

The African Economic Growth Record: The Roles of Policy Syndromes and Governance

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1. Introduction

Most countries of sub-Saharan Africa (SSA) countries attained political independence from colonial rule in the late 1950s and early to mid-1960s. Since 1960, economic performance of this region on average has substantially lagged behind that of other regions of the world. Nonetheless, the performance has been rather episodic, with African countries growing fairly strongly until roughly the late 1970s when GDP growth began to decline substantially, falling short of population growth. Many African¹ countries have exhibited increasingly strong growth as of the mid-1990s, however.

In 2007, for instance, the GDP growth of SSA economies averaged 5.8 percent, a rate that was comparable to those in other regions of the world (World Bank, 2008). Some 26 African countries, representing 70 percent of the SSA population and 78 percent of the GDP, grew at least 4.0 percentage points per year on average (Abarche et al, 2008; table 1). Indeed, since 1995, the annual growth rates of these countries have averaged 6.9 percent (ibid.), a rate that is comparable to that of India, for instance, which averaged 6.7 percent over the same period (based on data from World Bank, 2008). However, it must also be pointed out that about one-third of African countries registered growth rates that averaged 2.1 percent over this same period (ibid.). In sum, not only has the African growth record been episodic, but has also varied quite substantially across countries.

The above overall historically low SSA economic growth is reflected in the dismal poverty picture over the last two decade and a half. The proportion of the population earning less than \$1 decreased only slightly from 42 percent in 1981 to 41 percent in 2004 (Fosu, 2008, table 1; based on data from World Bank, 2008). Over the same period, this measure of poverty fell substantially for South Asia (SAS), as a

¹ 'Africa' and 'SSA' will be used interchangeably in the rest of the paper.

reference region, from 50 percent in 1981 to 31 percent in 2004, so that the relative SSA/SAS poverty rate gap increased steadily by nearly 50 percentage points (ibid.). It is important to observe, though, that the poverty-reduction of SSA and SAS has been comparable since the mid-1990s, with the rates falling by 4 and 5 percentage points, respectively, between 1993 and 2004 (ibid.).² There appears, therefore, to have been a reversal in course for the poverty rate as well in SSA since the mid-1990s, mirroring the growth pattern. Thus, understanding the growth record should be useful not only in its own right but also in terms of charting the course of human development as represented by the poverty rate for instance.

The current paper first reports the African growth record in greater detail. Second, we present the historical sources of growth. Third, based on a recent study of a “collaborative research” project on growth, we provide some explanations for the observed patterns of growth. Fourth, and finally, we attempt to extend the analysis to include the role of governance.

2. The African Growth Record

The SSA region grew fairly strongly at an average yearly GDP growth rate of 5.0 percent for about a decade and a half from 1960, with significant positive contributions from a substantial number of countries (tables 1 and 2). This record of growth could not be sustained in subsequent years, however, as the growth rate fell to as low as 1.2 percent per annum during 1981-85, a rate that was much smaller than population growth of roughly 2.9 percent. Hence, per capita GDP deteriorated on average of about 1.7 percent annually during this period. It was not until the late 1990s that SSA began to grow sufficiently to overcome population growth. The problem of the African growth record is, therefore, not necessarily a case of consistently dismal performance, but rather one of episodic growth.

² However, the differences in performance between SSA and SAS at the \$2 poverty standard since 1981 have been less dramatic. The SSA rate decreased marginally from 74 percent in 1981 to 72 percent in 2004, while the SAS rate fell to 77 percent in 2004 from 88 percent in 1981. Between 1993 and 2004, the rate fell by 4 percentage points and 5 percentage points for SSA and SAS, respectively.

table 1 about here

table 2 about here

As tables 1 and 2 further indicate, the aggregate evidence masks the significant disparities in growth among SSA countries. During the 1981-85 period, for example, when the average growth rate was at its nadir in SSA as a whole, a number of African countries actually registered growth rates of at least 4 percent (about 1 percentage point above population growth): Benin, 4.7 percent; Botswana, 10.0 percent; Burkina Faso, 4.2 percent; Burundi, 5.4 percent; Cameroon, 9.4 percent; Chad, 9.2 percent; and Republic of Congo, 10.6 percent.

It is also interesting to note from tables 1 and 2 that while South Africa, the biggest SSA economy, led growth in the early periods, it actually began to pull down the SSA average beginning in the early 1970s, and that situation has persisted since, though less so in the most recent half-decade. Because the overall SSA average is weighted heavily toward South Africa, which has a large relative weight due to its substantially higher GDP than the rest of SSA, we report in table 1 the simple average in addition to the usual weighted average of the growth rates. However, there are extreme values that appear to exaggerate the average as well. To avoid statistical dominance by South Africa and the skewness, we shall base our discussion of the SSA average, where applicable, on the data reported in table 3, where the weighted SSA average is calculated with and without South Africa. It is interesting to note that since the early 1970s, South Africa has actually been dragging down the SSA average, though the gap has narrowed more recently.

****table 3 about here****

Another observation about the African growth record is its episodic nature *within* countries. Many economies that started as growth leaders in the 1960s had by 2000 become growth laggards (e.g., Cote d'Ivoire, Gabon, Kenya, South Africa, Togo, and Zambia) (see tables 1 and 2). Conversely, several laggards in the earlier period became growth leaders as of the 1990s (e.g., Benin, Burkina Faso, Ghana, Senegal and Sudan). In

contrast, one African country that has exhibited consistently high economic growth is Botswana, whose GDP growth averaged about 10 percent annually over the entire period, and at least 5 percent every half-decadal period, though the record since the 1990s has been less than spectacular, a result that might be attributable in part to the high incidence of HIV/AIDS in the country during the more recent period.

Furthermore, African countries have exhibited high variable growths over the last four decades. The standard deviation of the per worker GDP growth for a sample of SSA countries averaged 3.2 percent over 1960-2000, representing the highest among all regions of the world (table 4). Indeed, the coefficient of variation (CV) is nearly four times the world average, so that SSA exhibited lower growth but with higher variance as compared to the rest of the world.

*****table 4 about here*****

On the basis of mainly cross-country studies, numerous explanations have been provided for the above growth record. These include: governance, geography, ethno-linguistic fractionalization, neighbours, domestic policies, the external environment, political instability, resource endowment, and colonial heritage.³ A most recent comprehensive study on the subject is provided by the Growth Project of the African Economic Research Consortium (AERC). That study combines both cross-sectional analysis and 26 country cases to explain the African growth record since 1960.⁴ Based on the study, we next provide historical evidence on the sources of growth for 1960-2000 and relevant sub-periods. Then, using the data generated from that study, we re-explore the implications of adverse policies for growth, based on the ‘policy syndromes’ taxonomy of the Growth Project. In particular, using the production-function approach, we examine how the ‘syndrome-free’ regime influences growth: via its effects on investment levels vis-a-vis TFP. We also explore the roles of both governance and terms of trade in the growth-syndrome relationship. Finally, relying on case studies, the present

³ See, for instance, Acemoglu, Johnson and Robinson (2001), Collier (2000), Collier and Gunning (1999), Easterly and Levine (1997, 1998), Fosu (1992, 2001a), Ndulu and O’Connell (1999), and Sachs and Warner (1997).

