

# Recent African Growth: What Changed, What's Matter?

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## Abstract

This paper analyses features of the recent African economic growth. The data reveal that during the period 1995-2005, Africa caught up with East Asia in terms of economic growth and investment. However, East Asia has improved its advantage on Africa in terms of GDP per capita, and growth fundamentals. Within Africa, economic growth rate was 2.2 percent points higher during the period 1995-2005 compared to the period 1975-94. However, between the two periods, only primary education, export and urbanisation rate have significantly increased in Africa. The other growth determinants have been either slightly deteriorated or stagnant.

The results of growth regressions over the period 1995-2005 show that *investment, access of the private sector to credit, government effectiveness, exports, and share of agriculture value added in GDP* are significantly related to economic growth. Thus, compared to the statistical analysis, growth regressions suggest that most of the variables which significantly contributed to growth recovery are not those variables which positively evolved in Africa. The good news is that African economies have grown recently without changing many growth fundamentals. The bad news is that the recent African growth recovery may not be sustainable if efforts are not focused on appropriate growth fundamentals.

**Key words:** Economic growth, Africa

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## 1. Introduction

During the 1990s, following the seminal paper of Barro (1991), many authors had tried to explain the disappointing African economic growth [see for instance, Easterly and Levine (1997), Sachs and Warner (1997), Collier and Gunning (1999a&b)]. Most of the arguments advanced in explaining the lower economic growth in Africa focused on structural factors, such as geographic and ethnic factors. However, recently African countries have succeeded in growing in spite of no change to those the structural factors which are supposed to limit the potential for economic growth in Africa.<sup>1</sup>

Recent African economic growth has generated much euphoria. However, beyond the euphoria, it is important to understand factors behind the recent growth in Africa, as good economic performance was not common on the continent. Indeed, the pattern of economic growth in Africa follows a U-shape trend, with high growth through the period 1960-1973, followed by growth stagnation during the period 1974-1994, and growth recovery during the period 1995-2005 [see Prichett (1998, 2000), O'Connell and Ndulu (2000), Ndulu et al. (2007) and Arbache, Go and Page (2008)].

This paper pursues two main objectives. The first objective is to analyse factors that are associated with the recent African economic growth. By doing so, it would be possible to identify factors that African countries need to strengthen in order to ensure the sustainability of the recent growth recovery on the continent.

The second objective is to analyse the dynamics of economic growth and its determinants within Africa as compared with East Asia. It is very important to understand factors that have changed in Africa between the period of growth stagnation and that of growth recovery. By comparing the results of such analysis to those of growth regressions, it would be possible to know whether or not African countries focus their efforts on the “right” economic growth fundamentals, i.e. factors which have significantly contributed to the recent growth recovery in Africa. Moreover, given that East Asia is a developing region which economically performs relatively well, East Asian countries could be benchmarks for African countries. Thus, it is important to measure the gaps of economic performance between East Asian and African countries. By doing so, it could be possible to quantify the necessary efforts that African countries would make to bridge the gaps with East Asian countries.

The rest of the paper is organised as follows. In section 2, I propose a selective review of studies on the recent economic growth in Africa. In section 3, I carry out statistical

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<sup>1</sup> In this paper, by Africa I mean sub-Saharan Africa. Thus, I use Africa and sub-Saharan Africa interchangeably.

analyses on the dynamics of economic growth rate and its determinants. The results of these analyses show that African growth rate was 2.2 percent points higher during the period 1995-2005 compared to the period 1975-94. Also between the two periods, GDP per capita has increased by more than US\$1,000 in Africa. Looking at the dynamics of growth correlates, the data show that only three have significantly improved during the period 1995-2005, compared to the period 1975-94. These three variables are: the share of the population aged at least 15 years who has achieved primary education, export and urbanisation rate. For the other growth correlates (i.e., investment rate, access of the private sector to credit, government effectiveness, share of agriculture value added in GDP, inflation rate, population growth rate) they have been either slightly deteriorated or stagnant in Africa.

The data also show that during the period 1995-2005, African countries started their economic growth catch up vis-à-vis East Asian countries. However, despite their recent catch up, the GDP per capita gap between African and East Asian countries has been widening over time. Looking at the dynamics of growth correlates, the data reveal that African countries have reduced their lag relative to East Asian countries in terms of investment rate only. As for the other growth correlates, it appears that East Asian countries have improved their advantage on African countries in terms of primary education, export rate, access of the private sector to credit, government effectiveness, and urbanisation rate.

In section 4, I analyse the results of growth regressions over the period 1995-2005. The results of this analysis suggest that five variables are positively and significantly linked with economic growth rate during the recent period in Africa. These five variables are: *investment rate, access of the private sector to credit, quality of government effectiveness, export rate, and the share of agriculture value added in GDP*. Thus, compared to the results of statistical analysis, the results of growth regressions suggest that most of the variables which significantly contributed to the recent growth recovery are not those variables which have significantly and positively evolved in Africa. Section 5 concludes the paper.

## **2. Selective Review of Empirical Studies**

In this section, I propose a selective review of the recent papers on economic growth in Africa. More specifically, the papers that I review deal with the recent African growth experience.

Some analysts consider the recent African economic growth as a result of policy reforms and/or favourable terms of trade in Africa. In the same vein, Beny and Cook (2009, 2008) analyse whether the recent African growth is due to “metals” (i.e., favourable terms of

trade and increase in export), “management” (i.e., institutional and policy reforms) or both. These authors run regressions with a global sample covering the period 1960-2005 including 57 African countries. By using OLS estimations and interaction variables between Africa and year 1995 dummies, Beny and Cook (2009, 2008) find that both “metals” and “management” matter for African economic growth during the year 1995 and afterward.

