

2. Restarting Sub-Saharan Africa's Growth Engine

After nearly two decades of strong growth, average economic activity in sub-Saharan Africa has decelerated sharply, against the backdrop of lower commodity prices, a less-supportive global environment, and, in the hardest-hit countries, a delayed policy response (Chapter 1). However, the full picture is more complex, with considerable heterogeneity across countries. Against this backdrop, two related questions arise: How can growth be revived in the hardest-hit countries? And for countries that are still growing fast, how can growth be sustained?

This chapter tries to answer these questions by examining the growth performance of sub-Saharan African countries through the lens of growth turning points and periods of sustained growth episodes using a sample containing data from 1950 to 2016.¹ To that effect, the chapter first documents the stylized facts of growth turning points—defined here as growth accelerations (up-breaks) and decelerations (down-breaks)—and sustained growth episodes (growth spells) across the region and *vis-à-vis* the rest of the world. The chapter then examines the changes in both the external and domestic environment (including policies) that coincided with turning points in sub-Saharan Africa. Finally, the chapter investigates how some episodes of growth acceleration become periods of sustained growth, and what influences the duration of these episodes.²

Based on the findings, the chapter concludes with policy recommendations to revive and sustain growth in sub-Saharan African countries.

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¹ Following an extensive literature on cross-country average growth performance, attention has turned to investigating the frequency and duration of growth episodes. See, for example, Hausmann, Pritchett, and Rodrik (2005), Hausmann, Rodriguez, and Wagner (2006), Jerzmanowski (2006), Aizenman and Spiegel (2007), Jones and Olken (2008), Berg, Ostry, and Zettelmeyer (2012), and Tsangarides (2012).

² Since what is associated with turning points may not necessarily be what sustains growth, we examine these two aspects separately.

The main findings are as follows:

- Growth turning points are common in sub-Saharan Africa, but with substantial variation across time. Before 2000, both up-breaks and down-breaks were frequent in the region, suggesting that growth was characterized by shifts between expansions and contractions. The region has experienced relatively fewer down-breaks since 2000.³
- Growth spells are also frequent in sub-Saharan Africa—both among resource-intensive and nonresource-intensive countries—and have become more frequent over the last 15 years. However, growth spells in the region have tended to be shorter than elsewhere. They also tend to be characterized by the largest swings in growth before, during, and after the spell: they start from worse growth positions and typically end in more “hard landings” compared to spells elsewhere—a result that still holds after controlling for armed and political conflicts.
- Growth accelerations are generally associated with improved external conditions, increased investment and trade openness, better fiscal balances, and more diversified economies, while the opposite is associated with growth decelerations. However, some factors seem to operate asymmetrically. Typically, up-breaks tend to be characterized by declines in inflation, increased fiscal revenues and foreign direct investment, improvements in the institutional environment and social indicators, and reductions in inequality. For their part, down-breaks coincide more often with increased public expenditure, higher debt ratios, increased aid flows, and overvalued exchange rates. These findings suggest that what is associated with growth accelerations may be different from what is observed when growth stalls, posing a different set of challenges in terms of policy options.

³ By construction, the empirical approach used to identify breaks requires selecting a minimum number of years between breaks, which we set at five. As a result, while our analysis covers the period 1950–2016, breaks can only be identified up to 2011 (see also Berg, Ostry, and Zettelmeyer, 2012).

- Transitioning from growth turnarounds to periods of sustained growth is difficult and often requires additional efforts beyond what is needed to trigger a growth up-break. In particular, besides the importance of an improved external environment, better macroeconomic policies play a specific and important role in lengthening the duration of a growth spell. The main factors are the consistency of macroeconomic policies, which we proxy by the level of inflation, sound fiscal policy through reduced debt-to-GDP ratios, more outward-oriented trade policies, efforts to induce higher investment-to-GDP ratios, and improved macro-structural policies, as captured by lower market distortions. Also, better-quality institutions, diversification, and technology adoption help sustain growth spells in the region. Each of these factors or policies has an important effect on the duration of spells. Improvements in *each* policy variable from its median value by 25 percentile points in the distribution (while keeping other variables constant) increases the length of the spell by one to six years.
- Historically, sustained periods of growth have required joint efforts on a number of macroeconomic policy fronts. In the context of the current environment, the following policy implications can be drawn:
 - ♦ For countries in a severe growth slowdown, the most pressing challenge is to preserve macroeconomic stability, which can help trigger a turnaround and lead to a period of sustained growth. Such a turnaround can be achieved through a policy adjustment effort that includes consistent monetary policy to contain inflation, and sound fiscal policy to anchor public debt increases. Also, an environment that fosters investment, increased openness to trade, and more stable political environments can help growth recover.
 - ♦ For countries continuing to grow at a fast clip, attention should turn to addressing potential vulnerabilities. In particular, many of these countries should focus on rebuilding buffers and stemming increases

in public debt through domestic revenue mobilization to finance a larger part of their ambitious infrastructure projects while avoiding overheating.

- ♦ For all countries, more efforts are needed to unlock their growth potential. These efforts include advancing economic diversification to increase resilience to shocks and generate new sources of growth; deepening technology adoption; invigorating financial reforms; and strengthening macro-structural policies to reduce market distortions and risks associated with investment, and to improve the business climate.

STYLIZED FACTS: TURNING POINTS AND GROWTH SPELLS IN SUB-SAHARAN AFRICA

This section begins by examining how turning points and episodes of durable growth have evolved in sub-Saharan Africa since 1950. As differences in average growth rates across countries are influenced historically by large fluctuations in rates of growth over time, it makes sense to investigate growth breaks. But with the frequency of growth accelerations fairly constant across regions, there is also a need to look beyond to the length of growth spells, since this is what likely explains the different growth rates across countries or regions.⁴ Figure 2.1 illustrates the concepts of growth up-breaks and down-breaks, and growth spells for a country in our sample.

Growth Turning Points

Following Berg, Ostry, and Zettelmeyer (2012), we identify structural turning points as breaks in economic growth classified as *up-breaks*—periods of higher growth than before, or growth accelerations—and *down-breaks*—periods of lower growth than before, or growth decelerations—using a variant of the Bai and Perron (1998) methodology (see Annex 2.1 for details). We find that growth

⁴ In addition, investigating turning points and periods of durable growth avoids many of the pitfalls of cross-country growth regressions that attempt to explain developing economies' average growth experience, where the average typically confounds periods of volatility from sharp growth increases and declines, compared to the smooth upward paths of industrial countries (Pritchett 2000).

up-breaks and down-breaks are common across the world, but with substantial variation across time and income levels.

Many growth breaks in sub-Saharan Africa...

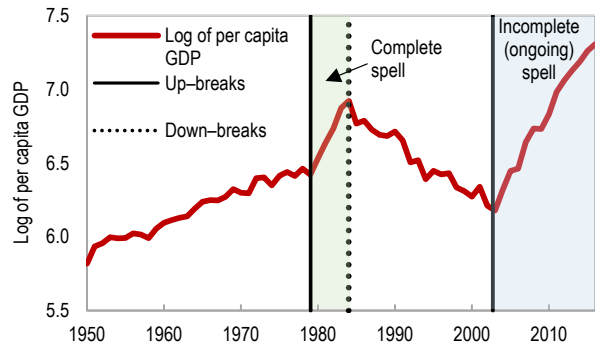
The great majority of growth turning points occurred in developing economies over 1950–2016, with sub-Saharan Africa experiencing many of the up-breaks and down-breaks (Figures 2.2a and 2.2b).⁵ Dividing the period into four roughly equal sub-periods, we find that, overall, about 25 percent of total up-breaks and down-breaks identified correspond to sub-Saharan Africa, which is in line with the fraction of sub-Saharan African countries in the sample, about 28 percent.⁶

Growth in the region during 1950–99 was characterized by high volatility and frequent shifts between periods of expansion and contraction: up-breaks were most common during 1985–99 while most down-breaks occurred during 1970–84. However, this pattern seems to have changed during the last 15 years. In contrast to the rest of the developing economies in the sample, sub-Saharan Africa experienced less volatile growth and fewer down-breaks during 2000–16, while maintaining about the same number of up-breaks. This suggests that at the turn of the century the region transitioned from a pattern of high growth

⁵ Sub-Saharan Africa has experienced political and armed conflicts over the years, although their frequency has declined significantly in recent decades. Using a proxy for “severe” conflicts from the Uppsala Conflict Data Program, we find that the vast majority of breaks in the region do not occur around conflict years. In some cases, however, they have occurred within a year or two of the beginning or end of conflicts, as was the case for the growth down-breaks in Mozambique (1981) and Sierra Leone (1994), and some up-breaks in growth in Angola around 2000–01, Chad in 1980, Mozambique around 1993–95, Uganda after 1989, and Zimbabwe in 1979. As will be discussed later, conflict years do not affect the results in the chapter including the multivariate regression analysis.

⁶ Developing economies in Latin America and the Caribbean represent 16 percent of the countries in the sample and experienced about 19 percent of up-breaks and down-breaks; developing economies in the Middle East and North Africa represent 13 percent of the countries in the sample and experienced about 16 percent of up-breaks and down-breaks; and developing economies in Asia represent 9 percent of the countries in the sample and experienced about 13 percent of up-breaks and 8 percent of down-breaks. Similarly, the shares of total breaks of emerging market economies correspond roughly to their shares in the sample. In contrast, advanced economies represent 21 percent of the countries in the sample but experienced 13 percent of up-breaks and 18 percent of down-breaks.

Figure 2.1. Up-Breaks, Down-Breaks, and Growth Spells of per Capita GDP



Source: Authors' calculations based on data from Penn World Tables 9.0.

Note: GDP per capita measured in purchasing power parity terms. A complete growth spell is the period that starts with an up-break, is followed by an average rate of per capita growth of at least 2 percent, and ends with a down-break; an incomplete or ongoing spell starts with an up-break and ends with the end of the sample.