⁴ The output of the study appears in two volumes: Ndulu et al (2008a; 2008b). An epitomized version of the study may be represented by Fosu and O’Connell (2006).

paper provides a synthesis of likely factors explaining the growth record in the light of the empirical findings.

3. Sources of Growth in Africa

Table 5 presents data on the sources of GDP growth for SSA over 1960-2000, based on the Collins-Bosworth decomposition.⁵ These statistics show that when SSA grew fairly strongly in the early 1970s, that growth was supported about equally by both investment and growth of total factor productivity (TFP). However, when growth fell substantially in the early 1980s and again in the early 1990s, there was primarily a large fall in TFP each time. Furthermore, a rise in productivity was associated with the growth recovery in the late 1990s.

*****Table 5 about here*****

As table 5 further shows, the overall per-worker growth in SSA during the forty-year period was positive but modest. Moreover, both physical capital and education contributed positively to this growth. In contrast, TFP's contribution was negative, though small. There are also sub-period differences in the overall performance of African countries, in terms of both growth and its sources, to which we turn next.

3.1 African Growth Experience, 1960 to Mid-1970s

The period from 1960 to the mid-1970s was the era of politically independent African states. The sub-period is also characterised by relatively high growth performance (tables 1, 2, 3, 4 and 5). Between 1960 and 1975, for example, GDP growth averaged 5.0 percent annually, which more than exceeded population growth of roughly 2.9 percent. This high annual per-capita growth of about 2.0 percent is primarily associated with physical

⁵ The decomposition is based on the production-function: $q=Ak^{.35}h^{.65}$, where q , k and h are GDP per worker, physical capital per worker and human capital (average years of schooling) per worker, respectively, with assumed respective capital and labor shares of 0.35 and 0.65. The exercise is conducted on per-country basis, and then aggregated to arrive at the SSA figures in table 3 for the 19 SSA countries that had consistent data over the sample period. (Ndulu and O'Connell, 2003)

capital accumulation and TFP growth, at about 45 percent each (table 4). Growth performance was, however, uneven across countries (tables 1 and 2).

Country-specific conditions obviously explain some of the differences in country performance during this early period. However, one common factor recognized in the country studies is the dichotomy of political institutions (Fosu, 2007b; Fosu and O'Connell, 2006). Nearly all the high-growth countries during this sub-period had relatively liberal economic regimes nurtured by conservative political governments during most of the period, while the reverse was the case for most of the low-performing countries. For example, Botswana, Cote d'Ivoire, Ethiopia, Kenya, Lesotho, and Malawi were countries with both high growth and market-oriented policies supported by politically conservative governments during this period, while Benin, Burkina Faso, Cameroon, CAR, Chad, Ghana, Guinea, Senegal, and Zambia are examples of low-performing countries with market-interventionist policies (control policies).⁶

A non-trivial part of the weak growth record could also be attributable to political instability, weak institutions and low capacity in several of the low-performing countries. For example, Burundi's weak economic performance during this period may be largely explained by the large trade deficit resulting from the loss of one-half of its Eastern Congolese export market, resulting in a large trade deficit (Nkurunziza and Ngaruko, 2003). Another culprit was the lack of qualified manpower due to decolonisation, which resulted in a substantial drop in capacity utilisation of the economy (ibid.).⁷ Perhaps more important, though, was the legacy of high ethnic tensions from colonial rule, mainly between the minority Tutsis and majority Hutus, which paralysed institutions and culminated in the first violent political conflict in 1965, followed by a series of destabilizing coups (ibid.).⁸

⁶ The regime classification is based on table 2.A2, Collier and O'Connell (2008), where the conservative governments (with liberal economic policies) were 'syndrome-free', while the other countries were deemed to have controls (soft or hard) on economic activities. Of course, there were exceptions as well. For example, the Republic of Congo and Gabon were classified as control regimes but experienced relatively high growth, while countries like Madagascar, Mauritania and Rwanda were viewed as syndrome-free regimes for most of the period but experienced low growth. Obviously, factors other than regime classification did contribute growth performance.

⁷ The drop in capacity use would show up in growth accounting exercises as a drop in TFP, for a given level of capital stock.

⁸ The cumulative effects of these factors likely explain the low annual average GDP growth of only 1.9 percent (table 1)

A similar situation of destabilizing ethnic tensions was taking place in Rwanda as well, with an outbreak of violence in 1964, contributing to the huge drop in TFP of 6.8 percent per year and an equivalent decrease in GDP during 1960-1964 (appendix table A). Similarly, the weak institutional structure and an outright civil war in Sudan were the main factors behind the country's weak growth performance in the 1960s, with annual GDP growth averaging less than 3.0 percent (table 1; Ali and Elbadawi, 2003). Even in the case of the Mauritius, where growth has been strong overall during the entire period, the mid-1960s saw the eruption of ethnic tensions, leading to negative per capita growth during 1965-69 (Nath and Madhoo, 2005). The periods of political instability generally also coincided with negative growths of TFP in these countries during this post-independence sub-period.

3.2 Growth Performance, Mid-1970s to Early 1990s

The late 1970s and particularly the early 1980s and the beginning of the 1990s registered a sharp deterioration in the socio-economic conditions of most African countries, with a fall in the average annual per capita income at the rate of about one percent (Fosu, 2001a). Indeed, the 1980s are referred to as 'Africa's lost decade' since per capita income of Africans at the end of the 1980s had fallen below the level prevailing at the beginning of the decade. The source of the contraction during 1975-1994 is primarily a deterioration in TFP (table 4). A major culprit here is very likely the idle capacity resulting from over-investment by the state as the dominant investor in most African economies, some of it real and some due to possible over-valuation of new investment at cost rather than based on market value.

The relevant question, though, is why did most African economies perform so poorly during this period? A synthesis of the case studies from the Growth Project reveals that much of this state of economic affairs may be attributable to supply shocks and policy 'syndromes' (Fosu, 2008). The mid-1970s were a period of supply shocks, both negative and positive. The negative shocks derived primarily from higher petroleum prices and droughts, which resulted in shortages in price-control regimes in a number of African countries. Existing controls were tightened, while additional ones were initiated.

Indeed, not only did the frequency of controls rise in the 1970s and into the 1980s, but also the proportion of controls that were considered ‘hard’ also increased (ibid.).

