2. Competitiveness in Sub-Saharan Africa: Marking Time or Moving Ahead?

In recent years the sub-Saharan African region has experienced strong real GDP growth and substantial trade integration. However, growth in sub-Saharan Africa's trade volumes has not kept up with growth in the volume of global trade during this period and its trade imbalances have begun to rise in recent years. Meanwhile, the drivers of growth since the mid-1990s—improved policies, increased aid, debt relief, abundant global liquidity, and high global commodity prices—have started to dissipate. Moving forward, to sustain rapid growth the region will need to diversify away from commodities, increase export sophistication, and integrate into global value chains. This chapter assesses how competitiveness indicators in sub-Saharan Africa have evolved, and on this basis asks if the region is well placed to diversify its export base and sustain growth. It also discusses policy options to improve competitiveness.

The main findings of the chapter are:

- Strong average growth in the last decade in sub-Saharan Africa has benefited from a set of unique circumstances. At the same time, a broad range of indicators point to weak and deteriorating competitiveness in the region, especially in commodity exporters.[1]
- The region has experienced fewer episodes of sustained growth necessary to produce a durable increase in incomes than has other regions, but the frequency of such spells has increased in the last 15 years. When growth spells have occurred in the region, three factors primarily explain them: high commodity prices; emergence from a period of civil conflict; and competitive real exchange rates. Overall, the empirical analysis provides strong evidence for the importance of competitive real exchange rates for sustaining growth spells.[2]
- While specific recommendations depend on country circumstances, some broad principles for policy action are pursuing sound macroeconomic policies, including not resisting near-term depreciation pressures in the face of terms-of-trade shocks; undertaking productivity-enhancing infrastructure investments while maintaining debt sustainability; eliminating remaining trade barriers; and improving institutions to enhance the business climate.

SETTING THE STAGE

Developments in Growth

After several decades of lackluster growth, the pace of economic activity in the region picked up in the mid-1990s. Particularly, since the global financial crisis, growth in sub-Saharan Africa has outpaced that in other regions with the exception of emerging and developing Asia.

While the rapid growth in the region's many commodity exporters has been supported by rising commodity prices, as has been observed previously,

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[1] A substantial literature suggests the tradable sector is "special" from the standpoint of growth because of learning externalities and technological spillovers that result from being exposed to international competition (Rodrik 2008), complementarities between activities that can spur integration into global value chains (Eichengreen 2007), and economies of scale (Feder 1983). Thus, institutional weaknesses and market failures that are thought to disproportionately affect the tradable sector result in an underallocation of resources to the tradable sector and low growth. Maintaining a competitive real exchange rate can correct some of the misallocation of resources and spur growth in the short to medium term.

[2] A competitive real exchange rate in this sense is different from the exchange rate assessment under the External Balance Assessment (EBA) methodology, which relates the exchange rate to external stability (see Phillips and others 2013).

growth in the region has not only been driven by commodities.[3] Many countries in the region that are not reliant on commodities were also able to achieve rapid growth by creating a virtuous circle of good macroeconomic policies and important structural reforms that attracted higher aid flows. Thus, eight of the 12 fastest growing countries in the region over 1995–2010 were nonresource-dependent economies. Growth across the region has also benefited from increased private capital flows. The period since the mid-1990s saw a spurt of financial innovations that, together with the improved policy environment and debt relief, allowed such flows to the region to increase very significantly.

While some of these growth drivers will continue to yield dividends, others have run their course. As noted in Chapter 1, commodity prices have retreated, the ongoing shift in China's growth model is likely to reduce demand for the region's raw materials, and the period of abundant global liquidity is tapering down. At the same time, the convergence growth dividend resulting from the poor initial conditions in many countries in the region is slowly dissipating. This suggests that in order for countries in the region to maintain growth moving forward, they will increasingly have to rely on more traditional growth drivers such as competitiveness, which has been a key determinant of sustained growth elsewhere in the world, including in Asia most recently.

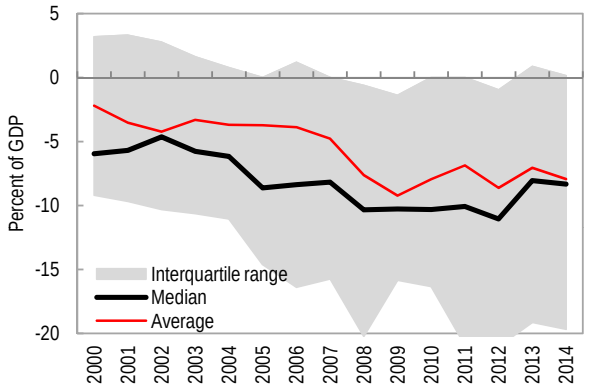
Evolution of Trade Balances

Against this background, the deterioration in sub-Saharan Africa's trade balances since the mid-2000s raises questions about the region's competitiveness (Figure 2.1).

- The increase of import volumes has been the driving force behind the deterioration of trade balances in the region (Figure 2.2). This is largely explained by capital goods imports, as the region has sought to overcome its infrastructure deficit (Figure 2.3). This represents a positive development as it enhances the prospects for future growth.

[3] See Chapter 2 of *Regional Economic Outlook: Sub-Saharan Africa*, October 2008, and Chapter 2, *Regional Economic Outlook: Sub-Saharan Africa*, October 2013.

Figure 2.1. Sub-Saharan Africa: Goods Trade Balance as a Share of GDP, 2000–14



Source: IMF, World Economic Outlook database.

- However, a concern is that export volume growth has been largely concentrated in non-oil commodity exporters, driven by strong external demand and high prices. Elsewhere, export volume growth has been weak.

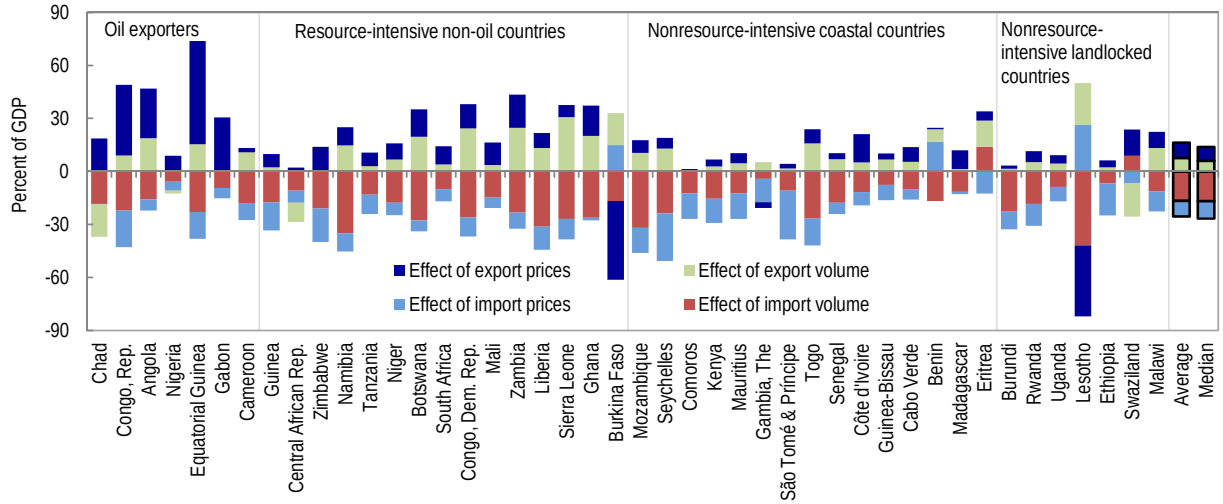
Global Export Shares

These concerns are borne out by changes in the region's share of global exports, and its domestic value added exported as a share of global domestic value added exported (that is, its global value-added income).[4] Figure 2.4, which reports data for countries with GDP per capita below $20,000 in 2014, indicates that, with the exception of commodity exporters, the penetration of sub-Saharan African countries in global trade in terms of gross exports has barely changed since 1995.[5] This is in marked contrast with countries in other regions, many of which have experienced significant increases in their market share.

[4] Trade in value-added terms has become more prominent in the last decade due to the increased fragmentation of production. As firms in many countries have integrated into global value-chains, it is important to assess trade in value-added terms rather than gross exports. For sub-Saharan African countries, however, the integration into global value chains has been only a nascent development as discussed in Chapter 3, *Regional Economic Outlook: Sub-Saharan Africa*, April 2015.

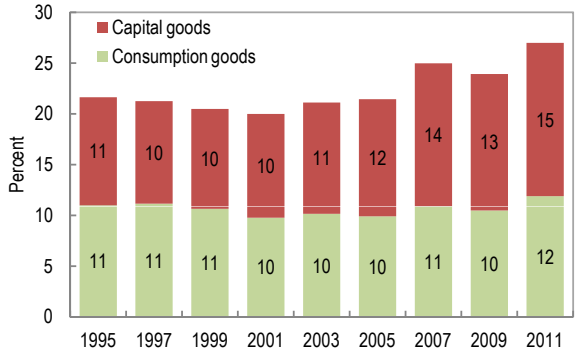
[5] A similar pattern emerges when using the domestic value-added exported as a share of global domestic value added exported.

Figure 2.2. Sub-Saharan Africa: Effects of Prices and Volume Variations on the Change in the Trade-Balance-to-GDP Ratio between 2004 and 2014



Source: IMF, World Economic Outlook database.

Figure 2.3. Sub-Saharan Africa: Imports to GDP, 1995–2011



Source: IMF staff calculations based on Penn World Tables 8.0.

Note: Capital goods include capital goods and industrial supplies. Consumption goods include consumer goods, food and beverages, fuel and lubricants, and transport equipment.

Diversification into Manufactured Exports

Export diversification, especially into manufacturing, has been shown to be an important indicator of competitiveness (for example, Johnson, Ostry, and Subramanian 2010).[6] One possible reason for this is Hausmann and Hidalgo's (2012) finding that most manufactured goods tend to be closely connected to other goods, facilitating further diversification.

- The share of manufacturing in the region's exports, relative to the share of global manufacturing in total global exports, confirms that sub-Saharan Africa remains far less specialized in manufacturing than other countries that have grown strongly for a sustained period (Figure 2.5).[7]
- Specifically, sub-Saharan Africa shows a degree of specialization in manufacturing that is just above half of that in the world as a whole. However, the region's share was higher than the average degree of specialization in other low-income developing countries.[8] Moreover, many countries in the region have manufacturing shares comparable to Bangladesh and Vietnam, countries that have made substantial progress in recent years in diversifying their exports.
- Of greater concern is the fact that between 1991–95 and 2008–12, the share of manufacturing in the region's exports declined relative to the world as a whole (Figure 2.5).

[6] While globally, export diversification towards the manufacturing sector has been closely related to growth, some sub-Saharan African countries have enjoyed success in diversifying their exports of services and commercial/non-traditional agricultural products. This could be a path that a few other countries in the region may take too.

[7] The manufacturing sector's domestic value-added exported as a share of total value-added exports relative to the same ratio for the world has a similar pattern.

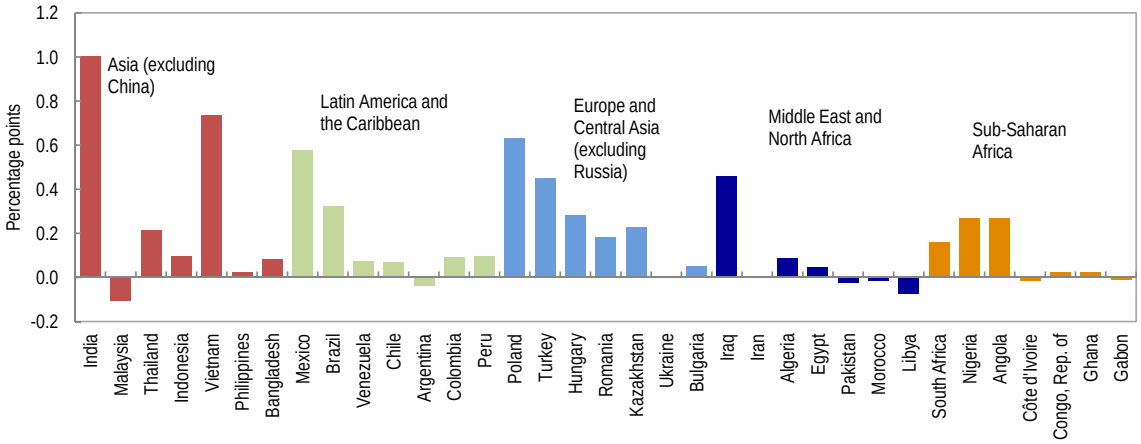
[8] These countries include: Afghanistan, Bangladesh, Bhutan, Cambodia, Djibouti, Haiti, Honduras, Kyrgyz Republic, Lao PDR, Mauritania, Moldova, Mongolia, Myanmar, Nepal, Nicaragua, Papua New Guinea, Sudan, Tajikistan, Uzbekistan, Vietnam, and Yemen.

