastal cities (Mozambique):** Cyclones Idai and Kenneth killed more than 600 people and affected almost 2 million in Mozambique. However, the resilience of the infrastructure in the port of Beira—a regional container shipping hub that is exposed to floods and sea level rises—prevented further loss of life and allowed the port to quickly resume operations. To this end, upgrading the primary drainage system to reduce flooding risks and contingency planning by the port’s firms were elemental. Solar-powered street lighting withstood the cyclones and became one of the city’s few sources of post-disaster lighting. Emergency restoration of transport and logistic services were critical to distributing aid.

**Box 2.3. Macroeconomic Gains from Resilient Infrastructure**

Investing in resilient infrastructure, though costly, benefits long-term growth and reduces inequality. This chapter’s simulations, based on the dynamic general equilibrium model of Marto, Papageorgiou, and Klyuev (2018) and Buffie and others (2012), illustrate this point (Figure 2.3.1). The negative impact of a natural disaster (assumed to hit in year 6) on output is considerably lower when a country spends additional funds on more resilient infrastructure versus investing in cheaper but less resilient infrastructure (over the previous five years, for example). Although post-disaster consumption inequality always widens across households, the gap is much less pronounced in the presence of resilient infrastructure, which shelters poor households from consumption cuts.

Ultimately, investing in resilient infrastructure reduces the toll of climate shocks on public debt. Before a disaster strikes, resilient infrastructure requires faster accumulation of public debt because it is more costly than investments in standard infrastructure. However, after a disaster, rebuilding costs are limited in a scenario with resilient infrastructure. By contrast, a disaster damages or destroys standard infrastructure, and reconstruction costs weigh on debt to a larger extent. Grant financing of a portion of resilient infrastructure would considerably reduce the impact on public debt.

**Figure 2.3.1. Sub-Saharan Africa: Simulated Impacts of Natural Disaster**

Source: IMF staff calculations.

Note: Simulations are produced with the model outlined in Marto, Papageorgiou, and Klyuev (2018). The model is matched with an economy that has sub-Saharan African averages for macroeconomic indicators. Public investment is assumed to be scaled up by 1 percent of GDP annually in years 1–5 in standard infrastructure (first alternative scenario) and resilient infrastructure (second alternative scenario). In the third alternative scenario, grants cover 80 percent of investment in resilient infrastructure. A natural disaster occurs in year 6 and is calibrated to yield a fall in output of 1 percent under the first scenario. Consumption inequality is (i) the percent change of consumption of households with access to finance from the baseline, minus (ii) the percent change of consumption of financially constrained households from the baseline.



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### 3. Digitalization in Sub-Saharan Africa

Every second, the region has averaged 106 new internet users.<sup>1</sup> This fast-paced digital revolution holds the promise of transforming economies and people's lives. It takes on added importance as countries across the region grapple with the unprecedented health and socio-economic fallout of the COVID-19 pandemic. All policy levers are being deployed to protect lives and livelihoods. Digital solutions have helped to provide more resilience and allowed for rapid, flexible, and inclusive policy responses to the pandemic.

Looking ahead, the diffusion of digital technologies and knowledge will create new opportunities for progress and inclusion—greater resilience and efficiency, more access to global markets, improved public service delivery, increased transparency and accountability, and the creation of new jobs. However, digitalization also brings new challenges, including the risk of traditional job losses, the need to revisit policy design, and cybersecurity and data privacy concerns, among others.

It is extremely difficult to know ahead of time how such innovations will ultimately play out. The impact will likely vary across countries, economic sectors, and occupations. But digitalization does not happen by itself. Public policy has a crucial role to play in facilitating technological change, shaping its effects, and in mitigating the potential costs of transition.

Countries and policymakers need to adapt to this new environment. Crisis response and development strategies should aim to nurture emerging digital economies where feasible. In sub-Saharan Africa, there is a pressing need to provide health and economic support to address the immediate crisis. Beyond this, the need to create 20 million jobs per year over the next two decades to absorb the region's young and growing workforce is more pressing than ever. This underscores the importance of economic connectivity and integration as key pillars of successful growth strategies (IMF 2018a).

Against this backdrop, this chapter provides an initial glimpse of how digitalization is influencing economies and policies in sub-Saharan Africa, and how digitalization has aided the crisis response. It also seeks to provide a broad framework to help guide policymakers in devising their countries' digital strategies. The chapter explores the following questions:

- How can digitalization be measured?
- With an appropriate measure in hand, how is digitalization evolving in sub-Saharan Africa, how does this compare to other regions, and what are the main drivers?
- How might digitalization impact economic outcomes and macroeconomic policies?
- And finally, which policies should countries adopt to foster digitalization, capitalize on emerging opportunities, and manage associated risks?

Digitalization, of course, is a multidimensional and rapidly evolving concept. Assessing and tracking progress is therefore difficult, particularly as data is limited—both in terms of coverage and length. To help address these constraints, this chapter builds on a new Enhanced Digital Access Index (EDAI) that aims to better reflect the multifaceted nature of digitalization and provide a baseline for future analysis.

In many respects, sub-Saharan Africa is closing the digital gap with rest of the world. Internet penetration is expanding rapidly, especially through mobile connectivity. Indeed, some countries in the region—Cabo Verde, Ghana, Rwanda, and the Seychelles—are leaders in their income group. Yet, large differences remain across the region and within countries. Rural areas are less connected and the gender gap is widening.

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<sup>1</sup> The average number of new internet users during 2012–17 based on data from the International Telecommunication Union.

This chapter’s empirical analysis suggests that connectivity is associated with stronger economic growth, with an increasing share from the services sector. This analysis treats the phased arrival of submarine cables to the region as a natural experiment to examine the impact of digital connectivity on economic performance. At the firm level, businesses that use digital communications have higher sales and create more jobs—importantly, higher skilled and permanent jobs. Similar to growth, digital connectivity appears to shift the *composition* of employment from manufacturing to the services sector, with an apparently larger shift to the services sector for women.

Digitalization is also impacting macroeconomic policy tools and the transmission of those policies to the economy. Some countries are delivering cash transfers through mobile money to provide immediate and much needed support to those impacted by the pandemic. Yet, the adoption of digital fiscal tools is still in its early stages and offers significant upside potential through higher revenues, more efficient public spending, improved public financial management, and greater transparency. In contrast, digitalization is already well advanced in the financial sector, where some sub-Saharan African countries are global leaders in mobile money transactions.

Countries in the region have embraced digital tools to respond to the crisis, building on existing strategies. The future path for economies is incredibly uncertain, but as attention turns to policies for the recovery, it seems likely that the pandemic will have served to accelerate the digital transformation. As countries move in this direction, four broad pillars can help guide policy efforts: investing in infrastructure, policy frameworks, people and skills, and resilience to risks.

## TRENDS IN DIGITALIZATION: WHERE DOES SUB-SAHARAN AFRICA STAND?

### Measuring Digitalization

Digitalization is a broad concept. It refers to the spread and use of digital technologies—the internet, mobile phones, and other tools and processes—to collect, store, analyze, and exchange information digitally (World Bank 2016, Brookings 2017). This chapter focuses on two aspects of digitalization:

- *Digital connectivity*—the ability to access and use technologies to connect to the internet and share digital information.
- *Digital depth*—the extent to which economic activities, transactions, and policies are becoming digital, including through more online, interconnected, and automated systems.

The process of digitalization, like the technologies that enable it, is evolving rapidly. As such, most data to measure digitalization is only emerging. Time series tend to be short, with inconsistent coverage across countries. More readily available indicators tend to capture narrower concepts, such as internet penetration and mobile phone subscriptions.<sup>2</sup> Broader measures are emerging. For instance, the World Bank’s Digital Adoption Index captures digital adoption by businesses, individuals, and government, but generally consists of only two data points (2014 and 2016).

To help capture the multidimensional aspects of *digital connectivity*, IMF staff have developed a new EDAI (Alper and Miktus 2019). Building on an index developed by the International Telecommunication Union (ITU), the EDAI covers more variables and upgrades the ITU’s weighting methodology to capture five core aspects of digital access: information technology (IT) infrastructure,<sup>3</sup> affordability, education, quality, and internet usage. The EDAI includes 20 underlying variables across these five core metrics.<sup>4</sup>

<sup>2</sup> Measured as “internet users,” as produced by the UN’s ITU—which includes individuals, as a share of the population—who have used the internet in the last three months via a fixed or mobile network. Other organizations that have developed indicators include the Economist Intelligence Unit’s *Inclusive Internet Index*, Euler Hermes’ *Enabling Digitalization Index*, and Dell Technologies’ *Digital Transformation Index*.

<sup>3</sup> Infrastructure in the EDAI refers to IT infrastructure, including measures of mobile and fixed line connections. Access to electricity is considered a foundational layer of infrastructure.

<sup>4</sup> Although the methodology for this chapter remains as described in Alper and Miktus (2019), the variables used to estimate EDAI and its subcomponents were updated to account for data availability. See Annex 3.1 for the list of variables and definitions.



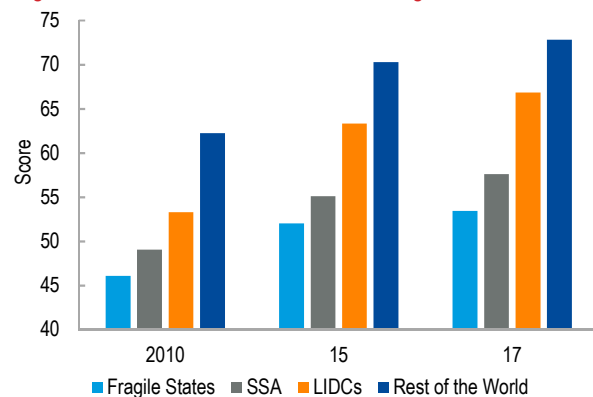
Measures of *digital depth* are even more scarce. Measuring digital depth allows us to gauge the diffusion of digital transactions into private and public sector activities. For instance, e-commerce can help measure the depth of private digital activity, capturing the share of active online paying customers and mobile money transactions. Public sector indicators often seek to measure the extent to which government services are available online. For example, the United Nations' (UN) online service index (OSI) covers the availability and quality of online public services. In this context, there is ongoing debate about how to measure digital activities in countries' GDP. For example, the contribution of digital trade to GDP has likely been underestimated (IMF 2018b).

### Sub-Saharan Africa Is Rapidly Becoming Digitally Connected

Digital connectivity has increased rapidly in sub-Saharan Africa (Figure 3.1). While the global digital divide is still large, the gap with the rest of the world is narrowing fast.<sup>5</sup> Internet penetration in the region has increased tenfold since the early 2000s, compared with a threefold increase in the rest of the world.<sup>6</sup> The proliferation of mobile technologies has been particularly pronounced in sub-Saharan Africa,

**Figure 3.1. Enhanced Digital Access Index (EDAI)**

*Digitalization has advanced across the region*



Source: Alper and Miktus (2019).

Note: SSA = sub-Saharan Africa; LIDCs = Low-Income Developing Countries.

<sup>5</sup> For an overview of digitalization in Asia see, “The Digital Revolution in Asia: Disruptor or New Growth Engine (or Both)?” in the Regional Economic Outlook: Asia and Pacific, IMF, October 2018.

<sup>6</sup> Internet penetration is measured as a percentage of the population that uses the internet. In 2017, it was about 24 percent for sub-Saharan Africa and 64 percent in the rest of the world.

<sup>7</sup> Download speeds vary widely across sub-Saharan Africa, with speeds in Botswana and South Africa ranging from 14 to 20 Mbps, while speeds in the Democratic Republic of Congo and Liberia are about 2.5 Mbps.

with most people accessing the internet via mobile rather than fixed line broadband.

Since 2010, the EDAI shows broad improvements in sub-Saharan Africa in IT infrastructure, internet usage, quality, and knowledge (Figure 3.2). But gaps remain compared to the rest of the world (Figure 3.3). Affordability is a lingering obstacle to adoption, given the high overall cost relative to income. The quality of mobile connection remains poor—the average mobile download speed in the region is 7.4 Mbps, more than three times slower than the rest of the world.<sup>7</sup>

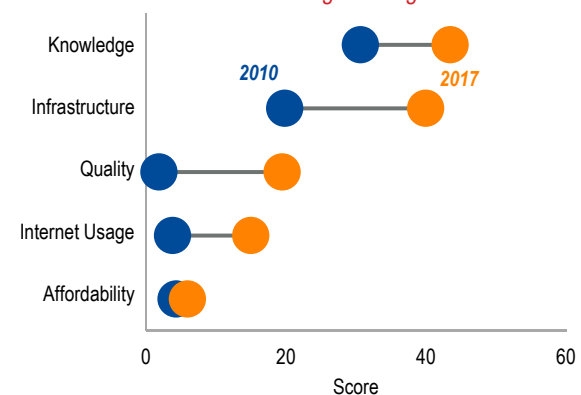
### Large Differences in Connectivity within the Region

There are large differences among countries *within* the region, with higher-income countries experiencing greater connectivity.

- IT infrastructure appears to be a main driver of variation, as indicated by differences in the amount of fixed-line connections and share of population covered by higher speed mobile services (at least 3G).
- Differences in knowledge and quality—EDAI sub-indices—also play a role, but to a lesser extent.

**Figure 3.2. Sub-Saharan Africa: Enhanced Digital Access Index—Evolution of Sub-Indices**

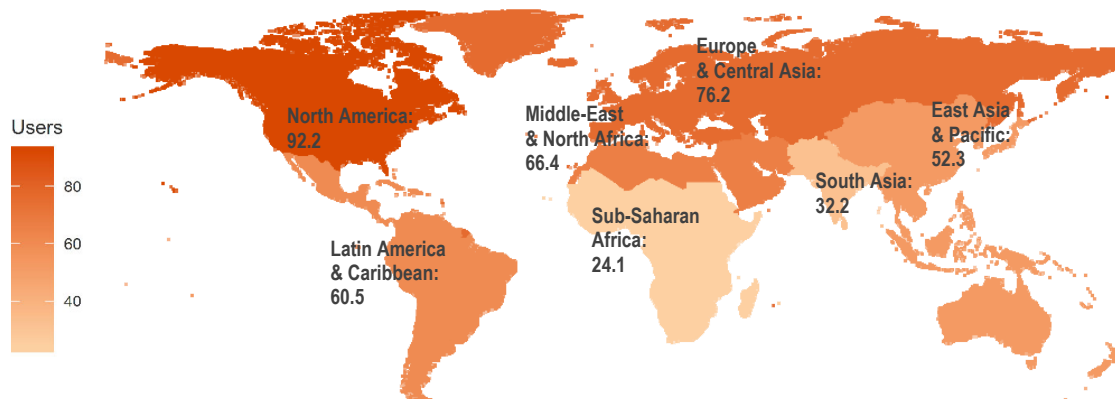
*With infrastructure and knowledge driving better connectivity*



Source: Alper and Miktus (2019).