Meanwhile, the use of price controls as a rationing mechanism provided rent-seeking opportunities that were detrimental to growth. The global negative shocks from petroleum also decimated embryonic Africa-based firms, most of which enjoyed protection from foreign competition through tariffs and subsidies. Indeed, the shocks contributed to the fiscal difficulties of many African governments, which could no longer afford to continue subsidizing domestic firms.

While many African countries experienced negative supply shocks, several others actually enjoyed commodity booms, especially in the latter part of the 1970s. Unfortunately, such positive shocks tended to lead to exuberant government spending that would often result in sub-optimal inter-temporal allocation of resources. When the boom invariably ended, however, governments became cash-strapped and were forced to borrow in order to continue the often bloated projects, or would simply abandon the uncompleted projects. In either case, there would be efficiency losses. Such myopic boom-bust phenomenon tended to reduce growth overall (ibid; Fosu and O’Connell, 2006; Collier and O’Connell, 2008).

In response to revenue windfalls from commodity booms, there was also the tendency for many African governments to engage in adverse redistribution in favour of their respective constituencies, usually impregnated with ethnic undertones. In turn, when revenues subsequently declined, the resulting pain was seldom shared equally, with the non-favoured constituencies having to bear a disproportionate burden of the cutbacks. Such a strategy would often contribute to political instability in the form of military coups d’etat, which have become a means for settling scores or misappropriating authority for economic gains (Kimenyi and Mbaku, 1993). Furthermore, such elite political instability, which has been rather rampant in SSA, is found to be growth-inhibiting (Fosu, 1992, 2001, 2002, 2003). Adverse redistribution could also sow the seeds for actual open rebellions that might lead to even stronger growth reductions.⁹

⁹ Collier (1999), for instance, finds that a civil war could reduce per capita GDP growth by as much as 2 percentage points per year. This is considerably larger than that attributable to the incidence of coups as estimated by Fosu, for example (ibid.).

Although SSA countries generally experienced poor economic growth during this sub-period, there were notable exceptions. For instance, during 1981-85 when GDP growth reached its historically low point, with a negative average annual per capita GDP growth rate (GDP growth rate of 2.41 percent), a number of countries achieved average GDP growth rates of at least 4.0 percent annually: including Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Chad, Comoros, Congo Republic, Guinea Bissau, Mauritius, and Zimbabwe (table 1). Furthermore, in most of these countries, but not all, it was a continuation of the fairly strong growth in the 1970s. While the explanation of such relatively high growth is likely to differ across countries, one common feature was that nearly all these countries experienced strong appreciations in their terms of trade during this period. Of these countries, only Benin, Botswana, Comoros and Mauritius had barter terms of trade growing by less than the 1.50 percent SSA annual average during 1980-1985.¹⁰

Nonetheless, most African countries grew dismally during the 1981-85, with a number of them actually experiencing negative GDP growth: including Ethiopia, Ghana, Liberia, Madagascar, Mali, Mozambique, Namibia, Niger, Nigeria, and Togo (table 1). Moreover, in all those countries for which the data exist (Ethiopia, Ghana, Madagascar, Mali, Nigeria and Togo), this negative growth was associated with negative TFP growth (appendix table A). Terms of trade explain only a part of this dismal growth performance, though. For example, Ghana, Mozambique, Niger, Namibia, and Nigeria experienced substantial losses in terms of trade, while Togo, Mali and Madagascar did not. What appears to be a relatively common feature is that most of these poor-performing economies were saddled with control regimes during this period, perhaps based on the socialistic strategy of development adopted by the countries: e.g., Ethiopia, Ghana, Madagascar, Mozambique, Niger, Nigeria and Togo (Collier and O'Connell, 2007). In the case of Liberia, there were no considerable state controls, though there was state failure in the 1980s. Nor were there any significant controls for Mali at the time; however, political leaders are believed to have looted the country beginning in the late 1960s until circa 1991 (ibid.).

¹⁰ Computations are based on terms-of-trade data from World Bank, 2007. Note that the SSA figure is the simple average based on countries with available data, with some 11 out of the 48 countries experiencing missing data.

In spite of the slight growth recovery for SSA as a whole in the latter part of the 1980s, the early 1990s were simply calamitous, with similar abysmal growth as in the early 1980s. Much of this underperformance could be attributed to severe political instabilities, as in Angola, Burundi, Democratic Republic of Congo, Liberia, Rwanda and Sierra Leone, all of which experienced negative GDP growth (table 1). In addition, the barter terms of trade deteriorated substantially in the late 1980s to early 1990s, falling by about 2.5 percent per year on average during 1989-1993, which may have contributed to the observed negative growth overall.¹¹

Indeed, South Africa, the largest economy of SSA, experienced a disappointing average annual GDP growth rate of less than 1.0 percent during 1991-95 per year, thanks in great part to both political uncertainty and deterioration in its terms of trade. The former, emanating from the transition from apartheid to majority rule, may have triggered a de-accumulation of physical capital as well as considerable human capital flight, resulting in over-capacity and a large decline in TFP (see appendix table A). Meanwhile, South Africa's barter terms of trade declined by 3.3 percent annually on average during 1988-92. Thus, the historically lowest growth performance of African economies in the early 1990s might be attributable, at least in great part, to a combination of severe political instabilities and negative terms of trade.¹²

Even the historically star performer, Botswana, managed only a mean annual growth rate of 4.1 percent, substantially below its historical trend, though still more than twice the SSA average. Such below-trend performance may be attributable to the substantial fall in Botswana's terms of trade resulting from a decline in the price of diamonds.¹³

Despite the overall dismal growth performance of SSA in the early 1990s, however, there were a number of exceptions. The following countries registered decent growth (at least 4.0 percent during 1991-95): Benin, Botswana, Burkina Faso, Cape Verde, Equatorial Guinea, Eritrea, Ghana, Lesotho, Mauritius, Namibia, Sudan, and

¹¹ Ibid.

¹² Indeed, for 1989-1993, SSA terms of trade declined at an average of 2.5 percent per year.

¹³ Botswana's barter terms of trade fell by 4.0 percent, 6.4 percent and 8.3 percent, respectively, in 1990, 1991 and 1992 and at an average of 1.7 percent annually over 1991-1995, compared with an average appreciation rate of 0.6 percent for SSA (computations based on data from World Bank, 2007). The generally lower growth performance since the 1990s, though, might be attributable in part to the relatively high prevalence of HIV/AIDS affecting approximately a quarter of the population (UNAIDS, 2006).

