WP/17/202

IMF Working Paper

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INTERNATIONAL MONETARY FUND

 WP/17/202

IMF Working Paper

African Department

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Prepared by Francisco Arizala, Jesus Gonzalez-Garcia, Charalambos Tsangarides, and Mustafa Yenice[†]

Authorized for distribution by Céline Allard

September 2017

Abstract

This paper examines the growth performance of sub-Saharan African countries since 1960 through the lens of growth turning points (accelerations and decelerations) and periods of sustained growth (growth spells). Growth accelerations are generally associated with improved external conditions, increased investment and trade openness, declines in inflation, better fiscal balances, and improvements in the institutional environment. Transitioning from growth accelerations to growth spells often requires additional efforts beyond what is needed to trigger an acceleration. Growth spells are sustained by fiscal policy that prevents excessive public debt accumulation, monetary policy geared toward low inflation, outward-oriented trade policies, and structural policies that reduce market distortions, as well as supportive external environment and improvements in democratic institutions. Overall, determinants of growth spells in sub-Saharan Africa are different from those in the rest of the emerging and developing countries.

JEL Classification Numbers: O11, O47, C41, O55.
Keywords: Growth, accelerations, duration analysis, Africa.

Authors' E-Mail Address: farizala@imf.org; jgonzalezgarcia@imf.org; ctsangarides@imf.org; myenice@imf.org

[†] The research underlying this paper was initiated in the context of the preparation of IMF's April 2017 Regional Economic Outlook for Sub-Saharan Africa. We would like to thank Tim Willems who contributed significantly to this project in its early stages, and Céline Allard, David Robinson, Abebe Aemro Selassie, and IMF colleagues for helpful comments and suggestions. The usual disclaimer applies.

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I. INTRODUCTION

After nearly two decades of strong growth, average economic activity in sub-Saharan Africa decelerated sharply in 2016, against the backdrop of lower commodity prices, a less supportive global environment, and in some countries, a delayed policy response. While the broad-based slowdown now appears to be abating, 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? To answer these questions, we depart from the traditional cross-country investigation of average growth rates and focus on growth turning points and episodes of sustained growth.

The emphasis on turning points recognizes that cross-country differences in per-capita income are more closely related to differences in the volatility of growth and less to structural differences in the levels of growth rates. Some related literature finds that the higher average growth in advanced and emerging economies compared to developing countries is explained by their relatively lower volatility of growth, with most developing countries alternating between episodes of very fast growth and episodes of stagnation or decline (Pritchett (2000)). Several papers have then sought to characterize growth patterns as accelerations, plateaus and hard-landings, and explain these patterns using proxies of the macroeconomic, institutional and geographical environment (Hausmann, Pritchett, and Rodrik, 2005; Jerzmanowski, 2006; and Aizenman and Spiegel, 2010). Overall, evidence from this literature suggests that traditional growth determinants are not necessarily associated with growth accelerations.

Subsequent work has focused on better understanding what determines the duration of sustained growth episodes or growth spells (Berg, Ostry, and Zettelmeyer, 2012; Kerekes, 2012; Tsangarides (2012)), and the duration of growth declines (Hausmann, Rodriguez, and Wagner, 2006; Bluhm, de Crombrugghe, and Szirmai, 2014). This literature is motivated by the fact that even though growth accelerations are just as common in emerging and developing economies as in advanced countries, growth spells are found to be significantly shorter in emerging and developing economies; this factor accounts for a fair share of the growth differentials between regions and across levels of income. Berg, Ostry, and Zettelmeyer (2012) find that the duration of growth episodes is positively associated with lower income inequality, democratic institutions, and macroeconomic stability. In addition, Tsangarides (2012) documents how the factors affecting growth spells in Africa differ from those in the rest of the world, highlighting the role of trade openness and droughts. In a similar vein, Kerekes (2012) characterizes countries according to the duration and level of growth and finds that the best performers share features such as favorable initial conditions, and strong institutions and macroeconomic policies. Finally, exogenous factors, political institutions, ethnic cleavages, financial and political crisis, and a measure of export sophistication have been found to be associated with the duration of growth declines (Mora and Siotis, 2005; Hausmann, Rodriguez, and Wagner, 2006; Bluhm, de Crombrugghe, and Szirmai, 2014).

Building on these elements from the literature, we follow Berg, Ostry, and Zettelmeyer (2012) to first define structural turning points or 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). Then, episodes of durable growth or *growth spells* are identified as the periods between growth *up-breaks* and *down-breaks*. Next, using growth breaks and growth spells as the units of analysis, we examine the changes in factors and policies that coincided with turning points and then investigate what influences the duration of growth spells.

Our analysis builds on and extends the literature in several ways. *First*, we focus squarely on sub-Saharan Africa and draw comparisons with the groups of emerging and other developing countries to understand whether the region's experience is different. *Second*, to overcome potential data limitations, we built a comprehensive database covering turning points, growth spells and associated determinants over the period 1950 to 2016. *Third,* we examine, separately, what occurs at turning points and the factors that prolong periods of sustained growth —since what is associated with turning points may not necessarily be what sustains growth. While other studies may incorporate these elements individually, none includes both within a unified framework to allow meaningful comparisons.

We find that growth turning points are common in sub-Saharan Africa, but with substantial variation across time. While both up-breaks and down-breaks were frequent in the region before 2000, the region has experienced relatively fewer down-breaks since 2000. Growth spells are also frequent in sub-Saharan Africa—both among resource-intensive and nonrecourse-intensive countries—and have become more frequent over the last 15 years. But what differentiates sub-Saharan Africa from the rest of the world is that growth spells have tended to be shorter, start from worse growth positions, and more often end in "hard landings" compared to spells elsewhere—a result that still holds after controlling for armed and political conflicts.

Growth accelerations in sub-Saharan Africa 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.

Ensuring that growth turnarounds become periods of sustained growth often requires additional efforts beyond what is needed to trigger a growth up-break. Our findings, which are robust to several tests, suggest that in addition to improved external environment, spells are sustained by better macroeconomic policies proxied by lower inflation, reduced debt-to-GDP ratios, more outward-oriented trade policies, and higher investment-to-GDP ratios. In addition, improved macro-structural policies captured by smaller market distortions and better-quality institutions help sustain growth spells.

Overall, we find that in the case of sub-Saharan Africa there are differences between the factors associated with growth accelerations and the factors that prolong periods of sustained growth. We also find that the determinants of the duration of growth spells in sub-Saharan

Africa are somewhat different from those in the rest of the world.

In terms of policy implications, our findings suggest that in the current context of a less supportive external environment, the impetus to revive growth where it has faltered, and sustain it where it has remained relatively strong in sub-Saharan Africa, must come primarily from within, that is, a strong domestic policy response. For countries where growth has slowed down, the priority is to maintain macroeconomic stability and set the stage for a growth turnaround that can then be sustained. For countries currently enjoying a growth spell, the focus should be on prolonging it and avoiding a hard landing.

The rest of the paper is organized as follows. The next section defines the units of analysis in the paper and presents stylized facts. Section III discusses the empirical strategy and proposes the potential determinants used in our analysis. Section IV presents the results from investigating coincident changes that occur around the time of growth turning points. Section V presents the results from a duration analysis of growth spells. Section VI concludes.

II. STYLIZED FACTS

A. Structural Breaks

We begin by identifying structural breaks in the growth of per capita GDP (growth turning points).[1] 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.[2] The procedure requires setting in advance two parameters for the determination of structural breaks: the minimum possible number of years between potential breaks (h) and the statistical significance to test for the existence of structural breaks (p). We focus on a minimum number of years between breaks of five years ($h = 5$), and a critical value of ten percent ($p = 0.10$), which maximize the number of accurately measured breaks for a reasonable minimum number of years between breaks.[3]

Next, we classify breaks as up-breaks—periods of higher growth than before the structural break, or growth accelerations—and down-breaks—periods of lower growth than before the structural break, or growth decelerations. We identify 184 up-breaks and 185 down-breaks in GDP per capita growth in 146 countries over the period 1950–2016. By construction, since we impose a minimum of five years between breaks, the method cannot identify a break in the first and last five years of the sample. Thus, for a country with 66 years of data and with sample $h = 5$, a maximum of 11 possible structural breaks can be identified, with the last

[1] A detailed description of the data and sources is given in Annex I.