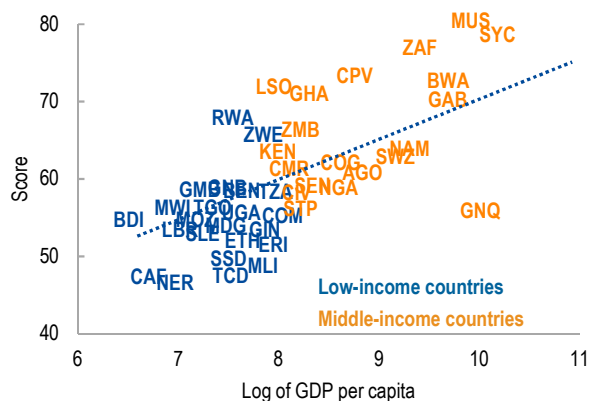


**Figure 3.3. World: Internet Penetration, 2017** (percent of population)  
*Sub-Saharan Africa continues to lag other regions in internet penetration.*



Source: International Telecommunication Union.

**Figure 3.4. Sub-Saharan Africa: Enhanced Digital Access Index by Income Group**  
*Countries' digital connectivity varies by income levels.*



Source: Alper and Miktus (2019).

- Similarly, a lower cost of doing business, higher urbanization, and more financial access also tend to be associated with greater digital connectivity (Figure 3.4). Leveling the playing field for female entrepreneurs is particularly important among the business environment factors associated with higher levels of digitalization (Alper and Miktus 2019).

There are also considerable differences *within* countries. Most rural communities do not have access to the internet (even through mobile devices). There is a significant gender gap, with just 23 percent of women in sub-Saharan Africa having access to the internet compared to about 34 percent of men. The regional gender gap of 33 percent in

2019 appears to be widening, up from 21 percent in 2013,<sup>8</sup> and is much larger than the global gender gap of 17 percent.

### Digital Depth in Sub-Saharan Africa is Still Relatively Low

The overall level of e-commerce remains low compared to other regions, but is growing rapidly. In 2019, e-commerce revenues grew by an average of 24 percent in sub-Saharan Africa. About one-quarter of the region's population were active, online-paying customers in 2019, compared with at least half the population in all other regions and 90 percent in advanced economies.

Here, too, there is a wide variation across the region. More than half the population is engaged in e-commerce in some countries (Botswana, Gabon, Nigeria, South Africa), whereas the share in other countries remains below 15 percent (Chad, the Democratic Republic of Congo, Malawi, Niger, Sierra Leone).

A similar pattern exists with social media. While average use of social networks puts the region below the world average, sub-Saharan Africa experienced the most rapid growth in social network use (Facebook, Twitter, etc.) during 2012–16.<sup>9</sup>

One area where sub-Saharan Africa is leading digital depth is the financial sector. Mobile money transactions as a share of GDP are close to 25 percent of

<sup>8</sup> The gender gap is the difference between internet penetration rates for males and females relative to the rate for males.

<sup>9</sup> See *The Global Information Technology Report 2016* by the World Economic Forum. Use of virtual social networks is an index based on a scale of 1-7. A higher number indicates a better position.

GDP, compared with just 5 percent in the rest of the world. The region has also been advancing digital innovation in fintech, resulting in the development of new services and apps.

More broadly, there is a growing field of digital innovators in the region, spanning areas such as health, education, commerce and agriculture.<sup>10</sup> There are currently an estimated 600 active tech hubs in Africa—40 percent more than the previous year—providing facilities and support for tech and digital entrepreneurs (GSMA 2019). Broader measures of digital innovation, such as mobile app creation or information and communication technology innovation, are increasingly available for countries in the region and will enable better monitoring of the region’s role in driving innovation.

Digitalization in the public sector is also advancing, with the UN’s average OSI for the region increasing by 45 percent between 2012 and 2018. Yet, this remains low relative to the rest of the world, with the gap widening slightly between 2014 and 2018.<sup>11</sup>

## THE IMPACT OF DIGITALIZATION ON ECONOMIC PERFORMANCE

Digitalization has the potential to influence productivity, employment, and growth. Greater digital connectivity enables specialization of production and economies of scale, both of which can raise productivity and growth. Moreover, it has provided more resilience by enabling firms and workers to maintain some operations through the COVID-19 pandemic. Connectivity can also support structural transformation through the diffusion of knowledge and the development of new products and services

(IMF 2016). At the same time, like trade integration, connectivity may result in winners and losers, with risks for particular sectors or jobs (Rodrik 2018).

### Macroeconomic Performance<sup>12</sup>

Analysis suggests that countries with higher levels of digital connectivity (measured by internet penetration) tend to have higher levels of economic growth. But, ex ante, the direction of causation is not always clear. Connectivity may help growth. And growth may facilitate greater connectivity. Untangling these effects is important, particularly if we want to understand the extent to which economic growth in sub-Saharan Africa might benefit from greater digitalization, and how this may impact employment.

The arrival of submarine cables delivering internet to the continent provides a rare natural experiment that helps answer this question. The timing and capacity of these cables was independent of the macroeconomic circumstances in any particular country. It, therefore, provides a valuable and exogenous source of variation in internet penetration that can help us estimate the *causal* impact of that penetration on economic growth and other macroeconomic outcomes.<sup>13</sup>

As countries were connected to the submarine cables, they experienced faster and cheaper internet access, which was associated with a faster uptick in internet penetration compared to countries not directly connected (Figures 3.5 and 3.6).<sup>14</sup>

Using this de facto experiment, we find that a 1 percentage point increase in the share of the population using the internet leads, on average, to a 0.37 percentage point increase in the growth of

<sup>10</sup> For example, see the publication series *Digital Innovation Made in Africa*, developed by Make-IT in Africa which showcases selected innovations and entrepreneurs.

<sup>11</sup> The OSI is part of the UN’s E-Government Development Index (EGDI) composite indicator. The OSI is based on an expert assessment of each country’s national website—including the e-services and e-participation portal—and the websites of ministries such as education, health, and finance, as applicable (UN 2018).

<sup>12</sup> This section is based on a forthcoming IMF working paper, “Macroeconomic Impacts of Internet Penetration in SSA: Evidence from Submarine Cables” by Felix Simione and Yiruo Li. Also see online Annex 3.2 for more details.

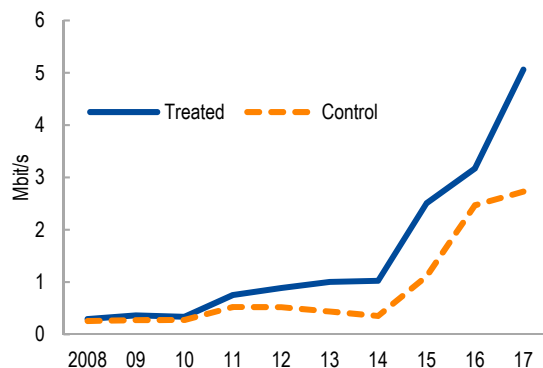
<sup>13</sup> Submarine cables are a network of fiber cables, placed under the sea, which connect countries and continents. They provide faster internet speed and lower cost compared to satellite networks that prevailed in the past. The analysis builds on the assumptions that (i) the difference in internet penetration rates between coastal and landlocked countries would have remained broadly unchanged absent the arrival of submarine cables, and (ii) the timing of the arrival and capacity of the cables depend little on macroeconomic conditions (see online Annex 3.2 for details). This country-level analysis complements the work by Hjort and Poulsen (2019), who explore a related experiment at the firm level to assess the impact on employment.

<sup>14</sup> Based on this, we explore two instrumental variables for internet penetration that capture (i) being directly connected to a submarine cable after 2009 and (ii) the data capacity of the submarine cables (see online Annex 3.2 for details).

real per capita income. This is slightly higher than other studies that are based on a broader sample of countries, possibly suggesting a higher marginal return from connectivity for countries in the region.<sup>15</sup>

**Figure 3.5. Sub-Saharan Africa: Fixed (Wired)-Broadband Speed**

*Countries' directly connected to submarine cables experience faster increases in internet speed*

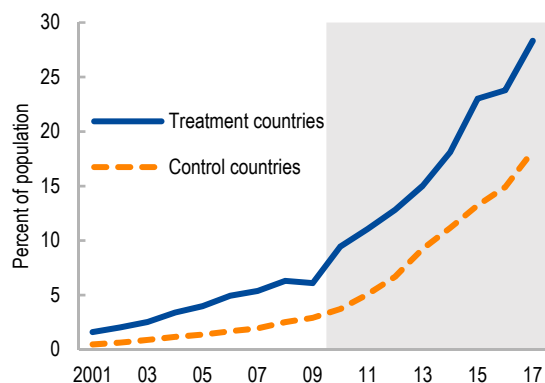


Sources: International Telecommunication Union; and IMF staff estimates.

Note: Treatment countries are defined as those directly connected to a submarine cable (mostly coastal, with the exception of Rwanda and Uganda). Control countries are those not directly connected (landlocked).

**Figure 3.6. Sub-Saharan Africa: Individuals Using Internet**

*And in internet penetration*



Sources: International Telecommunications Union; and IMF staff estimates.

Note: Treatment countries are defined as those directly connected to a submarine cable (mostly coastal, with the exception of Rwanda and Uganda). Control countries are those not directly connected (landlocked).

Moreover, we find that internet penetration leads to a possible shift in the sources of growth. Higher penetration increases the share of services in total value-added, while reducing the share of industry. The impact on agriculture, however, is not statistically significant.

Notably, a similar pattern emerges in the labor market. While there does not appear to be an impact on overall employment, the share of employment in the services sector increases. There is also a sizable gender impact. Increased internet penetration is associated with a larger share of women working in the services sector—the shift to more employment in services is two and half times larger for women than men.

### Firm-level Performance<sup>16</sup>

Observing the behavior of firms also provides insights into the potential payoffs of connectivity. The World Bank's Enterprise Surveys (WBES) provide data on the use of email for firms operating in the formal manufacturing and service sectors. This serves as a proxy for firms' digital connectivity, as email use forms an important—if not dominant—feature of most firms' digital connectivity.

The majority of firms in sub-Saharan Africa use email to communicate with clients or suppliers (57 percent)—the lowest among regions and well below the world average of 71 percent (Figure 3.7). Moreover, email use tends to be most common among large and experienced firms, as well as foreign-owned firms and those that export to international markets (Figure 3.8).

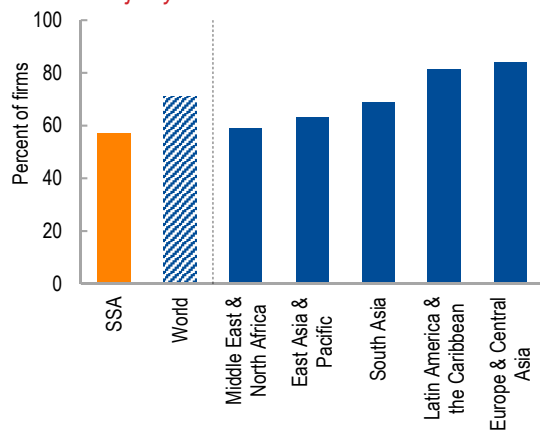
To assess how firm performance might benefit from digital connectivity (email use), the analysis again exploits an implicit natural experiment provided by the submarine cable network. In this case, internet access via submarine cables is periodically interrupted by seismic events on the sea floor; interruptions that are clearly not influenced by firm characteristics.

<sup>15</sup> Several studies estimate the relationship between growth and broadband internet penetration. The estimated coefficients range between 0.05 and 0.2, with very few exceptions of negative coefficients. However, most of the studies rely on broader country samples (mostly non-sub-Saharan Africa), and do not address the endogeneity between income and internet penetration. The ITU (2012) and World Bank (2016) provide an extensive review of the empirical work.

<sup>16</sup> This section is based on a forthcoming IMF working paper, "Digital Connectivity and Firm Performance in sub-Saharan Africa," by Joël Cariolle (FERDI), Maëlan Legoff (Banque de France), and Sampawende Jules Tapsoba and Martha Tesfaye Woldemichael (both IMF). This section also benefited from collaboration with Olivier Santoni (FERDI).

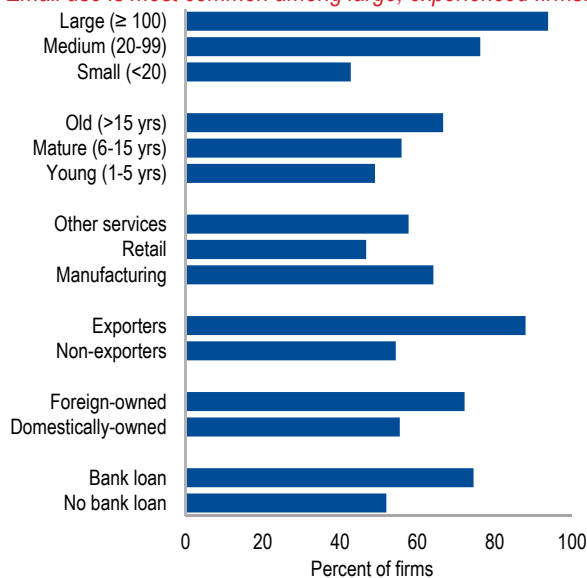
By looking at variations in connectivity across firms—combining each submarine cable network’s exposure to seismic risk with the firm’s exposure to that risk, as gauged by its distance to its nearest international telecommunications node—we can

**Figure 3.7. Selected Regions: Email Use by Firms**  
While the majority of firms in SSA use email for business



Sources: World Bank Enterprise Surveys; and IMF staff calculations.

**Figure 3.8. Sub-Saharan Africa: Email Use by Firm Characteristics**  
Email use is most common among large, experienced firms.



Sources: World Bank Enterprise Surveys; and IMF staff calculations.

estimate the impact of connectivity on different outcomes (Cariolle, Le Goff, and Santoni 2019).<sup>17</sup> In this instance, we estimate the impact of email use on firms’ sales and their number and type of workers.<sup>18</sup>

Even accounting for firm size, the results suggest that firms using email for business perform better in sales and in creating jobs—importantly, higher-quality jobs. Firms using email have real annual sales that are 2.6 times higher than non users and employ eight times more workers than non users. These firms also tend to hire more permanent, full-time employees rather than temporary workers. Attesting to the quality of job creation, the results also show that email use shifts the composition of the manufacturing workforce in favor of higher-skilled jobs (administration, sales, and skilled production workers).

## THE IMPACT OF DIGITALIZATION ON MACROECONOMIC POLICIES

Digitalization has provided additional tools to respond to the COVID-19 pandemic. Digital platforms have enabled the rapid deployment of social protection programs and enabled some essential government services to continue to operate (Box 3.1). Beyond these immediate benefits, digitalization can support better policy design, improve public sector accountability, and support further financial inclusion and deepening. Yet, the changing nature of economic and financial transactions can complicate policymaking and introduce more uncertainty and risks.