Uganda (table 1). What is interesting about this list of countries is that none of them experienced large terms of trade appreciation during the late 1980s or early 1990s. Hence, it would be difficult to explain their relatively strong growth performance on the basis of terms of trade. Instead, many of these countries had undergone structural adjustment, such as Benin, Burkina Faso, Ghana, Namibia and Uganda, suggesting that at least for these countries SAP may have been a boon in terms of growth. For at least two of the decent growth performers, though, post-war rebound might constitute the plausible explanation: Sudan (see Ali and Elbadawi, 2003) and Eritrea.

3.3 Growth since Mid- 1990s

Considerable recovery of African economies generally seems to have occurred since the mid-1990s (tables 1 and 2). Annual GDP growth has averaged approximately 4.0 percent (3.6 percent when South Africa is included and 4.1 percent when it is excluded). Indeed, growth has accelerated to 4.5 percent for non-South-African SSA economies since the beginning of the millennium, while South African GDP growth has averaged slightly less at 4.1 percent (table 3). This growth can be accounted for by improvements in TFP (table 5).¹⁴ Bucking the trend during this period are mostly countries experiencing severe political instability, such as Burundi, CAR, Congo DR, Cote d'Ivoire, Guinea Bissau, Seychelles, Togo and Zimbabwe.

One plausible explanation of the post-1995 growth recovery is the set of SAPs undertaken by most of these countries following the dismal performance in the 1980s. Countries like Benin, Burkina Faso, Cameroon, Chad, Ethiopia, Ghana, Mali, Rwanda, and Sudan undertook credible SAPs leading to improvements of their respective macroeconomic environments for growth. Furthermore, a number of these countries have experienced booms in their respective exports, especially in oil more recently but also in other commodities such as coffee, cocoa, gold and other metals. Indeed, the barter terms of trade of SSA as a whole have improved considerably especially since the late 1990s. Coupled with better macroeconomic environments, these improvements have apparently been translated to sustained economic growth so far.

¹⁴ Note that table 3 provides no evidence for the more recent post-2000 period.

Not all countries undertook significant policy adjustments during this period, however. It is generally agreed that the most populous African country, Nigeria, for instance, failed to undergo sufficiently credible reform before the millennium (Iyoha and Oriakhi, 2004). The country actually experienced negative per-capita growth from the mid-1990s until 2002, in spite of a substantial improvement in its net barter terms of trade in the latter part of the 1990s. The Nigeria case suggests that without a more conducive economic environment, improvements in terms of trade alone may not suffice for generating solid growth.

Most of the growth since the mid-1990s is associated with productivity increases, which could have been made possible by the reforms. Nearly all countries with relatively high economic growth rates during 1995-2000 also experienced large TFP growth. With the exception of a few countries (Ethiopia, Ghana, Mozambique and Uganda), capital accumulation does not seem to be behind the growth recovery. Indeed, for several countries (Cameroon, Cote d'Ivoire, Madagascar, Malawi, Mali and Zambia), the contribution by capital was negative, even though per-worker growth was positive (appendix table A). It is quite possible, however, that physical capital's contribution may have been delayed for many African economies, as in the case of Ghana and Uganda where capital contributions lagged behind TFP improvements. A considerable portion of the improvements in TFP is likely attributable to reductions in idle capacity following reforms, with increases in capital accumulation to follow. As gross domestic capital formation as share of GDP in SSA has risen from 16.8 percent in 2000 to 19.5 percent in 2006 (World Bank, 2007), perhaps capital's contribution to growth will be realizable in future growth accounting.

As early reformers among SSA economies, Ghana and Uganda stand out as possibly shining examples of how reforms may have worked. Until the latter part of the 1980s when reforms were undertaken, Ghana's growth performance was rather poor (tables 1 and 2), registering negative per-worker GDP growth rates in three out of the five half-decadal periods. With the exception of the early 1970s when short-lived reforms were undertaken, growth was anaemic even when positive, and productivity deterioration accompanied much of the dismal performance (appendix table A). Following the World Bank-led reforms in the mid-1980s, however, growth has been both considerably high

and stable (Aryeetey and Fosu, 2008), explained mainly by productivity improvements until the late 1990s, when capital formation kicked in as the primary contributor to growth (appendix table A).

The Uganda experience is somewhat similar to Ghana's. Except for the early 1960s, Uganda's growth was quite weak through the 1970s, but then picked up in the early 1980s after the overthrow of the Idi Amin regime. Subsequent to the World Bank-led reform in the mid-1980s, however, the country began to record considerable growth, which actually intensified in the early 1990s. Furthermore, the strong growth was associated with substantial improvements in TFP, until the latter 1990s when capital formation began to contribute significantly, though productivity increases continued to be the dominant contributor to growth.¹⁵

4. Explaining the African Economic Growth Record

The growth accounting decompositions discussed above have revealed the relative roles of human capital (education), physical capital accumulation and TFP in the growth of African economies during the post-independence period. These variables may, as many studies have argued, be accounted for, in turn, by a number of factors such as: geography (Bloom and Sachs, 1998), demography (*ibid.*), natural resource endowment (Sachs and Warner, 2001), economic instabilities (Fosu, 2001c), political instability (Fosu, 1992, 2001b, 2002, 2003; Gyimah-Brempong and Traynor, 1999),¹⁶ open conflicts (Collier, 1999; Collier and Hoeffler, 1998), ethnic polarization (Easterly and Levine, 1997), governance (Ndulu and O'Connell, 1999), and the global (external) environment (Fosu, 1990, 2001a; Sachs and Warner, 1997). Although many of these factors are related to initial conditions that put Africa at a disadvantage, as observed by several studies,¹⁷ the impediments need not be destiny and should be overcome by an appropriate set of policies.

¹⁵ This account is not meant to imply that the SAP was successful all over in SSA. Mkandawire and Soludo (1999), for instance, argue that SAP has been deleterious to socio-economic conditions in SSA.

¹⁶ For the role of instabilities generally see also Guillaumont et al., 1999.

¹⁷ See for example Acemoglu et al (2001), which emphasizes colonial origins.

Indeed, the main thesis of the Growth Project discussed above is that policies matter for growth in Africa. The project defines several categories of factors that might be adverse to growth as ‘policy syndromes’:¹⁸ ‘state controls’, ‘adverse redistribution’, ‘inter-temporally unsustainable allocation’, and ‘state breakdown’, with the absence of any of the above syndromes referred to as ‘syndrome-free’.¹⁹ Table 6 shows the evolution of these regimes over 1960-2000.