Figure 2.2a. Selected Groups: Growth Up-Breaks, 1950–2016

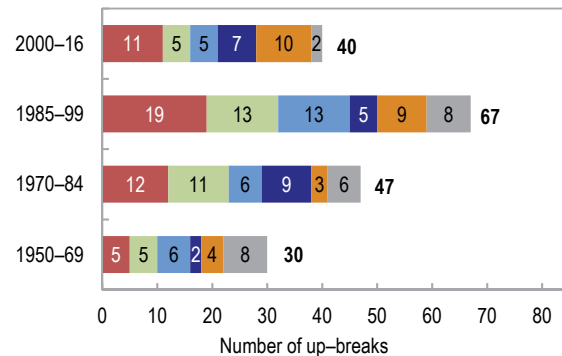
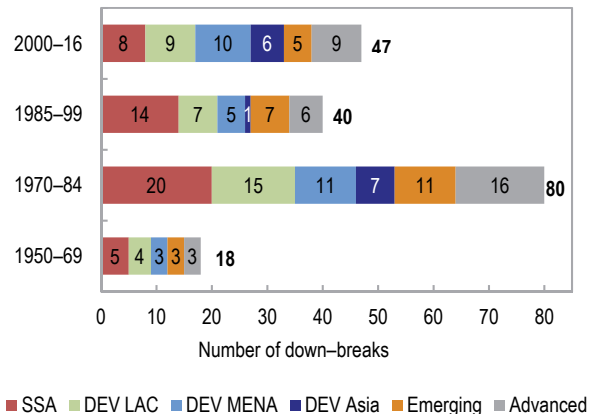


Figure 2.2b. Selected Groups: Growth Down-Breaks, 1950–2016



Source: Authors' calculations.

Note: DEV Asia= developing Asia; DEV LAC = developing Latin America and the Caribbean; DEV MENA = developing Middle East and North Africa; SSA = Sub-Saharan Africa.

volatility, with frequent shifts from expansion to contraction, to a somewhat more regular pattern of growth upticks.

...but also more dramatic shifts in growth

Nonetheless, countries in the region tend to experience large growth fluctuations between up-breaks and down-breaks—that is, large break sizes—suggesting high volatility (Figure 2.3). On average, per capita growth in sub-Saharan African countries was 10 percentage points higher after an up-break compared to the period before it. This is the largest break size among all groups examined—higher than the 7 percent break size in other emerging and developing economies. Similarly, countries in the region experience large swings in growth following a down-break, on par with developing economies in the Middle East and North Africa, and Asia, but significantly less than in emerging market economies. These large swings point to more widespread stop-and-go growth patterns than elsewhere, with a detrimental impact on investment behavior and large swings in living conditions.

From Turning Points to Growth Spells

The previous discussion shows that countries in the region have managed to get growth started, but that growth has also been more volatile. We now turn to the analysis of episodes of durable growth or growth spells—that is, episodes where growth after up-breaks was sustained. Following Berg, Ostry, and Zettelmeyer (2012), we define a *complete* growth spell as a period of time that starts with an up-break, is followed by an average rate of per capita growth of at least 2 percent, and ends with a down-break (and a per capita growth rate of less than 2 percent).⁷ Since some spells may be ongoing at the end of the sample period, we similarly define an *incomplete* or *ongoing* growth spell as one that was still ongoing using data up to 2016, the end of the sample.

The analysis identifies three main patterns among growth spells in the region: growth breaks in the region are frequent, but they are shorter than elsewhere, and they are characterized by large swings in growth rates.

⁷ The rate of per capita GDP growth of 2 percent is considered a reasonable rate for low-income and sub-Saharan African countries, and has been used in the related literature.

Figure 2.3. Selected Groups: Change in Median Annual per Capita Growth During Up-Breaks and Down-Breaks
(Percentage points)



Source: Authors' calculations.

Note: The bars indicate the median difference in per capita growth after the break (and until the next break) minus per capita growth before the break (and after the previous break). DEV Asia = developing Asia; DEV LAC = developing Latin America and the Caribbean; DEV MENA = developing Middle East and North Africa; SSA = Sub-Saharan Africa.

Frequent growth spells in the region...

The region recorded 40 growth spells between 1950 and 2016—about 30 percent of total spells identified over the sample period—which is slightly above the share of sub-Saharan African countries in the sample (Figure 2.4). Furthermore, 25 out of the 40 growth spells in the region are ongoing, which represents more than a third of all ongoing spells in the sample—a testament of the positive growth performance that the region has recorded in the last two decades, notwithstanding recent challenges.⁸

Indeed, growth spells in the region were more concentrated after 1995, a period characterized by a significantly improved business and macroeconomic environment, increased trade integration with the rest of the world, higher average commodity prices, and accommodative global financial conditions (Figure 2.5).⁹ This performance was widespread across the region, with more than two-thirds of countries enjoying 10 or more years of uninterrupted growth—with both resource-intensive and nonresource-intensive countries experiencing a roughly equal number of growth

⁸ Given the growth slowdown that some of the countries in the region are currently experiencing, it is possible that some of these growth spells will come to an end in the years to come.

⁹ Also, the Highly Indebted Poor Country (HIPC) Initiative in the region had a positive impact by lifting a heavy burden that restrained growth in many countries.

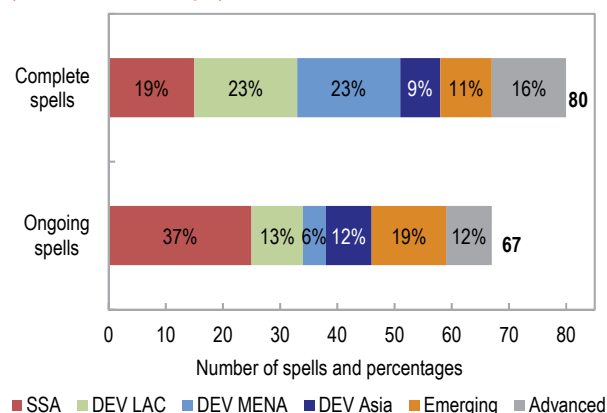
spells (23 for the former group, 17 for the latter).¹⁰ Of the ongoing growth spells, two are among oil exporters, six among other resource-intensive countries, and 17 among nonresource-intensive countries, highlighting that the growth momentum remains strong among countries that have not been adversely affected by the fall in commodity prices. In fact, Côte d'Ivoire, Ethiopia, Kenya, Rwanda, and Tanzania—forecast in 2017 to register growth at 5 percent or higher—are also in the midst of ongoing growth spells.

...but shorter spells than elsewhere...

While the region's record on growth spells is relatively positive, the spells have nonetheless tended to be shorter than elsewhere. The median length of complete growth spells in the region has been six years (six years for resource-intensive countries, and five years for nonresource-intensive countries) compared to 10 years for other developing economies and eight years for emerging market economies (Figure 2.6).

Spells in the region are not just more likely to be shorter; it is also the case that fewer complete spells in the region last longer. For example, only one out of three spells in the region lasts at least 10 years compared to more than half of the spells in the rest of the developing world and about 80 percent of spells in industrialized economies.

Figure 2.4. Selected Groups: Growth Spells, 1950–2016
(Number and Percentages)

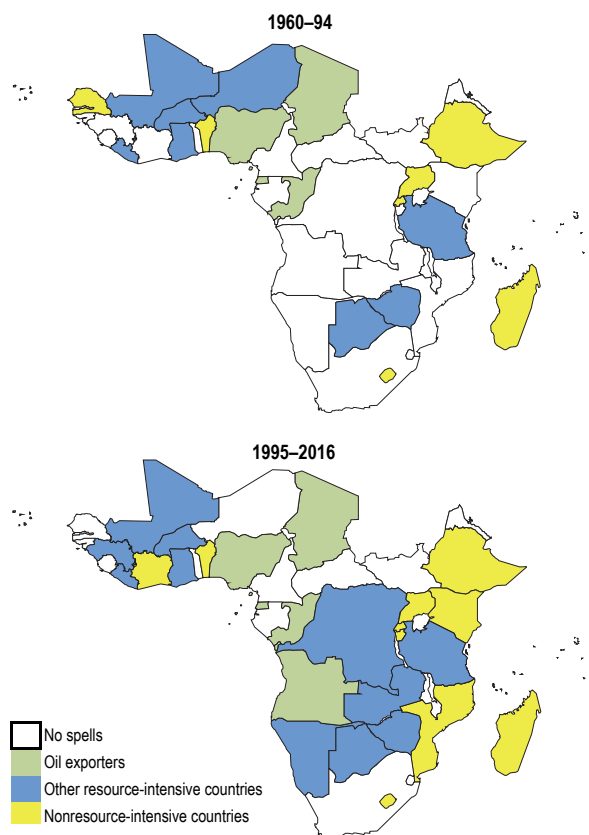


Source: Authors' calculations.

Note: DEV Asia = developing Asia; DEV LAC = developing Latin America and the Caribbean; DEV MENA = developing Middle East and North Africa; SSA = Sub-Saharan Africa.

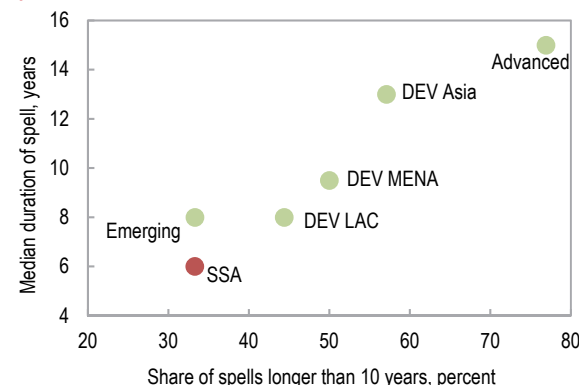
¹⁰ There are 23 resource-intensive countries (of which eight are oil producers) and 22 nonresource-intensive countries in the region and in our sample. See page 70 for country groupings.

Figure 2.5. Sub-Saharan Africa: Growth Spells, 1960–94 and 1995–2016



Source: Authors' calculations.

Figure 2.6. Selected Groups: Median Duration of Complete Growth Spells, 1950–2016



Source: Authors' calculations.

Note: DEV Asia= developing Asia; DEV LAC = developing Latin America and the Caribbean; DEV MENA = developing Middle East and North Africa; SSA = Sub-Saharan Africa.