The period 1975-2005 is a mix period of growth stagnation and recovery in Africa. For more instructive growth analysis, it is useful to distinguish the period of growth acceleration from that of growth deceleration, such as what Arbache, Go and Page (2008) do. Using data covering the period 1975-2005, these authors analyse factors are correlated with growth decelerations and accelerations in 44 sub-Saharan African countries. They find that most growth accelerations occurred during the period 1995-2005, and are correlated with better policy, favourable terms of trade, and greater aid. Moreover, according to Arbache, Go and Page (2008), the recent growth acceleration is fragile as economic fundamentals, such as saving, investment, productivity, and export diversification remain stagnant in Africa. However, most of these conclusions are drawn as stylized facts rather than as the results of rigorous econometric analyses. Indeed, Arbache et al. (2008) mostly compare the mean values of economic variables during the “normal time” to their values during times of acceleration and deceleration. When Arbache et al. (2008) run econometric regressions; their regressions are much more bivariate than multivariate analysis.

Arbache and Page (2007) examine the characteristics of long run growth in 44 sub-Saharan African countries between 1975 and 2005. These authors find that low and volatile growth is the outstanding defining characteristic of Africa’s growth experience since 1975, but they find no evidence that growth volatility is associated with economic performance over the long run. Arbache and Page (2007) also find that the 1990s may mark a turning point in Africa’s growth; initial conditions, geography, as well as natural resources do not matter for growth. These authors draw their conclusions much more from bivariate regressions. However, because of missing variables, bivariate regressions are likely biased.

Ndulu et al. (2007) focus their analysis on three sets of constraints to African growth: geography, demography, policy and institutions. This is an analysis of African growth experience over 45 years, i.e. over the period 1960-2005. According to Ndulu et al., growth gap between Africa, other developing regions (East Asia and South Asia) and the rest of the world is much more the result of demographic factors (e.g., population growth and age dependency ratio), initial conditions (initial income and life expectancy at birth) and to a less extent of policy factors (inflation, government consumption and black market premium). They

find the same result after dividing the period 1960-2004 into three sub-periods: 1960-74, 1975-94 and 1995-2005, which characterise different patterns of African growth.

From the above review of empirical studies, two main contributions of my paper can be highlighted. Firstly, after analysing statistically the dynamics of growth covariates between the period of growth stagnation and that of growth recovery, I run multivariate growth regression in order to identify factors that are linked with the recent growth recovery in Africa. And by comparing the results of growth regression to those of statistical analyses, I investigate whether or not African countries focus their efforts on the “right” growth fundamentals. This is a straightforward and innovative approach to analyse growth and to draw relevant policy recommendations. Moreover, I run regressions with data covering the period 1995-2005, i.e., the period of growth recovery in Africa. By doing so, I avoid mixing periods of different patterns for economic growth in Africa. Also, given that 1995-2005 is a period of growth recovery in Africa, by running regressions with data over the period 1995-2005, it is possible to identify factors that African governments could strengthen in order to ensure the sustainability of the recent good economic performance that the continent witnessed. Moreover, the period 1995-2005 has the advantage of increased available data for most African countries.

Secondly, in addition to investment and export which have been documented as relevant determinants of the recent African growth, I also identify an *improvement in the quality of government effectiveness, an increase in the agriculture value added, and an increase in the private sector access to credit* as relevant factors, which significantly and positively affect economic growth in Africa during the period 1995-2005.

### **3. Growth Analysis**

#### **3.1. Econometric Model**

The objective of this paper is to identify policy factors that have contributed to the recent growth recovery in Africa. Thus, I estimate a classical growth model with policy variables as independent variables. More specifically, the model I estimate is as follows:

$$g_i = c + \beta \log(\text{gdpc}_{i0}) + \theta x_{i0} + \delta \text{oil}_i + \varepsilon_i$$

The dependent variable is the average growth rate over the period of analysis. In the equation above,  $c$  and  $\varepsilon_i$  respectively stand for constant and disturbance term. As previously indicated, I focus my empirical analysis on the period 1995-2005. The choice of this period is

motivated by the fact that this is a growth recovery period for Africa. Therefore, it is important to understand factors which have contributed to growth recovery, and possibly find ways to strengthen those factors in order to ensure growth sustainability in Africa.

The first independent variable is the natural logarithm of GDP per capita at the beginning of the period. In the tradition of Solow (1956) growth model, initial GDP per capita is supposed to capture convergence phenomenon. In this case, because of diminishing returns to reproducible capital, countries with low GDP per capita at the beginning of the period are supposed to grow faster over the period of analysis.

In the equation above, X is a vector of other growth covariates. Based on the Solow model, the X vector includes the natural logarithm of the population growth rate and domestic investment as a share of GDP. An accumulation of capital is favourable for economic growth, while a high growth rate of population reduces the available capital per capita, therefore, negatively affects economic growth. Thus, theoretically, according to Solow growth model, investment and population growth rates are relevant determinants of economic growth. Empirically, Hoeffler (2002) shows that investment rate and population growth rate are among the key variables which could explain economic growth rate difference between Africa and the rest of the world.

Based on the endogenous growth model à la Romer (1990), I also control for human capital, approximated by the level of education in the population. More specifically, I control for the share of the population aged at least 15 years old who have achieved primary education. The education variable is taken from Barro and Lee (2000) data set. According to Romer (1990), human capital is the key input to the research sector, which generates new ideas or products that underlie technological progress. Thus, countries with a high level of human capital are supposed to grow faster. Empirically, Barro (1991), Mankiw et al. (1992) and Hoeffler (2002) found that the level of education positively affects economic growth.<sup>2</sup>

The other control variable that I add in the model is access of the private sector to credit. Since the works of Schumpeter (1912) and Levine (1997), financial development is considered a determinant of economic growth. Indeed, financial development improves the efficiency of saving and investment. Moreover, there is a body of work on the role of credit constraints for private investment development and thus for economic growth in developing countries [see for example, McKenzie and Woodru (2003), and Banerjee and Dufflo (2004)].