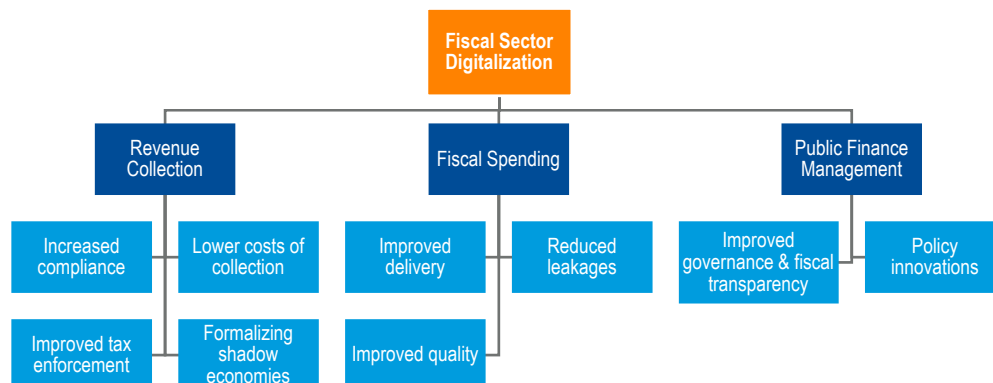
### Tool for More Efficient and Effective Fiscal Policy

Digital tools have the potential to improve the efficiency, transparency, and impact of fiscal policy by strengthening how governments collect and

<sup>17</sup> The identification strategy is built on the assumption that (i) firms’ digital connectivity via the internet is directly affected by the exposure of the country’s submarine cable network to seismic risks and that (ii) firms are heterogeneously affected by such vulnerability to internet disruptions based on their distance to international telecommunications infrastructure nodes. Therefore, the variable used to instrument email use is the interaction between the annual frequency of earthquakes and the firm’s distance to the closest connectivity infrastructure. While firms in the same location share the same nodes, each WBES round is administered to a nationally representative sample of firms, usually covering businesses operating in different cities within the same country, and thus provides sufficient variation for running regressions. The empirical approach is discussed more fully in online Annex 3.3.

<sup>18</sup> The analysis covers some 18,000 observations from 39 countries in sub-Saharan Africa. It controls for country, time, sector, location-specific effects, and other determinants of firm performance, including firm age, firm size (measured by the number of full-time permanent employees when the firm started operations), foreign ownership, exporting status, experience of the top manager, access to bank financing, and distance to the closest submarine cable landing station or Internet Exchange Point.

**Figure 3.9. Transmission Channels in Digitalizing the Fiscal Sector**  
*Digitalization helps to improve the efficiency and impact of fiscal policy*



Source: IMF staff.

analyze data, as well as how effectively they deliver public services and raise revenues (Figure 3.9). This does not make digitalization a silver bullet to achieving better fiscal outcomes. It can, however, complement and reinforce underlying structural fiscal reforms.

So far, the adoption of digital tools by the public sector in sub-Saharan Africa remains low compared with other regions. For instance, only about 30 percent of countries in sub-Saharan Africa provide e-filing services and none use e-procurement processes other than for ex-post information sharing. Half of the countries in the region do not have a website or one that is easy to navigate to share information on public finances (Figure 3.10).

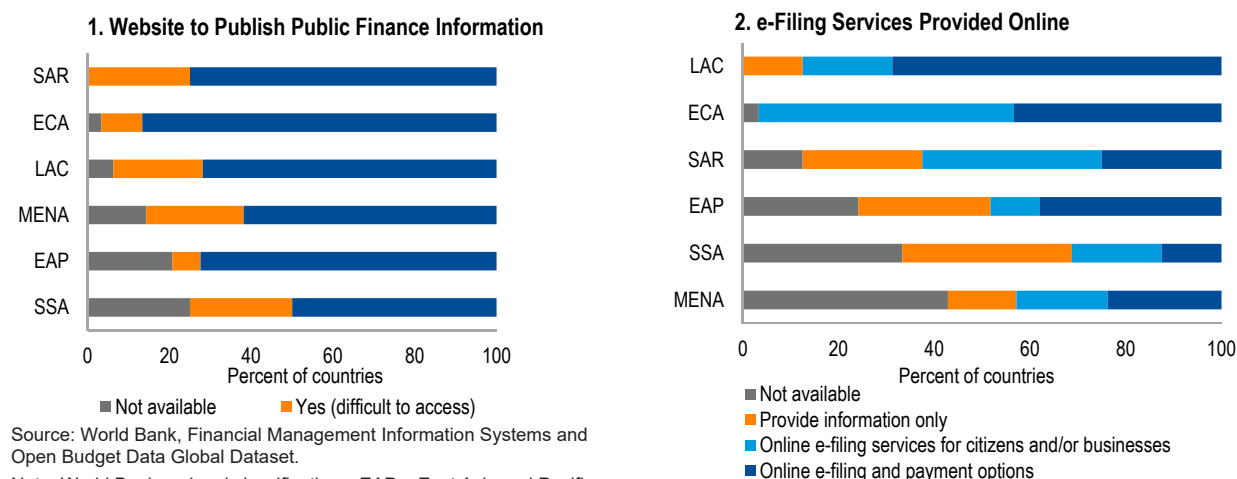
Adoption is more advanced in the area of debt management, where 94 percent of countries in the region have an operational digital platform.

**Improving Public Financial Management**

By providing opportunities to strengthen public financial management, digitalization can facilitate better planning, execution, and monitoring of government budgets. Access to more accurate and timely information via digital platforms supports improved policy analysis, forecasting, and budget formulation. Digitalized processes can reduce delays, streamline procedures, and reduce the potential for human error, improving budget execution. Together with more accessible online information,

**Figure 3.10. Open Budget Score and e-Services**

*Adoption of digital tools by the public sector in sub-Saharan Africa remains low compared with other regions.*



Source: World Bank, Financial Management Information Systems and Open Budget Data Global Dataset.  
 Note: World Bank regional classifications. EAP = East Asia and Pacific; LAC = Latin America and Caribbean; MENA = Middle East and North Africa; ECA = Europe and Central Asia; SAR = South Asia; and SSA = sub-Saharan Africa.

Source: World Bank, Public Financial Management Systems and Eservices Global Dataset.



these factors provide an additional vehicle of transparency. And, by helping key stakeholders hold governments more accountable, digitalization can improve governance and reduce incentives for corruption (see Box 3.2).

### Optimizing Fiscal Spending

Spending efficiency, as measured by the Public Expenditure and Financial Accountability (PEFA) framework, is higher in countries that have adopted e-payment systems.<sup>19</sup> In this regard, digital systems can allow for:

- *Better targeting* of public benefits and services (Dubois and Ludwinek 2015). Digital technology allows for better identification and verification of beneficiaries, reporting, and information management. It also enables governments to limit leakages related to fraud, corruption, and over subscription of public programs (Lund and others 2017). Similarly, biometric technology or digital IDs (as being introduced in Burkina Faso, Côte d'Ivoire, and Ghana) can help governments ensure that public programs are well targeted (Muralidharan and others 2016). For example, by requiring biometric registration, South Africa eliminated 850,000 ghost and ineligible public-program beneficiaries in 2014 and halved administrative costs (IMF 2018c).
- *Better coverage* of eligible recipients of public payments, with conservative estimates of a non-take-up rate of about 40 percent (IMF 2018c). Using digital tools to simplify application processes and raise awareness of social benefits can help reduce barriers to program uptake. Mobile payment systems can also help governments provide support to difficult-to-reach households. For example, during the 2014–16 Ebola crisis, e-transfers delivered much needed cash support in Liberia and Sierra Leone for isolated rural households (Dumas and others 2017).

### Strengthening Revenue Collection

Evidence suggests that countries with higher levels of internet penetration and mobile subscriptions also have higher revenues.<sup>20</sup> An increase in digitalization in sub-Saharan Africa from the 25<sup>th</sup> to the 75<sup>th</sup> percentile (measured as a proportion of households with internet access) is associated with an increase in domestic revenue by up to 2.1 percentage points of GDP (see online Annex 3.4). Countries adopting e-filing also tend to have higher value-added tax collection efficiency, and nearly half of the countries in the region experienced a statistically significant boost in collection efficiency after implementing e-filing.

- *Simplifying tax administration.* Moving from paper and cash-based tax payments can reduce transportation, labor, and transaction costs. For example, in 2014, the Kenya Revenue Authority (KRA) introduced iTax, a fully integrated and automated domestic tax administration that allows taxpayers to pay via mobile devices. This allowed the KRA to establish real-time revenue and audit monitoring, and progressively reduced the cost of revenue collection (Ndung'u 2017). Since 2016, digitalized tax services in South Africa—automated processing and risk management—have significantly reduced the time and red tape associated with tax assessments and customs evaluations. Today, most personal income tax assessments (95 percent) are made within 3 seconds, compared to 180 days in 2006 (IMF 2018c).
- *Increasing tax compliance.* Digital tools such as e-filing and prepopulated tax return forms can streamline the process of paying taxes, reducing compliance costs (Artana and Templado 2018). For example, attitudes toward tax compliance among small business owners improved after Uganda enabled e-filing of tax returns in 2012 (Night and Bananuka 2018). While digitalization can create the risk of new ways to evade taxes, it can also enhance the breadth and quality of taxpayer information. Enabling third-party verification (for example, financial sector

<sup>19</sup> The PEFA measures the extent to which a country's public financial management practices contribute toward their "aggregate fiscal discipline, strategic allocation of resources, and efficient service delivery." The PEFA is 23 percent higher on average in countries with e-payment systems.

<sup>20</sup> The control variables include GDP per capita, economic growth, trade openness, terms of trade, the size of the agriculture sector, measures of corruption, inflation and education. These variables are from the IMF's *World Economic Outlook* and the World Bank's World Development Indicators.



data) or using e-invoices to track business transactions can help reduce tax evasion, including at the border (Pomeranz 2015; Bellon and others 2019). Further, digital cadasters<sup>21</sup> can help mobilize revenue from property taxes—Ghana and Niger have introduced GPS-based digital-address initiatives to reduce tax evasion.

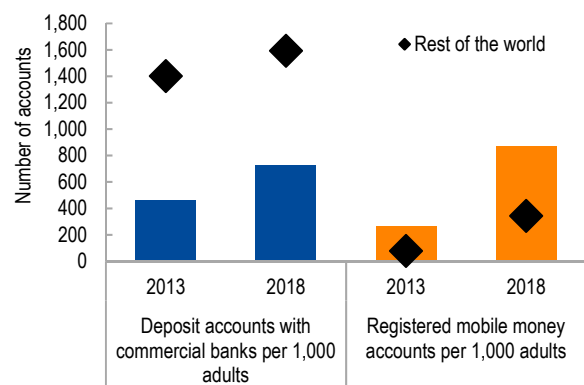
- *Broadening the tax base.* Adopting digital platforms may encourage formalization by reducing barriers to acquiring information (Aslam and Shah 2017) and making it easier to make payments. However, such initiatives need to be implemented carefully, with an appropriate mix of incentives, so as not to deter economic agents in the initial stages. In Benin, for example, offering training with online bank accounts increased registration of informal businesses by 16.3 percentage points (Klapper and others 2019).

### Monetary and Financial Sector Policies<sup>22</sup>

Over the past decade, technological innovation has accelerated the pace of financial sector development and inclusion in sub-Saharan Africa. The early and rapid spread of mobile money, in particular, opened up the financial sector to previously excluded

**Figure 3.11. Sub-Saharan Africa: Deposit Accounts and Mobile Money Accounts (average)**

*Penetration of mobile banking in SSA is outpacing traditional banking*



Source: IMF, Financial Access Survey.

Note: Data availability covers 31 and 23 sub-Saharan countries in 2013 and 2018 respectively.

<sup>21</sup> A digital cadaster is a computerized map or “spatial” location showing property boundaries.

<sup>22</sup> This section is based on a forthcoming IMF working paper, “Beyond Fintech: The Implications of Digitalization on Monetary and Financial Sector Policies” by Mame Astou Diouf, Pranav Kumar Gupta, and Franck Ouattara.

<sup>23</sup> See online Annex 3.5, “Mobile Phone Ownership and Welfare: Evidence from South Africa’s Household Surveys”.

<sup>24</sup> Data from the IMF’s Financial Access Survey.

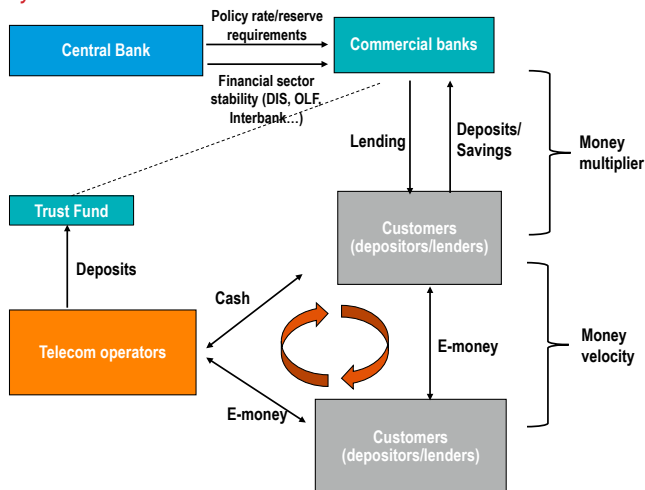
populations and proved to be a valuable tool amidst the COVID-19 pandemic. Evidence suggests that the spread of mobile money can help reduce poverty and raise growth (Jack and Suri 2016 and Khera and others 2019).<sup>23</sup>

In sub-Saharan Africa, the number of mobile money agent outlets has increased significantly, from almost zero in 2008 to more than 38,000, on average, in each country in 2018. Moreover, the number of mobile money accounts now exceeds the number of traditional deposit accounts, with 21 percent of adults in the region having a mobile money account (IMF 2019) (Figure 3.11).

The region is also leading the world in mobile transactions. Mobile-money transactions more than tripled from an average of 8 percent of GDP in 2014 to 25 percent in 2018. This compares with an increase from 3 percent to 5 percent for the rest of the world. By 2018, the volume of transactions among new frontier countries (Burkina Faso, Côte d’Ivoire, Ghana) had caught up with the region’s early adopters (including Kenya, Tanzania and Uganda).<sup>24</sup> As financial inclusion has increased, mobile money has provided a robust—and safe—alternative to physical transactions during the COVID-19 pandemic. More broadly, it has

**Figure 3.12. Evolving Structure of the Financial Sector**

*The growth of mobile banking adds complexity to payment systems*



Source: IMF staff.

increasingly become a platform for other financial services, such as the provision of credit, savings, and cross-border payments.

### Changing the Pattern of Monetary and Financial Relationships

The rise of mobile money, or e-money more broadly,<sup>25</sup> and the entrance of mobile network operators (MNOs) has the potential to reshape traditional financial relationships, with attendant implications for financial stability and monetary policy. Under current practices, the key role of an MNO is to issue e-money, manage trust funds,<sup>26</sup> operate a mobile money platform, and manage an agent distribution system (Figure 3.12).

Despite its growing prominence, literature on the impact of e-money on monetary policy remains thin.<sup>27</sup> A study using data of 33 countries in sub-Saharan Africa over 2011–18 suggests that an increase in registered mobile money accounts is associated with an increase in velocity; most likely due to increased financial inclusion and depth.<sup>28</sup> Consequently, central banks that target monetary aggregates may face increased uncertainty in forecasting velocity. For those central banks that instead focus on the policy rate as an operational instrument, increased use of e-money should strengthen the transmission mechanism, because of higher financial inclusion and reduced informality. Furthermore, a few MNOs have begun to provide short-term credit to customers, which could further impact monetary policy transmission.<sup>29</sup> Hence, it is important for central banks to remain attentive to the growing prominence of e-money and adopt statistical reporting methods to account for e-money developments.