... and large swings in growth before, during, and after spells

Furthermore, based on complete spells in the sample and consistent with the earlier finding of greater growth fluctuations at the time of up-breaks and down-breaks, spells in sub-Saharan Africa tend to be characterized by the largest swings in growth before, during, and after spells (Figure 2.7). Overall, spells in the region start from worse positions and typically end in “hard landings” or crashes—in sharp contrast to the rest of the world, where spells are characterized by both milder starts and softer landings. Indeed, while the median annual growth rate during growth spells is highest in sub-Saharan Africa, it swings from -4 percent before a spell to 9 percent during spells, before turning negative again at about -4 percent after the end of the spell.¹¹

The results do not appear to be influenced by the relatively more frequent periods of conflict experienced in the region during the period. Specifically, median annual growth rates excluding conflict countries continue to be at about -4 percent before growth spells, reach about 8 percent during spells, and return to negative growth of -6 percent

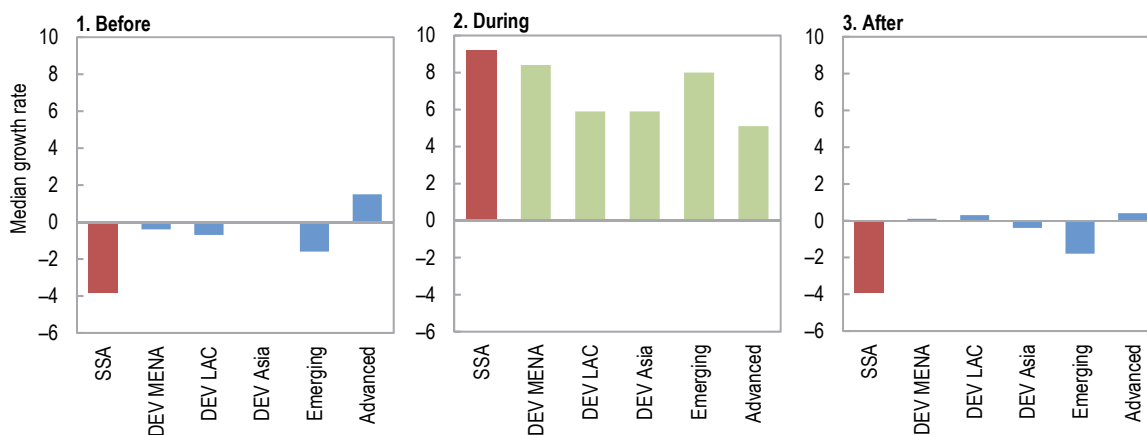
after the end of the spell, consistent with the patterns observed in Berg, Ostry, and Zettelmeyer (2012) and Tsangarides (2012).¹²

These findings—shorter growth spells and larger swings in growth—point to specific difficulties in the region in engineering and sustaining growth over long periods. The subsequent sections investigate first what factors may coincide with growth up-breaks, and then what factors may influence the duration of growth spells.

WHAT HAPPENS AROUND GROWTH TURNING POINTS?

Using the turning points previously identified, this section examines what happens in economies that experience transitions between periods of strong and weak (or negative) growth. To this end, we examine what happened around the time of breaks in growth to variables representative of the external environment, macroeconomic policies, structural features, and political and institutional characteristics (see Annex 2.2 for a list of variables

Figure 2.7. Selected Groups: Median Annual per Capita Growth Before, During, and After Complete Spells
(Percentage points)



Source: Authors' calculations.

Note: “Before” is defined as the per capita growth before the start of the spell and after the previous break; “during” is per capita growth during the spell; and “after” is per capita growth after the end of the spell and until the next break. DEV Asia = developing Asia; DEV LAC = developing Latin America and the Caribbean; DEV MENA = developing Middle East and North Africa; SSA = Sub-Saharan Africa.

¹¹ The swings in growth after complete spells are even starker when looking at average growth numbers: average annual growth after the end of a complete spell in sub-Saharan African plummets (from close to 10 percent during the growth spells) to -6 percent, as opposed to -1 percent in other developing economies, and -2 percent among emerging market economies.

¹² As a further robustness check, we investigate whether natural disasters, epidemics, or HIPC debt relief are associated with break points in growth or the beginning or end of spells. Our results suggest that these three factors do not show systematic relationships with breaks in growth or spells.

and their sources).¹³ This analysis does not attempt to identify what caused the emergence of growth turning points, nor does it control for other factors that may also potentially influence their occurrence. Instead, the goal is to identify the regularities observed over time.

Exogenous Factors

Growth turning points coincide with significant changes in key exogenous factors (Figure 2.8). Specifically:

- Growth up-breaks in the region tend to coincide with improvements in the countries' terms of trade, while the opposite holds for down-breaks of a similar magnitude (as confirmed by a statistical test for symmetry between up- and down-breaks). The importance of changes in terms of trade has been particularly relevant for commodity exporters; for instance, worsening terms of trade following the global financial crisis coincided with down-breaks in Nigeria in 2010 and in Equatorial Guinea and the Republic of Congo in 2011. Also, stronger growth in trading partners is significantly associated with up-breaks in growth (not shown in the figure).

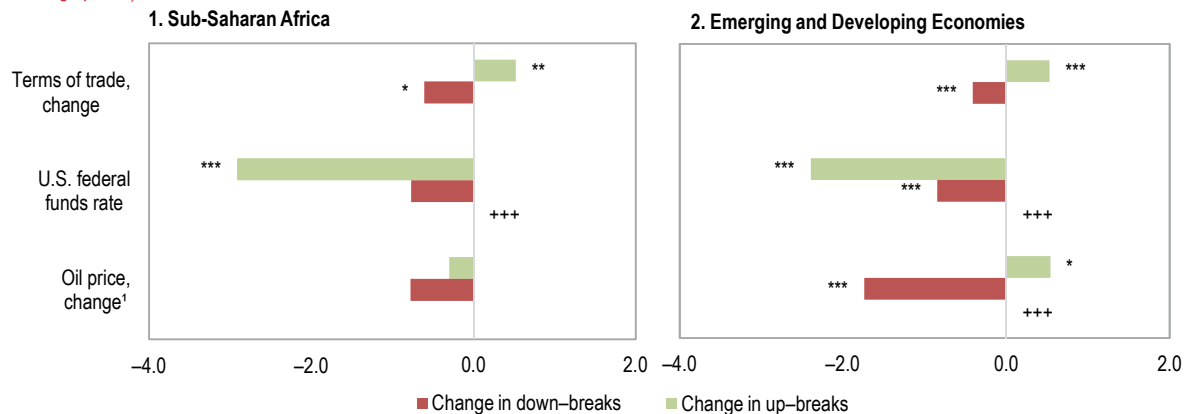
- Growth up-breaks in sub-Saharan Africa are associated with looser global liquidity conditions, represented by declines in the U.S. federal funds rate of about 2.5 percentage points on average, as observed in the early 2010s. However, there is no significant association between changes in the U.S. federal funds rate and down-breaks.
- Unlike in the rest of the emerging and developing economies, growth breaks in the region are not significantly associated with changes in oil prices. This is most likely because sub-Saharan Africa includes both oil exporters and importers, two groups for which the role of oil prices in relation to growth breaks plays in opposite directions.¹⁴

Macroeconomic Indicators

This section turns to the domestic macroeconomic environment, for which changes in several variables tend to significantly characterize changes between periods of strong or weak growth (Figure 2.9). Specifically:

- Growth up-breaks in sub-Saharan Africa coincide with lower inflation, significant

Figure 2.8. Change in External Shocks Variables Associated with Growth Breaks
(Percentage points)



Source: Authors' calculations.

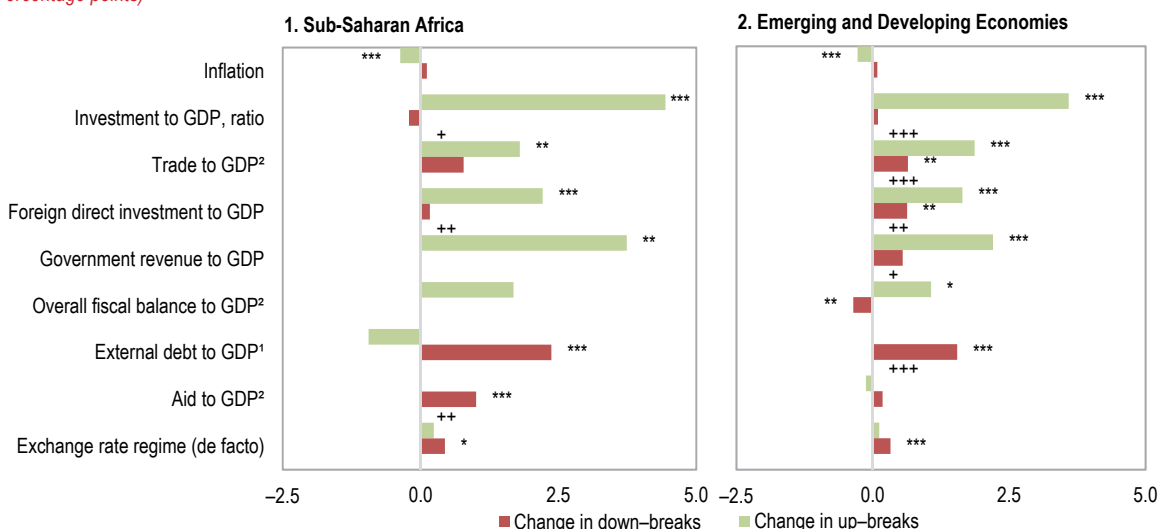
¹ Changes divided by 5.

Note: *, **, and *** indicate that the changes in means are significant at the 10, 5 and 1 percent levels. +, ++, and +++ indicate that the absolute magnitudes of changes in means between up-breaks and down-breaks are significantly different at the 10, 5, and 1 percent levels.

¹³ We follow the approach in Jones and Olken (2008). For each variable tested, we report the change in its mean value when there is a break in the rate of growth and test whether the change is statistically significant. Also, we test if changes in variables have similar absolute magnitudes when up-breaks and down-breaks occur in a form of a "symmetry test." More details are provided in Annex 2.1.

¹⁴ In other emerging and developing economies, growth up-breaks are associated with higher oil prices—likely reflecting stronger global growth for that group—and higher trade partner growth, while down-breaks coincide with lower oil prices.

Figure 2.9. Change in Macroeconomic Variables Associated with Growth Breaks
(Percentage points)



Source: Authors' calculations.