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<sup>2</sup> For a long time, it was not obvious to find a positive and significant effect of education on economic growth with macroeconomic data, while with microeconomic data; it has been shown that individuals with a high level of education earn higher revenue. This fact has been coined “micro-macro paradox of education.”

Likewise, some recent works show that financial development contributes to economic growth in Africa [see for example, Akinlo and Ebgetunde (2010), Ghirmay (2004), Agbetsiafe (2004)]. Therefore, I expect a positive effect of the private sector access to credit on growth.

The quality of institutions has been widely demonstrated as important for economic growth and economic development in Africa and world samples [see North (1990), Knack and Keefer (1995), Hall and Jones (1999), Acemoglu et al. (2001), Mijiyawa (2008), Ndulu and O'Connell (1999), Fayissa and Nsiah (2010)]. When institutions are effective, private investors are guaranteed to reap the benefits of their investment, which boosts investment and stimulates economic growth. In the model I control for an indicator of institutional quality. More specifically, I include in the model an index of the quality of government effectiveness, and I expect a positive effect of this variable on growth. Data on government effectiveness are taken from the World Governance Indicator data base, compiled by Kaufmann et al. (2009) for various years. According to Kaufmann et al., the index of government effectiveness measures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The index ranges between -2.5 and +2.5, the higher the index the more effective a government is.

In recent years, trade openness has been theoretically and empirically analysed as a relevant factor for economic growth [see Sachs and Warner (1995), Frankel and Romer (1999) and Dollar and Kraay (2002)]. In this paper I use the share of exports in GDP as an indicator of trade openness. Indeed, recently Hausmann et al. (2007, 2005) have shown that what countries export matter for their economic growth. Moreover, the prices as well as the volume of exports have been analysed as relevant factors for the recent African growth recovery (see for example Beny and Cook, 2009). Thus, I control for the value of exports as a share of GDP, and to some extent, I take into account the effect of favourable terms of trade as well as the effect of an increased volume of exports that recently many African countries witnessed. I expect a positive effect of export rate on economic growth.

Another control variable that I include in the model is the share of agriculture value added in GDP. Agriculture plays an important role in African economies. On average, agriculture contributes up to 30% of GDP, and employs about 70% of the population in Africa. However, the productivity of agriculture is the most important factor for the

contribution of agriculture to economic growth. Thus, I include in the model the share of agriculture value added in GDP, and I expect a positive effect of this variable.<sup>3</sup>

Some authors attribute the recent African growth recovery to policy reforms. In order to take into account the effect of policy variables I control for the logarithm of GDP deflator, which is a proxy for the inflation rate. Inflation rate reflects macroeconomic policies (essentially fiscal and monetary policy) pursued in a country. High inflation rate may create uncertain economic environment and make it difficult for economic agents to extract correct signals from relative prices (Barro, 1976 and 1980). Moreover, Ghura and Hadjimichael (1996) show that public policy which reduces inflation rate stimulates economic growth in Africa. Therefore, I expect a negative effect of inflation rate on economic growth.

A high urbanisation is one of the phenomena that recently characterise African economies. If African countries managed well their urbanisation, they may benefit from the economy of scale that urbanisation could generate and, therefore, make urbanisation an engine of economic growth. I include in the model the rate of urbanisation, and because of the economy of scale that urbanisation may generate (see World Development Report, 2009), I expect this variable to have a positive effect on economic growth rate.

In the past, African oil exporters have experienced lower economic growth rate, because of mismanagement of their oil resources. This is what the literature has coined “natural resources curse” (see Sachs and Warner, 1995). However, during the recent period, most African oil exporters have recorded higher growth rate than the average African country. In order to take into account the economic performance of African oil exporters, I introduce in the model a dummy for African oil exporters.<sup>4</sup> To some extent, the dummy variable for oil exporters may also capture the effect of fuel price increase on growth in Africa.

The baseline model includes eleven independent variables. Most of the independent variables that I consider are under the control of policy makers. In other words, these variables can be changed with the willingness of policy makers.

To reduce endogeneity biases, I consider the initial values of the independent variables, i.e., their values in 1995, the beginning of the period of analysis. Indeed, most of growth correlates are likely to suffer from endogeneity bias. However, it is not an easy task to

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<sup>3</sup> The role of agriculture in African economic development has been recently recognised by African policy makers and their partners. At the African level, some new initiatives have been undertaken to boost African agricultural productivity. For instance, African leaders have established the Comprehensive African Agriculture Development Plan (CAADP), which exhorts African countries to consecrate 10% of national budgets to agriculture in order to increase the growth rate of agriculture at 6% per year.

<sup>4</sup> The dummy variable takes the value of one for the main African oil exporters and zero otherwise. For the period of analysis, the list of African oil exporters is as follows: Angola, Cameroon, Chad, Congo Republic, Equatorial Guinea, Gabon, Nigeria, and Sudan.



find suitable instrumental variables for each potential endogenous variable. In this case, the use of the initial values of the independent variables can be an alternative solution to deal with endogeneity issues; such a procedure is not rare in the literature. However, the initial values of the independent variables may help in dealing with simultaneity errors, but not with measurement errors associated with the independent variables. In case of measurement errors, the coefficients are biased towards zero (Wooldridge, 2002). Thus, despite possible measurement errors with the independent variables, if I still find significant coefficients with their expected signs; this could be considered reassuring.

I run regressions with a sample of 46 sub-Saharan African countries (for the list of countries, see the appendix). However, because of missing data, the number of observations may be lower and change from one regression to another. Except for the education and the government effectiveness variables, all the other variables are from the World Bank, 2008 World Development Indicators data sets.

### **3.2 Dynamics of Economic Variables**

As I mentioned in the introduction, one of the objectives of the paper is to analyse factors which have changed in Africa. Therefore, before analysing the results of econometric regressions, it is important to analyse the dynamics of economic growth covariates in Africa, as compared with East Asia.