### Financial Sector Challenges and Risks

The success of mobile money, a growing user base, and continued innovation has helped boost the introduction of new financial products, including credit and savings products and cross-border payments (Sy and others 2019). The physical and economic barriers posed by the COVID-19 pandemic are expected to accelerate these trends.

At the same time, digitalization exposes the financial sector to new risks. Mobile money issuers face operational challenges that give rise to credit and liquidity risks from e-money issuance, risks in managing customer deposits and a widely dispersed agent network, and risks to mobile money platforms and telecommunication networks (including cyber risks). Existing risks related to consumer protection could also be exacerbated, as it may become easier for online firms to bypass financial regulations.

Similarly, digitalization will likely require amendments to legal and regulatory frameworks, and supervisory practices.<sup>30</sup> Increasingly central banks may need to regulate private-sector crypto-currencies, and are exploring central bank digital currencies. While some of these challenges could be overcome by considering a synthetic central bank digital currency, central banks will need to carefully weigh the pros and cons, while being cognizant of the infrastructure and resources available and the potential impact on financial stability and monetary policy (Mancini-Griffoli and others 2018).<sup>31</sup>

<sup>25</sup> Mobile money refers to a range of financial transactions offered across mobile phones and is generally considered as a sub-category of electronic or e-money

<sup>26</sup> In some countries, regulations stipulate that the stock of e-money must be backed one-for-one by cash deposits in a trust fund or liquid investments. In some, including in the West African Economic Monetary Union, the stock of e-money must be backed one-for-one by deposits in bank accounts in the form of term deposits (at least 75 percent of the float) and investments in the regional stock market.

<sup>27</sup> For example, Weil, Mbiti, and Mwega (2012) and Ndirangu and Nyamongo (2015) have found no significant impact of mobile money on monetary aggregates, whereas Adam and Walker (2015) using a dynamic stochastic general equilibrium model, found the impact of mobile money likely to be positive to enhance the efficacy of monetary policy implementation.

<sup>28</sup> Estimates suggest that a 10-percentage point increase in registered mobile money accounts leads to a 0.2-point increase in velocity. The results are robust, controlling for the number of ATMs and nominal GDP growth (see forthcoming IMF working paper, “Beyond Fintech: The Implications of Digitalization on Monetary and Financial Sector Policies” by Mame Astou Diouf, Pranav Kumar Gupta, and Franck Ouattara).

<sup>29</sup> Estimates show that mobile money does not seem to have a significant impact on the money multiplier yet, possibly as the issuance of e-money is typically backed one-for-one by cash deposits in a trust fund, and so does not lead to an increase in the monetary base.

<sup>30</sup> See “The Bali Fintech Agenda” (International Monetary Fund and World Bank Group 2018), which brings together the key considerations for policymakers to support the fintech sector while managing risks to financial stability and integrity.

<sup>31</sup> Also see online Annex 3.6.

## POLICIES TO REAP THE REWARDS OF DIGITALIZATION AND MANAGE RISKS

Countries across sub-Saharan Africa are embracing digitalization, developing policies to improve connectivity and leverage digital opportunities to boost growth and inclusion.<sup>32</sup> The COVID-19 pandemic is bringing the potential benefits of digitalization into sharper view.

While not a substitute for broader reforms, policies to promote digital tools and services that are more efficient and resilient, and less damaging to the environment, take on new importance in a post-pandemic world. However, digitalization does not happen by itself. It will be shaped by the policies and actions that each country adopts, and each country's priorities will depend on its relative digital strengths and weaknesses. Emerging from the pandemic with more resilient digital-based economies will, therefore, depend on integrating digital strategies within each country's broader development agenda.

Efforts to support digital connectivity and raise digital depth will require developing a digital-friendly policy framework anchored around four broad policy pillars: investing in infrastructure; investing in policies for a supportive business environment; investing in skills; and investing in risk management frameworks. In light of the real-time lessons from the pandemic, countries can benefit from an adaptive, peer-learning approach to guide these policy efforts.

### Investing in Infrastructure

Large upfront fixed costs and rapid technological change can make it difficult to prioritize a country's most important investment. But digitalization requires two critical infrastructure layers:

- *A foundation of traditional, but digital-friendly infrastructure.* Reliable electricity is critical. But access to electricity in sub-Saharan Africa is one of the lowest in the world, with a sizable

urban-rural divide within countries. Expanding access to electricity is therefore a priority.

- *A layer of digital-ready IT infrastructure.* Ensuring connectivity involves (i) connecting each country to the global network; (ii) national and intercity networks within each country; and (iii) connecting end users (fixed-line and mobile connections). Almost all countries in sub-Saharan Africa, except for the Central African Republic, Eritrea, and South Sudan, are connected through submarine cables or via cross-border terrestrial links. Progress is needed on building networks within countries and connecting end users. This also involves investing in supporting data storage and management, and content-hosting infrastructure, such as data centers (Broadband Commission 2019).

The traditional infrastructure costs are substantial. According to the African Development Bank (2018), achieving near full electrification in sub-Saharan Africa by 2025 would cost about \$35–50 billion annually.<sup>33,34</sup> Arguably, technologies could, over time, help to lower upfront investment costs (for example, solar mini grids).

In terms of IT infrastructure, the Broadband Commission (2019) puts the cost of achieving the Sustainable Development Goal of universal, affordable, and quality access to broadband connectivity in sub-Saharan Africa at about \$90 billion.<sup>35</sup> This estimate comprises 30 percent for capital investment in infrastructure, 50 percent for maintenance and operation, and 17 percent for investment in user skills and local content to ensure that the deployed infrastructure is used adequately. The remaining 3 percent is associated with regulation and building policy frameworks.

### Investing in Policy Frameworks

Financing IT infrastructure investments should rely primarily on funds from the private sector, with supportive public policies. As with the private sector

<sup>32</sup> See online Annex 3.7 on selected country experiences with digital reform.

<sup>33</sup> Other estimates have been broadly similar. In 2017, the Netherlands Environmental Assessment Agency put the costs of universal access to electricity in sub-Saharan Africa at \$24–49 billion per year by 2030.

<sup>34</sup> Beyond electricity, other complementary investments are also needed (for example, education). See IMF 2019 Working Paper “The Spending Challenge for Reaching the SDGs in Sub-Saharan Africa: Lessons Learned from Benin and Rwanda,” for cost estimates.

<sup>35</sup> The estimated cost of achieving high speed universal internet ranges from about \$57–90 billion depending on the estimation technique (Alper and Miktus 2019).

more broadly, investment in the digital economy requires a supportive business environment (IMF 2019). Moreover, given high fixed costs and the limited market in many countries, a broad regional approach would offer economies of scale, as was the case with investments in submarine cables.

Governments have a vital role to play in ensuring an appropriate business and regulatory environment for digitally enabled businesses and new entrants. Putting in place digital strategies is another key step to ensure equal access to critical digital infrastructure for all market players (competition policy) and individuals (mainstreaming gender policies), and lowering barriers to entry (cost, information asymmetries, licensing, etc.).

Support from governments—both regulatory and financial—and development partners would also be needed to ensure universal access and inclusion, such as connecting vulnerable or rural users (Broadband Commission 2019). Digitalization policies should seek to incorporate approaches to counter the widening gender gap and ensure that girls and women are not left behind.

Finally, governments can demonstrate leadership. Adoption of digital policy tools and providing e-government services can help make fiscal policy more effective and introduce citizens and businesses to the benefits and culture of digitalization. Governments can also encourage public-private sector dialogue by establishing points of contact and exchange between policymakers and digital service providers, through designated innovation hubs, offices, or digital sandboxes (a framework to allow innovators to conduct live experiments in a controlled environment under a regulator's supervision).

### Investing in People and Skills

Reaping the benefits from digital-supporting infrastructure and policies also requires investing in education. That includes improvements in core education as a basis for continued learning as well as focused investments in digital skills. This is vital to: (i) ensure that people and businesses can successfully leverage technology, while providing some assurance of a viable market for investors; and (ii) adequately equip the workforce of the future.

Despite a 40-percent improvement in EDAI knowledge indicators over the past decade, a gap remains between sub-Saharan Africa and other regions.

To this end, countries across the region are investing in human capital:

- Countries are *leveraging digital technology to enhance core education*. For instance, Côte d'Ivoire and Kenya have launched e-education services, and Sierra Leone is using digitalization to upgrade teacher recruitment processes and evaluate student progress.
- Increased focus on *promoting basic digital and financial literacy* is also a key tenet of many countries' digital strategies, as in Kenya and Rwanda.
- Other countries are focused on *building more advanced technical skills*, such as the coding academy at Niger's tech center and more options for tertiary training in software development and entrepreneurship in Kenya.
- Innovation hubs and similar vehicles can also *facilitate on-the-job or peer learning* to support entrepreneurs in building skills to develop new businesses.

### Investing in Resilience Against Digital Risks

As countries become more digitally connected, they also become more vulnerable to a range of unintended consequences and emerging risks, including internet shutdowns or misuse of technologies. It is important to complement pro-digital policies with risk-management frameworks to enable early and preemptive action. Risk frameworks would also need to evolve as rapidly as the underlying technology. Business continuity and cyber-risks have become more acute during the COVID-19 crisis as increased use of digital technology has intensified vulnerability to data and privacy risks and cyber-attacks. There are three broad categories of digital risk against which policymakers should aim to build resilience:

- *Cybersecurity resilience.* Maintaining an appropriate cybersecurity stance ensures that digital technologies are protected from threats that could cause disruptions for users. Sub-Saharan Africa's reliance on outsourced infrastructure services, such as data centers, makes it vulnerable to supply chain risks (for example, data breaches or communication interruptions). The ITU's framework to assess cybersecurity focuses on countries' legal, technical, and operational institutions and frameworks to deal with cybersecurity and cybercrimes. Cross-border cooperation and information sharing are also important.
- *Economic resilience.* Economic risks from digital technologies can evolve rapidly, such as money laundering and terrorist financing (ML/FT) risks or threats to consumer protection and data privacy. Other economic risks—workers facing job dislocation, tech firms weakening the tax base, or monopolies dominating some sectors due to network externalities—may be slower moving. Policymakers need to develop tools to respond. Regulations can protect consumers from monopolies, investment in skills can support job transitions, and better data can help increase tax efficiency.
- *Operational resilience.* As economies become more reliant on digital technologies, they also become more vulnerable to loss of connectivity. This means that individuals, businesses, and the public sector need to build skills and capacity for business continuity (including disaster recovery and contingency plans) in the event of unforeseen shocks.

Reflecting growing awareness of digital risks, countries across the region are adopting legislative and other frameworks to address these risks. About half of the countries in sub-Saharan Africa have passed laws on cyber-crimes and other cyber risks. According to the ITU framework, Mauritius, Kenya, and Rwanda are the top three performers in sub-Saharan Africa (ITU 2018). Many countries have also passed laws dealing with electronic transactions, consumer protection, and privacy and data protection. In some cases, legislation is being implemented at the regional level (for example, the Economic Community of West African States and the West African Economic and Monetary Union).



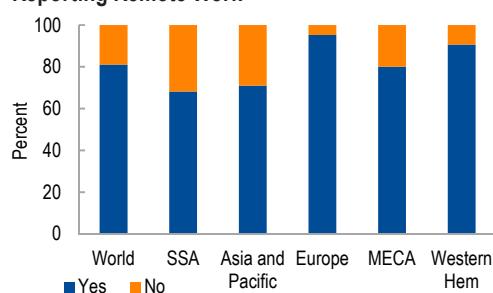
### Box 3.1. Digitalization and Responding to the COVID-19 Pandemic in Sub-Saharan Africa

Many sub-Saharan African countries are deploying digital policy responses to cope with, and cushion the effects of, the COVID-19 pandemic. This early experience offers some insights into how digitalization can help build more resilient economies for the future. For instance, mobile money, where the region is already a global leader, has been used to effectively deliver much-needed support while promoting social distancing. Yet, the connectivity gap between sub-Saharan Africa and the rest of the world also suggests that greater digital readiness could have allowed the region to do even more.

**While digitalization allowed businesses in the region to continue partial operations amid COVID-19, gaps in connectivity have limited the extent to which countries are benefiting from online activities.**

- *The switch to partial telework arrangements occurred in most countries, but has been less pronounced in sub-Saharan Africa than in other regions* (Figure 3.1.1). In countries where telework has been possible, it has generally been limited to a fraction of companies and services operating in the small formal sector, and has also been vulnerable to the region's less reliable internet connectivity and electricity supply. An IMF survey of policy responses to the pandemic suggests that countries in the region that were able to switch to partial telework by mid-May 2020 had more access to the internet (28 percent of the population) than non telework countries (17 percent).
- *While levels of e-commerce remain low, it has helped maintain business operations in some*

**Figure 3.1.1. Selected Regions: Percent of Countries Reporting Remote Work**



Source: IMF Strategy, Policy, and Review Department, Survey of Policy Responses to COVID-19 and Related Shocks (2020).  
Note: SSA = sub-Saharan Africa; MECA = Middle East and Central Asia; Western Hem = Western Hemisphere.

countries. Online orders picked up in Kenya and Nigeria, and the Senegalese authorities set up an e-commerce platform to provide easy access to the websites of small-and medium-sized enterprises that sell essential goods. In Uganda and Kenya, authorities are using social media to share information on where consumers can purchase food with mobile money, and have it delivered through ride-hailing apps.

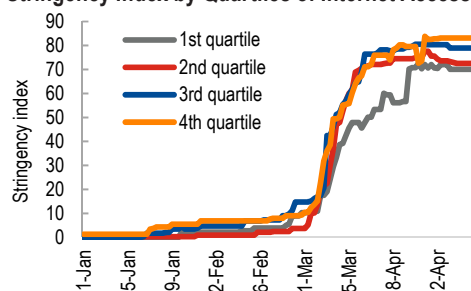
**Some governments found new technologies to be useful to maintain public services.**

- *Telework has allowed some countries to minimize disruptions in some public services.* In Rwanda, the judiciary is increasingly using videoconferencing for court proceedings. In Côte d'Ivoire, a new ePassport agency manages the service online from application to appointment booking and payments. Kenya's eCitizen portal is witnessing increased usage for services, such as civil and vehicle registration.
- *Countries are leveraging e-learning tools for remote education.* Although access to schooling lags behind and fewer classes have moved online compared to other regions, virtual campus apps and websites have provided free study materials during school and university closures (Côte d'Ivoire, Ghana, Kenya, Liberia, and Uganda). Educational television and radio programs have also been launched, including in Angola, Burkina Faso, Cameroon, Madagascar, Malawi, and Sierra Leone.

**As governments in the region moved quickly to adopt containment measures (Figure 3.1.2), many also turned to digital tools to support these efforts and raise public awareness.**

- *Digital technology is supporting the public health response in unprecedented ways.* The South African and Kenyan authorities engaged tech companies to develop contact tracing apps. In Nigeria and Niger, free e-consultation tools allow users to self-assess infection risk and get tested based on symptoms. International experts shared experiences on hospital management, emergency response and staff medical training via webinars with Mozambique's frontline doctors.



**Figure 3.1.2. Sub-Saharan Africa: COVID-19 Policy Stringency Index by Quartiles of Internet Access**

Source: Oxford COVID-19 Tracker.

Anti-epidemic robots in Rwanda are monitoring patients, delivering food and medication, and keeping medical records.