¹ Changes divided by 10.

² Changes divided by 5.

Note: *, **, and *** indicate that the changes in means are significant at the 10, 5 and 1 percent levels. +, ++, and +++ indicate that the absolute magnitudes of changes in means between up-breaks and down-breaks are significantly different at the 10, 5 and 1 percent levels. The exchange rate regime variable is based on the fine classification in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions database, with higher values indicating more flexibility.

increases in investment, more trade openness, and stronger net inflows of foreign direct investment, as well as increases in the ratio of credit to the private sector to GDP (not shown in the figure). In particular, growth up-breaks in Zambia in 1999, and Equatorial Guinea in 1994 were associated with increases in investment. Likewise, successful efforts to curb inflation in Uganda during 1993–94 and the Democratic Republic of Congo after 2009 coincided with growth up-breaks. Also, increases in foreign direct investment were observed at the time of growth up-breaks in the Democratic Republic of Congo in 2009, Zambia in 1999, and São Tomé and Príncipe in 1995.

- Fiscal variables also tend to change significantly at the time of growth breaks, although differently on the upside and downside. Growth up-breaks are accompanied by higher government revenues and better fiscal balances—probably reflecting the impact of better growth performance on fiscal outcomes and measures to boost revenue mobilization—while down-breaks coincide with higher debt ratios.¹⁵ For example, up-breaks in Ethiopia in

¹⁵ Both external debt and total public debt, not shown in the figure, show similar results.

2003, Angola in 2000–01, and Rwanda and Tanzania in 1994 coincided with improved fiscal balances. Conversely, large increases in debt-to-GDP ratios during down-turns have been recorded in sub-Saharan Africa. Interestingly, aid flows toward the region also rise significantly during down-breaks, suggesting a strong international response to support countries in difficult times.

- Finally, exchange rate developments show interesting associations with growth breaks in sub-Saharan Africa. Growth down-breaks tend to be associated with more flexible exchange rate regimes, potentially reflecting the fact that, in response to a growth deceleration, countries may allow more exchange rate flexibility in order to use the exchange rate as an adjustment tool.

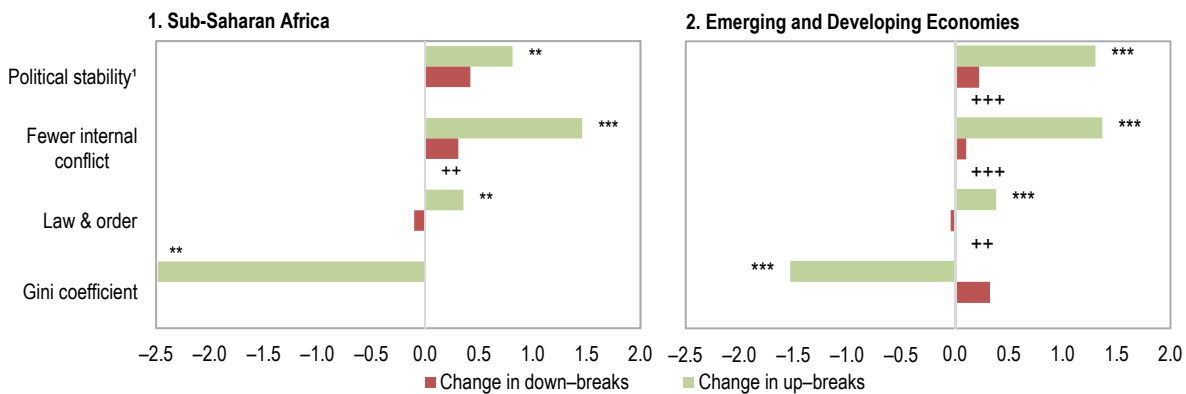
Institutions, Social Indicators, and Structural Transformation

The final set of factors covers domestic institutional and social factors, productivity, and structural features of the economy. Although these are slow-moving variables, it is possible to identify some interesting patterns. Specifically:

- Growth up-breaks in the region coincide with improvements in the institutional environment, such as a reduction in political risks, fewer internal conflicts, and improved law and order (Figure 2.10). Also, growth up-breaks in the region tend to be associated with significant declines in inequality.¹⁶
- Improvements in structural factors are also associated with growth up-breaks, while down-breaks generally coincide with their

deterioration (Figure 2.11). In particular, growth up-breaks are found to coincide with significant increases in the rate of growth of total factor productivity—implying that the use of resources becomes more efficient or more intense during those periods of rapid growth—while the opposite holds true for down-breaks. Also, slower adoption of technology, represented by hampered growth of mobile cell phone lines, is present during down-breaks.

Figure 2.10. Change in Institutions and Inequality Variables Associated with Growth Breaks
(Percentage points and units)

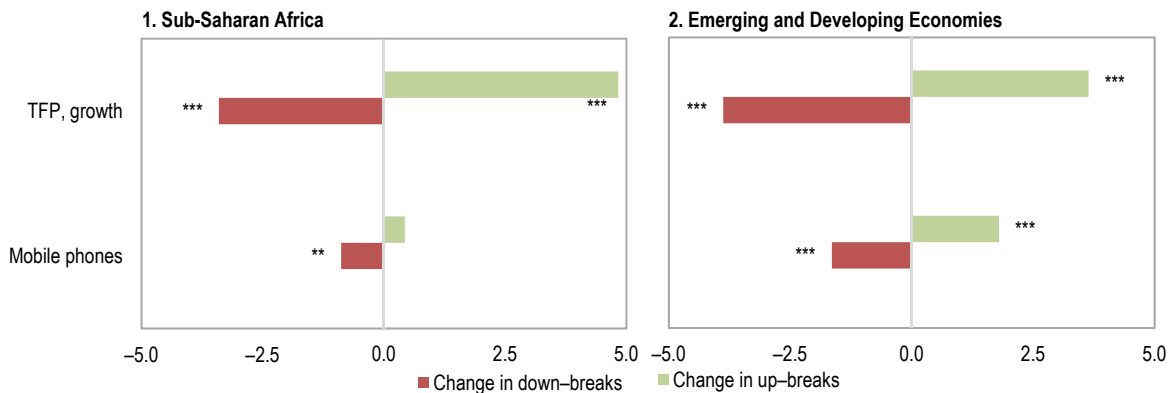


Source: Authors' calculations.

¹ Changes divided by 5.

Note: *, **, and *** indicate that the changes in means are significant at the 10, 5 and 1 percent levels. +, ++, and +++ indicate that the absolute magnitudes of changes in means between up-breaks and down-breaks are significantly different at the 10, 5 and 1 percent levels.

Figure 2.11. Change in Structural Transformation Variables Associated with Growth Breaks
(Percentage points and units)



Source: Authors' calculations.

Note: *, **, and *** indicate that the changes in means are significant at the 10, 5, and 1 percent levels. +, ++, and +++ indicate that the absolute magnitudes of changes in means between up-breaks and down-breaks are significantly different at the 10, 5 and 1 percent levels. TFP = Total factor productivity.

¹⁶ There is a general declining trend in political risks and conflicts, which helps explain why the institutional environment generally improves, irrespective of up-breaks

or down-breaks. However, as the figure shows, it is only in the case of growth up-breaks that a significant improvement in those conditions can be identified.

ANALYZING THE DURATION OF GROWTH SPELLS

Having established the changes in the external and domestic environment that tend to occur at times of growth turning points, this section now turns to what influences the length of growth spells. We use the findings of the previous section to motivate the variables and policies that are likely to affect the duration of growth spells in sub-Saharan Africa, but at the same time, we expand our search to allow the possibility that sustaining a growth spell may pose a different challenges than those required to trigger a growth up-break.

More specifically, we relate the probability that a spell will end in the next period to changes in those variables, also investigating to what extent these relationships might differ in the region from elsewhere (see Annex 2.1 for more details). Due to a relatively short number of spells and the unavailability of long time series, we follow a two-step approach. First, we test the relevance of each factor or policy of interest, controlling for initial conditions at the beginning of each spell (to account for growth convergence). Second, we take a set of representative factors or policies from all groups analyzed in the first step in a way that preserves a reasonable sample size, and examine a multivariate setting that allows us to identify the effect of each factor or policy while controlling for other determinants.¹⁷

Determinants of Growth Spells: One by One

The first step of the two-step approach consists of investigating the effect of several variables on the duration of growth spells one by one while controlling for income levels.

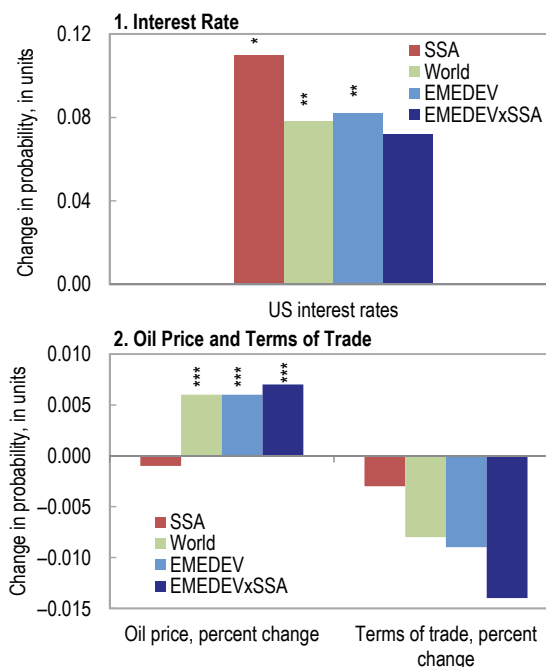
Exogenous Factors

Since emerging markets and developing economies are particularly sensitive to changes in commodity prices and global financial conditions, we first investigate the extent to which external shocks may disrupt growth spells. As before, we focus on

changes in the terms of trade, oil prices, and U.S. interest rates (as a proxy of global liquidity conditions).¹⁸

We find that tighter global financial conditions significantly increase the probability that growth spells end in sub-Saharan Africa as well as in the rest of the world (Figure 2.12).¹⁹ On average, fluctuations in oil prices do not appear to have a significant impact on spells in the region, but this result may be influenced by the fact that changes in oil prices have a very different impact on oil exporters and importers.