In summary, the evolution of trade aggregates presents a mixed picture of competitiveness in sub-Saharan African countries. While the significant role of capital imports in explaining the deterioration in trade balances is reassuring, the performance of exports, particularly of the manufacturing sector, raises questions about the region's competitiveness. These developments suggest that a deeper analysis of the region's competitiveness is warranted to assess where sub-Saharan African countries stand in relation to their peers.

INDICATORS OF COMPETITIVENESS: WHAT DO THEY REVEAL?

In the discussion below we consider the evolution of a wide range of competitiveness indicators (Table 2.1). We first look at real effective exchange rate (REER) indices, followed by relative aggregate price levels adjusted for changes in productivity across countries (for example, the Balassa-Samuelson effect), and then at disaggregated price components. Finally, this section looks at nonprice

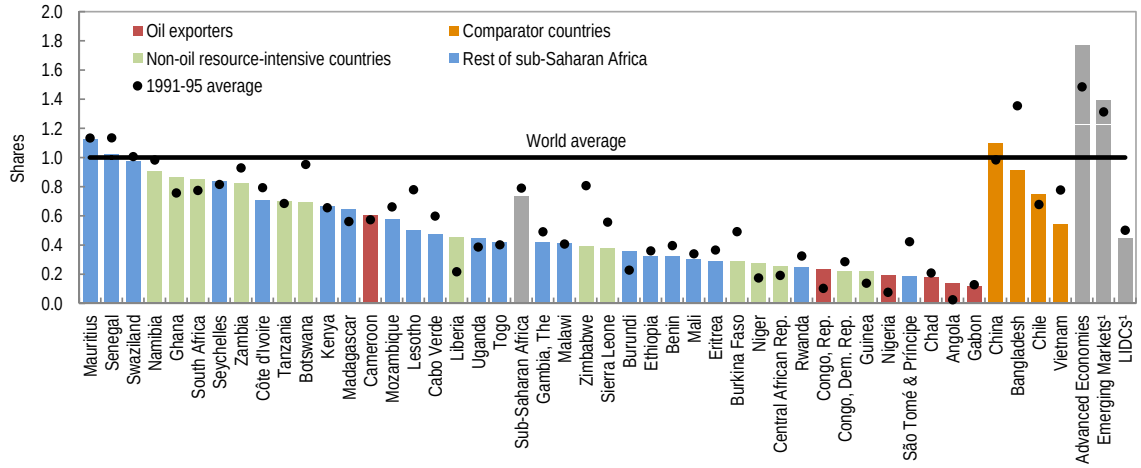
Figure 2.4. Selected Countries: Domestic Exports as a Share of Total Global Exports, Change from 1995–2014



Source: IMF staff calculations based on data from IMF, Direction of Trade Statistics.

Note: Only emerging and developing countries with 2012 GDP per capita below US$20,000 from each region are considered. China is excluded from the Asia group and Russia from the Europe and Central Asia Group, as their value is significantly greater than the average for that region.

Figure 2.5. Sub-Saharan Africa and Comparator Countries: Manufacturing's Share of Gross Exports by Country Relative to World, Average over 2008–12



Source: IMF staff calculations based on data from IMF, Eora database.

Note: A value of 0.5 indicates that, for the country in question, the share of manufacturing in gross exports is only 50 percent of that share at the global level.

¹Excluding sub-Saharan African countries. LIDCs = low-income developing countries.

Table 2.1. Competitiveness Indicators

Indicator	Description	Strengths	Weaknesses
Price Index-Based Indicators			
Standard real effective exchange rate (REER)	The REER is an index calculated as the trade-weighted average of bilateral real exchange rates against trade partners that uses the Consumer Price Index (CPI) as the price deflator and gross bilateral trade shares as weights. An increase in the REER implies that exports become more expensive and imports become cheaper; that is, a loss in trade competitiveness.	Widely used; easy to compute.	It is an index that only provides information on changes in competitiveness relative to trade partners; uses gross exports and imports that are not an accurate reflection of domestic production in the calculation of trade shares; and uses the CPI, which does not accurately reflect domestic costs of production. Reflects the use of different consumption baskets across countries. Trade partners remain fixed over time.
Global value chain (GVC) REER	GVC-based REER uses value-added exports and imports as weights instead of gross exports as in the case of the standard REER.	Provides a more accurate description of domestic production due to the use of value-added trade weights and the GDP deflator, which better reflect production costs.	Data are less easily available, with some missing data in terms of countries. Data available only through 2012.
Price Level-Based Indicators			
Balassa-Samuelson adjusted relative price level	This is a direct measure of competitiveness of the real exchange rate, taking account of the Balassa-Samuelson effect, that is, the deviation of the real exchange rate from the level predicted taking account of the Balassa-Samuelson effect, whereby wealthier countries have more appreciated real exchange rates on account of higher productivity.	Based on price-level data relative to the United States. Strong theoretical link to export performance and growth. Estimated using Penn World Tables data that include consistent data for a large amount of countries over a long time period.	Does not capture other structural factors (for example, business environment) that may have an impact on competitiveness. Unlike the REER does not provide an assessment of competitiveness relative to all trading partners.
Import and export basket	Calculates the domestic cost of the country's import basket, and the foreign cost of the export basket using price-level data from the World Bank's International Comparison Program.	Uses comparable consumption baskets across countries; uses price level instead of indices and allows trade weights to change over time. This makes it comparable across countries and over time.	Data are available for only two years, 2005 and 2011.
Non-Price-Based Indicators			
Global Competitiveness Index	Based on surveys and data collection, describes institutions, policies and factors that determine productivity in a country.	Based on theoretical and empirical research, takes into account the different stages of development of countries.	Opinions collected in surveys answered by business leaders are subjective, may be influenced by changes in perceptions.

Source: Prepared by IMF staff.

competitiveness indicators, with a view to capturing institutional and structural constraints that hold back the tradable sector.

Real Effective Exchange Rate Indices

The REER, which measures relative movements in aggregate price indices across countries, has traditionally been a key indicator to assess competitiveness. We consider here two concepts of the REER. The standard REER measures the changes in the consumer price index (CPI) relative to trade partners, expressed in a common currency and weighted by the gross bilateral trade share by partner. The analogous value-added REER (the global value chain [GVC] REER), which takes into account value-added instead of gross bilateral trade, also substitutes GDP deflators, as a proxy for the price of exported domestic value added (see Annex 2.1).[9]

[9]See Bems and Johnson (2012) for a discussion of the construction of this index.

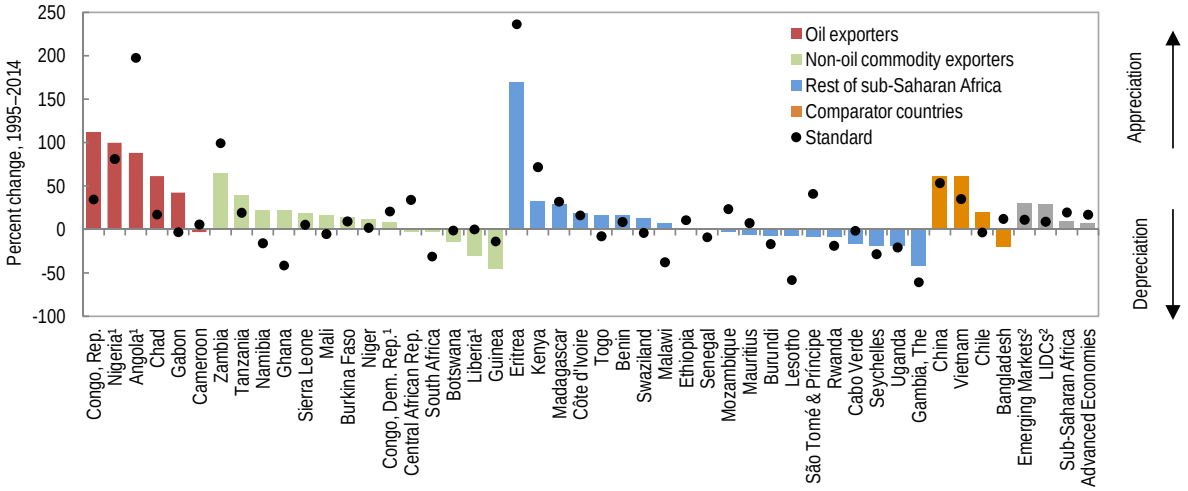
An appreciation of the REER makes exports more expensive than foreign competition and imports cheaper than domestic production, and thus signals a loss in competitiveness relative to trading partners.[10]

The aggregate picture is of a modest appreciation in both the REER and the GVC REER over 1995–2014 (Figure 2.6). However, this masks the pronounced change in trend over time and the marked diversity at the individual country level.

- Notably, both REERs point to a sustained depreciation over 1995–2002 followed by a strong appreciation since 2002 (Figure 2.7).
- This pattern is more pronounced in commodity exporters, where REERs have on average appreciated by 40 percent since 2002, and is

[10]Alternatively, an appreciation of the REER signals an improvement in the profitability of nontraded goods relative to traded goods. This draws resources away from the traded sector and eventualy results in a deterioration in the trade balance.

Figure 2.6. Sub-Saharan Africa and Comparator Countries: Change in Real Effective Exchange Rate, Standard versus Global Value Chains, 1995–2014



Sources: IMF, staff calculations based on data from IMF, Information Notice System (INS), and Eora database.

¹Global value chain (GVC) REERs (in bars) are based on 1995–2012. Data for these countries begin after 1995 due to data availability (with start dates in parentheses): Angola (2000); Democratic Republic of Congo (2010); Liberia (2000); Nigeria (1999).

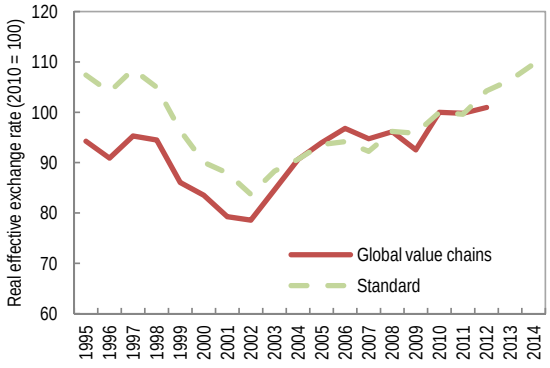
² Excluding sub-Saharan African countries. LIDCs = low-income developing countries.

suggestive of Dutch disease associated with the period of strong commodity prices (Figure 2.8). As a consequence, many commodity exporters, including Nigeria and Angola, which are among the largest countries in the region, show substantial appreciation of their REERs over the entire period 1995–2014.

- REERs of noncommodity exporters have also appreciated since 2002, but not as sharply as in commodity exporters (Figure 2.8). Indeed, over 1995–2014, REERs in most noncommodity exporters either appreciated modestly or depreciated.
- Countries with pegged exchange rates seem to show a more stable REER than floaters (Figure 2.9).

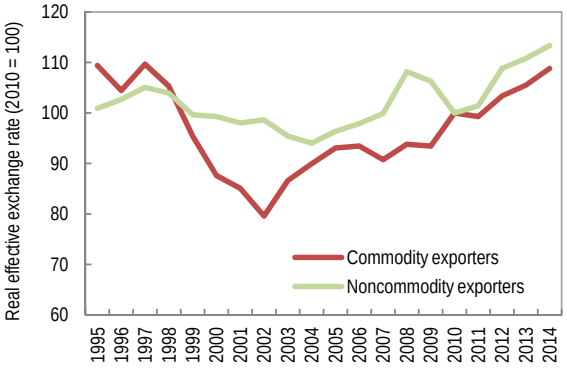
A decomposition indicates that nominal exchange rate depreciations are the main contributors to the depreciation of the REER, most notably in countries with floating exchange rate regimes,

Figure 2.7. Sub-Saharan Africa: Change in Real Effective Exchange Rate, Global Value Chains versus Standard, 1995–2014



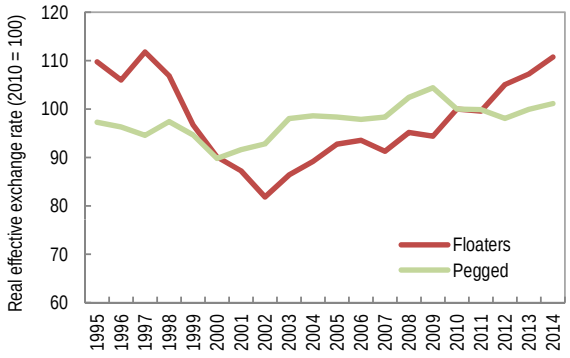
Sources: IMF staff calculations based on data from IMF, Information Notice System (INS), and Eora database.