*****Table 6 about here*****

4.1 State Controls

In any given year, a country is classified as having ‘state controls’ if the government “heavily distorted major economic markets (labor, finance, domestic and international trade, and production) in service of state-led and inward-looking development strategies” (Fosu and O’Connell, 2006, p.38). Many African countries attained political independence from colonial rule in the late 1950s and early-to-mid 1960s. Consistent with the development paradigm at the time, there was strong reliance on government to lead the development efforts, especially in the light of limited markets and private capital. These countries had also relied externally on their colonial ‘masters’ for economic exchange, with the colonies serving primarily as the producers of primary products in exchange for manufactures from the West. Leaders of the newly created African countries were determined to free their respective economies from this colonial arrangement, which the leaders viewed as economically disadvantageous to the newly

¹⁸ For a description of this study, “Explaining the African Economic Growth” (the Growth Project) of the African Economic Research Consortium (AERC), see for instance Fosu and O’Connell (2006). The study is in two volumes under the general title, *The Political Economy of African Economic Growth*, Cambridge University Press, edited by J-P Azam, R. Bates, P. Collier, A. Fosu, J. Gunning, B. Ndulu, D. Njinkeu, S. O’Connell, and C. Soludo.

¹⁹ Much of the present section derives from Fosu (2008b). Definitions and descriptions of these policy syndromes are provided below. These definitions form the basis of the classification of a country in a given year into one or more of the categories by the editorial committee of the Growth Project (for details see Collier and O’Connell, 2007; Fosu, 2008b; Fosu and O’Connell, 2006). Note that “classification is based on policies, not growth outcomes” (Fosu and O’Connell, 2006; p. 37). For example, though Sudan grew rather rapidly in the late 1990s it was not categorized as ‘syndrome-free’ but instead as ‘state breakdown’ during this period. Conversely, Malawi was designated ‘syndrome-free’ throughout the post-independence period, yet it stagnated in the 1980s, and so did Cote d’Ivoire in the early 1980s despite its syndrome-free classification during that period. (ibid.)

independent countries. Thus, many African governments opted for inward-looking, state-led development strategies.

As the role of government became more pervasive in the economy and bottlenecks developed, resource rationing became necessary. This was particularly true with the external sector, where overvaluation of the domestic currency required that foreign exchange be rationed through quotas, with a proliferation of foreign exchange controls in most African countries by the 1970s. State controls were not limited to the external sector, however, but were pervasive in other markets as well, such as banking, finance, labour, and consumer products.

The quest for greater equity in development, especially in socialist-oriented governments further compelled many of these authorities to redistribute resources, usually through implicit taxes such as substantial wedges between world prices and government administered producer prices for exports involving state marketing boards. It is often argued that this urban-biased distortion has been particularly deleterious to growth (Bates, 1981). In fairness, however, given the difficulties associated with direct revenue collection, many African governments saw this form of indirect taxation as the best source for funding the various development projects, including infrastructure development (schools, roads, communications, etc.) that was so lacking at the time of independence. The only real issue, then, is not whether such indirect taxation was warranted, but the degree to which it was distortionary in terms of attenuating production incentives, as well as creating rent-seeking opportunities.

The inward-looking strategy entailed the use of import tariffs and quotas, as well as other trade restrictions like import licensing, to protect 'infant' manufacturing industries. Meanwhile, agricultural policies often involved government intervention such as direct investment and establishment of extension services. The key feature of macroeconomic policies during the period was the fixed exchange rate regime, which often resulted in overvaluation of the domestic currency. While most African economies suffered from overvaluation of the domestic currency, the case of the CFA countries is especially noteworthy. The CFA currency, designed to achieve total convertibility, was tied to the French franc. While this arrangement fostered monetary and price stability, it also led to overvaluation of the CFA currency, which inhibited growth in many of the

economies involved. It was not until 1994 that the CFA franc was appropriately devalued to remove the overvaluation drag on the CFA economies.²⁰ Meanwhile, the hallmark of monetary policy in most African countries generally was the use of financial repression based on controlled nominal interest rates amidst a high inflationary environment. This policy tended to limit financial development, with adverse implications for growth.

The government also became the main employer in the formal labour sector through the establishment of state-owned enterprises. Although many of these programs were well intentioned, they nonetheless ended up creating state controls of resources. Such a regulatory regime was often highly inefficient, as it tended to breed rent-seeking behaviour in addition to the usual high transaction costs accompanying such controls.

When negative supply shocks hit in the mid-to-late 1970s, in the form of substantial price increases due to drought in many African countries and to global petroleum price rises, the state controls became even more binding and widespread.²¹ Countries with soft controls tended to upgrade to hard controls (e.g., Benin, Ghana, Madagascar, and Mozambique), while those without controls heretofore adopted them as a rationing mechanism (e.g., Kenya, Mauritius, Nigeria, Sierra Leone, Tanzania, Togo, and Zambia).²² The frequency of controls rose generally in the 1970s, while the incidence of hard controls increased even faster; however, its frequency waned considerably beginning in the early to mid-1980s (table 6). During 1960-2000, the regulatory syndrome constituted one-third of the country-years though its frequency increased in the 1970s and early 1980s but declined substantially thereafter..

The incidence of state controls is estimated to have reduced per capita annual GDP growth by approximately 1 percentage point, *ceteris paribus* (Fosu and O'Connell,

²⁰ The persistence of the CFA overvaluation, just as in the case of other non-CFA currencies, might be explained in part by the tendency of elite coalitions to form around the relatively cheap imports availed by domestic currency overvaluation.

²¹ While oil-producing countries including those in Africa enjoyed revenue boosts in the 1970s, most SSA countries were not oil producers and actually experienced adverse terms-of-trade shocks. For example, of the 33 SSA countries examined by Svedberg (1991, p. 559), "nineteen countries saw their barter terms of trade deteriorate significantly between 1970 and 1985"

²² For classification of these episodes, see Collier and O'Connell (2008, table 2.A2). Different factors other than just terms of trade, including government changes (as in the case of Ghana, for example), may have also contributed to the adoption of state controls in these countries. However, the case studies suggest that governments tended to adopt more stringent controls in the face of a negative and inflationary supply shock (see Fosu, 2008b). In the case of Nigeria, for example, the adoption of (hard) controls began about 1983 when the country suffered a major terms-of-trade deterioration due to tumbling oil prices in the wake of large gains in terms of trade in the 1970s from skyrocketing oil prices.

2006; table 7). This amount is not inconsequential, especially given that SSA's per-worker growth deficit with the rest of the world during 1960-2000 averaged only slightly above 1 percentage point per year (table 4).

Adverse Redistribution

'Adverse redistribution' is said to occur when redistributive policies lead to polarization by favouring the constituencies of respective government leaders, usually regional in nature and with ethnic undertones (Fosu and O'Connell, 2006). Redistribution need not be adverse, though, if it promotes harmony (Azam, 1995). Actually, governments could use redistribution to buy peace. In many West African countries (e.g., Chad, Cote d'Ivoire, Ghana, and Nigeria), the south, on the one hand, tends to be agricultural and enjoys more financial resources than the north. On the other hand, the north tends to enjoy greater command over military resources and to use violence to extract rent from the south. A Pareto-optimal solution would require redistribution from the south to the north, just enough to obviate the latter taking up arms. The resulting peace would be growth-enhancing. (Ibid.)