Figure 2.12. External Shocks



Source: Authors' calculations.

Note: The size of the bars corresponds to the change in the probability (measured in units) that the growth spell will end associated with a 1 unit change in each of the described variables. EMEDEV = all emerging and developing economies; EMEDEVxSSA = all emerging and developing economies excluding sub-Saharan Africa; SSA = sub-Saharan Africa. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels.

¹⁸ Real external shocks have been found to be particularly costly in terms of output in developing economies, with external financial shocks being relatively costlier in the emerging market context (Becker and Mauro 2006).

¹⁹ For the U.S. interest rate we use a composite rate that combines the effective U.S. federal funds rate with alternative shadow measures of the U.S. monetary policy rate to account for the monetary accommodation provided by unconventional policies after the global financial crisis, when interest rates hit the zero lower bound (Krippner 2016).

¹⁷ A similar approach is taken in Berg, Ostry, and Zettelmeyer (2012), who investigate a similar question but focus on the global country sample.

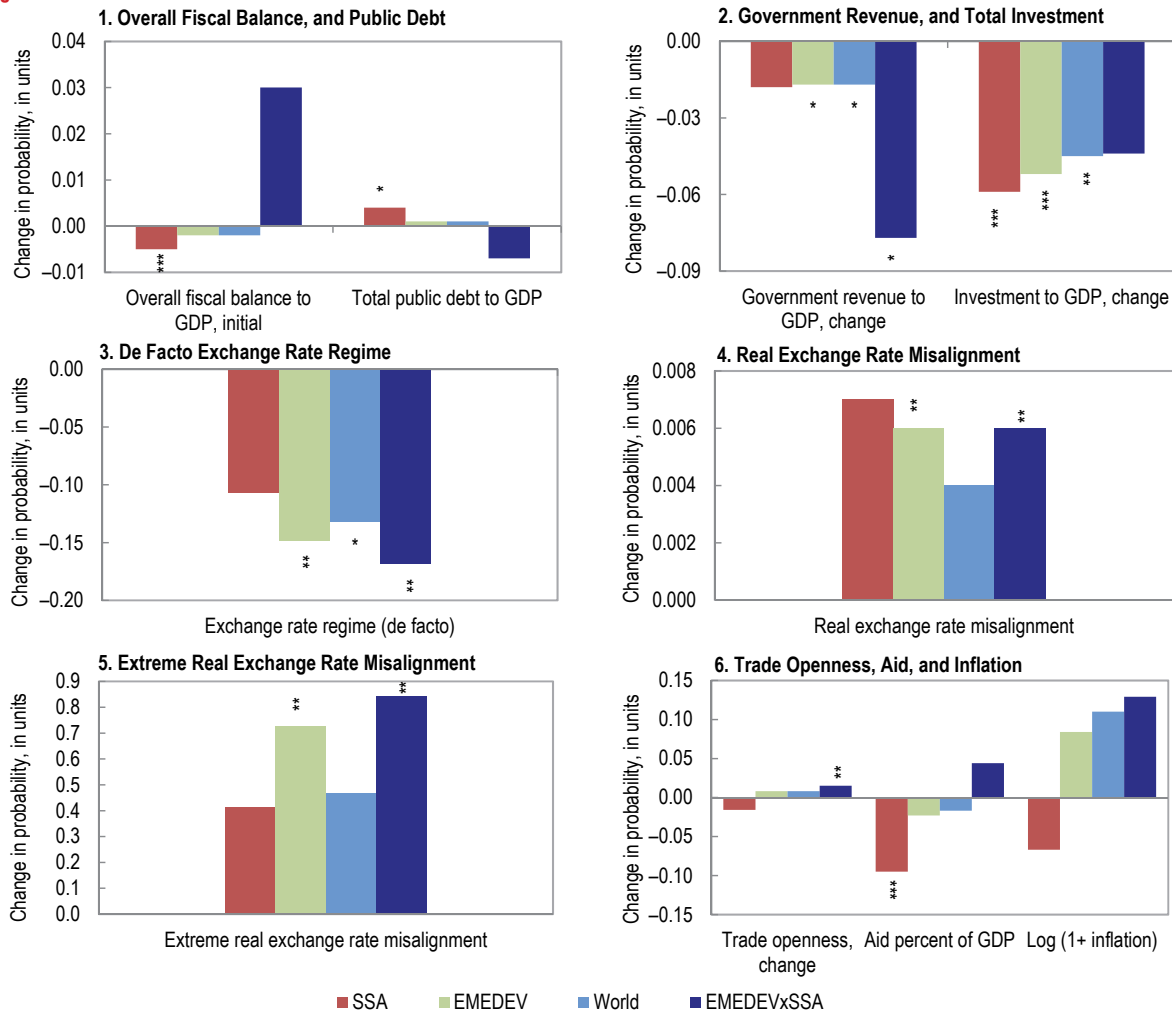
Macroeconomic Indicators

Negative developments in the external environment can adversely affect the duration of a growth spell. In contrast, good macroeconomic policies should, in theory, have a protective effect on the spell, as they can promote healthy rates of investment, and provide an internal source of growth momentum.

Indeed, prudent fiscal policies play a special role in sustaining growth spells in sub-Saharan Africa: a better fiscal balance significantly increases the chance that a growth spell will continue, while conversely, a higher debt burden can accelerate its end (Figure 2.13). In fact, in most countries

of the region, the substantial debt reduction that occurred in the wake of debt relief provided through the Highly Indebted Poor Country (HIPC) Initiative allowed more fiscal space to finance productive spending with otherwise healthier fiscal balances—providing supporting conditions for sustainable growth. For instance, in Tanzania, the period of strong growth that started in the early 1990s was accompanied by an improvement in terms of public debt, together with a stepping-up of public expenditures (Robinson, Gaertner, and Papageorgiou 2011). This also is a reminder that a steady increase in public debt, even in fast-growing economies, ultimately poses a risk to growth spells, as elaborated in Chapter 1.

Figure 2.13. Macroeconomic Indicators



Source: Authors' calculations.

Note: The size of the bars corresponds to the change in the probability (measured in units) that the growth spell will end associated with a 1 unit change in each of the described variables. The exchange rate regime variable is based on the fine clarification in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions database; higher values indicate more flexibility. EMEDEV = all emerging and developing economies; EMEDEVxSSA = all emerging and developing economies excluding sub-Saharan Africa; SSA = sub-Saharan Africa. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels.

Investment also appears to play a strong role in warding off growth stops and sustaining growth spells, as it not only supports aggregate demand initially but also expands productive capacity over time. While in some resource-intensive countries this might reflect an investment boom related to discoveries of large commodity reserves, for the region as a whole, the momentum has gone beyond that to include large and much-needed infrastructure investment. For example, growth spells in Chad and Lesotho in the 1980s were accompanied by a sharp increase in the investment-to-GDP ratio.

Other macroeconomic factors seem to have a significant impact on the duration of growth in the world but less so in sub-Saharan Africa (Figure 2.13).²⁰ The effects of competitiveness, trade openness, and inflation are as follows:

- A more flexible exchange rate regime and less overvalued exchange rate levels seem to extend the length of growth spells (echoing findings in Rodrik 2008), although here again the coefficients do not come out significant for the region.²¹
- Higher trade openness tends to increase the duration of growth spells—although not significantly—most likely reflecting more diversified economies, which allows for more resilient and sustainable growth. One such example is Botswana, which experienced one of the longest growth spells in the sample, and where total trade (that is, the sum of exports and imports) represented 95 percent of GDP during the period. In the case of sub-Saharan Africa aid flows also appear to significantly increase the duration of growth spells in the region, a result that is new to the literature.²²

²⁰ Given their general significance in the global sample, we will nonetheless keep those other macroeconomic factors as candidates for our multivariate analysis in the next section.

²¹ Other proxies for macroeconomic factors, such as the growth of trading partners, and indicators of financial deepening (credit to GDP, and the rate of growth of credit to the private sector), were not significant.

²² Earlier studies have examined the effect of aid inflows on the rate of economic growth, rather than on the duration of growth spells, often without a robust finding (Rajan and Subramanian 2008).

- Higher inflation seems to decrease the duration of growth spells in the region, although the estimated coefficient is not significant.

Institutions and Social and Human Development

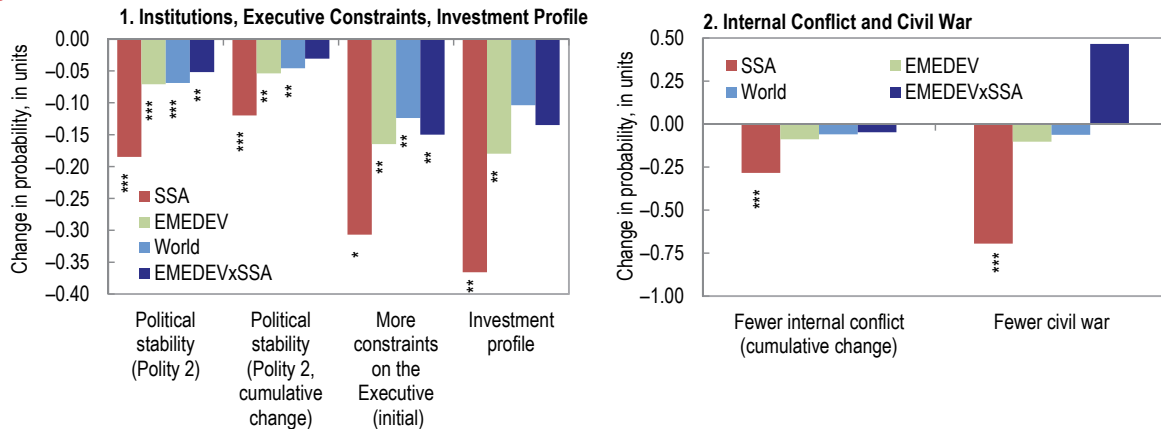
Turning to more slowly moving variables, the first set of such variables relates to the quality of political and economic institutions. The literature has long argued that these variables affect the ability of countries to fend off economic crises (Acemoglu and others 2003). Along a number of such variables—ranging from political stability to institutional constraints to policy decisions and the profile of countries to attract investment—in line with the literature, we find that high institutional quality strongly supports growth spells in the region, and consistently more so than in any other regions (Figure 2.14). For example, the strong economic growth in Eastern African Community (EAC) countries has been explained by the macroeconomic stability, favorable business climate, and government stability in those countries (McAuliffe, Saxena, and Yabara 2012). In addition, armed conflicts significantly disrupt economic activity and shorten the duration of growth spells in sub-Saharan Africa, although it should be noted that the number of such conflicts has dramatically decreased over the last two decades in the region.

