

# Estimating the determinants of growth stability and instability in Sub - Saharan African countries: a Markov Switching Approach

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The present paper aims to analyze the change of growth patterns and its determinants within Sub-Saharan African countries, relying on the idea that the country's growth path is the result of different growth regimes that could occur without obvious changes in country fundamentals (Jerzmanowski, 2006).

Sub-Saharan African countries record different growth behaviours over time, in terms of different balanced growth paths, different within-state variability and different long-run growth rates. The behaviour of the growth rate in this region, as the one observed in most of the developing and emerging countries, is characterized by a non-linear path, large fluctuations and swings (see among others Becker et al., 2006) and asymmetric interchanges between phases of acceleration and collapse (e.g. Easterly et al., 1993). In particular, the Sub-Saharan region records the most volatile growth rate and the most frequent output collapse<sup>1</sup>. These stylized facts imply a failure, for this region, to conform to economic growth theories, especially of convergence model, that predicts a rapid and regular growth rate for these countries.

To estimate the different phases of growth each country faces over time and the determinants of this switching process, we apply a two state Markov Switching model with time varying transition probability (e.g. Filardo, 1994; Diebold et al., 1994; Kerekcs, 2012; Hamilton, 1989) to an unbalanced panel of 37 African countries over the period 1987–2011<sup>2</sup>. This statistical approach allows us to disentangle the different growth paths within countries and specify a two-state Markov switching approach since African countries are mainly characterized by two asymmetric regimes, unstable and stable growth (Byrne, 2010).

Entering into details, this model allows us to deal with non-linear properties of the regression function such as asymmetry, dependency weights and volatility. Furthermore, it splits the time series into a discrete number of regimes, simultaneously estimating the transition from one state to another, whether the variable leading to regime shift is unobservable. Although other models commonly used to study the growth rate variation, such as autoregressive (AR), moving average (MA) or autoregressive integrated moving average (ARIMA) can capture the dynamics in data, they are unable to capture the fact that the variable under estimation change its behaviour during time, i.e. it switches between regimes (see among others Kuan, 2002).

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<sup>1</sup>Output collapse is described as a dip or a decline in GDP.

<sup>2</sup>Data are retrieved from Summer and Heston database.

The time varying transition probability allows us to deal with two challenges. Firstly, we can understand long run growth pattern by determining the length of time a country remains in the same regime as dependent on country fundamentals. Moreover, it has the ability of capturing systematic changes before and after the turning points. Secondly, we allow for cross country heterogeneity in the growth path, evaluating the effect of country fundamentals on switching regimes and how the end of a highly unstable growth regime could be affected by variation in country fundamentals.

Previous works about switching growth determinants are present in literature with special references to papers by Hausmann et al. (2005), Byrne (2010) and Jerzmanowski (2006). The present paper closely follows the Byrne (2010)'s intuition about the need for applying Markov Switching Model with time varying transition probabilities to understand the African countries growth dynamics. On the other hand, it takes its theoretical basis from the Hausmann et al. (2005)'s work for the choice of the explanatory variables of the discrete latent process. Their results provide evidence that foreign direct investment (FDI henceforth), trade, depreciation of the real exchange rate and changes in political regimes are the main reasons behind the phases of economic acceleration<sup>3</sup>.

Our empirical findings provide the existence of two distinct growth regimes: a stable growth regime where the volatility of the growth path is low despite the presence of negative (positive) values in the growth rate and a highly volatile growth regime, in which the growth behaviour spans from negative to positive picks or vice versa. These conclusions are confirmed by the within countries variability, the different magnitude of the autocorrelation effects and the distribution of the observed growth rate for observations belonging to the each regime.

As our results highlight, most of the African countries have experienced changes from high volatility to low volatility regime (or vice versa). Mauritius and South Africa represent a relevant exception since their export driven economies were supported by a solid institutional framework. Causes of high volatility in Sub-Saharan Africa can be broadly divided into two groups: those associated with higher exposure to exogenous shocks and augmenting factors and those related to faulty policies and structural issues.

FDI, trade volume as well as a democratic, or in some cases an autocratic political regime, encourage the probability of maintaining a stable growth path. In particular, a change in the political regime from transitional to autocracy and from autocracy to democracy increases this probability. On the other hand, instability in the growth pattern, in terms of the probability for a country to move to the unstable growth rate regime, could be due to appreciation of the exchange rate, disinvestment of foreign investors and a lower trade intensity.

As it is common in non-parametric approaches, we check the goodness of fit through the empirical cumulative density function and the kernel distribution. The results confirm that our identification strategy well approximate the Data Generating Process.

**JEL classification:** C24, F41, F43.

**Keywords:** Markov Regime-Switching Model; Economic Growth; Sub-Saharan Africa.

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<sup>3</sup>Hausmann et al. (2005) identify the growth acceleration phases defining a threshold for the growth rate.

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