Redistribution could, however, be adverse to growth if it led to (ethnic) polarization. Such redistribution could also undermine efficient resource mobilization, as it tends to reduce the propensity to pay (Kimenyi, 2006). African political history is replete with numerous examples of redistributive policies partial to certain ethnic groups: including, favouring of the Tutsis in Burundi during 1975-87 (Nkurunziza and Ngarako, 2004), the Kalenjins in Kenya under President Arap Moi (Mwega and Ndugu, 2004), the Temnes in Sierra Leone by the All People's Congress during 1969-90 (Davies, 2004), and the Kabeyes in Togo by President Eyadema during 1976-90 (Gogue and Evlo, 2004). Also classified under adverse redistributive policies is downright looting, as in the case of Mobutu in the Democratic Republic of the Congo (1973-97), Idi Amin in Uganda (1971-79), and Sani Abacha in Nigeria (1993-98).

The frequency of this redistributive syndrome increased steadily right from the time of independence, dipped temporarily in the early 1970s when negative supply shocks set in, and then resumed its upward trend in the mid-1970s in response to positive supply shocks in the form of commodity booms beginning about the mid-1970s (Fosu

and O’Connell, 2006; see also table 6). By the 1990s, however, the incidence of adverse redistribution had begun to diminish, likely in response to the reforms undertaken in many African countries. During 1960-2000, this redistributive syndrome constituted about 21 percent of the country-years (table 6).

Inter-temporally Unsustainable Resource Allocation

‘Inter-temporally unsustainable resource allocation’ refers the syndrome of revenue misallocation over time, with overspending during commodity booms and insufficient spending during the subsequent busts (Fosu, 2008b; Fosu and O’Connell, 2006). While many of the projects undertaken during booms were probably economically justifiable, as the case of education and infrastructure development in Nigeria during the 1970s, it is also true that numerous projects were either ill-advised or over-allocated resources relative to their absorptive capacities (Iyoha and Oriakhi, 2004). When the booms invariable ended, many of the projects were simply abandoned so that their potential values of marginal product could not be realized. Instead, bust periods were often characterized by much larger output declines than would have been the case with more prudent inter-temporal revenue management. In effect, the cumulative impact on growth over the cycle was likely to be negative.²³

The frequency of this inter-temporal syndrome rose dramatically in the early 1970s, maintaining a plateau from the mid-1970s, before finally falling beginning in the latter part of the 1990s (Fosu and O’Connell, 2006). Over the entire 1960-2000 period, it accounted for about 9.0 percent of the country-years (see table 6). It also had the tendency to reduce Africa’s overall per capita growth by about 1 percentage point annually (Fosu and O’Connell, 2006, table 7).

State Breakdown/Failure

‘State breakdown’ (or state failure) refers primarily to open warfare, such as civil wars, but also acute elite political instability involving coups d’état, for instance, resulting in a breakdown of law and order (Fosu and O’Connell, 2006). Such a situation of the state is

²³ Such misallocation would usually show up as a decline in TFP, as the case of Nigeria in the late 1970s to early 1980s, Cameroon in the 1980s and early 1990s, and Zambia in the 1970s and eighties (see appendix table A).

likely to substantially impede efficient resource allocation and to inhibit growth. In addition to causing tolls in human suffering, state failure tends to result in major interruptions in production and distribution, as well as inefficient reallocation of resources from the productive and social sectors into the non-productive military sector.

Over 1960-2000, state breakdown was relatively rare, in that it constituted approximately 10 percent of the country-years, which is considerably lower than that of state controls (33 percent) or adverse redistribution (21 percent) (see table 6). Furthermore, despite popular belief, the incidence of state failure was historically rare in Africa until more recently in the 1990s, when its relative frequency doubled to 20 percent of the country-years from 5 percent in the 1970s (table 6). Despite its relatively low frequency, however, state breakdown is estimated to have exerted a rather substantial negative impact on growth. Its reduction of Africa's per capita annual growth of GDP is estimated to be as much as 2.6 percentage points (Fosu and O'Connell, 2006, table 7). This estimate is only slightly larger than the 2.2 percent obtained by Collier (1999).

The Syndrome-free Regime

The 'syndrome-free' state constitutes the absence of any of the above syndromes, that is, a regime with a combination of political stability and reasonably market-friendly policies (Fosu and O'Connell, 2006). Interestingly, this regime represented more than one-quarter of the country-years during 1960-2000, higher than any of the above syndromes, with the exception of the regulatory syndrome (see table 6). In 1960, its relative frequency was roughly one-half, but then began to deteriorate starting about the latter part of the 1960s, especially in the 1970s when state controls and other syndromes became dominant. The downward trend continued until about the mid-1980s when it reversed course, with the upward trend actually accelerating in the 1990s, likely as a result of the World Bank- and IMF-championed market-oriented reforms (Fosu, 2008b).

Since the early 1990s, most African countries have undergone substantial economic and political reforms. For instance, the relative frequency of state controls has fallen from its peak of over 50 percent in the early 1980s to just 15 percent by the dawn of the millennium. Though the incidence of adverse redistribution, mainly regional, has remained relatively high at nearly 20 percent by 2000, this prevalence is low compared to

the peak of approximately 30 percent in the late 1980s. Meanwhile, the incidence of the syndrome-free regime has skyrocketed to 45 percent by 2000, from its lowest point of about 10 percent in the early 1980s.²⁴

Being syndrome-free was a necessary condition for sustainable growth and a near-sufficient condition for preventing a growth collapse (Fosu and O’Connell, 2006). Indeed, such a regime is estimated to have contributed as much as 2 percentage points to the per capita annual growth in Africa (table 6, *ibid*). This estimate constitutes nearly twice Africa’s growth gap with the rest of the world during 1960-2000, about a third of its gap with East Asia and Pacific, and more than the gap with South Asia (table 4).

5. Explaining African Growth – Some Empirical Exploration on the Roles of the Syndrome-free Regime and Governance

In this section, we take advantage of the data generated by the Growth Project to further explore the role of the syndrome-free (SF) regime in explaining the economic growth of African economies. In contrast with Fosu and O’Connell (2006), for instance, which employs a structural model,²⁵ we use a production-function approach in order to further investigate the channels by which SF may have influenced growth: via production factor inputs versus TFP. We also examine the role of governance, relative to SF, in the growth equation.