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

[3] Averaging of five years is typically used in panel growth regressions. A larger minimum number of years between breaks (such as $h = 8$) may also be reasonable to reduce the influence of cyclical factors, but may result in fewer spells. Results using $h = 8$ suggest similar conclusions in terms of stylized facts (see Annex II).

possible break occurring in 2011.
Table 1 groups breaks 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. We find that growth up-breaks and down-breaks are common across the world, but with substantial variation across time and income levels. Most growth turning points over 1950–2016 occurred in developing economies, with sub-Saharan Africa experiencing many of them.

Dividing the period into four roughly equal sub-periods, we find that, overall, about 25 percent of total up-breaks and down-breaks identified occur in sub-Saharan Africa, which is in line with the fraction of sub-Saharan African countries in the sample, about 28 percent.[4] 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 and experienced about 16 percent of up-breaks and down-breaks; and developing economies in Asia represent 9 percent of the countries and experienced about 10 percent of up-breaks down-breaks. Similarly, the shares of total breaks of emerging economies correspond roughly to their shares in the sample. In contrast, advanced economies represent 21 percent of the countries in the sample but experienced only 16 percent of up-breaks and down-breaks.

Growth in sub-Saharan Africa over 1950–99 was characterized by high volatility and frequent shifts between periods of expansion and contraction: while most down-breaks occurred during 1970–84, up-breaks were most common during 1985–99. 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.

Nonetheless, countries in the region have tended to experience large growth fluctuations between up-breaks and down-breaks—that is, a large break—suggesting high volatility. Results in Table 2 show that, 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, and it is considerably higher than the 7 percent break size in the rest of emerging and developing economies. Similarly, countries in the region have experienced large swings in growth following a down-break, on par with developing economies in the Middle East and North Africa, and Asia, but significantly larger than in emerging market economies.

[4] 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 Database, 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 (e.g. the down-breaks in Mozambique in 1981 and Sierra Leone in 1994, and up-breaks in growth in Angola around 2000–01, Chad in 1980, Mozambique around 1993–95, Uganda after 1989, and Zimbabwe in 1979). As discussed in the robustness section, conflict years do not affect the results, including the duration analysis.

B. 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 threshold of 2 percent rate of per capita growth has been used before in the literature, and is considered reasonable per capita growth for low-income countries. Similarly, "incomplete" growth spells are defined as those that satisfy the first condition but are still ongoing at the end of the sample. A total of 80 complete and 67 incomplete spells are identified for the full sample.

Three main patterns are observed in the growth spells in sub-Saharan Africa: growth spells are as frequent as in other regions, but shorter and characterized by larger swings in growth rates. First, sub-Saharan Africa recorded 40 growth spells between 1950 and 2016—27 percent of total spells identified over the sample period—which is about the share of sub-Saharan African countries in the sample (Table 3). Furthermore, 25 out of the 40 growth spells in the region are still ongoing, which represents more than a third of total ongoing spells in the sample—evidence of the growth performance of the region in the last two decades, notwithstanding current economic challenges. Also, 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 1).[5] This performance was widespread across the region, with more than two-thirds of countries enjoying 10 or more years of uninterrupted growth—both resource-intensive and nonresource-intensive countries have experienced a roughly equal number of spells.[6]

Second, despite the relatively positive record on growth spells, spells in sub-Saharan Africa have tended to be shorter than elsewhere. Results in Table 4 suggest that the median length of complete growth spells in the region has been 6 years (6 years for resource-intensive countries, and 5 years for non-resource-intensive countries) compared to 10 years for other developing economies and 8 years for emerging market economies. 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 in developing economies, and about 80 percent of spells in advanced economies.

Third, spells in sub-Saharan Africa tend to be characterized by the largest swings in growth before, during, and after spells (Table 5). Based on evidence from complete spells, the spells

[5] 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.

[6] 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 the region start from worse positions and typically end in "hard landings" or large output contractions—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. The swings in growth after complete spells are even starker when looking at average growth rates: average annual growth after the end of a complete spell in sub-Saharan African plummets (from close to 10 percent during sub-Saharan African growth spells) to −6 percent, as opposed to −1 percent in other developing economies, and −2 percent among emerging market economies. These results are not driven 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).[7]

III. Data and Empirical Methodology

The stylized facts for breaks and spells discussed above suggest that Africa's growth experience may differ from that of the rest of the world. Our empirical analysis aims to first identify what factors or policies may coincide with growth up-breaks and then what factors or policies influence the duration of growth spells.

A. Determinants

We draw the pool of potential determinants (factors or policies) from the most recent literature on the determinants of growth accelerations and growth spells, combined with findings from the broader literature on growth empirics.

We consider five broad categories of potential determinants: (i) exogenous factors, as global liquidity conditions (proxied by the Fed Funds rate), fluctuations in oil prices and changes in the terms of trade; (ii) macroeconomic indicators, including fiscal variables (overall balance, public debt, and government revenues); total and foreign direct investment; external debt (public and private); the exchange rate regime and real exchange rate misalignment; trade openness and flows of international aid; and inflation as a measure of economic stability; (iii) indicators of the quality of institutions, such as political stability, how democratic the political regime is, the frequency of internal conflicts and the observance of law and order; and investment climate; (iv) social indicators, including schooling, the quality of human capital, and infant mortality; and economic inequality; and (v) structural factors and policies, such as the composition and concentration of exports; indicators of financial liberalization and distortions that hamper investment; total factor productivity; and technology adoption—

[7] 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.

proxied by imports of information technology products and the use of mobile phone communication.

B. Turning Points

To examine coincident changes of factors or policies that occur around the time of growth turning points, we follow the approach in Jones and Olken (2008). We 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). Specifically, we calculate the change in the variables between each break date and then test whether the average change between two breaks is equal to zero. Also, we apply symmetry tests, which are two-sample t-tests to determine whether the absolute magnitude of the change observed during up-breaks is equal to that observed during down-breaks.[8]

It is important to highlight that this analysis does not attempt to identify causality between the variables of interest and the growth turning points, nor does it control for other factors occurring simultaneously and potentially associated with growth breaks. Instead, the goal is to identify stylized facts during up-breaks and down-breaks episodes.

C. Duration Analysis

For the study of growth spells, we use survival analysis to model the expected time before the end of a growth spell. In general, survival analysis consists of two parts: the baseline hazard function, which describes how the risk of an event happening changes over time at reference levels of covariates; and the effect parameters, which describe how the hazard function varies away from the reference level in response to changes in the covariates.

We are interested in the duration of growth spells, so if we let T denote the time of the end 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 time t, conditional on survival up to that time) as:

$$\lambda(t) = \lim_{j \to 0} \frac{\Pr(t \leq T < t + j | T \geq t)}{j} \tag{1}$$

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

[8] 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 accounts for the dispersion of both samples, while the t-test degrees of freedom account for different samples sizes and variances.

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. A proportional hazard model can be written as:

$$\lambda(t; X) = \lambda_0(t)\, exp(X\beta) \tag{2}$$

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 line with Berg, Ostry, and Zettelmeyer (2012) we assume that the baseline hazard $\lambda_0(t)$ follows a Weibull distribution whose parameters can be estimated along with the coefficient vector.

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 the covariates.

IV. TURNING POINTS

We begin by analyzing the performance of the various factors and policies identified in the previous section capturing the state of the external environment, macroeconomic policies, structural factors, and political and institutional characteristics, before and after growth breaks. Specifically, we identify stylized facts during up-breaks and down-breaks; whether these stylized facts differ between growth up-breaks and down-breaks or between sub-Saharan Africa and emerging and developing countries in general. We take each of these of groups of variables in turn and summarize the results in Table 6.

A. Changes During Turning Points

Exogenous Factors

Growth turning points coincide with significant changes in exogenous factors. Growth up-breaks in sub-Saharan Africa and in emerging and developing countries are associated with looser global liquidity conditions, as proxied by cuts in the U.S. federal funds rate. However, the evidence concerning growth down-breaks is less conclusive. While growth down-breaks in sub-Saharan Africa are not associated with significant changes in the U.S federal funds rate, small but significant declines are observed in the U.S federal funds rate during decelerations in emerging and developing economies.

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 fluctuations

in oil prices have opposite effects. In contrast, for emerging and developing economies, down-breaks are associated with large and statistically significant declines in oil prices, and up-breaks are associated with small price increases—confirmed by the symmetry test which suggests that these changes have (statistically significant) different magnitudes.