#### **3.2.1 Dynamics of Economic Variables within Africa**

At the beginning of section 3 I theoretically examined how certain factors can affect countries' economic growth rate. In this subsection I compare the mean values of each of the potential growth correlates over time in Africa. More specifically, I compare the mean values of growth correlates over the period 1975-94 with their mean values during the period 1995-2005. The choice of these two sub-periods is motivated by the fact that the period 1975-94 has been documented as a "lost period", whereas the period 1995-2005 is considered as a "blessed period" for economic growth in Africa [see Prichett (1998, 2000), O'Connell and Ndulu (2000), Ndulu et al. (2007) and Arbache, Go and Page (2008)]. Thus, it is important to understand what has changed in Africa between these two periods.

From Table 1 we can see that in Africa during the period 1975-94 the average growth rate was almost zero, more precisely about 0.05%, whereas it was 2.24% during the period 1995-2005. Thus, African growth rate was 2.2 percent points higher during the period 1995-

2005 compared to the period 1975-94. The recent growth recovery has contributed to the increase of GDP per capita in Africa. In fact from Table 1, we can see that compared to the period 1975-94, during the period 1995-2005 GDP per capita has increased by more than US\$1,000 in Africa.

**Table 1: Dynamics of Economic Variables within Africa**

Variables	Mean 1975-1994	Mean 1995-2005	Difference
GDP per capita growth rate	0.051	2.240	2.189 (2.38)**
GDP per capita	1,422.75	2,551.437	1,128.687 (4.02)***
Investment (percentage of GDP)	20.092	20.930	0.838 (0.65)
Population growth rate	2.689	2.545	-0.144 (1.02)
Primary school achievement	6.489	7.309	0.819 (3.34)***
Credit to private sector	18.070	17.341	-0.729 (0.36)
Government Effectiveness 1/	-0.676	-0.734	-0.057 (1.44)
Agriculture value added (percentage of GDP)	31.394	29.051	-2.343 (1.37)
Export (percentage of GDP)	28.511	33.482	4.970 (2.34)**
Inflation rate (GDP deflator)	3.894	3.476	-0.418 (0.88)
Urbanisation rate	27.355	35.225	7.870 (9.04)***

Note: Author's calculations based on data from different sources as described in the text. Figures in brackets are t-statistics.

1/ Data on government effectiveness quality are from the World Bank, Kaufmann et al. (2009) and they cover the period 1998-2005.

Looking at the dynamics of growth correlates in Africa, it appears that only three of them have significantly improved over the period 1995-2005, compared to the period 1975-94. The share of the population aged at least 15 years who has achieved primary education has increased by 0.8 percentage point. Export and urbanisation rates have also increased by 5 and 8 percentage points respectively.

Table 1 shows that the share of investment as a percentage of GDP has increased by 0.84 percent point, but this is not statistically significant. The quality of government effectiveness and the agriculture value added as a share of GDP have deteriorated over time in Africa. The t-statistics associated with the variations in the quality of government effectiveness and agriculture value added as a share of GDP are higher than one, which suggests that the deterioration in these variables is not negligible. Likewise, credit to the private sector as a share of GDP, population growth rate, and inflation rate, all decreased

during the period 1995-2005 compared to the period 1975-94, though the difference is not statistically different from zero.

Thus, the data reveal that during the period 1995-2005 the efforts of African countries in increasing investment, access of the private sector to credit, improving the effectiveness of government, and in controlling inflation rate seem insufficient. Likewise, the data suggest a slight decrease in agricultural productivity and in the population growth rate during the recent period in Africa. More positively, the data reveal that the number of Africans with a primary education level, the number of Africans living in urban area, as well as the volume of African exports, have all increased. Thus, the data indicate that few economic fundamentals have significantly and positively changed in Africa between the period 1975-1994 and that of 1995-2005.

### **3.2.2 Dynamics of Economic Variables: Africa versus East Asia**

In this subsection I compare the performance of African countries to East Asian countries. By East Asian countries, I denote the following countries: **Indonesia, Malaysia, Singapore, South Korea and Thailand**. In the past, the economic performance of some of these countries was compared to some African countries. For instance, during the early 1970s, Côte d'Ivoire was compared to South Korea, and some analysts had even considered that Côte d'Ivoire would have a brighter future compared to South Korea. Moreover, according to the Commission on Growth and Development (2008), the five East Asian countries are among the 13 world countries which have achieved sustained growth over 25 years or more. Therefore, in terms of economic growth, the five Asian countries that I consider could be models and good benchmarks for African countries.

From Table 2, we can see that during the period 1975-94 the average growth rate in East Asia was 5.5% as compared to 0.06% in Africa, which means a difference of 5.5 percent points in favour of East Asian countries. During the period 1995-2005, although East Asian countries grew at a rate of 3% on average, compared to 2.3% in Africa, the growth difference between East Asia and Africa is no more statistically significant. Thus, during the period 1995-2005, African countries have started their economic growth catch up vis-à-vis East Asian countries.