- *Digital tools are being used to raise public awareness and monitor lockdowns.* In Niger and South Africa, interactive WhatsApp- and Facebook based platforms provide local language automated responses to COVID-related questions. In Rwanda, drones fitted with megaphones are used to raise awareness and enforce lockdown measures and, in Botswana, people can request passes for domestic movements via an online platform. Countries are using mobile-based applications and location technology to monitor the effectiveness of lockdowns, revealing a sharp decrease in mobility in April 2020 (Figure 3.1.3).

**Many governments have actively turned to digital policy solutions to cushion the socio-economic impact of the pandemic, taking advantage of the region's leadership in mobile money.**

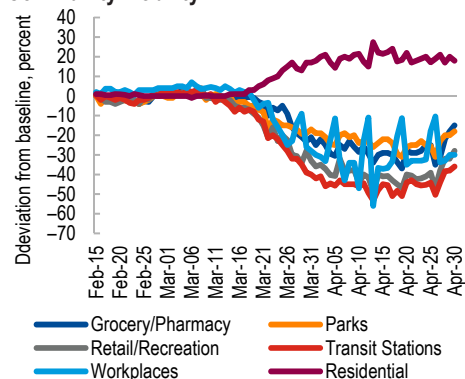
- *Central banks have relaxed regulations, while telecom operators have eased terms of service to encourage greater use of mobile money.* This aims to support retail transactions while limiting the spread of the COVID-19 virus through bank notes (Cameroon, Democratic Republic of Congo, Ghana, Kenya, Liberia, Mozambique, Rwanda, Uganda, Zambia, WAEMU). These measures include waiving fees for transactions below certain amounts (including transfers from bank accounts to electronic wallets and

This box was prepared by Félix Simione, Martha Tesfaye Woldemichael, and Franck Ouattara.

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World Trade Organization (2020). *E-commerce, Trade and the COVID-19 Pandemic*. Information Note. May 4, 2020.

**Figure 3.1.3. Sub-Saharan Africa: COVID-19 Community Mobility**

Source: Google LLC "Google COVID-19 Community Mobility Reports." Note: The baseline is the median value, for the corresponding day of the week, during the 5-week period Jan 3–Feb 6, 2020.

vice-versa), increasing the balance limits, and relaxing interoperability rules.

- *Countries are deploying and targeting social protection programs to vulnerable households and businesses through mobile money, electronic cash transfers, and virtual engagement* (Benin, Côte d'Ivoire, The Gambia, Lesotho, Madagascar, Namibia, Togo, Uganda, Zambia, Zimbabwe). Togo's "NOVISSI" cash transfer scheme uses mobile phone solutions to manage and target payments for the most vulnerable groups, mostly in the informal sector. Mobile money transfers are also being used to deliver emergency income support (Namibia) and benefits to people who have lost their jobs due to COVID-19 (Zambia). In Uganda, the "Girls Empowering Girls" urban social protection program for adolescent girls successfully transitioned to virtual mentoring. In Gabon and Senegal, the government will provide utility bills relief by digitally crediting the beneficiaries' accounts with utility companies.
- *Tax authorities in some countries are encouraging the use of e-tax services.* In Kenya, Namibia, and Nigeria, taxpayers have been encouraged to use existing online platforms for filling tax returns, making tax registrations, applying for tax refunds, and communicating with tax officers during the lockdown.

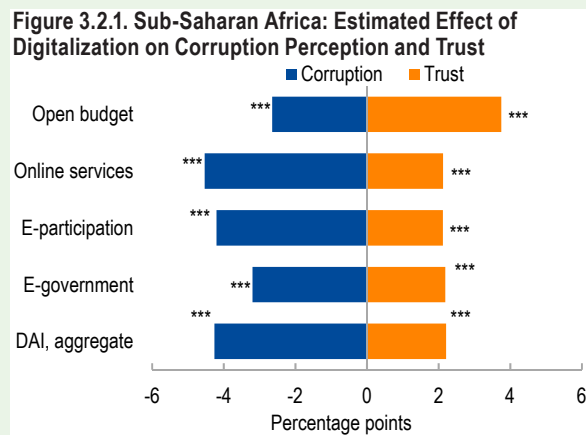
### Box 3.2. Digitalization, Corruption, and Trust in Africa

**Digitalization offers the opportunity to fight corruption more efficiently.** Several studies demonstrate that digitalization can improve prevention, detection, reporting, and prosecution of corruption (IMF 2018), notably by promoting transparency, accountability, and citizen participation. In this regard, countries in the region—Kenya, Tanzania, and Senegal—have adopted in recent years digital tax administration tools that reduce bureaucracy and help combat corruption of tax officials by reducing the opportunities for bribes.

**Digitalization can also enhance ties between the government and citizens, reinforcing trust in public officials.** Digitalization can help disseminate information in a cost-effective way, reducing search costs and moral hazard. The use of digital tools by governments (such as e-participation) facilitates advocacy and greater involvement by citizens in decision making, policy setting, problem solving and services design. This improves service quality, promotes

transparency, and helps enhance public trust in the government, which strengthens integrity and openness of the policy process to the participation of citizens (OECD 2018).

**Empirical analysis suggests that digital adoption is associated with lower corruption perceptions and improved trust in tax officials.** The study (Ouedraogo and Sy 2020) uses individual-level data (covering 23,000 individuals and 26 countries in sub-Saharan Africa) from the sixth wave of Afrobarometer surveys to analyze the impact of digitalization—proxied by several indicators including the World Bank’s Digital Adoption Index, Open Budget Index, and the United Nations’ E-government Index—on corruption.<sup>1</sup> The analysis finds that an increase in the index of digital adoption from the 25<sup>th</sup> percentile to the 75<sup>th</sup> percentile: (i) is associated with a decline in the perception of corruption of tax officials by up to 4.2 percentage points; and (ii) would boost trust in tax officials by around 2.5 percentage points (Figure 3.2.1).



Source: IMF staff calculations.

Note: Based on increase in digital adoption from 25th to 75th percentile. DAI = Digital Adoption Index. \*\*\*, \*\*, and \* indicate statistical significance at the 1, 5, and 10 percent level, respectively.

This box was prepared by Rasmane Ouedraogo.

<sup>1</sup> The analysis controls for characteristics such as the respondents’ socio-economic and demographic conditions and satisfaction with politicians, government performance in terms of public service delivery, and media availability. It also uses variations in the deployment of submarine cables at the subnational level as an exogenous instrument for digitalization.

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World Bank. 2016. *World Development Report 2016: Digital Dividends*. World Bank, Washington, DC.

### Annex 3.1. Variables Used in the Enhanced Digital Access Index (EDAI)

Definition	Source
<b>Affordability</b>	
Fixed (wired)-broadband monthly subscription refers to the monthly charge for fixed (wired)-broadband internet service (i.e., any dedicated connection to the internet at speeds equal to, or greater than, 256 kbit/s) (% GNI per capita).	ICT
Mobile-cellular prepaid price of a short-message service (SMS) refers to the price of sending a message from a mobile-cellular telephone with a prepaid subscription to a mobile-cellular number of a competing network (% GNI per capita).	ICT
The price per minute of a peak rate call from a mobile cellular prepaid telephone to a mobile cellular subscriber of another (competing) network. Taxes should be included. If not included; it should be specified in a note including the applicable tax rate. (% GNI per capita).	ICT
Mobile-cellular prepaid connection charge is the initial, one-time charge for a new prepaid mobile-cellular subscription (but not refundable deposits); usually corresponds to the price of a subscriber identity module (SIM) card, but may include other fees (% GNI per capita).	ICT
Price of the plan, in local currency, mobile-broadband USB/dongle-based prepaid tariffs with 1GB volume of data (% GNI per capita).	ICT
<b>Infrastructure</b>	
Fixed-telephone subscriptions 100 inhabitants	ICT
Mobile-cellular subscriptions per 100 inhabitants	ICT
Percentage of population covered by mobile-cellular network refers to the percentage of inhabitants within range of a mobile-cellular signal, irrespective of whether or not they are subscribers or users. Calculated by dividing the number of inhabitants within range of a mobile-cellular signal by the total population and multiplying by 100.	ICT
Percentage of the population covered by at least a 3G mobile network refers to the percentage of inhabitants that are within range of at least a 3G mobile-cellular signal, irrespective of whether or not they are subscribers. Calculated by dividing the number of inhabitants covered by at least a 3G mobile-cellular signal by the total population and multiplying by 100.	ICT
Percentage of population covered by at least an LTE/WiMAX mobile network refers to the percentage of inhabitants that live within range of LTE/LTE-Advanced, mobile WiMAX/Wireless MAN or other more advanced mobile-cellular networks, irrespective of whether or not they are subscribers. Calculated by dividing the number of inhabitants covered by the mentioned mobile-cellular technologies by the total population and multiplying by 100.	ICT
<b>Internet Usage</b>	
Active mobile-broadband subscriptions per 100 inhabitants.	ICT
Fixed broadband subscribers divided by population and multiplied by 100.	ICT
Internet users (% population) can include both estimates and survey data corresponding to the proportion of individuals using the internet, based on national households surveys. The number should reflect the country's total population or at least individuals of 5 years and older.	ICT
<b>Knowledge</b>	
Adult literacy is measured as the percentage of people aged 15 years and above who can both read and write a short simple statement on their everyday life.	UNESCO (UIS)
Expected years of schooling is the total number of years of schooling that a child of a certain age can expect to receive, assuming the probability of his or her being in school at any particular age is equal to the current enrolment ratio age.	UNESCO (UIS)
Mean years of schooling provides the average number of years of education completed by a country's adult population (25 years and older), excluding years spent repeating grades.	UNESCO (UIS)
Gross enrolment ratio is measured as the total number of students enrolled at the primary, secondary and tertiary level, regardless of age, as a percentage of the population of school age for that level.	UNESCO (UIS)
<b>Quality</b>	
Fixed (wired)-broadband speed; in Mbit/s refers to the advertised maximum theoretical download speed; and not speeds; guaranteed to users associated with a fixed (wired)-broadband internet monthly subscription.	ICT
International Internet bandwidth per Internet user (bit/s).	ICT
Advertised maximum theoretical download speed; speeds not guaranteed to users associated with a 1GB USB/dongle-based postpaid plan.	ICT

Note: Variables were selected based on the following criterion: at least one observation for each variable is available during one of the previous three years leading up to the year for which the index is being calculated. When a given economy has more than one observation for a given variable, the latest data point is selected. The variable "Percentage of the population covered by at least an LTE/WiMAX mobile network" was dropped for 2010 as LTE/WiMAX was still an emerging technology. The indicators are aggregated using the Adjusted Mazziotta-Pareto Index (AMPI) methodology.

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# Statistical Appendix

Unless noted otherwise, data and projections presented in this *Regional Economic Outlook* are IMF staff estimates as of 7 April 2020, consistent with the projections underlying the April 2020 *World Economic Outlook*.

The data and projections cover 45 sub-Saharan African countries in the IMF's African Department. Data definitions follow established international statistical methodologies to the extent possible. However, in some cases, data limitations limit comparability across countries.

## Country Groupings

Countries are aggregated into three (non-overlapping) groups: oil exporters, other resource-intensive countries, and non-resource-intensive countries (see table on page 54 for the country groupings).

- The oil exporters are countries where net oil exports make up 30 percent or more of total exports.
- The other resource-intensive countries are those where nonrenewable natural resources represent 25 percent or more of total exports.
- The non-resource-intensive countries refer to those that are not classified as either oil exporters or other resource-intensive countries.

Countries are also aggregated into four (overlapping) groups: oil exporters, middle-income, low-income, and countries in fragile situations (see table on page 54 for the country groupings).

The membership of these groups reflects the most recent data on per capita gross national income (averaged over three years) and the World Bank, Country Policy and Institutional Assessment (CPIA) score (averaged over three years).

- The middle-income countries had per capita gross national income in the years 2016–18 of more than \$1025.00 (World Bank, using the Atlas method).

- The low-income countries had average per capita gross national income in the years 2016–18 equal to or lower than \$1025.00 (World Bank, Atlas method).
- The countries in fragile situations had average CPIA scores of 3.2 or less in the years 2016–18 and/or had the presence of a peace-keeping or peace-building mission within the last three years.
- The membership of sub-Saharan African countries in the major regional cooperation bodies is shown on page 54: CFA franc zone, comprising the West African Economic and Monetary Union (WAEMU) and CEMAC; the Common Market for Eastern and Southern Africa (COMESA); the East Africa Community (EAC-5); the Economic Community of West African States (ECOWAS); the Southern African Development Community (SADC); and the Southern Africa Customs Union (SACU). EAC-5 aggregates include data for Rwanda and Burundi, which joined the group only in 2007.

## Methods of Aggregation

In Tables SA1 and SA3, country group composites for real GDP growth and broad money are calculated as the arithmetic average of data for individual countries, weighted by GDP valued at purchasing power parity as a share of total group GDP. The source of purchasing power parity weights is the World Economic Outlook (WEO) database.

In Table SA1, country group composites for consumer prices are calculated as the geometric average of data for individual countries, weighted by GDP valued at purchasing power parity as a share of total group GDP. The source of purchasing power parity weights is the WEO database.

In Tables SA2–SA4, country group composites except for broad money, are calculated as the arithmetic average of data for individual countries, weighted by GDP in U.S. dollars at market exchange rates as a share of total group GDP.



### Sub-Saharan Africa: Member Countries of Groupings

Oil exporters	Other resource-intensive countries	Non-resource-intensive countries	Middle-income countries	Low-income countries	Countries in fragile situations	
Angola	Botswana	Benin	Angola	Benin	Malawi	Burundi
Cameroon	Burkina Faso	Burundi	Botswana	Burkina Faso	Mali	Central African Rep.
Chad	Central African Rep.	Cabo Verde	Cabo Verde	Burundi	Mozambique	Chad
Congo, Republic of	Congo, Dem. Rep. of	Comoros	Cameroon	Central African Rep.	Niger	Comoros
Equatorial Guinea	Ghana	Côte d'Ivoire	Congo, Republic of	Rep.	Rwanda	Congo, Dem. Rep. of
Gabon	Guinea	Eritrea	Côte d'Ivoire	Chad	Sierra Leone	Congo, Republic of
Nigeria	Liberia	Eswatini	Equatorial Guinea	Comoros	South Sudan	Côte d'Ivoire
South Sudan	Mali	Ethiopia	Eswatini	Congo, Dem. Rep. of	Tanzania	Eritrea
	Namibia	Gambia, The	Gabon	Eritrea	Togo	Gambia, The
	Niger	Guinea-Bissau	Ghana	Ethiopia	Uganda	Guinea
	Sierra Leone	Kenya	Kenya	Gambia, The	Zimbabwe	Guinea-Bissau
	South Africa	Lesotho	Lesotho	Guinea		Liberia
	Tanzania	Madagascar	Mauritius	Guinea-Bissau		Malawi
	Zambia	Malawi	Namibia	Liberia		Mali
	Zimbabwe	Mauritius	Nigeria	Madagascar		São Tomé & Príncipe
		Mozambique	São Tomé & Príncipe			Sierra Leone
		Rwanda	Senegal			South Sudan
		São Tomé & Príncipe	Seychelles			Togo
		Senegal	South Africa			Zimbabwe
		Seychelles	Zambia			
		Togo				
		Uganda				

### Sub-Saharan Africa: Member Countries of Regional Groupings

The West African Economic and Monetary Union (WAEMU)	Economic and Monetary Community of Central African States (CEMAC)	Common Market for Eastern and Southern Africa (COMESA)	East Africa Community (EAC-5)	Southern African Development Community (SADC)	Southern Africa Customs Union (SACU)	Economic Community of West African States (ECOWAS)
Benin	Cameroon	Burundi	Burundi	Angola	Botswana	Benin
Burkina Faso	Central African Rep.	Comoros	Kenya	Botswana	Eswatini	Burkina Faso
Côte d'Ivoire	Chad	Congo, Dem. Rep. of	Rwanda	Comoros	Lesotho	Cabo Verde
Guinea-Bissau	Congo, Republic of	Eritrea	Tanzania	Congo, Dem. Rep. of	Namibia	Côte d'Ivoire
Mali	Equatorial Guinea	Eswatini	Uganda	Eswatini	South Africa	Gambia, The
Niger	Gabon	Ethiopia		Lesotho		Ghana
Senegal		Kenya		Madagascar		Guinea
Togo		Madagascar		Malawi		Guinea-Bissau
		Malawi		Mauritius		Liberia
		Mauritius		Mozambique		Mali
		Rwanda		Namibia		Niger
		Seychelles		Seychelles		Nigeria
		Uganda		South Africa		Senegal
		Zambia		Tanzania		Sierra Leone
		Zimbabwe		Zambia		Togo
				Zimbabwe		

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Sources: IMF, Common Surveillance database and IMF, World Economic Outlook database, April 2020.