Finally, we find that up-breaks in sub-Saharan Africa are associated with improvements in terms of trade, while the opposite holds for down-breaks (although the symmetry test suggest that the magnitudes of the changes during up-breaks and down-breaks are not statistically different). These results also hold for emerging and developing economies.[9]

Macroeconomic Indicators

Fiscal variables show significant improvements during growth up-breaks, while down-breaks coincide with deteriorations but these changes are statistically significant only in the group of emerging and developing countries. For both samples of emerging and developing economies and sub-Saharan African countries, there are significant increases in the public debt-to-GDP ratios of about 11 to 16 percent of GDP during growth down-breaks. However, the effect is not symmetric during growth up-breaks: we do not find a statistically significant reduction in debt-to-GDP ratios at the time of growth accelerations. These results are consistent with stylized facts of fiscal procyclicality, which suggest that emerging and developing countries do not tend to take advantage of good times to implement fiscal consolidations and lower public debt ratios. Also, growth up-breaks are found to be associated with higher government revenues—probably reflecting measures to boost revenue mobilization and the impact of better growth performance on fiscal outcomes—while down-breaks are not associated with significant decreases in revenues as a share of GDP.

We also find that investment increases during growth up-breaks but does not decrease at times of down-breaks. On average, the investment-to-GDP ratio increases by 3.6 percentage points during up-breaks in both emerging and developing economies, and even more in sub-Saharan Africa (4.4 percentage points). On the other hand, we do not find a statistically significant decline in investment ratios during down-breaks in either group, which likely reflects the fact that most investment projects cannot be easily reversed. Foreign direct investment shows a similar pattern: it increases during up-breaks in sub-Saharan Africa but there are no significant declines during down-breaks.

External debt (including private and public liabilities) shows a similar pattern as total public debt. Down-breaks are associated with statistically significant increases in external debt—of about 15 percent of GDP in emerging and developing countries and 24 percent of GDP in sub-Saharan countries. However, up-breaks are not associated with reductions in external debt. The average variation in both groups of countries is negative but not statistically significant. Symmetry tests of changes in external between up-breaks and down-breaks

[9] 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 and in Equatorial Guinea in 2010, and in the Republic of Congo in 2011.

shows that magnitudes are statistically different in emerging and developing countries but the same is not true for sub-Saharan African countries.
In terms of exchange rate developments, growth down-breaks in sub-Saharan Africa are associated with more flexible exchange rate regimes, potentially reflecting the fact that, in response to a growth deceleration, countries may allow the exchange rate to absorb part of the shock. Our measures of real exchange rate misalignment and extreme real exchange rate misalignment suggest that undervalued exchange rates are associated with growth up-breaks, although these results are only significant for the emerging and developing economies sample.

Higher degrees of trade openness, as measured by the ratio of exports and imports to GDP, are associated with growth up-breaks both in the case of sub-Saharan African and emerging and developing economies. Down-breaks are also associated with increases in trade openness, but these changes are not statistically significant in the sub-Saharan Africa sample.[10] Relatedly, aid flows to sub-Saharan Africa increase during down-breaks, which probably reflects a strong international response to support countries in the region during difficult times.

Finally, nominal stabilization of the economy represented by a significant reduction in inflation rates, coincides with growth up-breaks in sub-Saharan Africa and in emerging and developing economies. In sub-Saharan African countries, there have been successful efforts to curb inflation that coincide with growth up-breaks, as in Uganda in 1993–94 and the Democratic Republic of Congo after 2009. However, there is no evidence of a significant increase in inflation rates at the time of growth down-breaks.

Institutions and Human Development Indicators

Although these indicators are slow-moving, it is possible to identify some patterns during growth breaks. Our measure of political stability shows significant improvements at the time of growth up-breaks both in sub-Saharan Africa and emerging and developing economies, while no significant change is recorded at times of growth down-breaks. Interestingly, down-breaks are associated with a significant improvement in democratic institutions (as measured by Polity 2) in both groups of countries, which may reflect the general tendency of this indicator to improve.

We find significant improvements in the investment profile indicator—capturing the business conditions with respect to the viability of contracts, the risk of expropriation, easiness to repatriate profits, and delays in payments—during growth up-breaks, both in sub-Saharan African countries and emerging and developing countries. However, we also find improvements in the investment profile during down-breaks, although these are much smaller than during up-breaks.

[10] In the case of emerging and developing economies, the symmetry test indicates that during up-breaks the increases in trade openness are larger than during down-breaks, and this difference is statistically significant.

We observe similar patterns for the internal conflict indicator, an indicator which summarizes factors as political violence, terrorism and civil disorder. At the time of growth up-breaks, there is a significant decrease in the risk of internal conflicts but there is no worsening of those conditions during down-breaks. In the same vein, the frequency of civil wars does not present a statistically significant change at the time of growth down-breaks. This result is consistent with the findings in Section II that most growth breaks in sub-Saharan Africa do not occur around years of conflicts. Finally, changes in the indicator of law and order confirm that growth up-breaks tend to coincide with institutional improvements, both in emerging and developing economies and in sub-Saharan Africa. Also, for both groups, there is no significant deterioration in this indicator when growth down-breaks occur.

Growth accelerations tend to be accompanied by a significant reduction in inequality, measured by the Gini index, both in sub-Saharan Africa and elsewhere, with more pronounced effects in sub-Saharan Africa than in the emerging and developing economies sample. In contrast, down-breaks are not associated with significant increases in inequality. Meanwhile, the association between growth breaks and indicators of human development is mixed. Indicators for years of schooling, human capital and infant mortality show significant improvements during both growth up-breaks and down-breaks in sub-Saharan Africa as well as in the group of emerging and developing economies.

Structural Factors

Broad stylized facts for changes in structural factors during turning points can be identified for the emerging and developing economies sample; results are less conclusive for sub-Saharan African countries (which may be attributed to limited data availability).

Exports of manufactures show increases during both up-breaks and down-breaks in emerging and developing economies, which may be linked to an upward trend in the share of manufactures in total exports. However, the concentration of exports in terms of products and destination presents somewhat puzzling results: on one hand, increased product concentration is related to growth accelerations, while less concentration seems to coincide with down-breaks in growth. These results (which are significant for the entire sample of emerging and developing economies) may be explained by the fact that several economies experienced growth accelerations associated with large increases in exports of commodities—both in prices and quantities. Consequently, increases in commodity exports implied a higher concentration of exports and directed to a limited set of market destinations.

Deeper financial liberalization is associated with growth down-breaks only in sub-Saharan Africa. This could suggest that at times of slower growth, countries pursue policies to liberalize and develop the financial sector to restart growth. However, there is no evidence that fewer financial restrictions are associated with growth up-breaks neither in sub-Saharan Africa or elsewhere.

Fluctuations in the price of investment goods relative to consumption goods—a proxy for market distortions that may hamper investment—do not show clear patterns during growth turning points. An increase in the relative price of investment goods is observed at times of

growth down-breaks in both sub-Saharan African countries and emerging and developing economies, but these changes are not statistically significant. Meanwhile, a decrease in the relative price of investment is observed in emerging and developing economies during growth up-breaks, but this change is not statistically significant either.

Changes in total factor productivity at times of growth breaks exhibit interesting patterns. Up-breaks coincide with significant increases in the productivity of factors—implying that the use of resources becomes more efficient or more intense during periods of rapid growth—while the opposite holds true for down-breaks. This evidence is robust across emerging and developing economies and sub-Saharan African countries.

Finally, there is no clear evidence about changes in proxies for technology adoption at the time of breaks. Imports of computers seem to accelerate in emerging and developing countries during both up-breaks and down-breaks in about the same magnitude. Another indicator of technology adoption—the use of mobile phone technology—shows declines at down-breaks in both emerging and developing economies and sub-Saharan African countries and an increase during up-breaks (although it is not significant in sub-Saharan Africa). Finally, the share of imports related to information and communication technology shows a small but significant decline during down-breaks in emerging and developing economies. These results should be interpreted with caution since some of these proxies are more relevant for recent spells (e.g. use of cell phones and computers).

B. A Summary View

Our analysis shows that stylized facts for several variables capturing the state of the external environment, macroeconomic policies, structural factors, and political and institutional characteristics differ between growth upticks and downturns.

We also find that factors associated with growth breaks in sub-Saharan Africa differ from those in the emerging and developing economies sample. Some of the factors that are associated with growth down-breaks in sub-Saharan Africa are not shared with the emerging and developing economies sample, including extreme real exchange rate misalignments, aid, and financial liberalization. In the case of up-breaks, all factors relevant in sub-Saharan Africa are also found to be statistically significant in emerging and developing economies.