However, despite recent growth catch up, the GDP per capita gap between African and East Asian countries has been widening over time. From Table 2 we can see that whereas the gap of GDP per capita between East Asia and Africa was about US\$3,588 during the period 1975-94, this gap has increased to US\$10,364 during the last period. Thus, East Asian

**Table 2: Dynamics of Economic Variables: Africa versus East Asia**

Variables	Mean 1975-1994			Mean 1995-2005		
	East Asia	Africa	Diff	East Asia	Africa	Diff
GDP per capita growth	5.529	0.066	5.463 (3.28)***	2.945	2.309	0.635 (0.31)
GDP per capita	5,010.646	1,422.75	3587.896 (4.28)***	12,902.83	25,38.905	10,363.93 (5.51)***
Investment	32.215	20.245	11.970 (3.47)***	28.156	20.676	7.480 (1.68)*
Population growth rate	1.957	2.689	-0.732 (2.48)**	1.515	2.545	-1.030 (3.04)***
Primary school achievement	17.365	6.489	10.875 (6.15)***	21.39	7.309	14.080 (7.86)***
Credit to private sector	64.697	18.070	46.627 (7.02)***	105.671	17.319	88.352 (7.62)***
Government Effectiveness 1/	0.720	-0.676	1.396 (4.52)***	0.753	-0.733	1.487 (4.87)***
Agriculture value added	15.523	32.112	-16.595 (2.32)**	8.222	28.848	-20.625 (2.74)***
Export	36.047	28.235	7.812 (0.86)	91.356	33.482	57.874 (4.08)***
Inflation (GDP deflator)	2.286	3.929	-1.642 (0.94)	1.780	3.453	-1.672 (1.16)
Urbanisation rate	52.668	27.355	25.313 (3.63)***	62.856	35.225	27.631 (3.55)***

Note: Author's calculations based on data from different sources as described in the text. Figures in brackets are t-statistics.

1/ Data on government effectiveness quality are from Kaufmann et al. (2009) datasets and they cover the period 1998-2005.

countries have taken advantage of the cumulative effect of their past economic growth to improve their level of GDP per capita. As a result, despite their recent high growth, African countries have not succeeded in closing the gap of GDP per capita vis-à-vis East Asian countries.

Looking at the dynamics of growth correlates we can see that African countries have reduced their lag relative to East Asian countries in terms of investment rate only. In fact, from Table 2 it appears that while the gap in the investment rate between Africa and East Asia was 12 percent points and significant at 1% in the period 1975-94, during the period 1995-2005, however, this gap was no more equal to 7.5 percent points and significant at 10%. This suggests that during the last period, the productivity and not the volume of investment would be the real difference between Africa and East Asia.

As for the other growth correlates, from Table 2 it appears that East Asian countries maintained and even improved their advantage on African countries in terms of primary education, export rate, domestic credit to the private sector and urbanisation rate. For all these variables except access of the private sector to credit, African countries have shown some improvement, but the improvement was higher in East Asian countries. Such a situation explains why African countries still lag behind East Asian countries on these variables.

The growth rate of the population and the share of agriculture value added in GDP are higher in Africa compared to East Asia whatever the period considered. The share of agriculture value added in GDP has been reduced both in Africa and in East Asia over time, but the drop is higher in East Asia. The reduction in agriculture value added in GDP in East Asia is probably a result of industrial and service sectors development, whereas in Africa, this is likely the result of reduction or lower growth in agricultural productivity. Likewise, the population growth rate has been reduced both in East Asia and in Africa over time, but the reduction was higher in East Asia.

From Table 2, we can also see that the quality of government effectiveness in East Asian countries is higher than in Africa regardless of the period considered. While East Asian countries have improved the quality of government effectiveness, the effectiveness of African governments has deteriorated over time. Such a situation has widened the gap in the quality of government effectiveness between Africa and East Asia. As for the difference in the inflation rate, Table 2 shows that African countries have always a higher inflation rate compared to East Asian countries.

To summarise, the data reveal that during the period 1995-2005 compared to the period 1975-94, African countries have caught up with East Asian countries in terms of economic growth rate. However, despite this, the gap in GDP per capita between Africa and East Asia has been widening. Moreover, except in terms of investment rate, the lag of African countries compared to East Asian countries in terms of primary education achievement, export rate, credit to private sector, urbanisation rate, and quality of government effectiveness

has been widening over time. Overall, the statistical analysis in this paper reveals that contrary to the general perception, economic fundamentals have not markedly changed in Africa.

#### **4. Econometric results**

In this section I analyse the results of econometric regressions. From these results we can see which variables are significantly correlated with economic growth in Africa during the period 1995-2005. We can also see whether the variables which have improved over time are those which are correlated with economic growth. Likewise, it is possible to identify whether the variables which have contributed to economic growth are those which have improved in Africa over time. In other words, by comparing the results of econometric regressions with those of statistical analysis, it would be possible to find out whether or not African countries have improved the “right” economic fundamentals, i.e., economic variables which significantly contributed to economic growth during the period 1995-2005.

From Table 3 it appears a positive and significant effect of investment rate on economic growth rate. The coefficient associated with investment rate is significant at 5%. The result suggests that a 1 percent point increase in investment rate would be associated with 0.2 percent point increase in GDP per capita growth rate. Thus, if African countries were to overcome their investment lag relative to East Asian countries, i.e., if the investment rate was increased by 7.5 percentage points in Africa compared to its 1995-2005 average, the payoff for African countries would be an increase in economic growth rate of 1.5 percentage points.

The second variable which is statistically significant is access of the private sector to credit. The coefficient associated with this variable is positive and significant at 5%. According to the coefficient, a 1 percentage point increase in the rate of private sector access to credit would result in 0.03 percentage point increase in the economic growth rate in Africa. Thus, if African countries were to compensate their lag relative to East Asian countries by increasing the rate of private sector access to credit by 88.4 percentage points, the payoff for African countries would be an increase in the growth rate of 2.7 percentage points.

The index measuring the quality of government effectiveness is also positively and significantly linked to economic growth. According to the result in Table 3, a one standard deviation increase (0.61) in the quality of government effectiveness would be associated with an increase of economic growth rate by 1.75 percent point in Africa. According to the statistics in Table 2, for the period 1995-2005, the difference of government effectiveness

between Africa and East Asia, was about 2.4 times the standard deviation of government effectiveness index in Africa. Thus, if African countries were to overcome their lag in terms of government effectiveness compared to East Asian countries, African countries would gain an additional 4.3 percentage growth rate.