Figure 2.8. Sub-Saharan Africa: Change in Standard Real Effective Exchange Rate, Commodity Exporters versus Noncommodity Exporters, 1995–2014



Source: IMF staff calculations based on data from IMF, Information Notice System (INS).

Figure 2.9. Sub-Saharan Africa: Change in Standard Real Effective Exchange Rate, Countries with Floating versus Pegged Exchange Rate Systems, 1995–2014



Source: IMF staff calculations based on data from IMF, Information Notice System (INS).

whereas relatively large inflation is often the driver behind their appreciation (Figure 2.10). In a number of countries, mainly floaters, nominal currency depreciations were accompanied by offsetting inflation, although many were also able to sustain a depreciation of the REER. Peggers generally saw little change in their nominal exchange rates or inflation.

Relative Price Level Adjusted for Balassa-Samuelson Effects

An important advantage of the standard REER is that it is easily computable from readily available data. However, REERs are indices, and hence only permit a comparison of relative price changes, but not relative and absolute price levels across countries. Thus, movements in the REER may indicate that a country is becoming more competitive relative to its trading partners, while it remains at a competitive disadvantage on account of its higher cost levels. To account for this, we consider a country's aggregate price level relative to the United States to assess where countries in the region presently stand (in level terms) with regard to competitiveness.[11]

This indicator also adjusts for the Balassa-Samuelson effect, that is, the upward bias of the REER and GVC REER indicators associated with faster productivity growth in the tradable goods sector, which is not necessarily reflective of a deterioration in competitiveness.[12] Hence, this adjustment corrects for differences in relative price levels that result from differences in productivity across countries and time. Figure 2.11 plots the relative price level for countries around the world. As predicted by the Balassa-Samuelson effect, there does indeed seem to be a robust positive relationship between relative prices and income levels.[13] A price level relative to the United States below the trend line could be indicative of a country benefitting from strong competitiveness, and vice versa. Many sub-Saharan African countries have relative prices that are higher than predicted by their income levels, suggesting they could be uncompetitive relative to other countries.

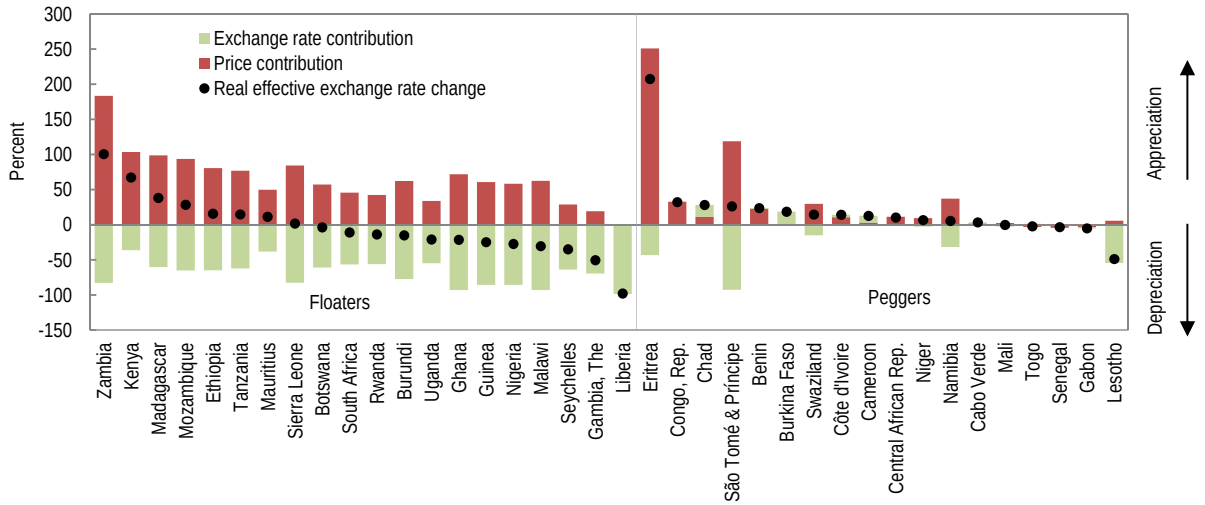
To further explore the competitiveness of sub-Saharan African countries we run a series of cross-section regressions that correct relative prices for differences in income levels. The results suggest that relative prices in sub-Saharan Africa in 2014 (or latest observation available) are on average 8 percent above the level predicted after adjusting for the Balassa-Samuelson effect, pointing to signs of a competitiveness problem (Figure 2.12). With a few notable exceptions (for example, Burundi, Kenya, and Mozambique) nearly all countries that appear to be uncompetitive are either commodity

[11] Specifically, we use aggregate price-level data since 1980 from the Penn World Tables, consisting of the price level in the country concerned relative to the United States. As noted by Rodrik (2008) this is equivalent to the real exchange rate.

[12] The Balassa-Samuelson effect conjectures that fast-growing countries are characterized by relatively faster productivity and wage growth in the tradable sectors that also exert upward pressure on wages in the nontradable sector. With no increase in productivity in the nontradable sector, prices rise, resulting in a deterioration in competitiveness. For further details see Rogoff (1996).

[13] We use data from the Penn World Tables (version 8.0), extended to 2014 (or the latest observation available) using data from the World Bank's WDI database. The Penn World Tables have the benefit of being consistent across countries and over time, and also including comparable data back to at least the 1970s—an important element given evidence that the Balassa-Samuelson effects matter over longer-term horizons (De Gregorio and Wolf 1994).

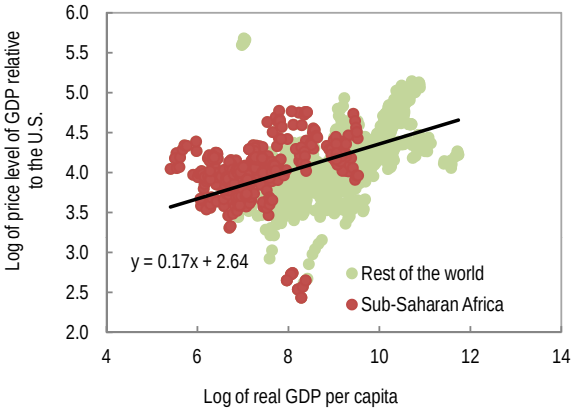
Figure 2.10. Sub-Saharan Africa: Contribution to Change in Standard Real Effective Exchange Rate, 1995–2012 Cumulative



Source: IMF staff calculations based on data from IMF, Information Notice System.

Note: Real effective exchange rate is Information Notice System weighted and uses consumer price indices.

Figure 2.11. Sub-Saharan Africa and Rest of the World: Balassa-Samuelson Effect



Source: IMF, staff calculations based on data from Penn World Tables and World Bank, World Development Indicators (2015).

producers or have pegged exchange rates. By contrast, countries with competitive relative price levels tend to have floating exchange rates and not be commodity exporters.[14]

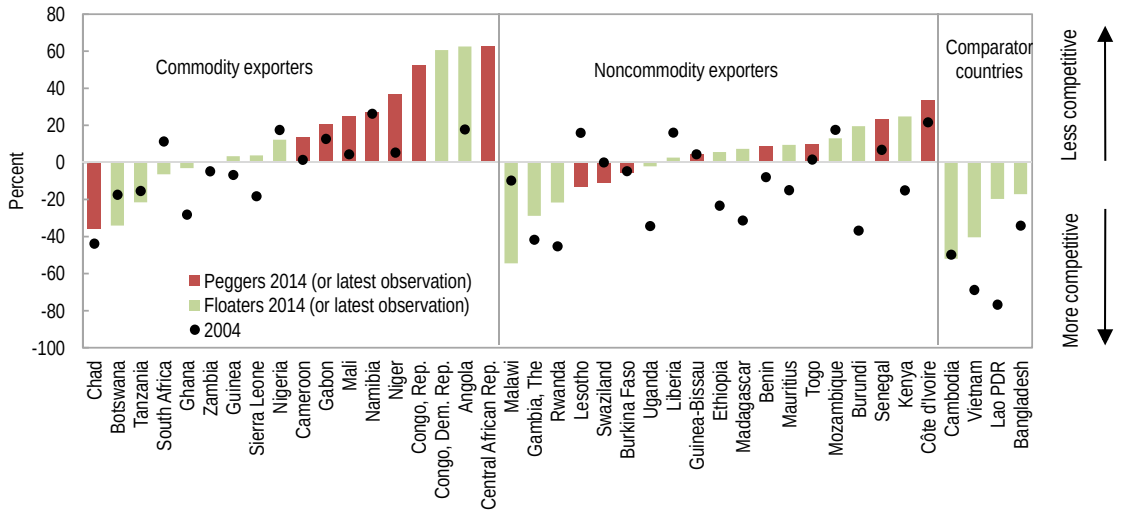
For the purpose of assessing the competitiveness of countries in the region, we also identify as comparators a group of other low-income countries, whose economic circumstances are likely to be most closely related to sub-Saharan African countries. Furthermore, we restrict the comparators to countries that have in recent years managed to integrate well into global trading networks and diversify their exports, and hence are likely to be sub-Saharan Africa's main competitors as they seek to achieve similar objectives. On this basis, we use Bangladesh, Cambodia, Lao PDR and Vietnam as a set of comparators for sub-Saharan Africa.[15] It is notable that relative price levels in our comparator group in 2014 were below the level consistent with competitiveness after the Balassa-Samuelson adjustment, in some instances by large margins.

Moreover, a comparison with data for 2004 suggests that competitiveness has deteriorated in all but a handful of countries. Commodity exporters appear to have struggled with uncompetitive relative price levels for a number of years. On the other hand, it is noticeable that many noncommodity

[14] This lack of competitiveness among countries with pegged exchange rates contrasts with the earlier finding that countries with fixed exchange rates have experienced less REER appreciation since 2010 because of lower inflation. A closer examination of data suggests however that this low inflation was often accompanied by lackluster growth. Côte d'Ivoire and Senegal, for example, have recorded average real per capita GDP growth below 1 percent since 2004.

[15] Low-income countries (LICs) in the Middle East and North Africa (MENA) and Latin America and the Carribean (LAC) have not enjoyed the same success in integrating into global trading networks. As defined by the IMF, the only LIC in Europe is Moldova, which is structurally very different from sub-Saharan African LICs.

Figure 2.12. Sub-Saharan Africa: Balassa-Samuelson-Adjusted Real Exchange Rate



Sources: Penn World Tables 8.0; World Bank, World Development Indicators database; and IMF staff estimates.

exporters with floating exchange rates appear to have benefited from competitive relative price levels in the past, a fact that may help explain their recent robust growth performance.

Disaggregated Price Components

The previous section pointed to the high relative price levels in sub-Saharan Africa that made it uncompetitive, especially in relation to its key comparators. Against this background, this section discusses sub-Saharan Africa's standing in relation to its competitors with respect to key production inputs, which have a strong bearing on relative price levels. In particular, we discuss the cost of labor, transportation, communication, and electricity.

Cost of Labor

The cost of labor is an important determinant of production costs, but available wage data for sub-Saharan Africa are scarce. Furthermore, wages in the large informal sector, where employees have a low reservation wage, are not readily available and hence the data may indicate a higher wage level than what actually prevails. This calls into question how good a proxy these wage data are for competitiveness. On the other hand, export activity typically requires larger firm size to overcome the fixed costs of trade, and such firms generally rely on higher-skilled formal sector labor.

Real hourly dollar wages in sub-Saharan Africa, in many instances, seem to be higher than in other emerging and developing countries.[16] Notwithstanding lower nominal dollar wages in the region than elsewhere, it is instructive to note that real wage levels in sub-Saharan African countries remain relatively high. Indeed, when real wages are plotted against real GDP per capita (Figure 2.13) it appears that real wages in the region's countries are higher than in other emerging and developing countries at a comparable income level, likely reflecting the scarcity of skilled labor in the region.[17] Thus, taking account of sub-Saharan Africa's lower productivity, the gap with other regions in terms of unit labor costs is higher still.

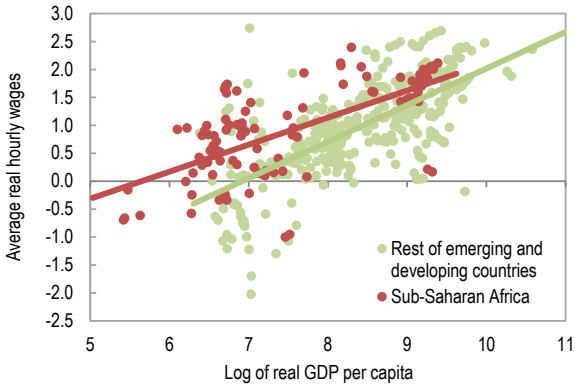
Developments in Nontradable Input Prices

Communications, transport, and electricity are among the most important nontraded inputs in the production process and their costs have a major bearing on a country's aggregate price level. This subsection compares how such costs have evolved in the region and its key comparators (Bangladesh,

[16] These data refer to economy-wide wages, which are particularly susceptible to the caveat about coverage noted above. However, wages in the manufacturing sector exhibit the same pattern.