Conversely, changes in some factors are found to be statistically significant in the case of emerging and developing economies down-breaks, but not in the case of sub-Saharan African economies. These include the Federal Funds rate, oil prices, the overall fiscal balance, government revenues, foreign-direct investment, real exchange rate misalignment, trade openness, exports of manufactures, product concentration, and imports of computers and ICT goods. Finally, some factors present significant statistical changes at the time of growth up-breaks in emerging and developing economies but not in sub-Saharan African countries, including the Federal Funds rate, the oil price, the overall fiscal balance, real exchange rate misalignment and the indicator of extreme real exchange rate misalignment, exports of manufactures and product concentration, imports of computers, and use of mobile lines.

V. Duration Analysis

Due to a relatively short number of spells and the unavailability of long time series, we follow a two-step approach to perform the duration analysis. First, we test the relevance of each factor or policy of interest while controlling for initial income levels using bivariate duration models. In the second step, 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 their relationship with the duration of growth spells in a multivariate setting. This allows to identify the effect of each factor or policy while controlling for other determinants.[11] For each part of the duration analysis we report the estimated effects of each determinant on the probability that the spell comes to an end in the next period.[12]

A. Bivariate Approach

Exogenous Factors

Emerging markets and developing economies are particularly sensitive to changes in commodity prices and global financial conditions. As in the previous section, we focus on changes in the terms of trade, oil prices, and U.S. interest rates (as a proxy of global liquidity conditions).[13] Results in Table 7 suggest that tighter global financial conditions significantly increase the probability that growth spells end in sub-Saharan Africa as well as in the emerging and developing economies and world samples.[14] On average, fluctuations in oil prices do not appear to have a significant impact on spells in the region, but, as mentioned earlier, this result may be influenced by the fact that changes in oil prices have a very different impact on oil exporters and importers in the region.

Macroeconomic Indicators

Good macroeconomic policies should, in theory, have a protective effect on growth spells, 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

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

[12] Specifically, we report 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 (0.95) implies that a unit increase in the associated regressor increases (reduces) the risk that a growth spell will end in the next period by 5 percent.

[13] 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).

[14] 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).

sub-Saharan Africa: a better fiscal balance significantly increases the probability that a growth spell will continue, while a higher debt burden can accelerate its end (Table 8). 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—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).

Also, investment seems to play a strong role in warding off growth stops and sustaining growth spells, as it not only supports aggregate demand but also expands productive capacity. 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 instance, growth spells in Chad and Lesotho in the 1980s were accompanied by a sharp increase in the investment-to-GDP ratio.

Other macroeconomic factors such as competitiveness, trade openness, and inflation, seem to have a significant impact on the duration of growth in the world but less so in sub-Saharan Africa.[15] In the emerging and developing economies and world samples, a more flexible exchange rate regime and less overvalued exchange rate levels seem to extend the length of growth spells, which echoes the findings in Rodrik 2008. Higher trade openness tends to increase the duration of growth spells—although not significantly—reflecting increases in resilience associated with greater trade integration with the rest of the world. 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.[16]

Institutions and Social and Human Development

The literature has long argued that variables related to the quality of political and economic institutions affect the ability of countries to fend off economic crises (Acemoglu and others 2003). Results in Table 9 suggest that proxies for political and economic institutions (e.g. political stability, institutional constraints to policy decisions, the profile of countries to attract investment, and the occurrence of internal conflicts) strongly support growth spells in the region, and consistently more so than in any other regions. Also, armed conflicts significantly disrupt economic activity and tend to shorten the duration of growth spells in sub-Saharan Africa, even though, as we noted before, the number of such conflicts has dramatically decreased over the last two decades in the region.

[15] 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.

[16] 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).

Finally, social and human development—which improves education and health, and hence efficiency and productivity—is found to profoundly impact growth spells. Results in Table 10 show that higher levels of education and human capital are associated with longer growth spells. 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.

Structural Transformation and Technology Adoption

Diversification, in terms of the composition of exports, is found to be an important factor supporting the resilience of growth episodes in the region (see Table 11), in line with findings in the literature that export concentration hampers the level of economic growth (e.g. Lederman and Maloney, 2003). A high share of exports of manufacturing products in total exports is found to be positively associated with the duration of growth spells, presumably because, unlike raw materials, manufacturing exports are associated with higher value-added content and less volatile prices. Indeed, countries with relatively high levels of product diversification, such as Tanzania and Kenya, are currently enjoying ongoing growth spells. 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.

In addition, deeper 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.

Finally, while the adoption of new technology—via, for example, imports of computers and other information technology products—is associated with longer growth spells in the emerging and developing economies and world samples, we do not find it to be the case for sub-Saharan Africa, where the coefficients are not statistically significant. This may reflect still-low levels of such imports across the region, as well as limited data availability. Also, the relative price of investment to consumption goods—a proxy for market distortions—seems to be associated with shorter spells in sub-Saharan Africa, although the coefficient is 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).

B. Multivariate Approach

We now turn to 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. We estimate equation (2) 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.[17]

Baseline Results

Our full model includes the U.S. interest rate, changes 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 represented by the price of investment goods relative to consumption goods (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.[18]

Results shown in Table 12, column 1 suggest that the duration of growth spells in sub-Saharan Africa is supported by a more favorable external environment, improved monetary and fiscal policies, better political institutions, and less market distortions. 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 overheating. At the same time, the results also suggest additional benefits from improving political institutions (making them more democratic) and reducing market distortions. The findings are robust to alternative specifications. Other potential determinants turned out to be nonsignificant when considered individually, 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.

To get a better sense for the importance of each factor or policy influencing growth spells in the region, Figure 2 plots the change in the spell's expected duration if a factor or policy improves by 25 percentile points starting from its median value in the sub-Saharan Africa sample, while keeping everything else constant. Starting with the external environment, a 25-percentile point improvement in the terms of trade increases the expected length of the spell by 3.4 years, while a similar increase in the oil price is associated with an increase in the expected length of the spell of 5.7 years. In addition, better domestic policies sustain growth spells in the region by an average of one to six years. Specifically, a 25-percentile points improvement in the change of investment to GDP increases the expected length of the spell by about 1.3 years; a reduction in the debt-to-GDP ratio increases the expected length of the spell by about one year; an increase in openness increases the expected length of the spell by

[17] 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 some variables from each of the groups examined in the previous section while maintaining a reasonable sample size.

[18] 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.

six years; and a reduction in inflation increases the expected length of the spell by 5.4 years. Furthermore, reduced market distortions and less overheating (proxied by a reduction in the GDP per capita growth) raise the expected spell length by 2.5 and 2.8 years, respectively. Finally, 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.

To get a sense about the differences between triggering and sustaining growth, we compare the identified determinants of growth spells to those found to be associated with growth up-breaks in the region. Our results suggest that, while improvements in the terms of trade and trade openness, and lower inflation help to both jump-start growth and have a significant impact on spell duration, overall, what is associated with growth accelerations does not necessarily sustain growth. For example, on one hand, reductions in the Fed Funds rate, improvements in foreign direct investment, fewer internal conflicts, a better investment profile and law and order, productivity growth, and export partner diversification, show statistically significant changes during growth up-breaks but do not appear as significant factors in the multivariate survival analysis. On the other hand, keeping total public debt in check at sustainable levels is found be an important factor preserving growth spells, but it does not show a statistically significant change during growth up-breaks. Similarly, we find evidence that lower market distortions, as measured by the relative price of investment to consumption, do help preserving growth spells but do not show significant changes around the time of growth accelerations.

Extensions and Robustness

Comparator groups

Are determinants of growth spells in sub-Saharan Africa different from those in the rest of the world? To answer this question, columns 2 and 3 of Table 12 investigate how the same factors and policies affect the duration of growth spells in emerging and developing economies. We find that, overall, several factors operate differently in sub-Saharan Africa compared to the rest of the world. There are also some commonalities: for instance, lower inflation and lower government debt prolong growth spells both in sub-Saharan Africa as well as in the emerging and developing economies sample.

However, other results are more specific to sub-Saharan Africa. Only in sub-Saharan Africa do we find that a higher investment-to-GDP ratio, and positive developments in the terms of trade and the oil prices prolong growth spells. Similarly, trade openness, the quality of institutions and macro-structural distortions are found to preserve the spells in sub-Sharan Africa, but these results are not statistically significant in the emerging and developing economies sample. This contrast may highlight the heightened importance of sub-Saharan Africa trade integration with the rest of the world, and the need for the region to catch-up in terms of strengthening institutions and eliminating market distortions.