Finally, social and human development—inasmuch as it improves aggregate education and health, and hence efficiency and productivity—is also found to profoundly impact growth spells, as higher levels of education and human capital are associated with longer growth spells (Figure 2.15). Indeed, countries in the region with relatively high levels of human capital, such as Botswana, Ghana, Lesotho, and Mauritius, have experienced longer growth episodes. Likewise, the reduction in infant mortality is associated with longer growth spells while higher income inequality leads to shorter spells (though the effect is not statistically significant in this sample).

Structural Transformation and Technology Adoption

Finally, we investigate to what extent economic diversification, structural reforms, and adoption of foreign technology are important engines of durable growth (Figure 2.16).

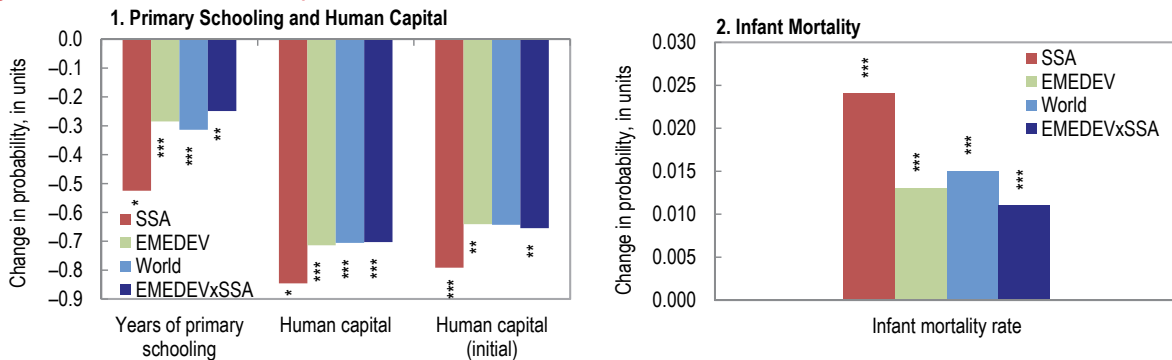
Figure 2.14. Institutions and Conflict



Source: Authors' calculations.

Note: The size of the bars corresponds to the change in the probability (measured in units) that the growth spell will end associated with a 1 unit change in each of the described variables. EMEDEV = all emerging and developing economies; EMEDEVxSSA = all emerging and developing economies excluding sub-Saharan Africa; SSA = Sub-Saharan Africa. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels.

Figure 2.15. Social and Human Development



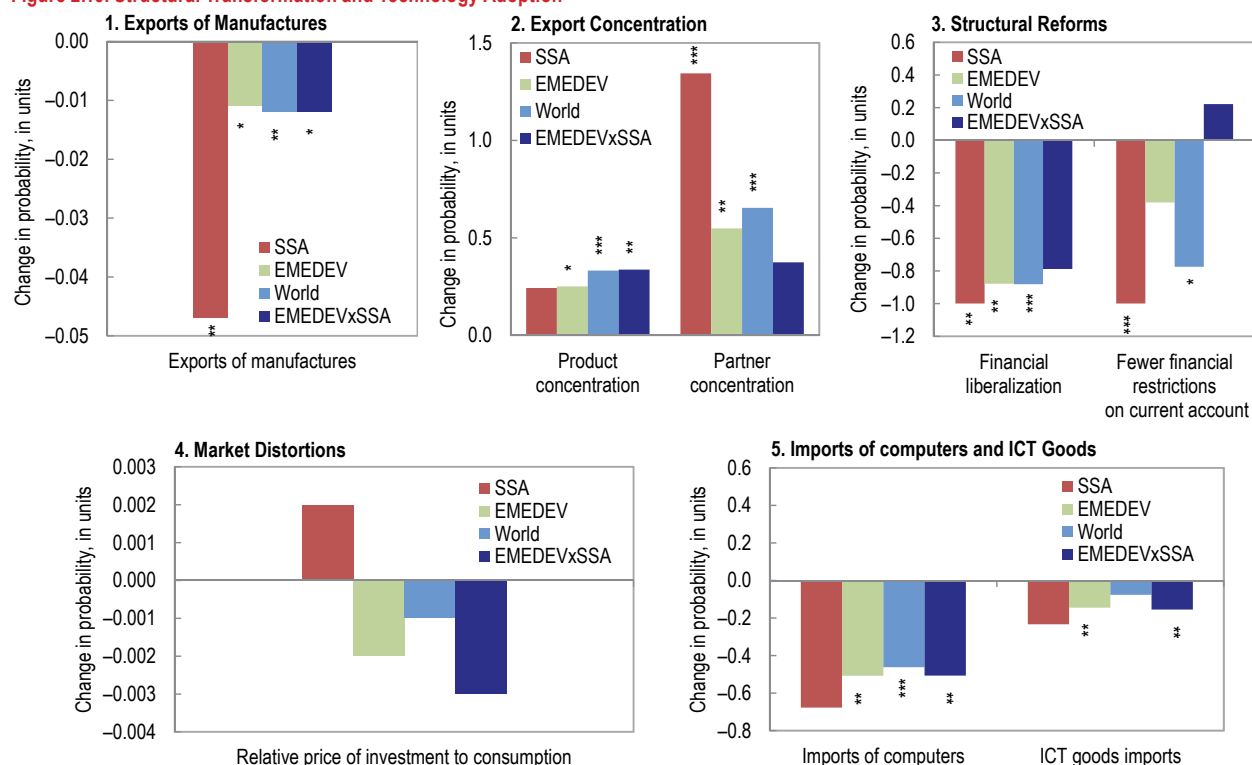
Source: Authors' calculations.

Note: The size of the bars corresponds to the change in the probability (measured in units) that the growth spell will end associated with a 1 unit change in each of the described variables. EMEDEV = all emerging and developing economies; EMEDEVxSSA = all emerging and developing economies excluding sub-Saharan Africa; SSA = sub-Saharan Africa. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels.

- Diversification, especially in terms of the composition of exports, is found to be an important factor supporting the resilience of growth episodes in the region, in line with findings in the literature that export concentration hampers the level of economic growth (Lederman and Maloney 2003). A high level of the share of exports of manufacturing products appears to be particularly beneficial, presumably because, unlike raw materials, manufacturing exports are associated with higher value-added content and less volatile prices. Countries with relatively high levels of product diversification, such as Tanzania and Kenya, are enjoying ongoing growth spells. Indeed, Giginishvili, Mauro, and Wang (2014) found that the strong growth of EAC countries during the last decade is explained by

the step-up in output and export diversification, and by the increase in sophistication and quality of exports. In the same vein, Botswana, Cabo Verde, Lesotho, and Mauritius managed to substantially increase the share of manufactures as a proportion of their exports while experiencing sustained growth episodes.

- Higher financial liberalization—proxied by an index reflecting interest rate restrictions, credit controls, competition restrictions, high state ownership, and the quality of banking supervision (IMF 2008)—is also associated with longer growth spells in the region, as it allows the economy to direct resources to the most profitable activities and to achieve efficiency gains.

Figure 2.16. Structural Transformation and Technology Adoption


Source: Authors' calculations.

Note: The size of the bars corresponds to the change in the probability (measured in units) that the growth spell will end associated with a 1 unit change in each of the described variables. EMEDEV = all emerging and developing economies; EMEDEVxSSA = all emerging and developing economies excluding sub-Saharan Africa; SSA = sub-Saharan Africa. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels.

- The relative price of investment to consumption goods—a proxy for market distortions—seems to be associated with shorter spells, although the coefficients are not statistically significant. This is consistent with the notion that distortions of market prices impact negatively on growth rates through their effects on investment decisions (Barro 1991).²³
- Finally, while the adoption of (foreign) new technology—via, for example, imports of computers and other information technology products—seems to matter elsewhere to support growth spells, this is not the case for sub-Saharan Africa, where the coefficient does not come out significant. This probably reflects

still-low levels of such imports across the region, as well as limited data availability.

Determinants of Growth Spells: A Summary View

To complete the analysis, we examine in a final stage the joint effect of factors and policies on the duration of growth spells. As many of these variables are likely to be correlated, this is a required step to assess their independent power in accounting for longer growth spells.

To that effect, we use duration analysis to relate the probability that the spell will end in the next year to a set of representative variables from all groups analyzed in the previous section, along with initial income.²⁴

²³ Typically, the relative price of investment goods is higher in less-developed economies. This may reflect low productivity in the production of investment and traded goods relative to consumption goods, and barriers to the production or import of investment goods resulting from distortionary tax systems or monopolistic structures in the market for investment goods. See Hsieh and Klenow (2007).

²⁴ As discussed earlier, due to a relatively short number of spells and the unavailability of long time series, we avoid “general-to-specific” modeling. Instead, we include at least some variables from each of the groups examined in the previous section while maintaining a reasonable sample size.

Our full model includes the U.S. interest rate, change in the terms of trade, and the oil price change (exogenous factors); trade openness, capital account openness, inflation, exchange rate regime, the debt-to-GDP ratio, and the change in the investment rate (domestic policy variables); human capital and institutions as measured by Polity 2, a proxy for political stability (human and institutional factors); and a measure of market distortions (macro-structural policy variable). The average growth during the spell is added to reflect potential overheating, and an indicator variable for 2000–08 is added to capture differential effects from the decade starting in 2000.²⁵

Results suggest that the duration of growth spells in sub-Saharan Africa is supported by improved monetary and fiscal policies, better political institutions, less market distortions, and a better external environment (see detailed results in Annex Table 2.3). In particular, increases in the investment rate, more trade openness, lower inflation, and a lower debt-to-GDP ratio tend to prolong growth spells in the region. In addition, a higher growth rate in the previous period increases the probability that a spell comes to an end—pointing to the risks associated with an overheated economy. At the same time, the results also suggest to additional benefits from improving political institutions (making them more democratic) and reducing market distortions associated with the high relative price of investment.²⁶

To get a better sense for the importance of each factor or policy influencing growth spells in the region, we ask the following question: what is the change in the spell's expected duration if a factor or policy improves by 25 percentile points, starting from its median value (while keeping other factors constant)?