Table 3: Basic results

	OLS Growth Rate
Initial GDP per capita	-2.801 (2.563)
Investment rate	0.196** (0.079)
Population growth rate	-0.719 (1.060)
Primary education	0.109 (0.137)
Credit to private sector	0.032** (0.012)
Government effectiveness	2.867** (1.197)
Share of agriculture value added	0.174** (0.067)
Export rate	0.076* (0.044)
Urbanisation rate	-0.003 (0.034)
GDP deflator	-0.669 (0.900)
Oil exporter dummy	4.148*** (1.361)
Constant	0.263 (9.140)
Observations	41
R-squared	0.72

Note: Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

The coefficient associated with the share of agriculture value added in GDP is positive and significant at 5%. According to the result, a one percentage point increase in the share of agriculture value added would result in 0.17 percentage point increase in economic growth rate. Thus, an increase in agricultural productivity in Africa would be beneficial for economic growth and would improve the population's living standards.

The share of export in GDP is also positively and significantly correlated with economic growth in Africa during the period 1995-2005. According to the results, if African countries had the same export rate as East Asian countries during the period of analysis, i.e., if African countries were to increase their export rate by 57.8 percentage points, this would result in an additional 4.4 percentage growth rate.

The last significant variable in Table 3 is the dummy for oil exporter countries. According to the result, being an oil exporter country is good for economic growth in Africa during the period 1995-2005. More specifically, the result suggests that on average, African oil-exporting countries grew 4 percentage points faster than African non-oil exporting countries. This is a big change compared to the precedent periods. It would be interesting to understand why African oil exporters performed relatively better during the period 1995-2005. This is beyond the scope of this paper.

The results in Table 3 show that the majority of the variables, which are positively and significantly linked with economic growth rate during the period 1995-2005 are not the variables that have significantly improved over time in Africa. Thus, it seems that African countries have not focused their efforts on the “right” economic fundamentals, i.e., economic variables which mattered for growth during the growth recovery period (i.e., 1995-2005).

In addition, from Table 3 it appears that among the three variables which have improved over time –recall these are export rate, primary education, and urbanisation rate-, only the export rate is positively and significantly related to economic growth rate. The coefficient associated with primary education is positive though insignificant. Thus, despite an increase in the share of the population with a primary education level, the education variable does not significantly contribute to economic growth during the period 1995-2005. This result suggests that African countries probably focus much more efforts in increasing the quantity instead of the quality of education.

Regarding the urbanisation rate, the results in Table 3 indicate that its coefficient is negative though insignificant. Thus, at the moment African countries have not succeeded in taking advantage of the economy of scale that urbanisation could generate.

Overall, the model performs well. All the coefficients associated with the different explanatory variables have the expected signs. The R-squared of the model is 0.72, which suggests that about 70% of the variation in the recent African economic growth rate is explained by the model.

#### **4.1 Robustness checks**



The baseline result shows that five variables are significantly and positively related to economic growth rate in Africa during the recent period. These variables are: *investment rate*, *export rate*, *access of the private sector to credit*, *quality of government effectiveness* and *share of agriculture value added in GDP*. I check the robustness of this result. The results of all the robustness checks are reported in the appendix.

During the 1990s, following the seminal paper of Barro (1991), many authors had tried to explain the lower African economic growth rate compared to the rest of the world. Most of the arguments advanced in explaining the disappointing African growth focus on structural factors. For instance, Easterly and Levine (1997) argue that ethnic fragmentation is a main growth constraint to Africa. Sachs and Warner (1997) highlight geographic factors – e.g., lack of access to sea and tropical climate- as factors which limit the potential for economic growth in Africa.

To check the robustness of my results, I include in the baseline model variables related to structural characteristics, which may constraint growth in Africa according to Easterly and Levine (1997) and Sachs and Warner (1997). By doing so, I reduce the risk of bias due to omitted variables. Indeed, given that most of the variables related to structural factors do not vary at all over time, these variables are comparable to country fixed effects. I use ethnic and language fragmentation indexes from Alesina et al. (2003) to build a composite index of fragmentation, which is a simple average of the ethnic and language fragmentation index. Thus, the fragmentation index measures the probability that two persons taken randomly in a country come from different ethnic and language groups. The second variable related to structural factors that I add in the initial model is a dummy variable taking the value of one for landlocked countries and zero otherwise. Based on data from Sachs and Warner (1997), I also introduce in the baseline model an indicator for tropical climate. More specifically, the tropical climate variable is a proxy for the fraction of a country's land area which is subject to a tropical climate.

From Table A2 in appendix, it appears that none of the five variables initially identified as significantly linked with economic growth rate has lost its significance, and the coefficients associated with the five variables have the same signs as in the baseline regression. We can also see from Table A2 that none of the variables related to structural factors has a significant coefficient. Consequently, after adding one by one the structural variables –i.e., variables related to ethnic and language fragmentation, tropical climate, and landlocked situation- the goodness of fit of the model does not change compared to the baseline model. Moreover, I expect a negative effect of the structural variables on economic

growth, but the results in Table A2 indicate positive though insignificant coefficients for each of the structural variables. Thus, the results in Table A2 suggest that during the period 1995-2005, there is no difference in economic growth rate between landlocked and non landlocked countries, highly fragmented and lowly fragmented countries, and between countries subject to a dense or slightly tropical climate in Africa.

A second robustness check that I carry out consists of estimating simultaneously the effect of the three variables related to structural characteristics. The result in Table A3 suggests that there is no difference when either the structural variables are added individually or simultaneously. The five variables –i.e., investment rate, credit to private sector, government effectiveness, export rate, and agriculture value added- still positively and significantly affect economic growth rate. Furthermore, the goodness of fit of the model does not change.

The robustness checks related to structural variables show that none of these variables significantly affects economic growth rate during the period 1995-2005 in Africa. This result suggests that if African countries were to implement appropriate policies and institutions they could overcome the constraints that ethnic and language fragmentation, tropical climate, being a landlocked country present to economic growth on the continent.