[17] This result is consistent with findings elsewhere in the literature. See for instance Gelb, Meyer, and Ramchandran (2013).

Figure 2.13. Sub-Saharan Africa and Rest of Emerging and Developing Economies: Real GDP Per Capita and Real Hourly Wage, 1983–2008



Sources: Penn World Tables 8.0; and Occupational Wages around the World database.

Note: Only emerging markets and developing countries from each region are considered.

Cambodia, Lao PDR, and Vietnam), mainly using comparable data on nontradable goods prices across countries for 2005 and 2011, which are available from the International Comparison Program (ICP) of the World Bank.[18]

Figure 2.14 plots average costs of transport, communications, and electricity in sub-Saharan African countries in 2005 and 2011 relative to the four comparator countries identified previously. A value greater than one indicates that the country in question is more expensive than the average of the four comparator countries. The data indicate that:

- The relative cost of transportation has improved significantly in almost all sub-Saharan African countries. While almost all sub-Saharan African countries were relatively expensive in 2005, many had managed to lower transportation costs by 2011, and several had transport costs that were lower than the average comparator. Other data sources, though, present a somewhat less positive picture, with the cost of shipping containers from sub-Saharan African countries still very high in relation to comparators (Figure 2.15). For instance, the average cost of exporting a container from sub-Saharan Africa is around US$2,200, whereas a container can be shipped for as low as US$610 out of Vietnam.
- While the absolute cost of communications had also declined in most sub-Saharan African countries, they have been unable to match the 45 percent decline in such costs in the average comparator over the 2005–11 period. Thus, in relative terms, the cost of communication has increased in most countries of the region.
- Compared with 2005, the cost of electricity has increased in almost all sub-Saharan African countries. While several countries were cheaper than the average comparator in 2005, rising electricity costs have rendered most of them relatively expensive.

The Impact of Changing Trade Partners on Competitiveness

An important development in recent years has been the change in the composition of the region's trade partners, with a sharp increase in the share of trade with emerging markets and developing economies.[19] This has a bearing on the region's competitiveness, and to assess this, we construct two alternate measures of effective exchange rates (see Annex 2.2 for details of the construction).[20] In addition to factoring in the change in trade weights over time, something that the standard CPI-based REER does not do, these alternative effective exchange rate measures are based on price levels rather than indexes. Furthermore, these measures also assess relative prices based on common consumption baskets. By construction, as with the standard REER, an increase in the value of these indices indicates a loss in competitiveness.

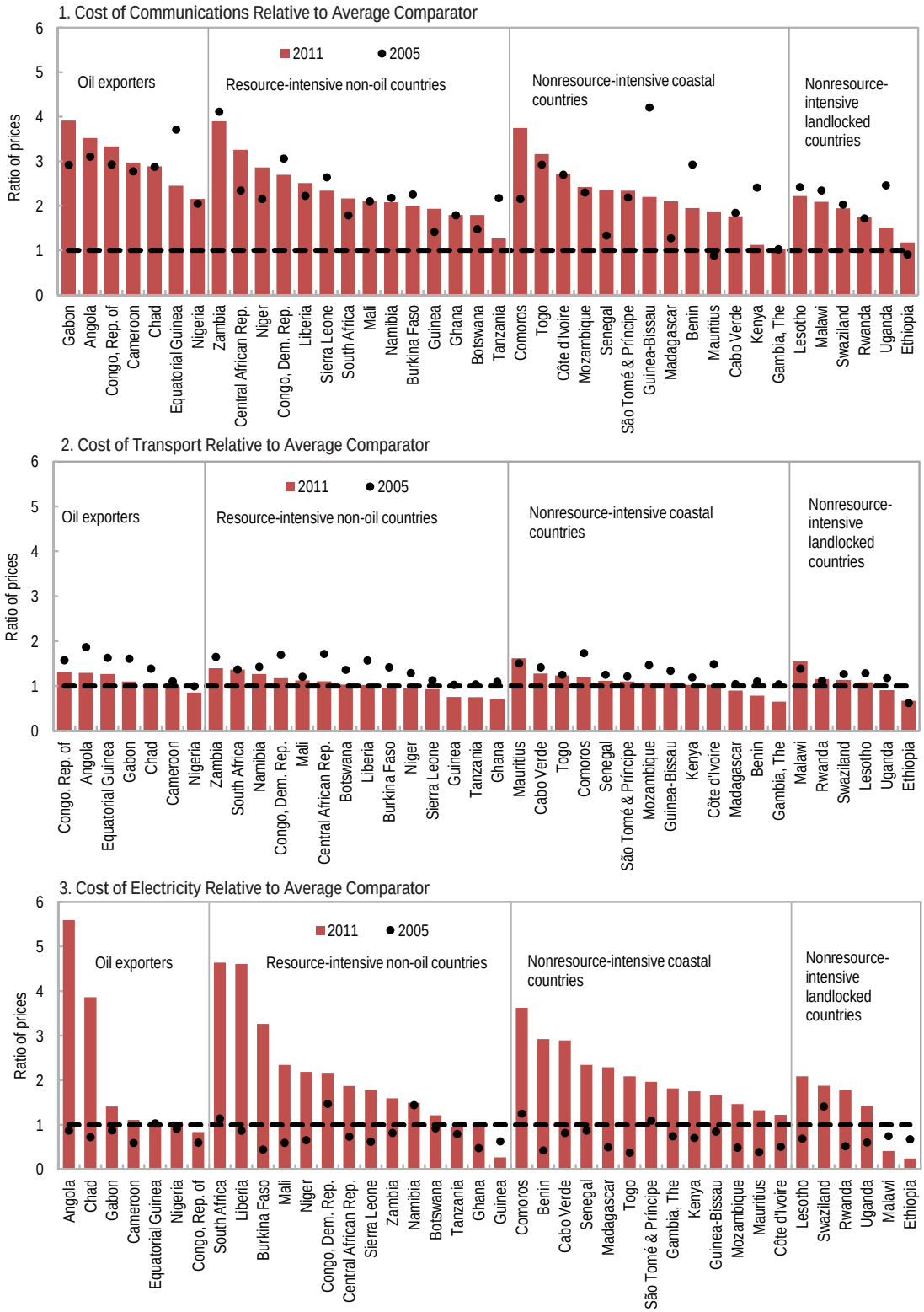
The Import Average Relative Price (Q^M) evaluates the relative price of the home consumption basket in the domestic market with the price of the same basket in the "average" partner country. In particular, the measure is obtained by calculating the price of the basket relative to each partner country and then aggregating over the home country's trading

[18] The ICP collects prices for more than 1,000 products to estimate purchasing power parities for the world economies (the latest round of the ICP, 2011, covered 198 countries). Data on 12 common consumption categories are made publicly available. For details, see http://siteresources.worldbank.org/ICPEXT/Resources/ICP_2011.html. See also World Bank (2015b).

[19] See Chapter 3 of *Regional Economic Outlook: Sub-Saharan Africa*, April 2015.

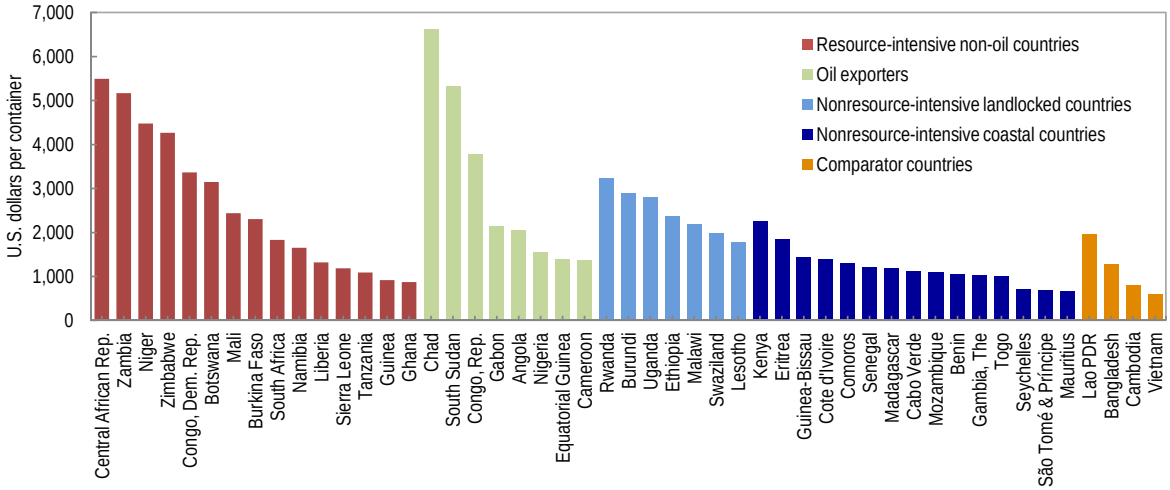
[20] See Tulin and Kranjnyák (2010).

Figure 2.14. Sub-Saharan Africa: Relative Price of Key Nontraded Goods and Services



Sources: World Bank, International Comparison Program; and IMF staff calculations.
Note: Comparators include Bangladesh, Cambodia, Lao PDR, and Vietnam.

Figure 2.15. Sub-Saharan Africa and Comparator Countries: Shipping Cost per Container, 2014



Sources: World Bank, World Development Indicators; and IMF staff estimates.

Note: Includes costs for documents, administrative fees for customs clearance and technical control, customs broker fees, terminal handling charges and inland transport.

partners (using the geographic composition of import trade volumes). Thus, Q^M measures the price of the home consumption basket in the domestic market relative to its price in the "average" import source country.

Analogously, the Export Average Relative Price (Q^X) evaluates the price of the foreign consumption basket in the domestic market relative to its price in the "average" partner country. It is obtained by aggregating the cost of the basket relative to each partner over the home country's export partners.

Figure 2.16 plots the changes in Q^X and Q^M for 43 sub-Saharan African countries for which ICP data are available for 2005 and 2011. In terms of the Q^M, most sub-Saharan African countries lost competitiveness, implying that imports have become cheaper than domestically produced goods. In terms of the Q^X, a majority of the region's countries, including frontier and emerging markets like Kenya, Nigeria, South Africa and Uganda, lost competitiveness between 2005 and 2011, while a few small countries have seen an improvement in their competitiveness.

A decomposition of the changes indicates that for both Q^X and Q^M, a shift in trade partners toward low-cost emerging markets and developing countries has reduced the cost of imports and the cost of export-competing products, and has hence contributed to reducing the competitiveness of sub-Saharan African countries.[21] This shift in trade partners has in many instances partially or fully offset the price reductions that countries in the region have been able to achieve. In some instances though, both higher relative costs and a shift towards low-cost trade partners has contributed to deteriorating competitiveness between 2005 and 2011. The fact that new entrants with cheaper exports have emerged as competitors was not captured by the previous indicators.