<sup>1</sup> Fiscal year data.

<sup>2</sup> In 2019 Zimbabwe authorities introduced the RTGS dollar, later renamed the Zimbabwe dollar, and are in the process of redenominating their national accounts statistics. Current data are subject to revision. The Zimbabwe dollar previously ceased circulating in 2009 and, between 2009–19, Zimbabwe operated under a multi-currency regime with the US dollar as the unit of account.

Note: “...” denotes data not available.

**Table SA4.**

Sources: IMF, Common Surveillance database, and IMF, World Economic Outlook database, April 2020

<sup>1</sup> As a member of the West African Economic and Monetary Union (WAEMU), see WAEMU aggregate for reserves data.

<sup>2</sup> As a member of the Central African Economic and Monetary Community (CEMAC), see CEMAC aggregate for reserves data.

<sup>3</sup> Fiscal year data.

<sup>4</sup> In 2019 Zimbabwe authorities introduced the RTGS dollar, later renamed the Zimbabwe dollar, and are in the process of redenominating their national accounts statistics. Current data are subject to revision. The Zimbabwe dollar previously ceased circulating in 2009 and, between 2009–19, Zimbabwe operated under a multi-currency regime with the US dollar as the unit of account.

Note: “...” denotes data not available.

Table SA1. Real GDP Growth and Consumer Prices

	Real GDP (Annual percent change)						Consumer Prices, Annual Average (Annual percent change)					
	2010–16	2017	2018	2019	2020	2021	2010–16	2017	2018	2019	2020	2021
Angola	3.6	-0.2	-1.2	-1.5	-1.4	2.6	13.5	29.8	19.6	17.1	20.7	22.3
Benin	4.1	5.7	6.7	6.4	4.5	6.0	1.6	1.8	0.8	-0.9	-0.8	0.6
Botswana	5.3	2.9	4.5	3.0	-5.4	6.8	5.6	3.3	3.2	2.8	2.1	2.6
Burkina Faso	5.9	6.2	6.8	5.7	2.0	5.8	1.0	0.4	2.0	-3.2	3.2	2.1
Burundi	2.8	0.5	1.6	1.8	-5.5	4.2	8.2	16.6	-2.8	-0.7	8.0	6.0
Cabo Verde	1.9	3.7	5.1	5.5	-4.0	5.5	1.3	0.8	1.3	1.1	1.3	1.4
Cameroon	4.8	3.5	4.1	3.7	-1.2	4.1	2.0	0.6	1.1	2.5	2.8	2.3
Central African Rep.	-1.9	4.5	3.8	3.0	1.0	4.0	5.2	4.2	1.6	2.7	1.2	2.5
Chad	4.5	-2.4	2.3	3.0	-0.2	6.1	1.8	-0.9	4.0	-1.0	2.2	2.9
Comoros	3.2	4.2	3.6	1.9	-1.2	3.1	2.0	0.1	1.7	3.3	3.0	2.1
Congo, Dem. Rep. of	6.9	3.7	5.8	4.4	-2.2	3.5	6.5	35.8	29.3	4.8	11.0	10.5
Congo, Rep. of	3.7	-1.8	1.6	-0.9	-2.3	3.4	2.7	0.4	1.2	2.2	2.1	2.6
Côte d'Ivoire	6.0	7.4	6.8	6.9	2.7	8.7	1.8	0.7	0.4	0.8	1.2	1.4
Equatorial Guinea	-2.2	-5.7	-5.8	-6.1	-5.5	2.3	3.4	0.7	1.3	0.6	1.7	1.7
Eritrea	6.5	-10.0	13.0	3.8	0.1	5.9	8.5	-13.3	-14.4	-16.4	4.5	2.4
Eswatini	2.8	2.0	2.4	1.0	-0.9	1.8	6.2	6.2	4.8	2.6	3.6	4.5
Ethiopia <sup>1</sup>	9.9	10.2	7.7	9.0	3.2	4.3	13.9	10.7	13.8	15.8	15.4	9.1
Gabon	4.9	0.5	0.8	3.4	-1.2	3.6	1.8	2.7	4.8	2.0	3.0	3.0
Gambia, The	1.5	4.8	6.5	6.0	2.5	6.5	5.7	8.0	6.5	7.1	6.7	6.0
Ghana	6.6	8.1	6.3	6.1	1.5	5.9	11.9	12.4	9.8	7.2	9.7	8.5
Guinea	5.4	10.3	6.2	5.6	2.9	7.6	12.9	8.9	9.8	9.5	8.5	8.0
Guinea-Bissau	3.9	4.8	3.8	4.6	-1.5	3.0	1.7	-0.2	0.4	0.2	0.8	1.5
Kenya	6.0	4.9	6.3	5.6	1.0	6.1	7.6	8.0	4.7	5.2	5.1	5.0
Lesotho	4.5	-1.0	0.4	1.2	-5.2	5.1	5.0	4.5	4.7	5.2	3.6	3.6
Liberia	4.3	2.5	1.2	-2.5	-2.5	4.0	8.1	12.4	23.5	27.0	13.8	13.5
Madagascar	2.6	3.9	4.6	4.8	0.4	5.0	7.1	8.6	8.6	5.6	5.5	6.5
Malawi	4.2	4.0	3.2	4.5	1.0	2.5	18.9	11.5	9.2	9.4	14.0	10.7
Mali	4.1	5.0	5.2	5.1	1.5	4.1	1.4	1.8	1.7	-0.6	0.6	1.5
Mauritius	3.8	3.8	3.8	3.5	-6.8	5.9	3.2	3.7	3.2	0.5	4.7	7.0
Mozambique	6.6	3.7	3.4	2.2	2.2	4.7	8.1	15.1	3.9	2.8	5.2	5.7
Namibia	4.5	-0.1	0.3	-1.4	-2.5	3.2	5.4	6.1	4.3	3.7	2.4	3.2
Niger	6.2	5.0	7.0	5.8	1.0	8.1	1.0	0.2	2.8	-2.5	4.4	1.7
Nigeria	4.7	0.8	1.9	2.2	-3.4	2.4	11.1	16.5	12.1	11.4	13.4	12.4
Rwanda	7.1	6.1	8.6	10.1	3.5	6.7	4.1	4.8	1.4	2.4	6.9	5.4
São Tomé & Príncipe	4.8	3.9	3.0	1.3	-6.0	5.5	9.2	5.7	8.3	8.4	7.9	7.0
Senegal	4.6	7.4	6.4	5.3	3.0	5.5	1.1	1.1	0.5	1.0	2.0	1.9
Seychelles	5.0	4.4	3.8	3.9	-10.8	8.0	2.3	2.9	3.7	1.8	4.5	3.1
Sierra Leone	5.4	3.8	3.5	5.1	-2.3	4.0	6.9	18.2	16.0	14.8	15.4	15.2
South Africa	2.1	1.4	0.8	0.2	-5.8	4.0	5.4	5.3	4.6	4.1	2.4	3.2
South Sudan	-7.4	-5.5	-1.1	11.3	4.9	3.2	95.9	187.9	83.5	51.2	8.1	24.5
Tanzania	6.6	6.8	7.0	6.3	2.0	4.6	8.7	5.3	3.5	3.4	3.9	4.3
Togo	6.1	4.4	4.9	5.3	1.0	4.0	1.6	-0.2	0.9	0.7	2.0	2.0
Uganda	4.9	5.0	6.3	4.9	3.5	4.3	7.2	5.6	2.6	2.9	3.9	4.8
Zambia	5.7	3.5	4.0	1.5	-3.5	2.3	9.5	6.6	7.0	9.8	13.4	12.1
Zimbabwe <sup>2</sup>	8.2	4.7	3.5	-8.3	-7.4	2.5	1.1	0.9	10.6	255.3	319.0	3.7
<b>Sub-Saharan Africa</b>	<b>4.5</b>	<b>3.0</b>	<b>3.3</b>	<b>3.1</b>	<b>-1.6</b>	<b>4.1</b>	<b>8.1</b>	<b>10.7</b>	<b>8.3</b>	<b>8.4</b>	<b>9.3</b>	<b>7.6</b>
<i>Median</i>	4.8	3.9	3.8	3.9	-0.9	4.3	4.9	4.8	3.9	2.8	4.4	3.7
Excluding Nigeria and South Africa	5.4	4.8	4.9	4.5	0.7	4.9	7.5	9.8	7.7	8.3	9.6	6.8
<b>Oil-exporting countries</b>	<b>4.3</b>	<b>0.5</b>	<b>1.5</b>	<b>1.8</b>	<b>-2.8</b>	<b>2.6</b>	<b>10.5</b>	<b>17.1</b>	<b>12.2</b>	<b>11.1</b>	<b>12.6</b>	<b>12.2</b>
Excluding Nigeria	3.2	-0.2	0.2	0.8	-1.2	3.3	9.1	18.6	12.5	10.3	10.5	11.8
<b>Oil-importing countries</b>	<b>4.7</b>	<b>4.6</b>	<b>4.4</b>	<b>3.8</b>	<b>-0.8</b>	<b>4.9</b>	<b>6.5</b>	<b>6.9</b>	<b>6.0</b>	<b>6.8</b>	<b>7.4</b>	<b>5.0</b>
Excluding South Africa	6.1	6.0	6.0	5.4	1.1	5.3	7.1	7.6	6.6	7.9	9.4	5.7
<b>Middle-income countries</b>	<b>4.1</b>	<b>2.1</b>	<b>2.3</b>	<b>2.1</b>	<b>-2.8</b>	<b>3.8</b>	<b>8.2</b>	<b>10.9</b>	<b>8.2</b>	<b>7.5</b>	<b>8.4</b>	<b>8.1</b>
Excluding Nigeria and South Africa	4.9	3.8	3.8	3.4	-0.3	5.1	7.2	9.3	6.7	6.0	7.4	7.4
<b>Low-income countries</b>	<b>6.1</b>	<b>5.8</b>	<b>6.0</b>	<b>5.7</b>	<b>1.7</b>	<b>4.7</b>	<b>8.0</b>	<b>10.3</b>	<b>8.9</b>	<b>10.8</b>	<b>12.0</b>	<b>6.2</b>
Excluding low-income countries in fragile situations	6.7	6.9	6.7	6.6	2.6	4.9	8.0	7.1	6.5	6.2	7.4	5.8
<b>Countries in fragile situations</b>	<b>5.2</b>	<b>4.1</b>	<b>4.9</b>	<b>4.1</b>	<b>0.3</b>	<b>5.6</b>	<b>5.9</b>	<b>11.8</b>	<b>9.6</b>	<b>14.5</b>	<b>15.3</b>	<b>5.4</b>
CFA franc zone	4.5	4.1	4.7	4.5	1.0	5.8	1.8	0.8	1.4	0.4	1.9	1.9
CEMAC	3.3	0.3	1.7	1.8	-1.7	4.0	2.4	0.8	2.1	1.7	2.5	2.5
WAEMU	5.4	6.5	6.5	6.1	2.5	6.8	1.4	0.9	1.0	-0.3	1.6	1.5
COMESA (SSA members)	6.5	5.7	6.0	5.2	0.6	4.5	8.4	9.8	9.2	13.3	15.2	7.3
EAC-5	5.9	5.6	6.6	5.9	2.0	5.2	7.7	6.5	3.5	3.8	4.5	4.7
ECOWAS	5.1	2.9	3.4	3.6	-1.4	3.9	9.3	12.5	9.4	8.3	10.1	9.2
SACU	2.3	1.4	1.0	0.3	-5.6	4.1	5.4	5.2	4.5	4.0	2.4	3.2
SADC	3.5	2.3	2.1	1.1	-3.4	3.9	7.0	9.8	7.7	9.0	9.6	6.6

See footnote on page 17.