²⁵ The indicator variable receives the value of 1 during the period 2000–08 to capture effects from the period of booming commodity prices. Results are robust to the exclusion of this variable.

²⁶ The findings are robust to alternative specifications. Other potential determinants turned out to be nonsignificant, including a variable capturing the growth of trading partners, the current account deficit and its changes, financial flows and indicators of financial deepening (credit to the private sector and bank deposits to GDP), credit growth, and the private and public investment components of total investment individually.

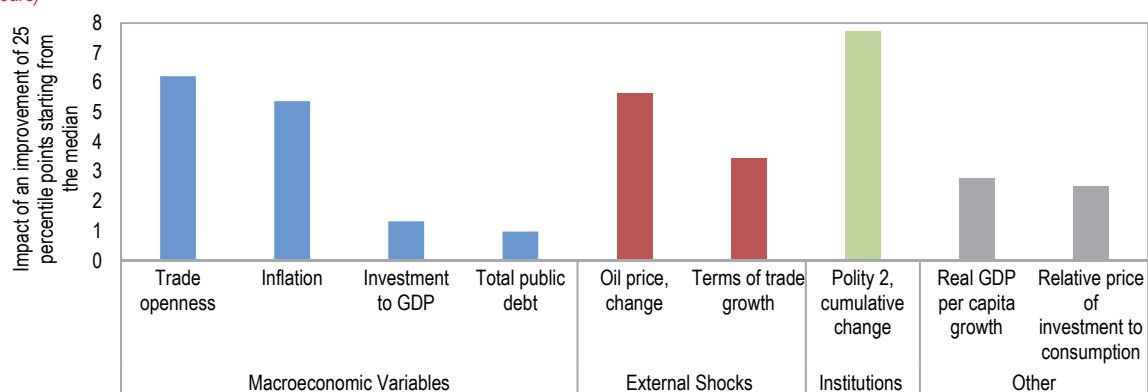
The main results are as follows (Figure 2.17):

- *Better policies sustain growth spells in the region:* (1) an acceleration in the change of investment to GDP increases the expected length of the spell by about 1.3 years, (2) a reduction in the debt-to-GDP ratio increases the expected length of the spell by about one year, (3) an increase in openness increases the expected length of the spell by six years, and (4) a reduction in inflation increases the expected length of the spell by 5.4 years.
- *Reduced market distortions help sustain growth spells:* a reduction in the ratio of the relative price of investment to consumption increases the expected length of the spell by 2.5 years.
- *A more favorable external environment is supportive of longer spells:* an improvement in the percent change of terms of trade increases the expected length of the spell by 3.4 years. Similarly, increases in the oil price are associated with an increase in the expected length of the spell of 5.7 years.²⁷
- *Better institutional quality increases the duration of the spell:* an increase in improvements in the Polity 2 rating increases the duration of the spell by 7.7 years.
- *Signs of overheating decrease the expected duration of the spells:* a reduction in GDP per capita growth increases the expected duration of the spell by 2.8 years.

In summary, each of these factors or policies has an important effect on spell duration. For example, improvements by 25 percentile points in *each* policy variable from its median value (while keeping others constant) increases the length of the spell by one to six years, while a similar percentile points improvement in the institutional environment or exogenous factors raises the spell length by four to eight years.

²⁷ These results suggest that improvements in the terms of trade not only help to jump-start growth (as shown in the up-breaks analysis section), but they also have a significant impact on the duration of growth spells in the region. Differentiating the effects between resource-intensive and nonresource-intensive countries is not possible due to sample size.

Figure 2.17. Sub-Saharan Africa: Impact on Spell Duration (Years)



Source: Authors' calculations.

Note: Each bar shows the change in the expected duration of a growth spell (in numbers of years) if a variable improves by 25 percentile points from the median value in the sample of sub-Saharan African countries, while holding other variables constant.

Investigating how the same factors and policies affect the duration of growth spells in emerging and developing economies can shed light on similarities and differences in growth spells in the region compared to those in the rest of the world.²⁸ Our results suggest that lower inflation, good institutions, and lower government debt prolong growth spells both in sub-Saharan Africa as well as in the rest of the emerging and developing economies of the world. However, other results are more specific to particular groups: only in sub-Saharan Africa do we find that a higher investment-to-GDP ratio, positive developments in the terms of trade prolong growth spells. Similarly, trade openness appears to have a stronger positive effect in the region (suggesting a heavier reliance of sub-Saharan Africa on countries from different continents), while macro-structural distortions as captured by higher dispersion in the relative price of investment, seem to do more harm in sub-Saharan Africa. Overall, the results suggest that growth spells in sub-Saharan Africa are somewhat different from those in the rest of the world, as several determinants operate differently in the region.

POLICY CONSIDERATIONS AND CONCLUDING REMARKS

Growth turnarounds and periods of sustained growth have become more common among countries in sub-Saharan Africa since the turn of the century. While this is clearly a positive development, the analysis in this chapter shows that, historically, growth spells in the region tend, on average, to last for shorter periods than elsewhere, exhibit larger swings, and often end in “hard landings.” Thus, the critical challenge in the context of the current economic difficulties faced by many countries in the region is to sustain spells for longer and avoid hard landings.

Historically, engineering growth up-breaks and transforming them into sustained periods of growth has been possible as a result of a number of factors and policies rather than one or two single driving sources. For example, a supportive external environment—be it better terms of trade or favorable global financial conditions—and improvements in the quality of institutions have clearly helped. However, our work shows that domestic macroeconomic policies play a critical role. These include sound fiscal policy to prevent excessive public debt accumulation, monetary policy geared toward low inflation, outward-oriented trade policies to make the best of opportunities offered by a globalized world, and macro-structural policies to reduce market distortions at the domestic level, with a view to both unleash the growth potential of the private sector and boost investment.

²⁸ Annex Table 2.3 compares our baseline multivariate estimation for sub-Saharan Africa and two comparator groups: all emerging and developing economies (EMEDEV), and all emerging and developing economies excluding sub-Saharan Africa (EMEDEV without SSA).

Where does that leave us today? Resource-intensive countries in sub-Saharan Africa have been severely affected by the slump in commodity prices. And while many other countries in the region continue to enjoy robust growth, some of those have started to see growth decelerate gradually and vulnerabilities emerge, as shown in Chapter 1. Furthermore, it is expected that the global environment will continue to provide little support for growth in the region, with growth rebalancing in China toward less resource-intensive sectors, commodity prices expected to remain low for a long period of time, aid flows expected to become more scarce, and growing risks of inward-looking policies across the globe.

The discussion above implies that the impetus to *revive* growth where it has faltered, and *sustain* growth where it has remained relatively strong, must come from inside. That is, it must come from a focus on macroeconomic and structural policies that support self-sustaining sources of growth:

- *For countries where growth has slowed markedly, the priority is to maintain macroeconomic stability and set the stage for a growth turnaround that can then be sustained.* Such policy adjustments need to be based on a comprehensive set of policies that reinforce each other. This includes improving fiscal balances through targeted cuts and measures that durably increase revenue to contain the increase in public debt, and ensuring that monetary policy is consistent with keeping inflation under control. It also means strengthening macro-structural policies that foster investment and help recover growth, as well as promoting openness and integration with the global economy, and improving human capital and more stable political environments. Our analysis indeed finds that all these policies are strongly associated with growth turnarounds and sustained growth spells.
- *For countries currently enjoying a growth spell, the focus should be on prolonging it and trying to avoid a hard landing.* Countries that are still growing robustly should rebuild buffers in comparatively favorable times to stem increases in public debt, as the analysis shows this is an important factor to sustain the length of growth episodes. Debt has been on an upward trend in many of these countries despite robust growth, and, going forward, some gradual fiscal consolidation is warranted, especially in the current environment of tighter and more volatile financial markets. It is also necessary to further strengthen monetary policy frameworks to ensure that objectives are centered around a price stability mandate, consistent with the findings of our analysis.
- *For all countries in the region, complementing macroeconomic policies with efforts to unlock the countries' growth potential is critical to the growth agenda.* These efforts include fostering educational development, advancing economic diversification to increase resilience to shocks, promoting regional and international trade integration, prioritizing growth-enhancing investment, invigorating macro-structural policies to reduce market distortions, and strengthening governance frameworks as well as the business climate to attract investment towards new sectors of growth. Concrete measures include investing in the development of human capital, increasing diversification of exports in terms of partners and products as well as increasing the share of manufactures in total exports, deepening technology adoption through imports of information technology goods, strengthening financial liberalization reforms, and reducing risks associated with investment, as evidenced in our empirical results.

Annex 2.1. Methodology

Structural Breaks

To construct the growth turning points, we follow Antoshin, Berg, and Souto (2008), who develop a variant of the Bai and Perron (1998) procedure to test for multiple structural breaks in time series when both the total number and the location of breaks are unknown.¹ The procedure requires setting in advance two parameters for the determination of structural breaks: the minimum possible number of years between potential breaks and the statistical significance to test the existence of those structural breaks (p). We focus on a minimum number of years between breaks of five years ($h = 5$), and a critical value of 10 percent ($p = 0.10$), which maximize the number of accurately measured breaks for a reasonable minimum number of years between breaks.²

Using this method, we identify 184 up-breaks and 185 down-breaks in economic growth in 146 countries over the period 1950–2016. By construction, since we impose a minimum of five years between breaks, the empirical approach used to identify structural breaks cannot use the first and last five years of the estimation sample. As a result, for a country with 66 years of data and with sample $h = 5$, a total of 12 possible structural breaks can be identified, with the last possible break occurring in 2011. The breaks are grouped by level of income into advanced, emerging, and developing economies, with the latter group disaggregated into Asia, Middle East and North Africa, sub-Saharan Africa, and Latin America.