Nonprice Competitiveness Indicators

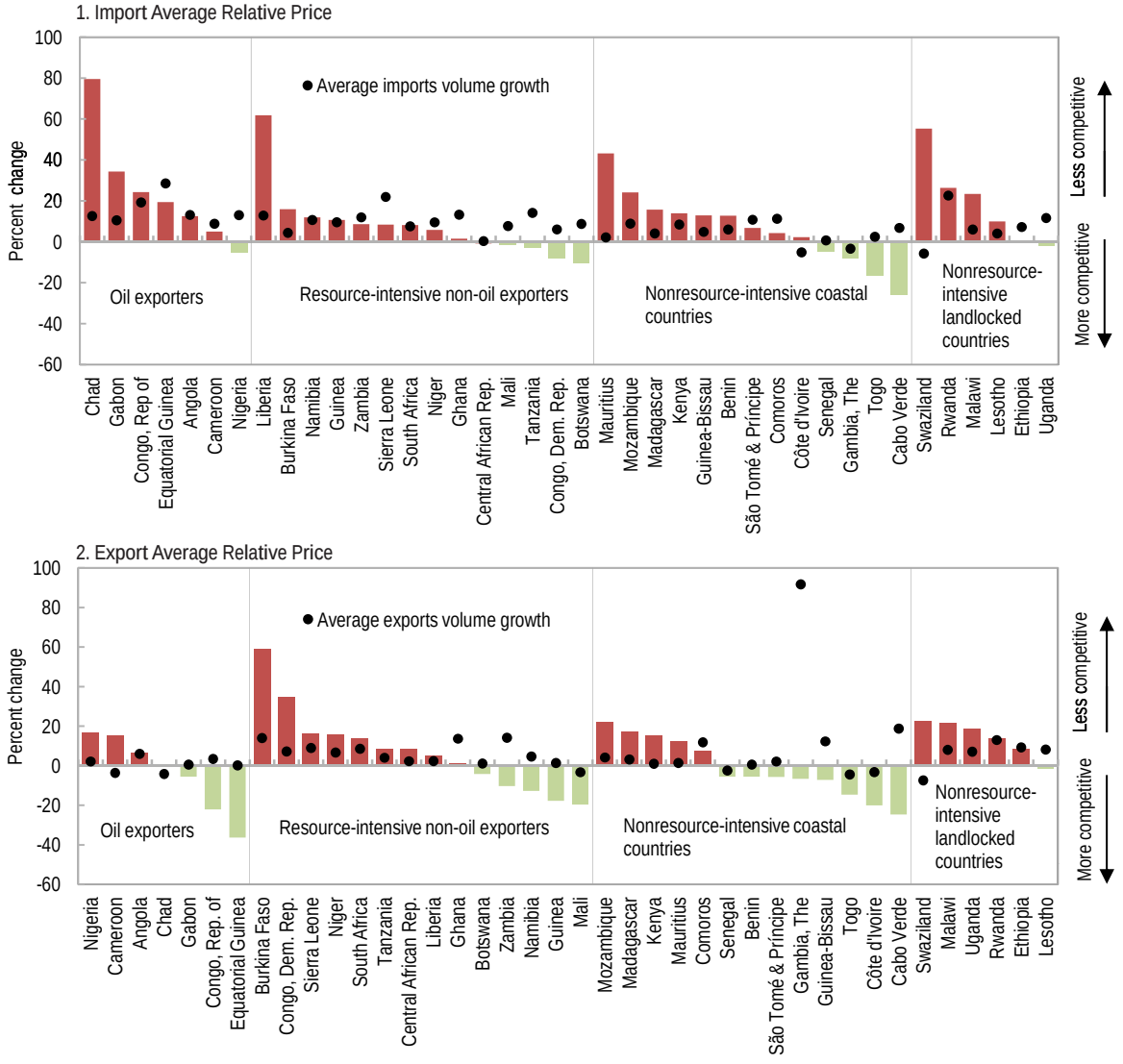
The previous discussion highlighted the role of infrastructural constraints in influencing countries' costs, and hence competitiveness. Similarly, countries' competitiveness also depends on their economic and institutional environments. Indeed, structural and institutional deficiencies can adversely influence the impact of changes in the nominal exchange rate on exports (see Boxes 2.1 and 2.2). Thus, notwithstanding such indicators changing slowly over time, and previous studies reporting that countries have been able to launch successful development experiences even with indicators at the same level as sub-Saharan Africa's today, it is important to make progress in mitigating

[21] Annex 2.2 provides technical details about the decomposition.

such constraints. The two most widely used sets of indicators are the Global Competitiveness Index developed by the World Economic Forum (WEF) and the Doing Business Indicators prepared by the World Bank. For sub-Saharan Africa, they give broadly similar results, and hence we report below only the Global Competitiveness Index results.

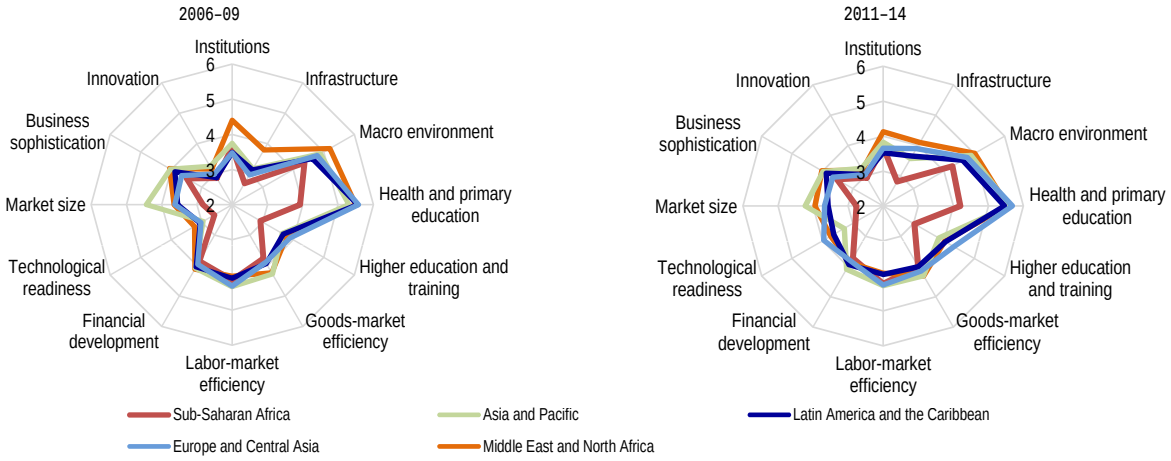
The Global Competitiveness Index contains 12 pillars and the rankings by region are shown in Figure 2.17. It indicates, unsurprisingly, that sub-Saharan Africa's economic and institutional environment trails all other regions of the world. A concern, though, is the limited improvement in such conditions between 2006–09 and 2011–14, especially in relation to other countries. The key bottlenecks in the region were in the areas of infrastructure, market size, technological readiness, and the provision of health and education. The limited progress in market size is understandable, but the persistent gap in infrastructure nowithstanding significant investment in recent years is disappointing. Furthermore, relative to some other regions, for instance Europe and Central Asia, progress in improving technological readiness was rather weak,

Figure 2.16. Sub-Saharan Africa: Relative Price-Based Measure of Real Effective Exchange Rate, 2005–11



Sources: World Bank, International Comparison Program; IMF, Direction of Trade Statistics; and IMF staff calculations.

Figure 2.17. Selected Regions: Pillars of Competitiveness



Source: World Economic Forum.

Note: Only emerging markets and developing countries from each region are considered.

while the gap with other regions in the provision of health and education remained very large.

Reflecting these developments, sub-Saharan Africa has the lowest Global Competitiveness Index score among all regions, but there is substantial heterogeneity among countries (Figure 2.18). While the weaker performers on the index, such as Guinea, Chad, Angola, Burundi and Sierra Leone, have some of the lowest scores anywhere in the world, other countries, such as Mauritius, South Africa, Rwanda, Botswana, Namibia, Kenya, and Seychelles, have an overall competitiveness index score that is similar or even slightly higher than the averages observed in emerging markets and developing countries elsewhere. Nonetheless, they still trail behind the best performers in most other regions.

Putting It All Together

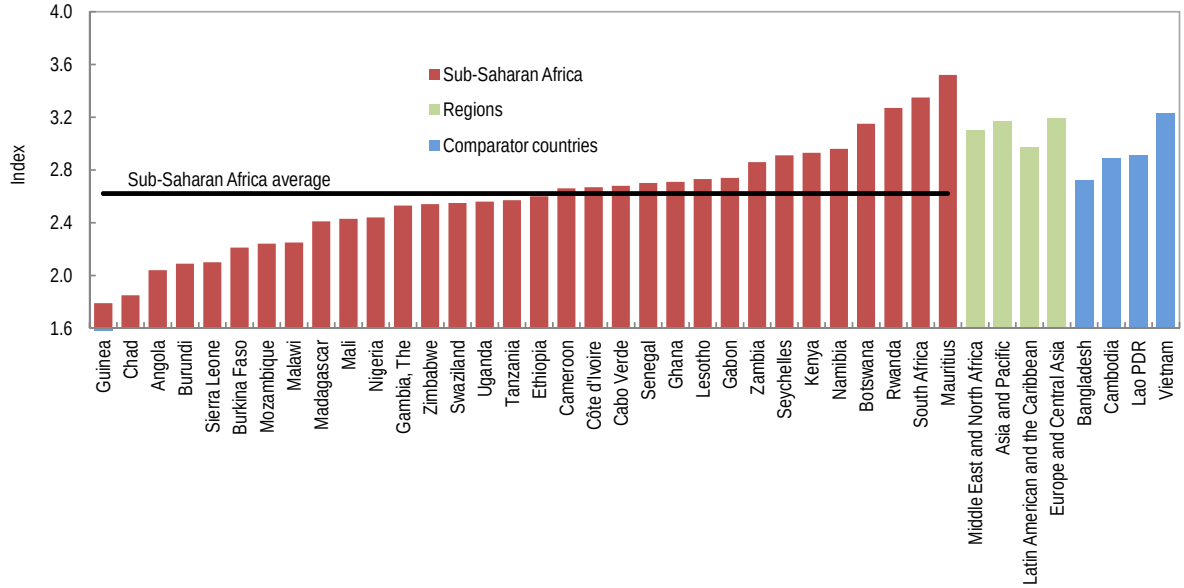
The declining share of manufacturing exports and evidence from the battery of indicators points to the erosion of competitiveness in most sub-Saharan African countries in recent years (Figure 2.19).[22]

In particular, our survey of competitiveness indicators suggests the following:

- Both the standard REER and the GVC REER suggest that following strong gains since the mid-1990s, sub-Saharan Africa's competitiveness has declined since 2002. While the loss in competitiveness is fairly broad-based, the pattern is more pronounced among commodity exporters and seems to be largely driven by high inflation.
- As a result, relative price levels in sub-Saharan Africa tend to be high, even after adjusting for increases that result from relative productivity gains in the tradable sector associated with fast growth. Competitiveness by this measure has deteriorated since 2004, a year when nearly half the region's countries would have been assessed to be competitive. Notably, a number of commodity exporters and countries with fixed exchange rates are now uncompetitive. By contrast, a comparator group of countries that have successfully integrated into global value chains in recent years all have strongly competitive exchange rates.

[22] Table 2.2 uses a confidence band of ±10 percent around the point estimates of the exchange rate measures. While the true confidence intervals are hard to determine, the IMF's Consultative Group on Exchange Rate Issues (CGER) methodology advocates a ±10 percent band for REER assessments (see "How to Apply CGER Methodologies to Non-CGER Countries: A Guide for Desk Economists," http://intranetapps.imf.org/fundwide/KE/Topics/External-Sector-Assessment/Pages/documents.aspx). Thus, in Table 2.2, changes in the REER, GVC REER, and import and export basket REER point estimates within ±10 percent are characterized as no change. Similarly, overvaluation estimates of the Balassa-Samuelson adjusted relative price level within this confidence band are also characterized as not being overvalued or undervalued. For the Global Competitiveness Index, only changes in rankings by more than five places are characterized as an improvement or a deterioration.

Figure 2.18. Sub-Saharan Africa, Other Regions, and Comparator Countries: Global Competitiveness Index, 2014



Source: World Economic Forum.

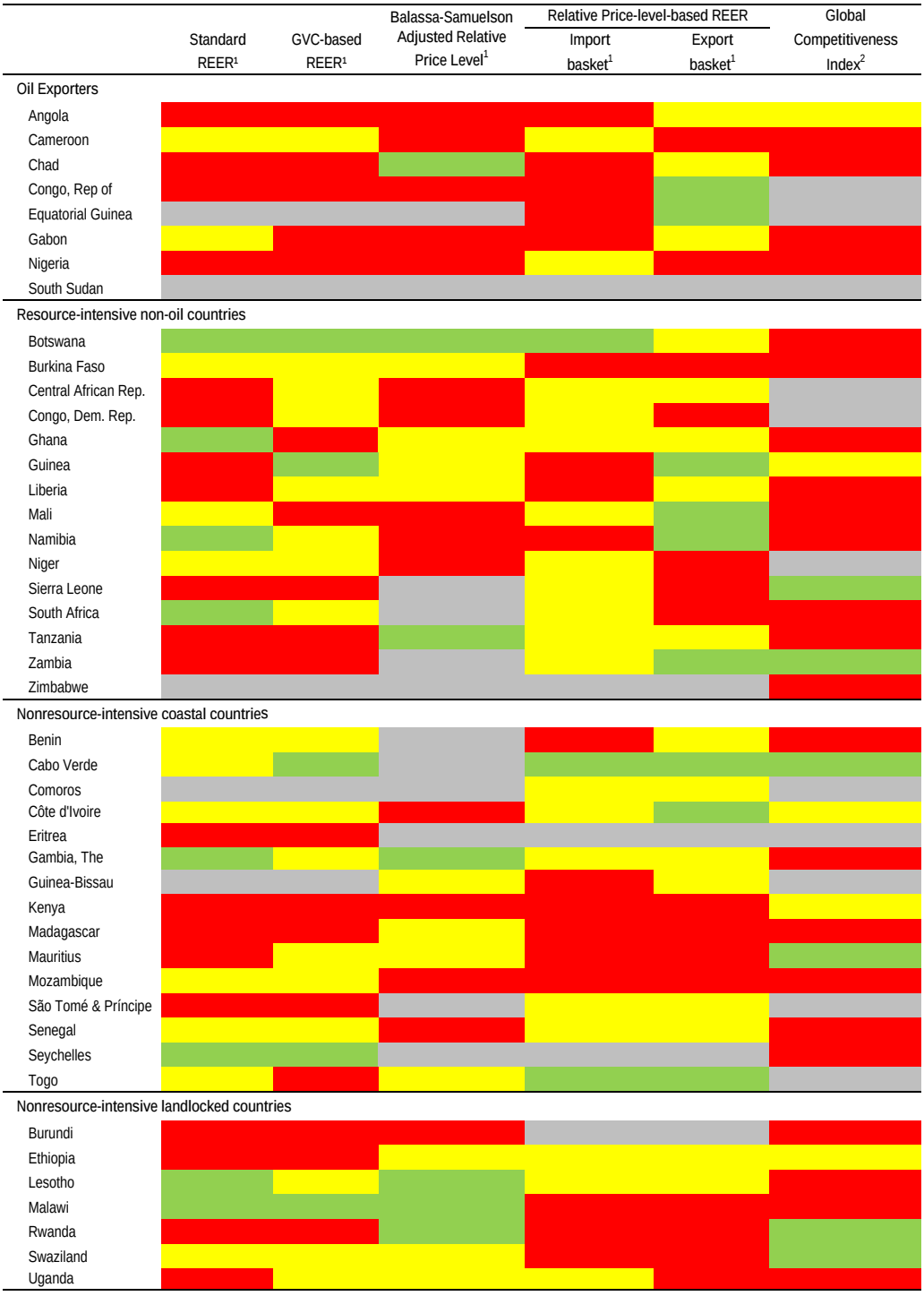
Note: Countries with higher values are more competitive. Only emerging and developing countries from each region are considered.