We postulate as the starting point a simple Cobb-Douglas production function:

$$Q=AL^bK^c \tag{1}$$

where Q is output, L labor, and K capital; A , b , and c are the respective parameters. The growth version of equation (1) is:

$$q = a + bl + ck \tag{2}$$

²⁴ These statistics are based on the annual data that form the basis of table 4.

²⁵ The Fosu-O’Connell model controls for shocks: ‘partner growth’, ‘rainfall’, ‘coastal’ and ‘resource rich’ in regressions using annual panel data. However, the control for these variables does not seem to substantially affect the coefficient of the syndrome-free variable (see Fosu and O’Connell (2006, table 6)).

where q , l and k are the growth rates of output, labor and capital, respectively, and a , b and c are the respective estimable parameters.

Equation (2) is the classical production function, an augmented version of which has been estimated in many studies.²⁶ However, to compare our results with those of Fosu and O’Connell (2006), we convert equation (2) to per-capita growth as:

$$q-p = a + bl-p + ck \quad (3)$$

where p is population growth. Assuming that population and labor grow similarly, then equation (3) may be rewritten as:

$$y = a + (b-1)l + ck \quad (4)$$

As the Hicks-neutral technological change measuring growth in total factor productivity (TFP), the parameter a may be especially susceptible to the syndrome-nature of the economy. Furthermore, TFP has been found to be crucial in explaining the generally low growth of African economies since the 1960s (Bosworth and Collins, 2003). Hypothesizing that SF would affect economic growth via its effect on TFP, the estimable version of equation (4) may be rewritten as:

$$y_{it} = a_1 + a_2f_{it} + a_3l_{it} + a_4k_{it} + \mathbf{a}_5\mathbf{x}_{it} + u_i + v_t + e_{it} \quad (5)$$

where i and t are the respective country and time indexes; f is the measure of the syndrome-free regime, l and k are as already defined, and \mathbf{x} is a vector of other variables that might influence y , including governance; $a_j(j=1,2,\dots,4)$ and \mathbf{a}_5 are the respective coefficients to be estimated; u and v are the country and time fixed effects, respectively; and e is the random perturbation.

Equation (5) is first estimated with 5-year panel data for 1960-2000, and then also for 1981-2000 in order to capture the effect of terms of trade for which consistent

²⁶ The production-function model has traditionally been estimated, alternatively to the Barro-type model, for example, in numerous studies to assess the effectiveness of production factors, vis-à-vis, the role of productivity, on growth. See, for instance, Bosworth and Collins (2003) and also Fosu (2001).

data are not available for the entire sample period but only for this latter period. To avoid potential problems of endogeneity, we control for both country and time fixed effects. The results are reported in tables 7 and 8, respectively, for 1960-2000 and 1981-2000. We discuss first the results in table 7.

****Tables 7 about here****

The results in table 7 are generally as expected. First, the effect of investment is strongly positive and significant in all equations. Second, and more importantly for the purpose of the present objective, the coefficient of the SF variable, SFREE, is significantly positive. Indeed, it is striking that the estimated impact of about 2.0 percentage points here is similar to that by Fosu and O'Connell (2006).

The above results suggest further that the effect of SFREE is primarily via TFP, since it seems invariant to the inclusion of investment in the growth equation.²⁷ Further support for this hypothesis is obtained by comparing specification (7), which does not control for investment, with the other specifications in table 7; the impact of SFREE remains unchanged whether or not one controls for the effect of investment. Moreover, we observe that the zero-order correlation coefficient between SFREE and the investment variable is only 0.08, which is insignificant; this compares with the correlation coefficient between SF and growth of 0.26, which is significant at the .01 level (appendix table C.1).

The results for the 1981-2000 involving terms of trade, presented in table 8, are now discussed. The results are quite similar to those for the entire period shown in table 7. In particular, the estimated effect of SFREE is positive and significant in all equations. We note, though, that the SFREE impact is higher compared with that implied by the estimates in specifications (1)-(7) of table 7 (see specifications (1) through (8) of table 8). The effect of investment is also strongly positive. We additionally observe that the impact of the governance variable, XCONST, appears to be nonlinear: positive initially but negative beyond a threshold (too much executive constraint bad for growth?). This finding was weakly apparent in the estimates involving the whole sample period as well (table 7).

²⁷ Note that Fosu and O'Connell (2006) does not include investment in the estimated equation.

****Table 8 about there****

Finally, we note that improvements in the net barter terms of trade, represented by TOTG, tend to increase growth. It also turns out that inclusion of this variable in the growth equation is rather crucial. As specification (9) of table 8 suggests, for instance, failure to include TOTG seriously diminishes the goodness of fit of the model (compare equation (9) with equation (2), for example). Indeed, the exclusion of TOTG renders SFREE rather impotent. This outcome suggests that the estimate of the effect of SFREE for the 1960-2000 period might actually be biased downward. Indeed, as specification (8) of table 7 indicates, the higher estimate of the SFREE impact for 1981-2000, than for the entire period, is not a temporal factor, as it suggests that SFREE might actually have an effect larger for the earlier than the later period. Hence, it would be fair to conclude that the SFREE impact is likely larger than the 2.0 estimate by Fosu and O'Connell (2006). An estimate of 2.7 percentage points seems more defensible.

6. Explaining the Anti-growth Policy Syndromes

Policies adopted by African governments were presumably dependent on the conditions of the environment within which they operated and, in that sense, the above anti-growth policy syndromes could be viewed as endogenous.²⁸ The saliency of this tenet is that altering those conditions could obviate the repetition of the African growth history. The Growth Project discusses the related issues in great detail. The synthesis of the case studies, in particular, provides several explanations: including initial conditions, supply shocks, resource opportunity set, and economically driven political expediency (Fosu, 2008b).²⁹ We discuss these factors only briefly here.

6.1 *Initial conditions*

²⁸ This assumption underlies the Growth Project. See, for example, Fosu (2007b) and Fosu and O'Connell (2006).

²⁹ This section borrows generously from Fosu (2008b), which provides many case examples as well.

The initial conditions at the time of independence heavily influenced the policies adopted by many African countries. These conditions included:

Reigning international paradigms

A major competing reigning development paradigm in the late 1950s and 1960s when most African countries attained independence portrayed socialistic policies as more egalitarian than capitalistic policies, and government as the primary agent for development. Such a school of thought rendered the socialist means of development particularly appealing to many African leaders, especially in the setting where the vast majority of their people lacked investment resources and markets were rudimentary. Those leaders opting for socialistic policies tended to resort to various forms of state controls, which in turn provided rent-seeking opportunities in support of adverse redistribution that was intended to preserve their political base. Meanwhile, government was believed by many, consistent with the socialistic ideology, as the best agent for development, thus cementing the dominant role of the central government along with state controls of resource allocation.