Growth Spells

Using the identified up-breaks and down-breaks we follow Berg, Ostry, and Zettelmeyer (2012) to define “complete” growth spells as periods of time that (1) begin with a growth up-break followed by a period of at least 2 percent average per capita income growth; and (2) end with a growth down-break followed by a period of less than 2 percent average per capita income growth. The 2 percent rate of per capita growth has been used before in the literature, for example, by Berg, Ostry, and Zettelmeyer (2012), and is considered reasonable per capita growth for low-income and sub-Saharan countries. Similarly, “incomplete” growth spells can be defined as those that satisfy condition (1) and are ongoing at the end of the sample. A total of 80 complete and 67 incomplete spells are identified for the full sample.

Changes in Variables at Turning Points

We follow Jones and Olken (2008) and use one-sample t -tests to examine the changes in the means of a large set of variables observed between the period before a break (and after the previous turning point) and the period after a break (and before the next turning point), for both up-breaks and down-breaks.

More specifically, to test changes in means, we calculate those changes at each break date. Then the mean change across breaks is obtained and tested (where the null hypothesis is that the mean change is equal to zero). The test compares the magnitude of the mean changes observed in up-breaks and down-breaks, irrespective of the direction (sign). We also apply symmetry tests, which are two-sample t -tests to evaluate whether the mean changes observed during up-breaks have the same magnitude as the mean changes observed during down-breaks. These tests allow for both the samples and variances of the mean changes in up-breaks and down-breaks to be different. The Satterthwaite approximation is used to take into account the measures of dispersion of both samples and the calculation of degrees of freedom for the t -test also considers the different samples and variances.

¹ This procedure has been used previously for the identification of structural breaks in growth rates by Berg, Ostry, and Zettelmeyer (2012) and Tsangarides (2012).

² Averaging of five years is also typically used in panel growth regressions as a unit of averaging. A larger minimum number of years between breaks (such as eight) also seems reasonable in order to reduce lower frequency fluctuations or cyclical factors, but may result in fewer spells. Results using $h = 8$ yield similar conclusions concerning the distribution of breaks among groups of countries and time periods, as well as the range of fluctuations in the rates of growth.

Duration Analysis

To study how the duration of a certain episode varies with covariates of interest, we take the previously identified growth spells and subject them to a duration analysis.³ In general, survival models consist of two parts: (1) the baseline hazard function, which describes how the risk of an event happening changes over time at reference levels of covariates; and (2) the effect parameters, which describe how the hazard function varies in response to changes in the covariates (away from the reference level).

In this chapter, we are interested in the duration of growth spells. If we let T denote the duration of a growth spell, we can obtain the survival function $S(t)$ as the complement of the cumulative distribution function $F(t) = Pr(T \leq t)$, that is, $S(t) = 1 - F(t)$. This reflects the probability that the spell under consideration does not end before time t .

From this setup, one can define the hazard rate (the probability that a spell ends at a particular time t , conditional on survival up to that time) as:

$$\lambda(t) = \lim_{h \rightarrow 0} \frac{Pr(t \leq T < t + h | T \geq t)}{h}.$$

This implies that, for small time intervals h , the probability of a spell ending during instant h is approximately equal to $\lambda(t)h$.

There are different ways to specify the hazard function: one can assume that it is constant over time, while it is also possible to be less restrictive and take a more general approach allowing for duration dependence. A particularly popular specification allowing for duration dependence is the proportional hazard model. It is built on the assumption that covariates are multiplicatively related to the hazard—implying that covariates have the same proportional effect on the hazard rate at all horizons. Mathematically, a proportional hazard model can be written as:

$$\lambda(t; X) = \lambda_0(t) \exp(X\beta),$$

where $\lambda_0(t)$ is the baseline hazard, X is a vector of covariates that may influence the duration of a growth spell, and β is a vector of parameters measuring the semi-elasticity of the hazard with respect to the covariates. In our analysis, we follow Berg, Ostry, and Zettelmeyer (2012) in specifying a Weibull distribution for the baseline hazard $\lambda_0(t)$.

Finally, when estimating hazard models, any feedback from the duration of a spell to the covariates may be problematic. Consequently, we assume that the hazard at time t only depends on lagged realizations of the covariates (not on current or future ones); hence, our empirical implementation uses lagged values of covariates in our estimations.

³ See Wooldridge (2002, Chapter 20) for further details. The approach follows Berg, Ostry, and Zettelmeyer (2012) and Tsangarides (2012).

Annex 2.2. Variable List and Sources**Annex Table 2.2. Variable List and Sources**

Description	Details	Source
Real GDP per capita growth	2011 U.S. dollars at PPP, extended using WEO until 2016, percent change	PWT 9.0
Initial GDP per capita	U.S. dollars in PPP	PWT 9.0
Investment to GDP	In percent of GDP	PWT 9.0
Trade openness	Exports plus imports, in percent of GDP	PWT 9.0
Population growth	Percent change	PWT 9.0
Overall fiscal balance	In percent of GDP	WEO
Total government revenue	In percent of GDP	WEO
Foreign direct investment, net	In percent of GDP	WEO
Total public debt	In percent of GDP	FAD
External debt	In percent of GDP	WEO
Log (1 + inflation)	Consumer price index	WEO
Crude oil price	Simple average of Brent, WTI, and Fateh spot prices	WEO
Terms of trade growth	Goods, U.S. dollars, percent change	WEO
Capital account openness	Normalized from 0 to 1	Chinn-Ito database (2014)
Shadow federal funds rate	Interest rate	Krippner (2016)
Political stability (Polity 2)	Modified polity score +10 (strongly democratic) to -10 (strongly autocratic)	Polity IV dataset
More constraints on the Executive (Executive constraints)	0–7 scale, 1 is unlimited authority and 7 is executive parity	Polity IV dataset
Political stability (Political risk)	Composite index, 0–100 scale, higher numbers suggest improvement	ICRG dataset
Investment profile	0–12 scale, higher numbers suggest improvement	ICRG dataset
Fewer internal conflict (Internal conflict)	0–12 scale, higher numbers suggest improvement	ICRG dataset
Law & order	0–6 scale, higher numbers suggest improvement	ICRG dataset
Fewer civil war (Civil war)	0–4 scale, higher numbers suggest improvement	ICRG dataset
Years of primary schooling	Average number of years	Barro and Lee database (2013)
Human capital	Index	PWT 9.0
Aid	Net official development assistance and aid received in percent of GDP	WDI
Gini coefficient	Gini index (World Bank estimate)	WDI
Infant mortality rate	Per 1,000 live births	WDI
De facto exchange rate regime	DF: hard=1 conventional=2 basket=3 band=4 crawl=5 managed=6 independent=7	October 2016 REO Chapter 2
Exchange rate misalignment calculations	In percent of equilibrium level / Dummy variable	IMF staff calculation/PWT
Product concentration	Index	SPR
Partner concentration	Index	SPR
Manufactured exports	Percent of merchandise exports	WDI
ICT goods imports	Percent of total goods imports	WDI
Mobile phone lines	Per 100 people	WDI
Imports of computers	Percent of total imports	Comtrade
TFP (Total factor productivity)	Constant national prices (2011=1)	PWT 9.0
Relative price of investment to consumption	Ratio	PWT 9.0
Financial liberalization	Index	IMF (2008)
Fewer financial restrictions on current account	Index	IMF (2008)

Note: FAD = IMF Fiscal Affairs Department; ICRG = International Country Risk Guide; ICT = information and communications technology; PPP = purchasing power parity; PWT = Penn World Tables; SPR = IMF, Strategy, Policy, and Review Department; WDI = World Bank, World Development Indicators; WEO = IMF, *World Economic Outlook*.

Annex 2.3. Duration Analysis

Annex Table 2.3. Multivariate Duration Regressions for Different Country Groups

Variables	(1)	(2)	(3)
	SSA	EMEDEV	EMEDEV without SSA
	Estimated Effect		
<u>External Shocks</u>			
U.S. interest rates	1.021 (0.110)	1.046 (0.0437)	1.037 (0.0529)
Oil price, change	0.935 *** (0.0187)	1.005 (0.0209)	1.032 (0.0293)
Terms of trade growth	0.959 ** (0.0161)	0.996 (0.0135)	0.996 (0.0165)
<u>Macroeconomic Indicators</u>			
Investment to GDP, change	0.923 * (0.0403)	0.962 (0.0429)	0.953 (0.0332)
Total public debt to GDP	1.007 ** (0.00343)	1.006 ** (0.00258)	1.007 (0.00812)
Trade openness	0.98 * (0.0117)	0.992 (0.00686)	0.994 (0.0109)
Capital account openness	1.359 (0.797)	1.071 (0.173)	1.086 (0.230)
Inflation	3.242 ** (1.770)	1.472 * (0.302)	1.527 * (0.343)
De facto exchange rate regime	0.756 (0.210)	0.81 ** (0.0740)	0.849 (0.0882)
<u>Institutions</u>			
Polity 2, cumulative change	0.815 ** (0.0652)	0.963 (0.0280)	1.003 (0.0311)
<u>Social and Human Development</u>			
Human capital	0.159 (0.355)	0.464 (0.333)	0.355 (0.322)
<u>Other</u>			
Real GDP per capita growth	1.115 *** (0.0321)	1.049 *** (0.0138)	1.064 ** (0.0286)
Initial GDP per capita	4.691 (6.359)	1.531 (0.454)	1.052 (0.422)
Population growth	1.073 (0.671)	1.004 (0.232)	1.104 (0.251)
Relative price of investment to consumption	1.015 ** (0.00582)	0.994 (0.00574)	0.982 *** (0.00638)
Decade dummy 2000	1.380 (1.634)	0.547 (0.256)	0.424 (0.249)
Observations	326	1,076	750
Subjects	28	81	53
Failures	8	29	21
α	3.956	1.557	1.342
p -value	0.00	0.00	0.00

Source: Authors' calculations.

Note: The table reports exponentiated regression coefficients (so-called "hazard ratios"), where a hazard ratio larger than 1 implies that increases in the associated variable shortens spells, while a ratio smaller than 1 implies that the covariate has a "protective" effect, that is, it helps sustain the spell. For instance, a hazard ratio of 1.05 implies that a unit increase in the associated regressor increases the risk that a growth spell will end in the next period by 5 percent. EMEDEV = all emerging and developing countries; SSA = sub-Saharan Africa. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels.

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