- The finding of a fairly broad-based deterioration in competitiveness is corroborated by developments in price levels of key inputs. In particular:
  - ◊ Relatively high real wages in sub-Saharan Africa are an important contributor to the lack of competitiveness, especially given the low productivity levels. As a result, unit labor costs in sub-Saharan Africa are the highest anywhere in the world.
  - ◊ In addition, competitiveness is hampered by the region's lagging infrastructure—the cost of key inputs such as communications, electricity, and transportation remain more expensive than in the comparator group of countries. Similarly, poor institutions compare unfavorably to comparator countries in other regions.
- In recent years, the shift in the composition of trade towards lower-cost emerging and developing countries has been an important factor that has impacted the region's competitiveness.
- However, there is significant heterogeneity among countries. In particular, a number of countries that are not largely reliant on commodities—for example, Ethiopia, Kenya, Tanzania, and Uganda—tend to compare favorably both in terms of transport and communication costs and the quality of institutions. These are countries that have had competitive exchange rates for an extended duration of time and, in the case of Tanzania and Uganda, continue to do so. These are also the countries that have made the most progress in achieving global value chains integration and, as discussed elsewhere in this section, in sustaining growth.[23]

As discussed above, a number of unique circumstances helped jumpstart growth in sub-Saharan Africa in the mid-1990s. The trends noted previously indicate that strong competitiveness was not an important factor behind the growth momentum over this period in many countries. However, with growth tailwinds now dissipating, the findings in this chapter raise the question as to whether many sub-Saharan African countries are sufficiently competitive to sustain the robust growth observed in recent years. We now explore this topic by analyzing in more detail the relationship between competitiveness and growth.

[23] For further details, see Chapter 3, *Regional Economic Outlook: Sub-Saharan Africa,* April 2015.

Figure 2.19. Sub-Saharan Africa: Price Competitiveness Indicator Heatmap



Sources: IMF, Information Notice System; World Economic Forum; Penn World Tables 8.0; Eora database; and IMF staff calculations.

Note: GVC = global value chain; REER = real effective exchange rate.

[1] Green denotes a decrease of 10 percent or more, red denotes an increase of 10 percent or greater, and yellow denotes variations in between.

[2] Green means an improvement in the world ranking between 2014–15 and the first report available, corresponding to 2010–11, yellow means no change or a slight worsening in the ranking of less than five positions, and red a worsening of more than five places.

COMPETITIVENESS AND GROWTH

This section assesses the possible implications of sub-Saharan Africa's deteriorating competitiveness on the likelihood that the recent favorable growth performance can be sustained in the face of mounting external headwinds (see Chapter 1).

Stylized Facts on Growth Spells

Our definition of a sustained period of growth ("growth spell") is a period of at least five years with real GDP growth per capita in excess of 2 percent.[24] Based on this definition, data from the Penn World Tables (PWT 8.0) extended to 2014 using data from the World Bank's WDI database yields 162 growth spells over 1980–2014, 62 of which are ongoing. Of these 162 spells, 32 occurred in sub-Saharan Africa, an amount somewhat below the share of sub-Saharan African countries in the sample—24 percent (Figure 2.20). As in Berg, Ostry, and Zettlemeyer (2012), we find that the duration of spells in sub-Saharan African countries is relatively short, suggesting that while countries in the region are able to get growth going, they face a particular challenge in sustaining the kind of growth necessary to produce a durable increase in incomes and reduction in poverty. Consistent with the region's improving macroeconomic performance, the overwhelming majority of growth spells in sub-Saharan Africa are of recent vintage, with nearly 60 percent of all spells starting after 2000, compared with 28 percent in the rest of the world.

What Is The Impact of Competitiveness on the Duration of Growth Spells?

Next, we evaluate empirically the impact of competitiveness—measured using the Balassa-Samuelson adjusted real exchange rate described earlier—on the probability of sub-Saharan Africa countries sustaining the relatively robust growth observed in recent years.[25]

A plot of the real exchange rate deviation from the level predicted by the Balassa-Samuelson effect against spell duration suggests that countries with competitive exchange rates tend to have longer growth spells (Figure 2.21). In sub-Saharan Africa, some 21 countries have had growth spells since 2000. In about half of these countries competitiveness did not play a role in the growth spell taking place—they were mainly commodity exporters or emerging from conflict. In the remaining countries, including Burkina Faso, Ethiopia, Ghana, Kenya, Rwanda, Tanzania, and Uganda, strong competitiveness supported growth spells (Figure 2.22).

A more formal econometric exercise confirms that competitiveness has a strong and significant impact on the duration of growth spells at the global level. Specifically, a real exchange rate 10 percent below the level predicted by the Balassa-Samuelson effect increases the expected length of a growth spell by 7 percent. Excluding the 32 growth spells in the region increases the importance of competitiveness even further.[26]

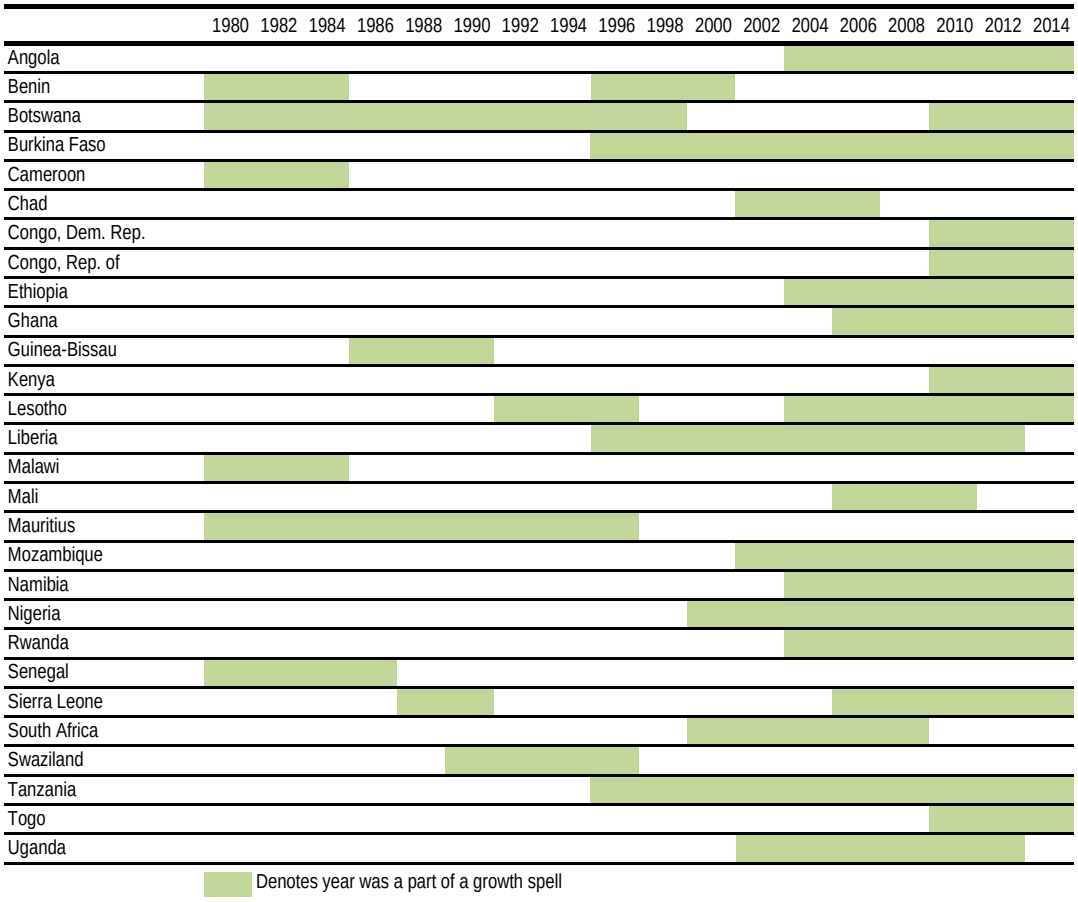
Our results confirm the important role of competitiveness in improving the prospects for sustained growth. While many countries in the region may have been able to achieve high average growth rates in recent years, fewer countries have been able to achieve sustained growth spells. Among these countries, competitiveness has been an important factor in explaining growth spells—once you exclude countries that were exiting from conflict, or benefiting from high commodity prices.

[24] In addition, we assume that growth must increase by at least 2 percent at the start of a spell (to capture the idea of a growth acceleration). To accommodate temporary shocks, we allow growth as low as zero in any one year and merge spells separated by less than three years. Annex 2.3 provides further details on the methodology and checks the robustness of the results to different definitions of growth spells. It also discusses the alternative definitions of spells used in the literature and how the definition used here compares with them.

[25] The use of Balassa-Samuelson adjusted real exchange rates calculated using data from Penn World Tables is standard in this literature, given the comparability of this measure across countries and time.

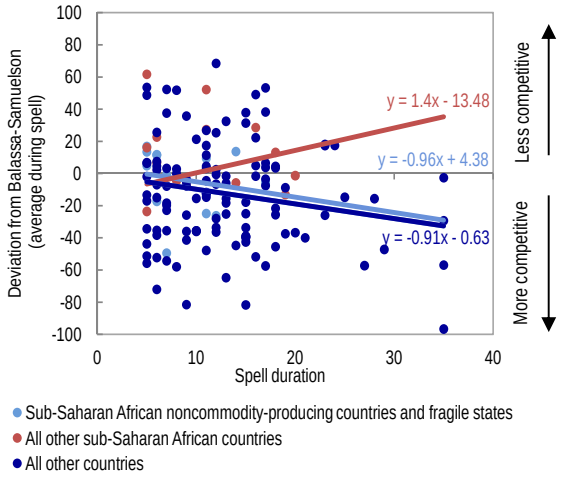
[26] In addition to competitiveness, an increase in the U.S. interest rate has a large and positive impact on spell duration. Terms-of-trade shocks, the initial level of institutions, lower inequality, and increases in the degree of forward integration in global value chains are also associated with longer spells, although the impact is not significant. These results are broadly in line with those found in other studies, including Berg and others (2012).

Figure 2.20. Sub-Saharan Africa: High Growth Spells, 1980–2014



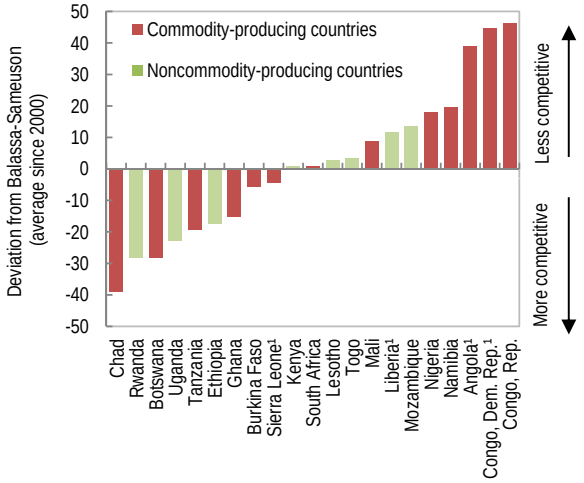
Source: IMF staff calculations.

Figure 2.21. Selected Countries: Spell Duration and Competitiveness



Sources: Penn World Tables 8.0; World Bank, World Development Indicators database; and IMF staff estimates.