Table SA2. Overall Fiscal Balance, Including Grants and Government Debt

	Overall Fiscal Balance, Including Grants (Percent of GDP)						Government Debt (Percent of GDP)					
	2010–16	2017	2018	2019	2020	2021	2010–16	2017	2018	2019	2020	2021
Angola	0.3	-6.3	2.2	0.7	-6.0	-2.5	42.7	69.3	89.0	109.8	132.2	124.3
Benin	-2.0	-4.2	-3.0	-0.5	-2.8	-2.2	24.3	39.6	41.0	39.4	39.8	38.8
Botswana	-0.2	-1.1	-4.6	-6.2	-5.9	-3.1	18.2	13.4	14.2	14.8	16.2	15.8
Burkina Faso	-2.8	-6.9	-4.4	-3.0	-5.0	-3.5	27.8	33.5	37.7	40.0	43.0	43.3
Burundi	-4.1	-7.2	-5.3	-6.0	-9.0	-6.8	40.9	48.6	53.4	59.4	67.7	68.0
Cabo Verde	-7.6	-3.0	-2.8	-1.8	-8.3	-4.3	102.2	127.2	124.9	121.2	132.5	127.7
Cameroon	-3.3	-4.9	-2.5	-2.3	-4.5	-3.6	21.5	37.7	39.5	40.9	45.2	45.9
Central African Rep.	-1.8	-1.1	-1.0	1.4	-2.4	0.4	42.7	50.3	50.0	47.8	46.2	43.6
Chad	-2.0	-0.2	1.9	-0.2	-0.4	-2.2	36.4	49.8	48.4	44.2	47.2	46.5
Comoros	2.2	0.4	-1.0	-2.2	-3.8	-2.7	19.8	18.4	21.1	25.3	31.2	33.6
Congo, Dem. Rep. of	0.1	1.4	-0.0	-2.1	-1.2	-0.3	21.7	19.1	15.3	14.7	15.7	13.2
Congo, Rep. of	-2.8	-7.4	6.6	5.8	5.7	6.1	63.0	117.7	90.3	95.3	120.0	106.9
Côte d'Ivoire	-2.1	-3.3	-2.9	-2.3	-5.3	-2.5	37.4	36.9	39.7	37.8	42.1	40.7
Equatorial Guinea	-7.0	-2.6	0.5	1.7	-4.8	-2.4	16.3	36.2	39.5	41.4	54.2	52.2
Eritrea	-6.1	-6.0	4.2	-1.5	-5.0	-4.5	169.4	202.5	185.6	189.2	184.8	174.7
Eswatini	-3.7	-7.0	-11.2	-8.0	-8.9	-7.6	16.0	25.1	33.4	38.4	46.8	49.5
Ethiopia <sup>1</sup>	-1.8	-3.2	-3.0	-2.5	-3.0	-3.4	47.5	57.7	61.1	57.6	56.9	57.6
Gabon	1.1	-1.7	-0.2	1.9	-2.7	-1.3	34.0	62.9	60.6	58.8	67.2	62.1
Gambia, The	-4.3	-5.0	-6.2	-2.6	-2.4	-2.1	60.2	87.0	86.6	82.5	80.3	74.6
Ghana	-7.1	-4.1	-7.0	-7.4	-10.0	-5.4	44.1	57.2	59.1	63.2	67.6	65.5
Guinea	-3.9	-2.1	-1.1	-0.5	-4.3	-4.1	43.9	40.5	38.0	34.5	43.8	45.3
Guinea-Bissau	-2.3	-1.3	-4.8	-4.9	-4.1	-3.9	55.8	52.5	60.1	69.8	70.9	71.1
Kenya	-6.2	-7.9	-7.4	-7.8	-7.7	-6.9	47.1	55.2	60.1	60.8	64.5	66.8
Lesotho	-4.9	-4.0	-4.4	-3.8	-2.0	-7.0	39.1	38.0	47.1	48.5	51.0	50.5
Liberia	-3.3	-4.8	-5.1	-5.4	-5.2	-4.1	21.8	34.0	39.5	55.4	62.8	65.3
Madagascar	-2.1	-2.1	-1.3	-1.4	-4.0	-4.8	35.9	40.0	39.9	38.4	41.0	41.3
Malawi	-4.1	-7.3	-5.5	-6.4	-6.3	-5.2	47.4	61.1	63.1	63.4	68.0	69.1
Mali	-2.6	-2.9	-4.8	-1.7	-5.8	-3.3	27.8	36.0	37.7	40.5	44.7	45.3
Mauritius	-3.0	-1.4	-2.3	-6.5	-10.6	-5.9	59.1	64.3	66.2	72.8	83.7	83.7
Mozambique	-5.2	-2.9	-6.9	-0.2	-7.7	-6.1	61.9	102.4	107.2	109.0	125.4	124.9
Namibia	-6.1	-5.0	-5.3	-4.7	-7.0	-7.2	29.3	43.9	50.2	53.2	66.6	67.7
Niger	-3.3	-4.1	-3.0	-3.6	-4.2	-3.3	21.8	39.6	39.0	42.0	47.1	45.8
Nigeria	-2.2	-5.4	-4.3	-5.0	-6.4	-5.8	17.8	25.3	27.2	29.4	35.3	37.0
Rwanda	-2.1	-2.5	-2.6	-5.2	-8.1	-4.6	20.9	32.3	34.8	38.6	55.1	57.1
São Tomé & Príncipe	-7.0	-2.7	-1.9	-1.8	-4.5	-1.9	80.0	85.8	83.1	73.1	73.5	69.1
Senegal	-4.0	-3.0	-3.6	-3.9	-5.6	-3.3	38.1	61.1	62.1	64.2	67.4	67.6
Seychelles	1.8	0.5	0.2	0.9	-14.1	-5.7	74.5	62.3	57.7	55.3	77.1	73.1
Sierra Leone	-4.8	-8.8	-5.6	-2.9	-5.6	-5.4	43.1	69.2	68.7	67.2	72.9	73.7
South Africa	-4.4	-4.4	-4.1	-6.3	-13.3	-12.7	43.7	53.0	56.7	62.2	77.4	85.6
South Sudan	-9.3	3.3	-0.6	-0.3	-2.7	-1.2	40.0	82.8	57.7	41.8	35.3	30.5
Tanzania	-3.5	-1.2	-1.9	-2.9	-3.8	-4.4	32.0	37.7	38.6	38.1	40.0	41.8
Togo	-6.5	-0.3	-0.8	2.1	-4.1	-1.6	59.3	76.0	76.2	70.9	69.1	64.9
Uganda	-3.6	-3.2	-3.8	-6.7	-6.8	-6.6	24.7	33.7	35.6	40.0	46.3	50.7
Zambia	-5.0	-7.7	-8.2	-7.6	-5.7	-6.9	36.0	63.1	75.0	85.7	109.9	112.6
Zimbabwe <sup>2</sup>	-1.3	-8.1	-4.5	-2.6	-4.9	-1.5	43.3	52.9	37.3	11.0	3.2	2.6
<b>Sub-Saharan Africa</b>	<b>-3.1</b>	<b>-4.5</b>	<b>-3.6</b>	<b>-4.3</b>	<b>-7.0</b>	<b>-6.0</b>	<b>33.1</b>	<b>45.6</b>	<b>48.4</b>	<b>50.1</b>	<b>55.9</b>	<b>57.4</b>
<i>Median</i>	-3.3	-3.2	-3.0	-2.6	-5.0	-3.9	37.1	50.3	50.2	53.2	56.9	57.6
Excluding Nigeria and South Africa	-2.9	-4.2	-3.0	-3.3	-5.3	-3.9	37.4	51.6	54.4	55.7	59.5	59.0
<b>Oil-exporting countries</b>	<b>-1.9</b>	<b>-5.3</b>	<b>-2.5</b>	<b>-3.4</b>	<b>-5.8</b>	<b>-4.9</b>	<b>23.7</b>	<b>38.7</b>	<b>41.9</b>	<b>43.9</b>	<b>48.7</b>	<b>48.4</b>
Excluding Nigeria	-1.3	-5.1	1.2	0.5	-4.0	-2.1	36.8	62.9	71.0	79.2	88.2	83.6
<b>Oil-importing countries</b>	<b>-4.0</b>	<b>-4.0</b>	<b>-4.2</b>	<b>-4.9</b>	<b>-7.7</b>	<b>-6.7</b>	<b>40.3</b>	<b>49.7</b>	<b>52.0</b>	<b>53.8</b>	<b>60.2</b>	<b>63.0</b>
Excluding South Africa	-3.6	-3.9	-4.2	-4.2	-5.6	-4.3	38.1	47.9	49.6	49.8	53.6	53.9
<b>Middle-income countries</b>	<b>-3.2</b>	<b>-5.0</b>	<b>-3.8</b>	<b>-4.9</b>	<b>-8.1</b>	<b>-6.9</b>	<b>32.5</b>	<b>45.5</b>	<b>49.3</b>	<b>52.1</b>	<b>59.3</b>	<b>61.1</b>
Excluding Nigeria and South Africa	-3.0	-5.2	-3.2	-3.8	-6.5	-4.3	38.7	55.8	61.3	65.6	71.5	70.1
<b>Low-income countries</b>	<b>-2.7</b>	<b>-2.8</b>	<b>-2.7</b>	<b>-2.6</b>	<b>-4.0</b>	<b>-3.6</b>	<b>35.8</b>	<b>46.0</b>	<b>45.5</b>	<b>44.0</b>	<b>46.7</b>	<b>47.0</b>
Excluding low-income countries in fragile situations	-3.0	-3.1	-3.1	-3.0	-4.3	-4.3	35.6	47.5	49.7	49.5	52.1	53.1
<b>Countries in fragile situations</b>	<b>-2.2</b>	<b>-3.0</b>	<b>-1.8</b>	<b>-1.6</b>	<b>-3.6</b>	<b>-1.9</b>	<b>37.9</b>	<b>45.6</b>	<b>41.8</b>	<b>38.5</b>	<b>41.4</b>	<b>40.1</b>
CFA franc zone	-2.6	-3.6	-2.0	-1.3	-4.2	-2.5	31.6	46.2	46.9	47.1	51.4	50.1
CEMAC	-2.7	-3.6	0.0	0.3	-2.6	-1.8	30.0	52.4	50.8	51.3	57.8	55.6
WAEMU	-2.8	-3.6	-3.4	-2.3	-5.0	-2.8	33.5	42.3	44.3	44.5	48.0	47.2
COMESA (SSA members)	-3.2	-4.5	-4.3	-4.9	-5.3	-4.7	39.6	49.5	50.9	50.5	54.0	55.2
EAC-5	-4.5	-4.7	-4.9	-6.0	-6.4	-6.0	36.1	44.7	48.1	49.3	53.7	56.2
ECOWAS	-2.8	-4.8	-4.3	-4.5	-6.4	-5.1	23.5	33.4	35.5	36.8	42.1	42.5
SACU	-4.3	-4.3	-4.3	-6.2	-12.5	-11.9	41.9	50.5	54.2	59.2	73.4	81.0
SADC	-3.2	-4.2	-3.0	-4.4	-8.9	-8.1	40.8	52.8	56.9	61.1	70.7	74.4

See footnote on page 17.

Table SA3. Broad Money and External Current Account, Including Grants

	Broad Money (Percent of GDP)						External Current Account, Including Grants (Percent of GDP)					
	2010–16	2017	2018	2019	2020	2021	2010–16	2017	2018	2019	2020	2021
Angola	35.8	32.2	29.3	31.5	31.5	31.8	3.1	-0.5	7.0	2.9	-6.7	-3.0
Benin	27.7	28.6	27.9	28.4	28.4	28.4	-3.3	-4.2	-4.6	-5.1	-5.3	-3.7
Botswana	43.6	40.2	41.2	42.9	43.2	40.6	5.8	6.1	2.1	-5.2	-2.5	-1.7
Burkina Faso	28.1	38.6	38.9	41.3	45.0	47.4	-5.0	-5.0	-4.1	-4.4	-4.3	-4.5
Burundi	21.1	21.3	25.5	32.4	33.3	33.3	-17.4	-14.2	-15.0	-16.4	-17.1	-16.6
Cabo Verde	89.6	104.6	99.4	98.2	101.5	99.2	-8.9	-7.9	-5.3	-0.2	-7.7	-7.6
Cameroon	21.7	22.6	24.4	24.5	24.1	24.1	-3.4	-2.7	-3.6	-3.7	-5.7	-4.8
Central African Rep.	21.8	25.0	27.1	26.2	29.0	27.6	-7.5	-7.8	-8.0	-4.9	-5.3	-5.0
Chad	13.7	15.3	14.3	17.0	18.3	17.8	-9.2	-7.1	-1.4	-4.9	-12.9	-10.1
Comoros	23.2	27.2	28.2	28.0	27.7	27.5	-2.8	-2.1	-2.8	-3.8	-5.7	-4.5
Congo, Dem. Rep. of	11.5	13.5	12.8	15.4	15.0	15.4	-5.3	-3.3	-3.6	-4.2	-5.4	-4.1
Congo, Rep. of	34.8	34.1	26.2	28.9	40.7	38.6	-9.1	-3.5	7.2	8.4	-1.2	-2.8
Côte d'Ivoire	11.2	10.1	10.2	11.6	10.7	10.8	1.0	-2.0	-3.6	-2.7	-3.3	-2.5
Equatorial Guinea	14.9	16.5	15.4	15.5	18.9	18.3	-9.0	-5.8	-5.4	-5.8	-10.4	-7.0
Eritrea	185.5	252.5	239.7	237.7	230.6	222.4	10.2	24.0	19.0	12.1	10.2	9.4
Eswatini	25.6	29.3	28.9	27.7	27.3	27.1	4.8	7.0	2.0	6.2	3.5	4.0
Ethiopia <sup>1</sup>	27.5	31.3	33.7	32.9	31.3	30.8	-6.4	-8.5	-6.5	-5.3	-5.3	-4.6
Gabon	23.2	22.7	24.3	23.3	26.9	26.6	8.0	-6.9	-3.2	-0.8	-8.4	-6.1
Gambia, The	35.5	40.1	42.9	48.4	50.1	50.0	-7.9	-7.4	-9.7	-5.4	-9.8	-9.8
Ghana	23.5	25.8	25.4	26.8	26.6	26.8	-7.0	-3.4	-3.1	-2.7	-4.5	-3.0
Guinea	24.6	23.9	22.5	24.0	25.5	24.1	-16.4	-6.7	-18.7	-13.7	-22.9	-16.1
Guinea-Bissau	35.1	41.1	43.0	45.5	45.5	45.5	-2.5	0.3	-3.5	-10.2	-7.4	-6.4
Kenya	41.4	37.2	37.5	35.7	35.5	36.8	-7.7	-6.2	-5.0	-4.5	-4.6	-4.4
Lesotho	34.3	39.1	40.1	39.4	40.4	39.9	-7.6	-2.4	-1.2	-8.3	6.9	-8.2
Liberia	20.2	18.6	19.6	20.9	22.0	22.3	-17.7	-22.7	-22.4	-22.3	-18.7	-19.7
Madagascar	22.2	25.8	25.5	24.8	27.3	27.3	-4.3	-0.4	0.7	-2.5	-2.9	-3.0
Malawi	24.4	23.6	23.6	22.6	22.6	22.6	-11.2	-25.6	-20.5	-17.2	-17.9	-17.9
Mali	26.0	27.0	29.2	29.5	29.7	29.7	-5.4	-7.3	-4.9	-4.2	-3.7	-3.9
Mauritius	101.3	114.2	115.1	119.6	119.6	119.6	-7.1	-4.6	-5.8	-5.8	-8.4	-7.9
Mozambique	31.1	34.3	35.0	37.9	38.0	38.0	-32.8	-19.1	-30.9	-42.2	-68.8	-74.0
Namibia	58.8	57.9	58.9	63.6	63.6	63.6	-8.0	-4.0	-2.7	-2.3	-0.4	-1.0
Niger	17.3	17.7	15.8	17.1	16.4	16.9	-13.2	-11.4	-12.7	-13.2	-13.5	-16.6
Nigeria	21.2	24.7	25.4	23.9	24.0	24.2	1.6	2.8	1.3	-3.8	-3.3	-2.5
Rwanda	21.3	23.6	25.3	26.2	26.0	27.8	-10.7	-7.5	-8.0	-9.2	-16.2	-10.2
São Tomé & Príncipe	38.3	32.9	35.6	32.5	33.4	33.4	-18.0	-13.2	-11.1	-12.3	-10.6	-8.9
Senegal	31.3	37.8	40.7	41.2	40.3	39.1	-6.3	-7.3	-8.8	-9.1	-11.3	-11.4
Seychelles	62.8	76.4	77.6	83.1	82.6	83.1	-19.7	-20.1	-17.9	-16.7	-27.8	-23.6
Sierra Leone	22.7	23.7	23.0	22.5	23.6	23.5	-24.4	-21.0	-18.7	-13.9	-14.3	-12.7
South Africa	73.0	72.2	72.8	72.8	72.3	71.9	-3.9	-2.5	-3.5	-3.0	0.2	-1.3
South Sudan	20.0	13.9	13.7	11.2	13.4	13.2	-0.2	-3.4	-9.3	-2.5	-2.4	0.3
Tanzania	23.1	20.7	20.3	19.7	20.4	20.8	-9.0	-2.9	-3.5	-3.2	-3.8	-3.8
Togo	46.3	56.0	57.2	55.6	58.6	59.0	-9.3	-2.0	-3.5	-4.3	-5.4	-4.5
Uganda	17.9	18.8	18.9	18.5	18.6	18.5	-6.2	-4.5	-7.2	-9.5	-9.7	-8.1
Zambia	20.7	22.0	22.3	21.9	22.5	22.4	1.8	-1.7	-1.3	1.0	-2.0	-2.6
Zimbabwe <sup>2</sup>	22.1	28.5	23.6	21.3	15.0	16.1	-10.9	-1.3	-5.9	1.1	-1.9	-1.9
<b>Sub-Saharan Africa</b>	<b>35.3</b>	<b>35.9</b>	<b>36.0</b>	<b>35.6</b>	<b>35.3</b>	<b>35.3</b>	<b>-2.6</b>	<b>-2.2</b>	<b>-2.5</b>	<b>-4.0</b>	<b>-4.7</b>	<b>-4.2</b>
Median	25.3	27.2	27.1	28.0	28.4	27.8	-6.5	-4.5	-4.6	-4.5	-5.4	-4.6
Excluding Nigeria and South Africa	28.0	28.6	28.6	29.1	29.1	29.1	-4.6	-4.3	-3.8	-4.4	-7.0	-6.1
<b>Oil-exporting countries</b>	<b>23.1</b>	<b>25.2</b>	<b>25.3</b>	<b>24.5</b>	<b>25.0</b>	<b>25.1</b>	<b>1.2</b>	<b>1.0</b>	<b>1.7</b>	<b>-2.6</b>	<b>-4.2</b>	<b>-3.0</b>
Excluding Nigeria	27.8	26.5	25.0	26.1	27.5	27.3	0.2	-2.2	2.5	0.3	-6.8	-4.4
<b>Oil-importing countries</b>	<b>43.9</b>	<b>42.8</b>	<b>42.7</b>	<b>42.4</b>	<b>41.5</b>	<b>41.3</b>	<b>-5.6</b>	<b>-4.2</b>	<b>-4.9</b>	<b>-4.8</b>	<b>-5.0</b>	<b>-5.0</b>
Excluding South Africa	28.0	29.2	29.5	29.8	29.4	29.5	-6.8	-5.0	-5.6	-5.6	-7.0	-6.5
<b>Middle-income countries</b>	<b>38.7</b>	<b>39.1</b>	<b>39.2</b>	<b>38.8</b>	<b>38.4</b>	<b>38.5</b>	<b>-1.1</b>	<b>-1.0</b>	<b>-1.1</b>	<b>-3.0</b>	<b>-3.2</b>	<b>-2.8</b>
Excluding Nigeria and South Africa	31.2	30.8	30.4	31.2	31.3	31.2	-1.7	-2.9	-1.3	-2.2	-5.1	-4.1
<b>Low-income countries</b>	<b>24.1</b>	<b>26.3</b>	<b>26.6</b>	<b>26.8</b>	<b>26.8</b>	<b>26.9</b>	<b>-8.8</b>	<b>-6.3</b>	<b>-7.1</b>	<b>-7.0</b>	<b>-8.9</b>	<b>-8.2</b>
Excluding low-income countries in fragile situations	24.1	26.1	26.7	26.6	26.7	26.9	-9.7	-6.7	-7.2	-7.8	-9.3	-9.0
<b>Countries in fragile situations</b>	<b>21.7</b>	<b>22.5</b>	<b>21.7</b>	<b>22.6</b>	<b>22.9</b>	<b>22.6</b>	<b>-5.4</b>	<b>-4.8</b>	<b>-5.4</b>	<b>-4.3</b>	<b>-6.6</b>	<b>-5.4</b>
CFA franc zone	21.8	23.5	23.8	24.7	25.6	25.4	-3.4	-4.7	-4.3	-4.1	-6.3	-5.7
CEMAC	21.4	22.4	22.1	22.8	25.4	24.9	-3.4	-4.7	-2.3	-2.2	-7.1	-5.8
WAEMU	22.0	24.2	24.8	25.7	25.7	25.7	-3.7	-4.8	-5.5	-5.3	-5.9	-5.7
COMESA (SSA members)	30.3	32.0	32.5	32.2	31.4	31.7	-6.2	-5.4	-5.2	-4.8	-5.8	-5.1
EAC-5	28.3	26.3	26.4	25.6	25.8	26.5	-8.2	-5.1	-5.2	-5.4	-5.9	-5.3
ECOWAS	21.8	24.9	25.4	24.8	25.0	25.1	-0.5	-0.1	-1.4	-4.4	-4.6	-3.7
SACU	70.4	69.4	70.0	70.2	69.7	69.2	-3.5	-2.1	-3.2	-3.0	0.1	-1.3
SADC	53.1	51.4	50.9	51.2	50.4	50.3	-3.7	-2.5	-2.5	-3.2	-4.0	-4.2