Conditional hazard and model fit

Our duration analysis established that spell duration is correlated with various determinants.[19] We return to the question of duration dependence and ask: controlling for the evolution of covariates, is there an intrinsic time effect on the hazard?

From equation (2), the baseline duration dependence varies with the estimated parameter α, growing with time for $\alpha > 1$, falling for $\alpha < 1$, or remaining constant if $\alpha = 1$. Our estimates of the *conditional* hazard parameter result in an α greater than 1 (statistically significantly). This suggests that controlling for the evolution of the covariates the baseline hazard rises with time, and thus the end of a spell becomes more likely as the spell matures.

To examine whether our baseline estimation explains a significant share of the variation in growth spell duration we assess its goodness of fit against a series of nested models. Table 13 compares the baseline model against models that control for some determinants but exclude others. The likelihood ratio tests favor the baseline specification, suggesting that it fits the data better than the various nested alternatives. In addition, a constructed likelihood-based pseudo-R2 which measures goodness-of-fit based on Woolridge (2002) suggests that the baseline model has substantial explanatory power.

Alternative distributional assumptions

Our baseline results assume that the hazard model follows a Weibull distribution. To examine the robustness of our conclusions about the estimated coefficients and the increasing baseline hazard, we examine alternative distributional assumptions about the duration of growth spells.

Table 14 presents results using distributions that allow for a non-monotonic baseline hazard (as was the case for the Weibull). To ensure consistent comparison across methods, column 2 re-estimates our baseline specification (shown in column 1) using the accelerated failure-time metric; columns 3 and 4 use alternative distributions to estimate the same model. We find that coefficient estimates are quite robust to the assumed distributional form with similar statistical significance across distributions.

In terms of duration dependence, recall that our baseline specification suggest that the hazard rate is a rising function of time.[20] Results from columns 3 and 4 in Table 14 are based on specifications where monotonicity is not imposed as was the case of the Weibull specification; they too suggest that the baseline hazard is rising.

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[19] Using our spells data, we can derive the empirical hazard rate by looking at the spells that have lasted at least a given number of years and calculate how many end in the next period. It turns out that the *unconditional* hazard decreases over time, implying that spells which have been going on for longer, are also more likely to persist.

[20] We also estimate the baseline (Weibull) with an ancillary time parameter. The ancillary time parameter itself is not significant in the augmented Weibull specification (p-value of 0.20), suggesting monotonicity cannot be rejected (and thus that the baseline Weibull is adequate).

Alternative model specifications

Finally, we document some of the robustness checks that we have carried out, focusing on model specification and heterogeneity across samples. The descriptive statistics suggest evidence of time and regional heterogeneity across the full sample. Some of the potential heterogeneity is mitigated by focusing on more homogenous samples in the analysis and particularly sub-Saharan Africa, as well as the fact that our baseline estimation includes a time dummy for the 2000 decade, when there was a particularly sustained boom in commodity prices.

In the context of our survival analysis, the presence of unobserved heterogeneity (or "frailty") can be modeled in the form of a multiplicative term that is added to the proportional hazard model in equation (2)— analogous to a fixed effects term in a panel regression context—which is assumed to be uncorrelated with the rest of the determinants. Adding this "frailty" term to the baseline specification model at the observation level or at the country level does not have an impact on the regression coefficients.

We further explore the robustness of our baseline estimates by adding variables to the specification that may proxy for potential omitted variables and/or unobserved heterogeneity. Table 15 presents specifications that sequentially add an indicator variable for conflict and then resource exporters in the region to the baseline specification (shown in column 1).[21] Estimated coefficients and their statistical significance levels remain unaffected, overall, suggesting that our baseline estimates are robust. In addition, likelihood ratio tests suggest that our baseline model cannot be nested in the model that includes both the conflict and resource exporter indicator variables (column 4), that is, our baseline model fits the data significantly better.

VI. CONCLUSIONS

Growth up-breaks and periods of sustained growth have become more common among countries in sub-Saharan Africa since the turn of the century. However, historically, 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 because of several factors and policies rather than one or two driving sources. For example, a supportive external environment such as favorable terms of trade or global financial conditions and improvements in the quality of institutions have

[21] Resource exporter countries include oil exporting countries and other resource intensive countries. Oil exporters refers to countries where net exports of oil constitute more than 30 percent of total exports. Other resource intensive countries correspond to countries where nonrenewable resource exports represent more than 25 percent of goods exports (IMF 2017).

clearly helped. However, our analysis shows that domestic macroeconomic policies play a critical role. These include monetary policy geared toward low inflation, sound fiscal policy to prevent excessive public debt accumulation, 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, to boost investment.

What are the policy implications of our findings particularly in the current context of decelerating growth in the region? 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. 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, aid flows expected to become more scarce, and growing risks of inward-looking policies across the globe. All this implies that the impetus to revive growth where it has faltered, and sustain growth where it has remained relatively strong, must come from domestic developments.

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 that include 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. In countries still enjoying a growth spell, the focus should be on prolonging it and trying to avoid a hard landing. Attention should turn to addressing potential vulnerabilities, focus on rebuilding buffers—in particular, maintaining or expanding the fiscal space—and stem increases in public debt through domestic revenue mobilization to finance a larger part of their infrastructure projects, while avoiding overheating.

Finally, 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.

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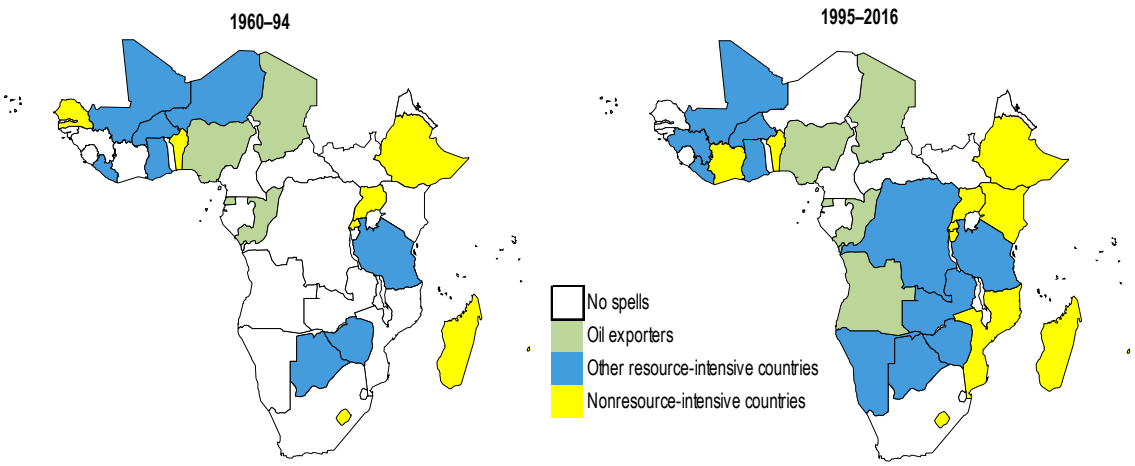
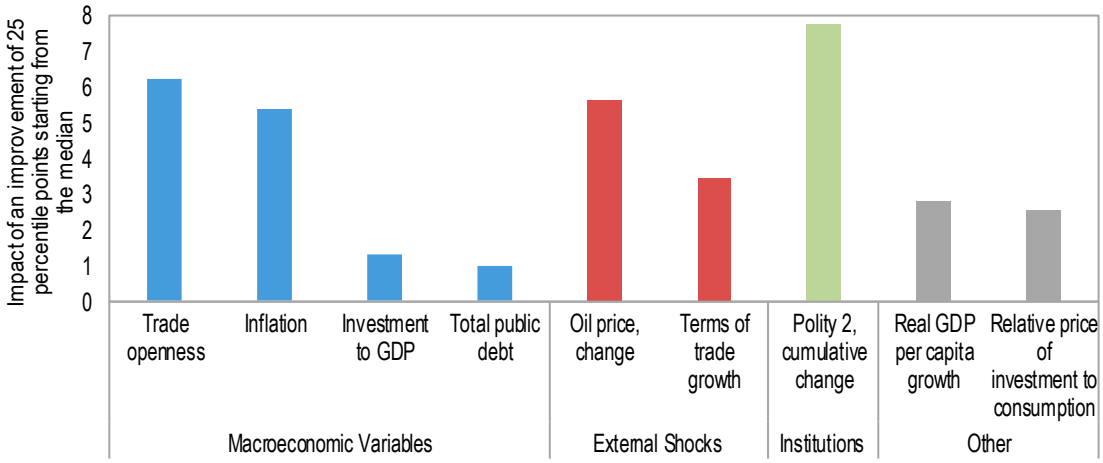
Figure 1. Sub-Saharan Africa Growth Spells



Source: Authors' calculations.