Figure 2.22. Sub-Saharan Africa: Competitiveness with Growth Spells since 2000



Sources: Penn World Tables 8.0; World Bank, World Development Indicators database; and IMF staff estimates.

[1] Countries exiting from conflict around the start of a growth spell.

SOME POLICY IMPLICATIONS

Sub-Saharan Africa is in a situation where competitiveness has deteriorated in the last decade and a half. A number of countries in the region, especially commodity exporters, are more expensive than key competitors at a time when competition from new and more efficient trade partners is increasing and tailwinds supporting growth are dissipating. The experience around the world indicates that a strong competitive position helps jumpstart and sustain growth. With countries in sub-Saharan Africa lagging behind most other regions of the world in terms of their infrastructure and institutions, the implementation of strong policy actions now to improve competitiveness needs to be a priority. Such action could help them capitalize on the favorable perceptions about the region that have emerged in recent years and take full advantage of the preferential trading arrangements it enjoys.

In the near-term, steps that could be considered include:

- Countries in the region must limit the buildup of macroeconomic imbalances that could lead to economic instability, including an increase in inflation that would adversely impact competitiveness.
- In this regard, where countries have flexible exchange rate regimes, they should allow them to adjust to respond to shocks (see Chapter 1).

Structural reforms are also imperative to enhance competitiveness. The following measures could usefully be considered by most countries in the region:

- Much of sub-Saharan Africa still maintains high trade barriers, which hinders trade integration, especially in GVCs, where access to cheap and high-quality imports is crucial for generating exports. Thus, furthering trade liberalization, something that can be pursued in the near term, is critical to realizing the full benefits of enhanced competitiveness.
- Efforts to improve human capital and enhance the region's labor productivity are critical. Some near-term improvements on this front can be achieved through learning and technology transfer associated with investment. However, the region must also continue to invest over the medium term in human capital to achieve sustainable improvements. This is especially important if it is to fully benefit from the ongoing demographic transition in the region.
- Countries must also continue to invest judiciously in building up over the medium term the region's infrastructure to address key bottlenecks that increase the costs of production. The region's infrastructure deficit has long been recognized as an important impediment to its competitiveness. However, it is critical that such investments proceed in a manner that does not compromise debt sustainability. In this regard, enhancing investment selection processes and capabilities is critical to putting scarce resources to their best possible use.
- Work to eliminate other structural impediments that adversely impact the business climate and production costs must also continue. Here too, countries should seek to identify key near-term actions, but recognize that institution building takes time. In this regard, it has been noted that other countries have launched successful development experiences with similar institutions as those in sub-Saharan Africa, but it is critical that the region not allow itself to fall behind other regions of the world, and that it gradually bridge the gap.

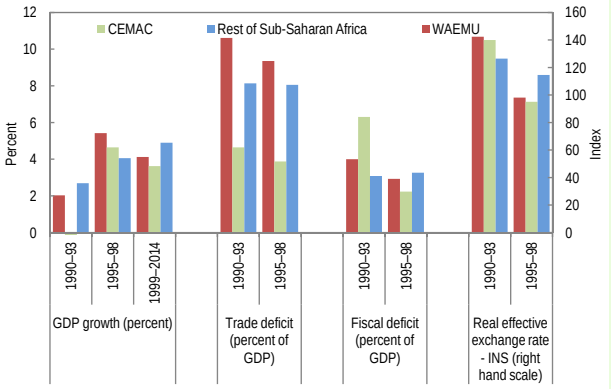
Box 2.1. CFA Franc Devaluation

The CFA franc zone devaluation in 1994 illustrates that competitiveness has many facets and that a nominal exchange rate devaluation alone cannot restore competitiveness. Specifically, it shows how a devaluation can help jumpstart growth, but also how, in the absence of supporting reforms, the benefits of a devaluation can quickly peter out.[1] Prior to the devaluation, goods produced by CFA franc zone countries were priced out of the world market and, partly as a result of this, these countries' economies grew little or not at all during the 1980s and early 1990s. This was especially true of the Central African Economic and Monetary Union (CEMAC) region, which contracted by about a ¼ percent on average over 1990–93 (Figure 2.1.1).

In 1994, member countries devalued the CFA franc by 50 percent, with significant beneficial macroeconomic effects. Growth increased by nearly 4 percentage points for the West African Economic and Monetary Union (WAEMU) region and more than 5 percentage points for the CEMAC region, when comparing four-year averages before and after the devaluation. This was significantly faster growth than achieved in the rest of sub-Saharan Africa. Trade and fiscal deficits also declined before and after the policy change, with especially notable adjustment of the fiscal deficit in the CEMAC region.

Devaluation was not intended to be a silver bullet, however, nor did it turn out to be. One of its immediate side effects was a one-time surge in prices, which lead to inflation picking up. Furthermore, as the momentum on structural and institutional reforms was not maintained, with the exception of Benin and Burkina Faso, the CFA franc zone countries were unable to embark on a period of sustained economic growth. This highlights the fact that a competitive exchange rate is best thought of as a way to jumpstart growth and underscores the importance of coupling a competitive exchange rate with a sound macroeconomic and institutional environment.

Figure 2.1.1. CFA Franc Zone: Selected Indicators



Sources: IMF, World Economic Outlook database; and IMF, Information Notice System (INS).

[1] The CFA franc zone consists of 15 countries in sub-Saharan Africa, all but one affiliated with one of two monetary unions. Benin, Burkina Faso, Côte D'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo comprise the West African Economic and Monetary Union, or WAEMU, founded in 1994 to build on the foundation of the West African Monetary Union, founded in 1973; six countries — Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea, and Gabon — comprise the Central African Economic and Monetary Union, or CEMAC; and The Comoros. These two unions maintain the same currency, the CFA franc, which stands for Communauté Financière Africaine (African Financial Community) within WAEMU and Coopération Financière en Afrique Centrale (Financial Cooperation in Central Africa) within CEMAC. WAEMU and CEMAC account for 14 percent of Africa's population and 12 percent of its GDP.

Box 2.2. South Africa's Export Performance and the Role of Structural Factors[1]

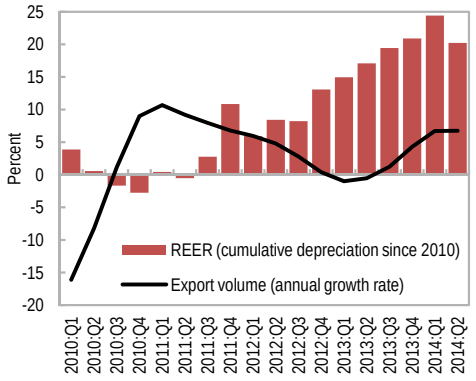
Despite a prolonged and substantive depreciation of the rand, South Africa's export performance remains weak. South Africa's real effective exchange rate (REER) depreciated by about 25 percent during January 2011–July 2014, one of the longest and largest depreciation episodes in emerging markets (Figure 2.2.1). Notwithstanding this real depreciation, South African exports grew at an average 4.3 percent during 2011–14.

Weaker external demand, coupled with softer commodity prices, doesn't fully explain the weak performance of South African exports. South Africa's export growth averaged around 82 percent of its trading partners' import growth during 2011–14—one of the lowest proportions among emerging markets, with its share of global exports falling by nearly 15 percent (Figure 2.2.2).

Binding structural constraints may be one of the reasons behind South Africa's poor export performance. In the last few years, supply constraints, such as availability of electrical power and production disruptions due to strike activities, have become more binding, hurting production and hence exports. The firm-level data are used to study the role of structural constraints in affecting the responsiveness of exports to the REER changes. The use of firm-level data allows us to isolate the impact of sector-specific factors on REER responsiveness, as macroeconomic conditions remain the same for all firms in the economy.

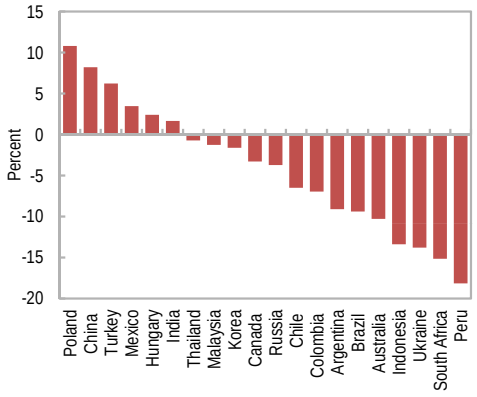
Firm-level estimates suggest that electricity bottlenecks, limited product market competition, and labor market constraints have reduced the responsiveness of exports to the exchange rate depreciation. Firms in electricity-intensive sectors have seen lower export growth as power shortages have hindered export expansion. Similarly, firms in sectors with greater labor market rigidities have worse export performance. The econometric findings also suggest that exports from sectors with high concentration have been less responsive to the depreciation, as low competition may have resulted.

Figure 2.2.1. South Africa: Real Effective Exchange Rate Cumulative Depreciation and Annual Growth of Trade Volumes, 2010–14



Sources: Haver Analytics; SARB; and IMF staff calculations.

Figure 2.2.2. Selected Countries: Change in Shares of World's Exports, 2010–14



Sources: Haver Analytics; and IMF staff calculations.

[1] For more information see IMF (2014a).

Annex 2.1. Methodology on Construction of GVC-Based REER[1]

We follow the standard Information Notice System (INS)[2] methodology of calculating the real effective exchange rate (REER). For a country *i*, the REER index in year *t* is calculated by

$$REER_{i,t} = \frac{P_{i,t} * X_{i,t}}{\prod_{j \neq i}(P_{j,t} * X_{j,t})^{w_{i,j,t}}}$$

where *j* is the subscript denoting trading partners, *P* is an index of prices, *X* is the nominal bilateral exchange rate index (U.S. dollar per national currency), and $w_{i,j,t}$ is a weight assigned to trade partners. The REER index increases when currency *i* appreciates nominally faster than its trading partners and/or when country *i* experiences higher inflation than partners, driving a real appreciation effect.

The IMF produces several variants of the REER which differ on the measure of prices ($P_{i,t}$) and the weighting methodology ($W_{i,j,t}$). The REER using consumer prices indices (CPI) is available for almost all countries, while the unit labor cost (ULC)-based REER is published for selected economies with data availability. The standard IMF weighting methodology is calculated by taking into account the amount of goods and services traded by each partner and type of goods and services traded. The weights are:

$$W_{i,j} = (a_M + a_S) * W_{i,j}(M) + a_C W_{i,j}(C) + a_T W_{i,j}(T)$$

where $W_{i,j}(M)$, $W_{i,j}(C)$, and $W_{i,j}(T)$ are the manufacturing, commodities, and tourism weights, respectively; a_M, a_S, a_C, and a_T are shares of manufactures, nontourism services, commodities, and tourism in overall trade (Bayoumi and others 2005). Derivation of commodity weights differs from that of manufacturing and tourism; the former assumes perfect substitutability with a single price, while the latter two take into account direct competition between country *i* and *j*, but also indirect competition in all third-country markets. The degree of competition in third markets is either measured by domestic sales data if data are available, or by arbitrarily setting equal weights to direct competition and third-market competition proxied on trade flows alone.

The global value chain (GVC)-based REER presented herein is a first step in using value-added measures of trade to weigh the importance of trading partners. From a matrix of bilateral value-added trade, we construct for each country *i* a set of GVC weights as follows:

$$W_{i,j}(GVC) = \frac{\sum_c w_i^c \, s_j^c}{\sum_c w_i^c (1 - s_i^c)}$$

where *j* represents all partner countries, w_c^i represents the share of value-added flows in sector *c* of country *i*, and s_j^c represent the share of country *j* in the totality of value flows in the world for sector *c*. A sector that is important to country *i* sees higher volumes of value-added imports and exports, represented by a higher value of w_i^c. This weight directly scales with the partner country's global importance in that particular sector. Summing over all sectors thus yields a number that measures the importance of country *j* with respect to the industries in country *i*. This weight is then normalized. The methodology is identical to that of the commodity weights in Bayoumi and others (2005). We use this simplification because our dataset lacks sales data in the tourism and manufacturing sector. Following Bems and Johnson (2012), we use GDP deflator in place of CPI and ULC as the price index, to reflect the point that when tasks are traded across the world, the relative price of tasks is better captured by a GDP deflator than other price indices.

Lastly, we calculate a set of GVC weights for each year. The standard practice of the IMF is to use the same set of weights for several years before updating. The GVC-based REERs presented are thus adjusted for changes in value-added trade on a yearly basis.

[1] Prepared by Fan Yang.

[2] See Zanello and Desruelle (1997).