See footnote on page 17.

Table SA4. External Debt, Official Debt, Debtor Based and Reserves

	External Debt, Official Debt, Debtor Based						Reserves					
	(Percent of GDP)						(Months of imports of goods and services)					
	2010–16	2017	2018	2019	2020	2021	2010–16	2017	2018	2019	2020	2021
Angola	25.2	38.2	46.5	58.0	85.4	79.9	8.1	8.4	7.7	11.5	9.3	9.2
Benin <sup>1</sup>	13.2	16.8	18.6	22.8	22.9	22.9	...	...	...	...	...	...
Botswana	15.7	12.6	11.3	11.0	8.8	8.4	11.8	12.4	11.5	11.8	10.2	9.2
Burkina Faso <sup>1</sup>	21.0	22.1	20.7	22.4	22.9	21.8	...	...	...	...	...	...
Burundi	20.7	16.0	16.1	16.6	19.4	18.9	3.0	1.3	0.8	0.7	0.7	0.7
Cabo Verde	75.0	100.6	99.5	98.7	106.6	100.4	5.0	5.2	5.8	8.6	8.4	7.7
Cameroon <sup>2</sup>	13.6	26.3	27.6	30.2	34.5	35.2	...	...	...	...	...	...
Central African Rep. <sup>2</sup>	22.3	29.5	26.9	27.2	26.6	24.9	...	...	...	...	...	...
Chad <sup>2</sup>	23.6	26.3	24.2	24.2	26.9	24.1	...	...	...	...	...	...
Comoros	18.6	17.8	18.9	23.6	29.8	32.4	7.0	6.8	6.9	6.8	5.9	5.5
Congo, Dem. Rep. of	16.6	14.6	12.9	12.6	13.1	11.3	1.2	0.4	0.5	0.8	0.9	1.5
Congo, Rep. of <sup>2</sup>	27.6	40.0	34.0	38.9	56.4	52.8	...	...	...	...	...	...
Côte d'Ivoire <sup>1</sup>	24.1	24.0	26.9	26.6	31.5	30.8	...	...	...	...	...	...
Equatorial Guinea <sup>2</sup>	7.4	9.2	9.2	11.2	20.1	23.2	...	...	...	...	...	...
Eritrea	62.2	70.9	64.4	61.7	58.1	54.0	3.1	2.3	2.6	2.3	2.2	2.7
Eswatini	7.9	8.9	9.8	11.7	18.3	19.8	4.0	3.3	2.8	2.8	3.3	3.1
Ethiopia <sup>3</sup>	22.9	29.1	30.6	28.4	29.9	31.8	2.0	2.0	1.7	2.3	2.1	2.6
Gabon <sup>2</sup>	23.9	40.6	38.5	39.0	48.8	46.7	...	...	...	...	...	...
Gambia, The	32.0	45.8	46.6	45.1	45.7	43.9	4.0	2.8	2.7	3.8	3.7	4.1
Ghana	21.8	29.1	30.6	30.2	36.0	33.2	2.7	2.8	2.6	3.4	2.7	2.8
Guinea	28.7	20.5	19.3	19.3	29.0	32.7	2.3	1.4	2.1	2.3	2.1	2.3
Guinea-Bissau <sup>1</sup>	24.7	18.2	20.8	23.9	23.6	23.5	...	...	...	...	...	...
Kenya	22.1	27.1	30.4	31.3	31.3	30.8	4.1	4.2	4.8	6.0	4.7	4.4
Lesotho	33.3	36.4	36.2	34.1	40.5	34.0	5.0	4.4	3.4	4.9	3.9	3.5
Liberia	10.8	24.2	28.6	36.2	43.3	46.4	1.9	2.5	2.3	2.5	2.6	2.8
Madagascar	22.6	24.8	25.6	27.0	28.9	30.3	2.8	3.8	4.3	4.5	3.5	3.7
Malawi	21.8	32.8	31.1	29.7	29.6	31.3	2.0	3.1	3.0	3.2	3.3	3.4
Mali <sup>1</sup>	21.4	26.2	24.0	26.3	28.6	28.4	...	...	...	...	...	...
Mauritius	14.1	12.9	11.2	13.9	16.8	17.9	6.1	9.5	10.2	16.4	7.9	6.9
Mozambique	50.7	94.3	91.3	93.0	105.1	108.7	3.1	3.7	2.9	3.2	2.4	2.0
Namibia	9.4	16.2	16.1	18.3	20.9	19.0	2.6	1.7	2.0	2.8	2.9	3.3
Niger <sup>1</sup>	15.0	25.3	23.2	25.3	29.3	28.6	...	...	...	...	...	...
Nigeria	6.5	15.6	16.5	15.5	17.4	16.9	5.9	6.6	5.1	6.1	3.9	3.2
Rwanda	21.3	37.3	40.8	45.1	47.7	48.4	4.8	4.4	4.7	5.5	3.6	3.6
São Tomé & Príncipe	77.9	78.0	66.3	66.7	73.5	69.1	4.0	3.6	2.7	3.8	3.0	3.2
Senegal <sup>1</sup>	26.5	39.4	44.9	47.1	48.6	47.3	...	...	...	...	...	...
Seychelles	41.2	29.3	28.4	26.9	32.3	27.0	3.3	3.5	3.6	5.3	2.0	1.8
Sierra Leone	28.3	40.5	38.6	39.7	46.8	48.7	2.7	4.0	3.5	4.0	3.6	3.4
South Africa	13.6	21.3	18.2	21.4	22.0	22.1	5.3	5.6	6.0	8.9	7.6	7.0
South Sudan	...	...	...	...	...	...	2.4	0.1	0.2	0.6	0.2	0.3
Tanzania	23.8	28.6	28.8	27.4	28.1	28.8	4.2	6.2	5.7	4.9	4.6	4.4
Togo <sup>1</sup>	16.3	21.1	19.7	23.5	26.2	25.4	...	...	...	...	...	...
Uganda	14.5	21.6	23.6	26.6	29.0	30.1	4.7	4.5	4.1	4.1	3.7	3.5
Zambia	19.3	36.7	41.7	50.5	70.7	73.2	3.0	2.2	2.1	2.2	1.1	0.8
Zimbabwe <sup>4</sup>	36.6	31.1	33.9	39.1	42.2	42.5	0.5	0.5	0.2	0.2	0.2	0.2
<b>Sub-Saharan Africa</b>	<b>15.4</b>	<b>24.2</b>	<b>24.6</b>	<b>25.7</b>	<b>28.7</b>	<b>28.1</b>	<b>5.0</b>	<b>5.0</b>	<b>4.6</b>	<b>5.9</b>	<b>4.4</b>	<b>4.2</b>
Median	21.5	26.3	27.2	27.1	29.7	30.8	3.5	3.6	3.0	3.8	3.3	3.3
Excluding Nigeria and South Africa	21.9	29.2	30.7	32.3	36.5	36.1	4.2	4.0	3.8	4.6	3.7	3.7
<b>Oil-exporting countries</b>	<b>11.2</b>	<b>22.1</b>	<b>23.5</b>	<b>23.5</b>	<b>27.3</b>	<b>26.1</b>	<b>6.0</b>	<b>6.4</b>	<b>5.2</b>	<b>6.5</b>	<b>4.4</b>	<b>3.9</b>
Excluding Nigeria	21.8	34.1	37.6	43.8	57.8	55.1	6.4	6.0	5.3	7.4	5.9	5.8
<b>Oil-importing countries</b>	<b>18.6</b>	<b>25.4</b>	<b>25.2</b>	<b>26.9</b>	<b>29.5</b>	<b>29.3</b>	<b>4.1</b>	<b>4.2</b>	<b>4.3</b>	<b>5.5</b>	<b>4.5</b>	<b>4.4</b>
Excluding South Africa	22.1	27.7	28.8	29.5	32.3	32.3	3.3	3.4	3.3	3.9	3.2	3.3
<b>Middle-income countries</b>	<b>13.7</b>	<b>23.0</b>	<b>23.5</b>	<b>24.7</b>	<b>28.0</b>	<b>27.1</b>	<b>5.5</b>	<b>5.6</b>	<b>5.2</b>	<b>6.9</b>	<b>5.1</b>	<b>4.7</b>
Excluding Nigeria and South Africa	21.3	30.0	32.7	35.5	41.9	40.6	5.4	4.9	4.7	6.2	4.7	4.6
<b>Low-income countries</b>	<b>23.1</b>	<b>28.2</b>	<b>28.2</b>	<b>28.6</b>	<b>30.6</b>	<b>31.2</b>	<b>2.7</b>	<b>2.8</b>	<b>2.6</b>	<b>2.8</b>	<b>2.6</b>	<b>2.7</b>
Excluding low-income countries in fragile situations	22.8	30.6	31.3	31.4	33.1	34.2	3.1	3.7	3.3	3.5	3.1	3.2
<b>Countries in fragile situations</b>	<b>23.9</b>	<b>25.0</b>	<b>24.6</b>	<b>25.2</b>	<b>28.9</b>	<b>28.3</b>	<b>2.7</b>	<b>1.5</b>	<b>1.7</b>	<b>2.2</b>	<b>2.1</b>	<b>2.4</b>
CFA franc zone	19.6	26.6	27.3	29.1	33.4	32.7	5.0	3.2	3.6	4.6	3.9	3.9
CEMAC	17.5	27.9	27.3	29.6	36.4	36.0	4.8	2.3	2.8	3.7	3.7	3.7
WAEMU	21.5	25.7	27.3	28.8	31.7	31.0	5.1	4.0	4.4	5.5	4.1	4.0
COMESA (SSA members)	21.0	26.2	27.6	28.6	30.7	31.1	3.0	3.0	3.1	3.8	3.0	3.1
EAC-5	20.9	26.9	29.0	29.8	30.6	30.8	4.3	4.8	4.9	5.2	4.4	4.2
ECOWAS	11.0	19.8	21.0	20.4	23.2	22.4	5.0	5.2	4.1	5.1	3.5	3.1
SACU	13.6	20.7	17.9	20.7	21.4	21.4	5.4	5.7	6.1	8.7	7.5	6.9
SADC	18.2	26.4	25.7	28.8	32.9	32.3	5.3	5.6	5.6	7.6	6.1	5.8

See footnote on page 17.