In the baseline regression GDP deflator and urbanisation rate variables are not statistically significant. Likewise, as it appears in Tables A2 and A3, variables related to structural characteristics are not statistically significant. As a third robustness check, I run a model which excludes GDP deflator, urbanisation rate as well as the structural variables. The result in Table A4 suggests that after this third robustness check, the initial five variables are still positively and significantly related to economic growth rate.

Nigeria and South Africa are economically and politically two important sub-Saharan African countries, while Mauritius and Botswana are two African countries well known internationally for their high growth rates. One can suspect that the results of this paper are driven by the presence of these countries in the sample. To check for this possibility, I run regressions whilst excluding the four countries from the initial sample. The result of this fourth robustness check in Table A5 shows that after excluding South Africa, Nigeria, Mauritius and Botswana from the sample, there is no change to the initial results, except that the coefficient associated with export rate is no more significant, though it is positive.

The results could also be sensitive to regional factors. To test for this possibility, I include in the baseline model two dummy variables respectively related to Southern Africa

Development Community and Franc Zone countries.<sup>5</sup> By doing so, I consider the specificities of these two sub-regions and I compare their economic growth rates to the rest of the continent. The choice of the Southern Africa Development Community (SADC) is justified by the presence of Botswana, Mauritius and South Africa in that community. Thus the SADC comprises three of the best performing economies in Africa. The choice of the Franc Zone countries is justified by the fact that in 1994, the common currency of these countries, i.e. the Franc CFA was devaluated. Thus, one could suspect that since 1994, because of the devaluation of their currency, the Franc Zone countries have registered higher growth rates and this may drive the results of this paper.

In Table A6, the results show that after adding the dummy variables related to the Southern Africa Development Community and the Franc Zone countries, there is no change to the initial results, and only the coefficient associated to the export rate is slightly insignificant though it is positive.

## **5. Conclusion**

In this paper I analysed factors related to economic growth in sub-Saharan Africa (henceforth, Africa) during the recent period, i.e. during the period 1995-2005. This period has been documented as a period of growth recovery in Africa. Thus, it is important to understand factors which have contributed to growth recovery in order to strengthen these factors and to ensure sustainable economic growth in Africa. Contrary to the period 1995-2005, the period 1974-1994 has been analysed as a period of growth stagnation in Africa. Thus, it is thus important to understand factors that have changed in Africa between the period of growth stagnation and that of growth recovery.

Before running regressions, I carried out statistical analyses whilst comparing African economic performance over time. More specifically, I analysed the dynamics of economic growth rate and its correlates between the period 1974-1994 and that of 1995-2005. I also compared the performance of African countries to that of East Asian countries. Indeed, given their economic performance, East Asian countries could provide a benchmark for African countries.

The results of statistical analyses show that compared to the period 1975-94, during the period 1995-2005 African countries caught up with East Asian countries in terms of

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<sup>5</sup> For technical reasons, I have to limit the number of dummy variables related to African sub-regions; otherwise the model would suffer from multicollinearity.

economic growth rate. However, despite the recent economic growth catch up of Africa, the gap of GDP per capita between Africa and East Asia has been widening. Moreover, excluding investment rate, the lag of African countries compared to East Asian countries in terms of primary education, export rate, access of the private sector to credit, urbanisation rate, and government effectiveness has been widening over time.

The data also show that African growth rate was 2.2 percent points higher during the period 1995-2005 compared to the period 1975-94. And thanks to their recent growth recovery, African countries witnessed an improvement of GDP per capita. In fact, compared to the period 1975-94, during the period 1995-2005 GDP per capita has increased by more than US\$1,000 in Africa. Regarding the dynamics of growth correlates, the data show that only three of them have positively and significantly improved over time in Africa. These three variables are: the share of export in GDP, the share of the population with primary education, and the urbanisation rate. For the other growth correlates (i.e., investment rate, access of private sector to credit, quality of government effectiveness, share of agriculture value added in GDP, inflation rate, population growth rate) they have been either stagnant or have slightly deteriorated in Africa.

The results of growth regressions reveal that five variables are positively and significantly linked with economic growth rate in Africa during the period 1995-2005. These variables are: *investment rate, access of the private sector to credit, quality of government effectiveness, export rate, and share of agriculture value added in GDP*. Thus, compared to the results of statistical analyses, the results of growth regressions show that among the variables which have positively changed in Africa (i.e., export rate, primary education, and urbanisation rate) only the export rate significantly contributes to the recent growth recovery in Africa. For the four other growth contributors, the statistical analyses show that they have been either stagnant or have slightly deteriorated over time in Africa.

The good news is that African economies have grown recently without changing many growth fundamentals, and also without a change in the traditional structural African growth constraints, namely, ethnic and language fragmentation, tropical climate, and landlocked position. The bad news is that the recent growth recovery may not be sustainable on the continent, if efforts are not focused on the “right” economic growth fundamentals.

The policy implication of this paper is that African countries need to transform their economies such that they could sustain the growth recovery that the continent witnessed recently. Based on the findings in this paper, three policy stances for transforming African economies can be suggested. First, African countries need to improve the business

environment so that they could increase the volume of investment in their economies. This paper highlights two factors relating to the business environment that could be improved in Africa: private sector access to credit, and the effectiveness of government in defining and implementing policies. Second, African countries should diversify their economies and they should also improve the competitiveness of their economies so that they could increase the volume of their exports. Third, African countries should strive to improve the productivity of agriculture, as an increase in agricultural productivity can raise economic growth rate in Africa.