Figure 2. Effects on Growth Spells



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.

Table 1. Selected Groups: Up-breaks and Down-breaks, 1950-2016

Regions	1950-1969		1970-84		1985-99		2000-16	
	Up-Breaks	Down-Breaks	Up-Breaks	Down-Breaks	Up-Breaks	Down-Breaks	Up-Breaks	Down-Breaks
Total	30	18	47	80	67	40	40	47
Advanced	8	3	6	16	8	6	2	9
Emerging	4	3	3	11	9	7	10	5
Developing	18	12	38	53	50	27	28	33
SSA	5	5	12	20	19	14	11	8
LAC	5	4	11	15	13	7	5	9
Asia	2	0	9	7	5	1	7	6
MENA	6	3	6	11	13	5	5	10

Source: Authors' calculations.
Note: LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; SSA = Sub–Saharan Africa. Calculations using h=5 and p=0.10.

Table 2. Change in Median Annual Per Capita Growth at Up-breaks and Down-breaks, percentage points

Regions	Up-Breaks	Down-Breaks
Total	7.3	-7.4
Advanced	3.8	-4.6
Emerging	8.0	-7.2
Developing	8.0	-8.6
SSA	9.9	-9.3
LAC	5.7	-6.8
Asia	6.4	-8.7
MENA	9.7	-10.4

Source: Authors' calculations. Results using h=5 and p=0.10.

Table 3. Growth Spells, 1950-2016

Regions	Complete Spells	Ongoing Spells
Total	80	67
Advanced	13	8
Emerging	9	13
Developing	58	46
SSA	15	25
LAC	18	9
Asia	7	8
MENA	18	4

Source: Authors' calculations. Results using h=5 and p=0.10.

Table 4. Duration of Complete Spells, 1950-2016

Regions	Median Duration of Spells (years)	Share of Spells longer than 10 years (percent)
Advanced	15	77
Emerging	8	33
Developing	8	45
SSA	6	33
LAC	8	44
Asia	13	57
MENA	10	50

Source: Authors' calculations. Results using h=5 and p=0.10.

Table 5. Median Growth Before, During and After Completed Growth Spells, 1950-2016

Regions	Before	During	After
Advanced	1.5	5.1	0.4
Emerging	-1.6	8.0	-1.8
Developing	-1.3	7.4	-0.4
SSA	-3.8	9.2	-3.9
LAC	-0.7	5.9	0.3
Asia	-0.1	5.9	-0.4
MENA	-0.4	8.4	0.1

Source: Authors' calculations. Results using h=5 and p=0.10.

Table 6. Changes in Macroeconomic Variables during Growth Breaks

	Emerging and Developing			Sub-Saharan Africa		
Variables	Up breaks	Down	Sym	Up breaks	Down	Sym
External Shocks						
U.S. federal funds rate	-2.4 ***	-0.8 ***	+++	-2.9 ***	-0.8	+++
Crude oil price, change	2.7 *	-8.7 ***	+++	-1.5	-3.9	
Terms of trade, change	0.5 ***	-0.4 ***		0.5 **	-0.6 *	
Macro Economic Indicators						
Overall fiscal balance to GDP	5.3 *	-1.8 **		8.4	-0.7	
Total public debt to GDP	0.0	11.5 ***	+++	-9.0	15.7 **	
Government revenue to GDP	2.2 ***	0.5	+	3.7 **	1.2	
Investment to GDP, ratio	3.6 ***	0.1	+++	4.4 ***	-0.2	+
Foreign direct investment to GDP	1.6 ***	0.6 **	++	2.2 ***	0.2	++
External debt to GDP	-0.3	15.5 ***	+++	-9.4	23.7 ***	
Exchange rate regime (de facto)	0.1	0.3 ***		0.2	0.4 *	
Real exchange rate misalignment	-4.0 *	4.1 *		-4.2	4.4	
Extreme real exchange rate misalignment	-0.1 ***	0.0	+++	-0.1	-0.1 *	
Trade to GDP	9.3 ***	3.2 **	+++	9.0 **	3.9	
Aid to GDP	-0.6	0.9		-0.1	5.0 ***	++
Inflation	-0.3 ***	0.1		-0.4 ***	0.1	
Institutions						
Political stability	6.5 ***	1.1	+++	4.1 **	2.1	
Political stability (Polity 2)	0.0	0.2 ***	++	0.0	0.4 ***	++
Investment profile	1.5 ***	0.6 ***	+++	1.3 ***	0.7 **	
Fewer internal conflict	1.4 ***	0.1	+++	1.5 ***	0.3	++
Civil war	0.0	-0.2		0.0	0.2	
Law & order	0.4 ***	0.0	++	0.4 **	-0.1	
Human Development Indicators						
Years of Schooling	1.3 ***	1.2 ***		1.3 ***	1.3 ***	
Human capital	0.2 ***	0.2 ***		0.2 ***	0.2 ***	
Infant mortality rate	-24.8 ***	-20.4 ***	++	-27.3 ***	-23.6 ***	
Gini coefficient	-1.5 ***	0.3		-2.5 **	0.7	
Structural Transformation						
Exports of manufactures	4.7 ***	4.2 ***		-1.8	-1.9	
Product concentration[1]	4.6 ***	-3.6 **		2.5	-2.4	
Partner concentration[1]	1.9 **	1.1		3.8 **	-1.1	
Financial liberalization[1]	0.7	0.2		0.1	2.0 **	+
Fewer financial restrictions on consumption[2]	19.4	1.4		-0.2	29.5	
Relative price of investment to consumption	-1.4	2.3		3.2	0.6	
TFP, growth	3.6 ***	-3.9 ***		4.8 ***	-3.4 ***	
Imports of computers	2.1 *	3.9 ***		-0.6	-0.2	
ICT goods imports	0.1	-0.9 ***		0.2	0.2	
Mobile lines per 100 people	1.8 ***	-1.6 ***		0.4	-0.9 **	

Source: Author's calculations.

[1] changes multiplied by 100. [2] changes multiplied by 1000.

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.

Table 7. Effect of Exogenous Factors on Growth Spells

Variables	SSA	EMEDEV	World	EMEDEVxSSA
US interest rates	1.11 *	1.082 **	1.078 **	1.072
Oil price, percent change	0.999	1.006 ***	1.006 ***	1.007 ***
Terms of trade, percent change	0.997	0.991	0.992	0.986
Spells	37	114	134	77
Failures	12	56	68	44
Observations	620	1,904	2,334	1,284

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. 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.

Table 8. Effect of Macroeconomic Variables on Growth Spells

Variables	SSA	EMEDEV	World	EMEDEVxSSA
Overall fiscal balance to GDP, initial	0.995 ***	0.998	0.998	1.030
Spells	21	52	58	31
Failures	4	18	21	14
Observations	311	668	803	357
Total public debt to GDP	1.004 *	1.001	1.001	0.993
Spells	38	122	143	84
Failures	13	62	75	49
Observations	634	1,972	2,474	1,338
Government revenue to GDP, change	0.982	0.983 *	0.983 *	0.923 *
Spells	32	99	114	67
Failures	7	40	47	33
Observations	458	1,371	1,666	913
Investment to GDP, change	0.941 ***	0.948 ***	0.955 **	0.956
Spells	40	126	147	86
Failures	15	67	80	52
Observations	648	2,085	2,589	1,437
Exchange rate regime (de facto)	0.893	0.851 **	0.868 *	0.832 **
Spells	35	103	119	68
Failures	9	42	49	33
Observations	529	1,602	1,994	1,073
Real exchange rate misalignment	1.007	1.006 **	1.004	1.006 **
Spells	40	119	140	79
Failures	15	61	74	46
Observations	644	2,008	2,510	1,364
Extreme real exchange rate misalignment	1.413	1.724 **	1.466	1.841 **
Spells	40	126	147	86
Failures	15	67	80	52
Observations	673	2,144	2,656	1,471
Trade openess, change	0.984	1.008	1.008	1.015 **
Spells	40	126	147	86
Failures	15	67	80	52
Observations	648	2,085	2,589	1,437
Aid percent of GDP	0.905 ***	0.977	0.983	1.044
Spells	37	120	126	83
Failures	11	59	61	48
Observations	610	1,906	2,070	1,296
Log (1+ inflation)	0.933	1.084	1.110	1.129
Spells	37	119	140	82
Failures	12	59	72	47
Observations	617	1,980	2,477	1,363

Source: Authors' calculations.
Note: See note in Table 7.