Decomposition of REER into Price and Exchange Rate Effects

To decompose the change in the REER into price and exchange rate effects, we first rearrange the REER formula for time *t* into a product of two factors: the relative prices and the relative exchange rates.

$$REER_{i,t} = \left(\frac{P_{i,t}}{\prod_{j\neq i} {P_{j,t}}^{w_{i,j,t}}}\right) * \left(\frac{X_{i,t}}{\prod_{j\neq i} {X_{j,t}}^{w_{i,j,t}}}\right)$$

Suppose that in *t*+1, each factor changes by some number (ΔP and ΔX):

$$REER_{i,t+1} = \left(\frac{P_{i,t}}{\prod_{j\neq i} {P_{j,t}}^{w_{i,j,t}}} + \Delta\mathrm{P}\right) * \left(\frac{X_{i,t}}{\prod_{j\neq i} {X_{j,t}}^{w_{i,j,t}}} + \Delta\mathrm{X}\right)$$

Taking differences and expanding,

$$\begin{aligned} REER_{i,t+1} - REER_{i,t} &= \left(\frac{P_{i,t}}{\prod_{j\neq i} {P_{j,t}}^{w_{i,j,t}}} + \Delta\mathrm{P}\right) * \left(\frac{X_{i,t}}{\prod_{j\neq i} {X_{j,t}}^{w_{i,j,t}}} + \Delta\mathrm{X}\right) - \left(\frac{P_{i,t}}{\prod_{j\neq i} {P_{j,t}}^{w_{i,j,t}}}\right) * \left(\frac{X_{i,t}}{\prod_{j\neq i} {X_{j,t}}^{w_{i,j,t}}}\right) \\ &= \frac{P_{i,t}}{\prod_{j\neq i} {P_{j,t}}^{w_{i,j,t}}}\frac{X_{i,t}}{\prod_{j\neq i} {X_{j,t}}^{w_{i,j,t}}} + \frac{P_{i,t}}{\prod_{j\neq i} {P_{j,t}}^{w_{i,j,t}}}\Delta\mathrm{X} + \Delta\mathrm{P}\frac{X_{i,t}}{\prod_{j\neq i} {X_{j,t}}^{w_{i,j,t}}} + \Delta\mathrm{P}\Delta\mathrm{X} - \frac{P_{i,t}}{\prod_{j\neq i} {P_{j,t}}^{w_{i,j,t}}}\frac{X_{i,t}}{\prod_{j\neq i} {X_{j,t}}^{w_{i,j,t}}} \\ &= \frac{P_{i,t}}{\prod_{j\neq i} {P_{j,t}}^{w_{i,j,t}}}\Delta\mathrm{X} + \Delta\mathrm{P}\frac{X_{i,t}}{\prod_{j\neq i} {X_{j,t}}^{w_{i,j,t}}} + \Delta\mathrm{P}\Delta\mathrm{X} \end{aligned}$$

We define the contribution of a factor using the above equation. For example, if both relative prices and exchange rate ratios increased, the change in the REER due to prices is the change in relative prices multiplied by the previous period's relative exchange rate plus the contribution of prices in the shared effect.[3] There are four possible combinations of change (two factors and two directions of change), each of which is decomposed in a similar approach.

[3] The contribution of the price effect to a change in the REER would be calculated as follows:

$$\textit{Contribution of price effect} = \frac{\Delta\mathrm{P} * \mathrm{X_t} + \frac{\Delta\mathrm{P}^2 * \Delta\mathrm{X}}{\Delta\mathrm{P} + \Delta\mathrm{X}}}{REER_{i,t+1} - REER_{i,t}}.$$

Annex 2.2. Construction of Import Average and Export Average Relative Price Measures

Benchmark relative prices are computed using two variables of the World Bank's International Comparison Program (ICP) data: real individual expenditure per capita expressed in international dollars and price-level indices. The ICP provides data for 12 categories of expenditure as per the Classification of Individual Consumption according to Purpose (COICOP). Using real per capita expenditure as weights, we compute the price level of a country and two measures of bilateral relative prices for 25 import and export partners of each country.

The first measure of bilateral relative price is for import partners and computed as follows:

$$Q^M = \frac{\sum p^H . y^H}{\sum p^P . y^H} . E \qquad (1)$$

Whereas H and P denote the home country and its trading partner, y and p are real consumption expenditure basket and prices in local currency, E is the nominal exchange rate expressed in domestic currency units per foreign currency unit.

Similarly, the second measure of bilateral relative price for export partners is computed as:

$$Q^X = \frac{\sum p^H . y^P}{\sum p^P . y^P} . E \qquad (2)$$

Further, using equations (1) and (2) above, the average relative price measures for 2005 and 2011 are computed as the weighted average of bilateral measures and import/export trade weights from the IMF's Direction of Trade Statistics. As export and import partners can differ significantly, two different sets of countries are used for export and import weights to compute these measures.

By construction, any change in the relative price measure can be attributed to a change in relative price levels, trade patterns, and changing consumer preferences. Since for competitiveness we are not interested in changing consumer preferences, we further disaggregate the change in the relative price measure for the average partner as the change in the bilateral relative price of each partner and their corresponding weights in the calculation as in equation (4) below.

$$\Delta Q = \sum_{i=1}^{N} w_i^{2011} Q_i^{2011} - \sum_{i=1}^{N} w_i^{2005} Q_i^{2005} \qquad (3)$$

$$\Delta Q = \sum_{i=1}^{N} \left(w_i^{2011} - w_i^{2005}\right). Q_i^{2011} + \sum_{i=1}^{N} \left(Q_i^{2011} - Q_i^{2005}\right). w_i^{2005} \qquad (4)$$

where ΔQ refers to change in average price measure, N = 25 is the number of partners, and w is the export/import weight. The first term in equation (4) refers to the contribution of change in trade weights while the second term captures the change in relative price levels [1].

[1] Technically, a change in the bilateral relative price measure is a combination of three factors: domestic prices, consumer preferences, and the nominal exchange rate.

Annex 2.3. Estimation of Duration Dependence of Growth Spells

To study the determinants of the length of growth spells we employ survival analysis models that are commonly used in medical, political, and microeconomic applications. Survival analysis models how various factors (for example, competitiveness) affect the survival time of a subject (for example, a growth spell).[1]

Let t denote survival time (time since growth accelerated) and T duration (the length of a growth spell). The "hazard rate" $\lambda(t)$ is defined as the probability of a spell ending at time t, conditional on survival up to that time. Formally:

$$\lambda(t) = \lim_{h \to 0} \frac{P(t \leq T < t + h | T \geq t)}{h}$$

The most popular way of parameterizing the hazard rate is Cox's (1972) proportional hazard model, which assumes that the "baseline hazard" (the hazard rate common to all subjects of the population) is multiplicatively separable from its dependence on other covariates $X(t)$ that may affect the probability that a growth spell ends, and does not require estimation. Formally:

$$\lambda\big(t; X_i(t)\big) = \lambda_0(t) \exp\left[X_i(t)\beta\right]$$

where $\lambda_0(t)$ is the baseline hazard at time t and β is a vector of parameters to be estimated.

A large number of potential determinants of growth spells have been discussed in the literature (see, for example, Berg, Ostry, and Zettelmayer 2012; and Tsangarides 2012). Given our focus on the role of competitiveness we control for to a relatively small number of covariates that are standard in the literature or were found to be significant determinants of spell duration.

Results

The estimated coefficients of the survival model are summarized in Annex Table 2.3.1. together with the associated robust standard errors. A coefficient of 0.15 implies that a one-unit increase in the regressor increases the risk that the spell will end in the next period by 15 percent.

The results suggest a large and significant impact of exchange rate overvaluation. In particular, a 10 percent overvaluation is associated with an increase in the probability that a growth spell will end by 6 percent (0.006 x 10) in our baseline definition of growth spells using the Frankel measure of overvaluation (*model 1*), and 7 percent using the Rodrik measure (*model 2*).

The other parameters estimates are broadly in line with those found in the literature. Higher initial incomes are associated with shorter growth spells, a finding Tsangarides (2012) suggests may reflect the greater likelihood that growth spells end as incomes approach an outer "frontier." Consistent with Rodrik (2008) we find a modest, but not statistically significant, impact of positive terms-of-trade shocks on spell duration. Contrary to Berg and Ostry (2012), we find a large and statistically significant impact on growth duration from increases in the U.S. interest rate, suggesting that shocks to the U.S. interest rate may reflect improvements to the global economy. As in Berg and Ostry (2012) we find that higher inequality, proxied by the Gini coefficient, has a large negative impact on spell duration. Strengthening of democratic institutions as measured by the Polity2 measure—measured on a scale of –10 (most autocratic) to 10 (most democratic)—has a positive but insignificant impact on growth spell duration at the start of a spell, as does increases in the degree of backward integration in global value chains. Finally, inflation—a proxy of macroeconomic stability—is associated with shorter growth spells but not significantly so.

[1] For further details see Wooldridge (2010, Chapter 20).

Robustness

The lack of observations for sub-Saharan Africa complicates estimating the model only for countries in the region. However, dropping sub-Saharan Africa from the sample (*models 3 and 4*) does not have a significant impact on the estimated impact of exchange rate overvaluation on growth duration, suggesting that the results for sub-Saharan Africa are likely to be broadly consistent with those for the sample as a whole.

The impact of overvaluation declines somewhat in spells with a minimum duration of eight years (*models 5 and 6*), but (in the case of the Frankel measure of overvaluation) remains significant. While it is tempting to interpret this as a decreasing role for a competitive exchange rate relative to other structural characteristics the longer the growth spell, it more likely reflects the fact that it is difficult for countries to maintain an undervalued real exchange rate for long periods of time.

As a further robustness check we follow Hausmann, Pritchett, and Rodrik (2004) and estimate a probit model (*models 7 and 8*) where the dependent variable is a dummy variable that takes the value of one around the time a growth spell ends (and zero otherwise). Specifically, we set the dummy equal to one for *i=t-1*, *t*, and *t+1* where *t* is the year the growth spell ends. The results confirm the important role for exchange rate overvaluation, with a 10 percent overvaluation increasing the probability of a spell ending by 2–3 percent.

One potential problem that may arise in the estimation of the baseline hazard model is the potential feedback from spell duration to covariates that may bias the parameter estimates. To control for this we re-estimate the baseline hazard model using (with the exception of the initial level of income and institutions) covariates lagged by one year. The results in *models 9 and 10* decline somewhat but in the case of the Frankel measure of overvaluation remain significant. Interestingly, the coefficient on the change in U.S. interest rates changes sign and, though insignificant, becomes associated with shorter spell duration as in Berg, Ostry, and Zettelmeyer (2012).

Annex Table 2.3.1.Estimation Results

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Initial income	0. 210	0.214	0.071	0.079	0.206	0.208	0.129*	0.132**	0.19	0.193
	-0.169	-0.169	-0.199	-0.2	-0.24	-0.24	-0.066	-0.066	-0.156	-0.156
Overvaluation (Frankel)	0.006*		0.007**		0.005*		0.003		0.005*	
	-0.003		-0.003		-0.003		(0.001)*		-0.003	
Overvaluation (Rodrik)		0.007**		0.008**		0.005		0.002		0.005
		-0.003		-0.003		-0.003		-0.002		-0.003
U.S. interest rate change	-0.280**	-0.291**	-0.320**	-0.334	-0.399***	-0.410***	-0.069	-0.069*	0.057	0.055
	-0.092	-0.094	-0.105	-0.107	-0.099	-0.099	-0.042	-0.042	-0.091	-0.091
Terms-of-trade growth	-0.007	-0.007	-0.012	-0.012	-0.01	-0.011	-0.007	-0.007	-0.012	-0.012
	-0.01	-0.001	-0.011	-0.011	-0.021	-0.021	-0.006	-0.006	-0.012	-0.012
Gini	0.025	0.026	0.016	0.017	0.005	0.005	0.010*	0.010*	0.017	0.017
	-0.016	-0.016	-0.021	-0.021	-0.029	-0.029	-0.006	-0.006	-0.015	-0.015
Consumer price index inflation	0.005	0.006	0.008	0.009	0.006	0.006	-0.002	-0.002	-0.001	-0.001
	-0.012	-0.011	-0.011	-0.011	-0.013	-0.013	-0.003	-0.003	0	0
Polity 2 (initial value)	-0.036	-0.037	-0.017	-0.019	-0.031	-0.03	-0.015	-0.014	-0.028	-0.027
	-0.026	-0.034	-0.036	-0.037	-0.042	-0.043	-0.012	-0.012	-0.033	-0.033
Change in backward integration	-0.09	-0.085	-0.019**	-0.020**	-0.098	-0.099	-0.047	-0.046	-0.111**	-0.109**
	-0.067	-0.069	-0.009	-0.009	-0.092	-0.092	-0.035	-0.035	-0.051	-0.052
Observations	855	855	735	735	506	506	92	921	871	871
Spells	98	98	78	78	52	52			101	101
Failures	50	50	43	43	33	33			52	52

Source: IMF staff calculations.
Note: Robust standard errors in parentheses. *** p<0.01; ** p<0.05; * p<0.1.