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## APPENDIX

Table A1: Statistical descriptive of the variables

Variable	Observation	Mean	Standard deviation	Minimum	Maximum
Growth rate	45	2.309	4.472	-3.136	26.633
Log (income per capita)	46	3.114	0.383	2.197	4.045
Investment(% of GDP)	44	21.426	13.089	4.949	76.322
Log (population growth )	44	0.880	0.451	-1.135	1.301
% population with primary education	46	7.160	3.599	2.1	23.1
Access to domestic credit (% of GDP)	44	18.331	27.240	1.063	142.025
Government effectiveness	46	-0.733	0.607	-2.013	0.754
Agriculture value added (% of GDP)	43	30.787	17.676	3.860	81.824
Urbanisation rate	46	33.032	14.431	7.3	75.4
Log (GDP deflator)	43	1.176	0.591	0.126	3.277
Oil exporter dummy	46	0.173	0.383	0	1
Fragmentation index	46	0.648	0.222	0.115	0.926
Landlocked situation	46	0.326	0.473	0	1
Share of land subject to tropical climate	46	0.897	0.267	0	1

Note: The growth rate is country average growth rate over the period 1995-2005. All the variables, except the structural variables (i.e., fragmentation index, landlocked situation, share of land subject to tropical climate).

### List of the countries

Countries marked with asterisk are the 5 East Asian countries serving as benchmarks to African countries.

Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Dem. Rep., Congo, Rep., Cote d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Indonesia\*, Kenya, Korea, Rep\*., Lesotho, Liberia, Madagascar, Malawi, Malaysia\*, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Singapore\*, Somalia, South Africa, Sudan, Swaziland, Tanzania, Thailand\*, Togo, Uganda, Zambia, Zimbabwe.



Table A2: Robustness to each of the structural variables

	(1)	(2)	(3)
	Growth	Growth	Growth
Initial GDP per capita	-2.800 (2.677)	-2.832 (2.772)	-2.006 (2.799)
Investment rate	0.196** (0.078)	0.196** (0.081)	0.209*** (0.071)
Population growth rate	-0.720 (1.058)	-0.725 (1.101)	-0.550 (1.302)
Primary education	0.109 (0.138)	0.105 (0.131)	0.144 (0.136)
Credit to private sector	0.032** (0.012)	0.032** (0.013)	0.042** (0.017)
Government effectiveness	2.867** (1.227)	2.880** (1.256)	2.952** (1.209)
Share of agriculture value added	0.174** (0.067)	0.174** (0.069)	0.172** (0.065)
Export rate	0.076* (0.045)	0.076* (0.045)	0.076* (0.044)
Urbanisation rate	-0.003 (0.035)	-0.001 (0.042)	-0.020 (0.041)
GDP deflator	-0.669 (0.919)	-0.655 (0.937)	-0.499 (0.850)
Oil exporter dummy	4.147*** (1.500)	4.145*** (1.384)	3.956*** (1.336)
Fragmentation index	0.011 (2.571)		
Landlocked dummy		0.083 (1.165)	
Tropic			2.520 (2.694)
Constant	0.250 (9.851)	0.297 (9.438)	-4.797 (11.17)
Observations	41	41	41
R-squared	0.718	0.718	0.73

Note: Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A3: Robustness to simultaneous effect of structural variables

	OLS
	Growth rate
Initial GDP per capita	-2.171 (2.979)
Investment rate	0.206*** (0.072)
Population growth rate	-0.488 (1.447)
Primary education	0.132 (0.138)
Credit to private sector	0.0431** (0.018)
Government effectiveness	3.002** (1.308)
Share of agriculture value added	0.170** (0.067)
Export rate	0.073* (0.044)
Urbanisation rate	-0.012 (0.049)
GDP deflator	-0.396 (0.874)
Oil exporter dummy	4.062** (1.515)
Fragmentation index	-0.884 (2.950)
Landlocked dummy	0.216 (1.181)
Tropic	2.744 (2.834)
Constant	-4.070 (11.24)
Observations	41
R-squared	0.73

Note: Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A4: Robustness after excluding some of the control variables

	OLS
	Growth rate
Initial GDP per capita	-2.055 (2.072)
Investment rate	0.203** (0.080)
Population growth rate	-0.664 (0.984)
Primary education	0.090 (0.133)
Credit to private sector	0.033*** (0.010)
Government effectiveness	2.876** (1.144)
Share of agriculture value added	0.179*** (0.065)
Export rate	0.068* (0.039)
Oil exporter dummy	4.126*** (1.338)
Constant	-2.886 (7.748)
Observation	42
R-squared	0.71

Note: Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A5: Robustness after excluding Botswana, Mauritius, Nigeria and South Africa

	OLS
	Growth rate
Initial GDP per capita	-2.763 (3.532)
Investment rate	0.192** (0.075)
Population growth rate	-0.617 (1.279)
Primary education	-0.046 (0.223)
Credit to private sector	0.039** (0.019)
Government effectiveness	2.601* (1.459)
Share of agriculture value added	0.163** (0.075)
Export rate	0.072 (0.055)
Urbanisation rate	-0.022 (0.038)
GDP deflator	-0.447 (1.036)
Oil exporter dummy	5.159*** (1.191)
Constant	1.499 (11.290)
Observations	37
R-squared	0.74

Note: Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A6: Robustness after including Southern Africa Development Community and Franc Zone dummies

	OLS Growth rate
Initial GDP per capita	-2.615 (2.725)
Investment rate	0.192** (0.0795)
Population growth rate	-0.558 (1.206)
Primary education	0.104 (0.150)
Credit to private sector	0.030* (0.017)
Government effectiveness	2.768** (1.316)
Share of agriculture value added	0.170** (0.068)
Export rate	0.072 (0.049)
Urbanisation rate	-0.001 (0.040)
GDP deflator	-0.678 (1.160)
Oil exporter dummy	4.206*** (1.191)
Southern Africa Development Community	-0.267 (1.487)
Franc Zone	-0.586 (1.529)
Constant	0.061 (9.491)
Observations	41
R-squared	0.72

Note: Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.