Table 9. Effect of Institutional Variables on Growth Spells

Variables	SSA	EMEDEV	World	EMEDEVxSSA
Political stability (Polity 2)	0.815 ***	0.929 ***	0.93 ***	0.948 **
Spells	38	118	138	80
Failures	14	60	73	46
Observations	636	1,991	2,446	1,355
Political stability (Polity 2, cumulative change)	0.88 ***	0.946 **	0.954 **	0.969
Spells	35	111	129	76
Failures	13	58	70	45
Observations	534	1,776	2,163	1,242
More constraints on the Executive (initial)	0.693 *	0.835 **	0.876 **	0.85 **
Spells	31	106	125	75
Failures	10	54	67	44
Observations	505	1,730	2,159	1,225
Investment profile	0.634 **	0.82 **	0.896	0.865
Spells	25	83	99	58
Failures	7	34	42	27
Observations	358	1,332	1,710	974
Fewer internal conflict (cumulative change)	0.716 ***	0.911	0.940	0.952
Spells	18	58	61	40
Failures	3	22	23	19
Observations	241	785	849	544
Fewer civil war	0.305 ***	0.897	0.937	1.465
Spells	21	67	79	46
Failures	3	18	22	15
Observations	244	792	937	548

Source: Authors' calculations.

Note: See note in Table 7.

Table 10. Effect of Human Development Indicators on Growth Spells

Variables	SSA	EMEDEV	World	EMEDEVxSSA
Years of primary schooling	0.933	0.964 ***	0.973 **	0.964 **
Spells	26	103	124	77
Failures	9	53	66	44
Observations	458	1,776	2,288	1,318
Human capital	0.154 *	0.286 ***	0.294 ***	0.297 ***
Spells	34	111	132	77
Failures	13	57	70	44
Observations	523	1,808	2,312	1,285
Human capital (Initial)	0.208	0.359 **	0.357 ***	0.345 **
Spells	34	111	132	77
Failures	13	57	70	44
Observations	544	1,862	2,374	1,318
Infant mortality rate	1.024 ***	1.013 ***	1.015 ***	1.011 ***
Spells	40	125	145	85
Failures	15	66	78	51
Observations	669	2,118	2,617	1,449

Source: Authors' calculations.

Note: See note in Table 7.

Table 11. Effect of Structural Transformation and Technology Adoption on Growth Spells

Variables	SSA	EMEDEV	World	EMEDEVxSSA
Exports of manufactures	0.953 **	0.989 *	0.988 **	0.988 *
Spells	31	114	135	83
Failures	8	54	67	46
Observations	383	1,566	2,050	1,183
Product concentration	1.242	1.25 *	1.331 ***	1.336 **
Spells	36	121	142	85
Failures	14	65	77	51
Observations	458	1,706	2,169	1,248
Partner concentration	2.344 ***	1.548 **	1.653 ***	1.374
Spells	36	121	142	85
Failures	14	65	78	51
Observations	458	1,706	2,156	1,248
Financial liberalization	0.000128 **	0.122 **	0.119 ***	0.212
Spells	14	67	81	53
Failures	6	25	29	19
Observations	118	660	944	542
Fewer financial restrictions on current account	3.11E-10 ***	0.619	0.225 *	1.221
Spells	7	52	70	45
Failures	2	20	29	18
Observations	69	614	942	545
Relative price of investment to consumption	1.002	0.998	0.999	0.997
Spells	40	126	147	86
Failures	14	66	79	52
Observations	637	2,074	2,578	1,437
Imports of computers	0.322	0.492 **	0.538 ***	0.493 **
Spells	27	89	105	62
Failures	4	32	40	28
Observations	340	1,100	1,389	760
ICT goods imports	0.766	0.855 **	0.923	0.845 **
Spells	24	76	88	52
Failures	3	22	26	19
Observations	255	781	929	526

Source: Authors' calculations.

Note: See note in Table 7.

Table 12. Multivariate Model of Effects on Growth Spells

	SSA		EMEDEV		EMEDEV without SSA	
External Factors						
U.S. interest rates	1.021		1.046		1.037	
	(0.110)		(0.0437)		(0.0529)	
Oil price, change	0.935	***	1.005		1.032	
	(0.0187)		(0.0209)		(0.0293)	
Terms of trade growth	0.959	**	0.996		0.996	
	(0.0161)		(0.0135)		(0.0165)	
Macroeconomic Variables						
Investment to GDP, change	0.923	*	0.962		0.953	
	(0.0403)		(0.0429)		(0.0332)	
Total public debt to GDP	1.007	**	1.006	**	1.007	
	(0.00343)		(0.00258)		(0.00812)	
Trade openness	0.98	*	0.992		0.994	
	(0.0117)		(0.00686)		(0.0109)	
Capital account oppenness	1.359		1.071		1.086	
	(0.797)		(0.173)		(0.230)	
Inflation	3.242	**	1.472	*	1.527	*
	(1.770)		(0.302)		(0.343)	
De facto exchange rate regime	0.756		0.81	**	0.849	
	(0.210)		(0.0740)		(0.0882)	
Institutions						
Polity 2, cumulative change	0.815	**	0.963		1.003	
	(0.0652)		(0.0280)		(0.0311)	
Social and Human Development						
Human capital	0.159		0.464		0.355	
	(0.355)		(0.333)		(0.322)	
Other						
Real GDP per capita growth	1.115	***	1.049	***	1.064	**
	(0.0321)		(0.0138)		(0.0286)	
Initial GDP per capita	4.691		1.531		1.052	
	(6.359)		(0.454)		(0.422)	
Population growth	1.073		1.004		1.104	
	(0.671)		(0.232)		(0.251)	
Relative price of investment to consumption	1.015	**	0.994		0.982	***
	(0.00582)		(0.00574)		(0.00638)	
Decade dummy 2000	1.380		0.547		0.424	
	(1.634)		(0.256)		(0.249)	
Constant	7.76E-11	**	0.00185	**	0.237	
	(7.31e-10)		(0.00462)		(0.761)	
Observations	326		1,076		750	
Spells	28		81		53	
Failures	8		29		21	
Ancillary parameter α	3.956	***	1.557	***	1.342	***
Ancillary parameter p-value (Ho: α = 1)	0.00		0.00		0.07	

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. EMEDEV = all emerging and developing countries; SSA= sub–Saharan Africa. *, **, and *** indicate statistical significance at the 10, 5, and 1 percent levels.

Table 13. Nested Models and Fit

Models	Baseline	Shocks	Macro & Shocks	Macro & Shocks & Social & Insitutions	No Institutions	No Growth
Log Likelihood	-6.327	-17.990	-12.940	-10.240	-8.799	-9.558
LR test statistic		23.340	13.220	7.828	4.944	6.464
LR p-value		0.016	0.021	0.020	0.026	0.011
Pseudo *R*-squared	0.693	0.126	0.372	0.503	0.573	0.536

Source: Authors' calculations.

Table 14. Alternative Functional Forms

Variables	Baseline	Baseline with AFT	Log-logistic with AFT	Log-normal with AFT
External Shocks				
U.S. interest rates	1.021	0.995	0.998	0.998
	(0.110)	(0.0273)	(0.0160)	(0.0217)
Oil price, change	0.935 ***	1.017 **	1.03 ***	1.025 ***
	(0.0187)	(0.00695)	(0.00485)	(0.00630)
Terms of trade growth	0.959 **	1.011 **	1.015 **	1.010
	(0.0161)	(0.00427)	(0.00711)	(0.00716)
Macroeconomic Indicators				
Investment to GDP, change	0.923 *	1.02 **	1.015	1.013
	(0.0403)	(0.0100)	(0.0133)	(0.0149)
Total public debt to GDP	1.007 **	0.998 ***	0.999	0.998 **
	(0.00343)	(0.000637)	(0.000919)	(0.000683)
Trade openness	0.98 *	1.005	1.013 **	1.008 *
	(0.0117)	(0.00357)	(0.00587)	(0.00435)
Capital account oppenness	1.359	0.925	0.906	0.962
	(0.797)	(0.128)	(0.0632)	(0.0745)
Inflation	3.242 **	0.743 ***	0.751 *	0.78 **
	(1.770)	(0.0638)	(0.130)	(0.0773)
De facto exchange rate regime	0.756	1.073	1.215 ***	1.118 **
	(0.210)	(0.0778)	(0.0860)	(0.0636)
Institutions				
Polity 2, cumulative change	0.815 **	1.053 ***	1.064 ***	1.052 ***
	(0.0652)	(0.0166)	(0.0181)	(0.0167)
Social and Human Development				
Human capital	0.159	1.592	0.744	1.270
	(0.355)	(0.779)	(0.362)	(0.563)
Other				
Real GDP per capita growth	1.115 ***	0.973 ***	0.97 ***	0.972 ***
	(0.0321)	(0.00415)	(0.00357)	(0.00450)
Initial GDP per capita	4.691	0.677	0.72 **	0.72 *
	(6.359)	(0.195)	(0.112)	(0.143)
Population growth	1.073	0.982	0.81 ***	0.892
	(0.671)	(0.157)	(0.0504)	(0.123)
Relative price of investment to consumption	1.015 **	0.996 ***	0.996 ***	0.996 **
	(0.00582)	(0.00142)	(0.00140)	(0.00171)
Decade dummy 2000	1.380	0.922	0.971	0.860
	(1.634)	(0.275)	(0.176)	(0.165)
Constant	7.76E-11 **	359.3 ***	454 ***	273.1 ***
	(7.31e-10)	(541.4)	(504.7)	(457.6)
Ancillary parameter[1]	3.956	3.956	0.156	0.338
Ancillary parameter p-value[2]	4.89e-07	4.89e-07	1.36e-06	7.86e-09

Source: Authors' calculations.

[1] Estimated shape parameter for the standard Weibull, scale parameter for log–logistic, and standard deviation for lognormal.

[2] Estimated p-values for the tests that shape parameter=1 for standard Weibull, that the scale parameter=1 in case of log–logistic, and that the standard deviation=1 in case of lognormal.

Note: See note in Table 12.

Table 15. Alternative Model Specifications

Variables	Baseline	Conflict	Resource Exporters	Conflict and Resource Exporters	No decade dummy
External Shocks					
U.S. interest rates	1.021	1.022	1.017	1.031	1.019
	(0.110)	(0.111)	(0.0951)	(0.113)	(0.109)
Oil price, change	0.935 ***	0.944 ***	0.942 ***	0.948 ***	0.939 **
	(0.0187)	(0.0192)	(0.0187)	(0.0165)	(0.0261)
Terms of trade growth	0.959 **	0.951 **	0.96 *	0.953 *	0.959 **
	(0.0161)	(0.0233)	(0.0202)	(0.0248)	(0.0161)
Macroeconomic Indicators					
Investment to GDP, change	0.923 *	0.926 **	0.948	0.952	0.927 *
	(0.0403)	(0.0358)	(0.0526)	(0.0587)	(0.0370)
Total public debt to GDP	1.007 **	1.008 *	1.007 *	1.009 *	1.007 *
	(0.00343)	(0.00458)	(0.00414)	(0.00443)	(0.00369)
Trade openness	0.98 *	0.986	0.952 *	0.957 *	0.980
	(0.0117)	(0.0136)	(0.0259)	(0.0218)	(0.0119)
Capital account oppenness	1.359	1.638	1.831	2.108	1.340
	(0.797)	(1.149)	(0.869)	(1.107)	(0.737)
Inflation	3.242 **	3.373 **	3.154 **	3.612 *	3.139 **
	(1.770)	(2.032)	(1.768)	(2.801)	(1.764)
De facto exchange rate regime	0.756	0.796	0.694	0.749	0.740
	(0.210)	(0.267)	(0.287)	(0.275)	(0.229)
Institutions					
Polity 2, cumulative change	0.815 **	0.805 **	0.785 ***	0.78 ***	0.823 ***
	(0.0652)	(0.0768)	(0.0446)	(0.0577)	(0.0519)
Social and Human Development					
Human capital	0.159	0.0818	0.196	0.121	0.204
	(0.355)	(0.192)	(0.411)	(0.281)	(0.375)
Other					
Real GDP per capita growth	1.115 ***	1.126 ***	1.116 ***	1.129 **	1.111 ***
	(0.0321)	(0.0490)	(0.0406)	(0.0609)	(0.0363)
Initial GDP per capita	4.691	8.041	3.855	6.440	4.267
	(6.359)	(13.44)	(4.905)	(10.57)	(5.080)
Population growth	1.073	1.066	1.130	1.052	1.091
	(0.671)	(0.528)	(0.981)	(0.709)	(0.655)
Relative price of investment to consumption	1.015 **	1.017 **	1.016 **	1.018 *	1.014 **
	(0.00582)	(0.00795)	(0.00790)	(0.0104)	(0.00605)
Decade dummy 2000	1.380	1.422	0.694	0.756	
	(1.634)	(1.658)	(1.620)	(1.934)	
Uppsala conflict level		9.584		8.601	
		(18.79)		(16.37)	
Energy exporters dummy			13.56	14.85	
			(27.11)	(41.95)	
Constant	3.956 ***	4.502 ***	4.095 ***	4.729 ***	3.845 ***
	(1.082)	(1.686)	(1.083)	(1.887)	(1.117)
Observations	326	326	326	326	326
Speels	28	28	28	28	28
Failures	8	8	8	8	8
Ancillary parameter α	3.956	4.502	4.095	4.729	3.845
Ancillary parameter p-value (Ho: α = 1)	4.89e-07	5.90e-05	9.66e-08	9.84e-05	3.57e-06
Log Likelihood	-6.327	-5.363	-5.178	-4.311	-6.350
LR test statistic	4.032	2.104	1.734		4.078
LR p-value	0.133	0.147	0.188		0.253
Pseudo *R*-squared	0.693	0.740	0.749	0.791	0.692

Source: Authors' calculations.

Note: See note in Table 12.

Annex I. 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 oppenness	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)
Conflict level	Dummy 1 War: At least 1000 battle-related deaths in one calendar year.	Uppsala Conflict Data Program database
Energy exporters	Dummy 0-1	April 2016 REO Ch2

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 II. Breaks and Spells Stylized Facts with $h = 8$

Table II.1. Selected Groups: Up-breaks and Down-breaks, 1950-2016

Regions	1950-1969		1970-84		1985-99		2000-16	
	Up-Breaks	Down-Breaks	Up-Breaks	Down-Breaks	Up-Breaks	Down-Breaks	Up-Breaks	Down-Breaks
Total	17	7	16	53	60	32	23	28
Advanced	4	2	2	11	3	5	0	9
Emerging	5	2	0	8	9	3	4	2
Developing	8	3	14	34	48	24	19	17
SSA	2	1	5	16	18	12	11	5
LAC	5	1	1	10	11	4	2	4
Asia	0	0	6	2	5	2	4	3
MENA	1	1	2	6	14	6	2	5

Source: Authors' calculations.
Note: LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; SSA = Sub–Saharan Africa. Calculations using h=8 and p=0.10.

Table II.2. Change in Median Annual Per Capita Growth at Up-breaks and Down-breaks with $h = 8$, percentage points

Regions	Up-Breaks	Down-Breaks
Total	5.9	-5.4
Advanced	4.0	-3.3
Emerging	4.5	-5.3
Developing	6.6	-6.9
SSA	7.7	-7.6
LAC	4.9	-5.2
Asia	5.7	-6.6
MENA	10.2	-10.4

Source: Authors' calculations. Results using h=8 and p=0.10.

Table II.3. Growth Spells with $h = 8$, 1950-2016

Regions	Complete Spells	Ongoing Spells
Total	36	63
Advanced	6	2
Emerging	5	11
Developing	25	50
SSA	6	25
LAC	8	10
Asia	4	8
MENA	7	7

Source: Authors' calculations. Results using h=8 and p=0.10.

Table II.4. Complete Spell Duration with $h = 8$, 1950-2016

Regions	Median Duration of Spells	Share of Spells longer than 10 years
Advanced	15	100
Emerging	10	80
Developing	10	52
SSA	9	33
LAC	12	63
Asia	22	75
MENA	9	43

Source: Authors' calculations. Results using h=8 and p=0.10.

Table II.5. Median Growth Before, During and After Complete Growth Spells with $h = 8$, 1950-2016

Regions	Before	During	After
Advanced	1.2	5.2	1.1
Emerging	-0.4	5.5	-1.6
Developing	0.2	6.4	-0.2
SSA	-2.5	5.8	-1.5
LAC	0.5	5.6	-0.1
Asia	0.3	6.2	0.2
MENA	-0.1	11.0	0.6

Source: Authors' calculations. Results using h=8 and p=0.10.