Experiences of the initial leaders

Those early African leaders who were politically conservative based on their respective experiences, derived internally or externally, tended to adopt relatively liberal economic policies, in contrast with their socialist-leading counterparts. Hence, leaders like Jomo Kenyatta of Kenya, Felix Houphouet-Boigny of Cote d'Ivoire, Sir Khama of Botswana, and Sylvanus Olympio of Togo adopted no or soft controls given their rural or business backgrounds. In contrast, leaders such as Kwame Nkrumah of Ghana, Sekou Toure of Guinea, Julius Nyerere of Tanzania, and Modibo Keita of Mali resorted to hard controls based at least in part on their exposure to Fabian socialism (Ndulu, 2008). Indeed, the adoption of controls was not dominant among African countries in the early 1960s; less than 40 percent of the country-years could be classified control regimes, compared with the 50 percent for syndrome-free regimes (see table 6).

Group-identity rivalry

As the physical and political boundaries of many African countries resulted from colonial partitioning that had no regard for well defined (ethnic) groups, many early African leaders found it necessary to tame likely group-based centrifugal political forces. One mechanism for accomplishing that was the adoption of strong central governments. State controls then became a natural set of instruments to accomplish such an objective.

Initial institutions

Modern institutions tended to supplant traditional chieftaincies as governing entities in many African countries, especially following independence. Yet, the adopted governing practices were only a shadow of the inherited modern institutions, with the checks and balances usually stripped in order to maintain the centrality of the executive branch of government. This meant that the executive had little control on its activities and acted to serve the interest of those who happened to hold power at the time.

6.2 Opportunity set and supply shocks

Negative supply shocks, e.g., oil price shocks of the 1970s and droughts, tended to result in shortages in the presence of price controls. Many governments chose to fix prices in the face of such shocks in order to make goods and services more affordable to the poor at large. Such a policy, however, led to more and/or stricter state controls. Those net-importing African countries were most affected by this impact of the negative-supply shock.

In the case of positive supply shocks resulting in commodity booms, governments usually engaged in exuberant public spending as if the booms were permanent, overshooting the optimal inter-temporal expenditure allocation. Thus, inter-temporally unsustainable spending would result. This syndrome would be particularly characteristic of natural resource-rich economies.

Meanwhile, governments saw the opportunity to use the revenue windfalls during booms to reward their cronies and ethnic constituencies who supported their political entrenchment. Conversely, during subsequent bust periods, governments would attempt to maintain that redistribution even. Thus adverse redistribution would result.

6.3 Institutions

The Fabian socialism adopted in many African countries contributed to the high frequency of state controls. The executive branch of government became dominant in these countries, usually through the diminution of political checks and balances. Over time, as the executive became entrenched in power, the military became the only real competing institution capable of removing it. This role of the military, coupled with the competition for rent made available by the various controls or high revenues from natural resources, contributed to the 'elite' political instability involving high frequencies of coups d'état (Kimenyi and Mbaku, 2003). Meanwhile, where adverse redistribution was severe, polarization was likely to accentuate, eventually resulting in open warfare and state breakdown in many cases.

6.3 Economically driven political expediency

As apparent in table 6, there appears to be a U-shape evolution of syndrome-free (SF) frequencies over the 1960-2000 period. SF and non-SF events were split about equally during the early post-independence period. SF then diminished in importance till more recently when it began to rise again beginning in the late 1980s. The relatively high frequency in the early period was likely due to chance, as the early leaders were divided roughly equally between socialistic and capitalistic tendencies. In contrast, the most recent upward trend is attributable to economically driven political expediency, for the socialistic experiments often ran into fiscal difficulties which, especially with the demise of the Cold War, required the assistance of the Bretton Woods institutions in exchange for reforms.

Unfortunately, many African countries also degenerated into political disorder and open conflicts, perhaps as a result in part of the political reforms that ensued in support of economic reforms. Previously authoritarian governments began to lose their grip on power, creating a power vacuum that tended to undermine the cohesion of the state. In other cases, distributive politics replaced authoritarian rule that had previously succeeded in preserving the nation-state, opening up wounds of divisionism and accentuating polarization with ethnic undertones. By the 1990s, countries like Burundi, CAR, Comoros, DRC, Djibouti, Liberia, Niger, Rwanda, Sierra Leone, Sudan and Togo

had all descended into severe political instability, most in the form of open conflicts. While political reforms may be blamed as responsible for many of these outcomes, it is also true that the new international political order that saw the diminution of the Cold War facilitated the overthrow of authoritarian regimes. Thus, as the frequency of the syndrome-free cases increased in the 1990s so did the incidence of state breakdown. Indeed, as figure 1 indicates, the increase in the incidence of SF in recent years is accompanied by resurgence in the prevalence of state breakdown.

*****Figure 1 about here *****

7. Conclusions and Policy Implications

The present paper, first, presented the growth record of African economies during the post-independence period. It observed, especially compared with the rest of the world, that the overall post-independence GDP growth of sub-Saharan African countries has been quite paltry. On average, the growth was barely enough to cover population increases. The growth record has, however, been quite episodic. From 1960 until the mid-1970s, African countries generally grew reasonably well, with growth rates of nearly 2 percentage points annually above population growth, though this performance was still below that of other regions. GDP growth declined substantially in the 1980s and early 1990s, and was well below population growth. Since the mid-1990s, however, there has been growth resurgence in many African economies, with the annual average per capita SSA growth exceeding 2 percent.

The above aggregate picture fails to properly reflect the heterogeneity in African country performance, though, at a point in time or across time. For example, Botswana and Mauritius have preformed spectacularly during the overall period. Moreover, even when growth declined substantially in the early 1980s and early 1990s, a number of African countries bucked the trend. Unfortunately, however, the growth of most of the countries has also been episodic, with many of those starting out with relatively strong growth faltering subsequently.

Second, the paper has presented evidence on the decomposition of the growth. It finds, despite some individual country exceptions, that changes in total factor productivity (TFP) were strongly associated economic growth performance in Africa. When growth was relatively strong in the 1960s and 1970s, TFP was a major contributing factor, and when growth fell substantially in the early 1980s and early 1990s, TFP was the primary culprit. Similarly, the recent resurgence in growth has been associated with major TFP improvements.

Third, the present paper has attempted to explain the above growth record using the ‘policy syndrome’ taxonomy adopted by a recent project by the African Economic Research Consortium (AERC) – the Growth Project. Despite country heterogeneity, reviewing the country studies of the Growth Project has, nonetheless, revealed a number of commonalities. These have been categorized into a set of anti-growth policy ‘syndromes’: state controls, adverse redistribution, sub-optimal inter-temporal allocation, and state breakdown.

The paper finds that the absence of syndromes could have increased annual per capita GDP growth by about 2.7 percentage points, which is rather large, especially when compared with the rather modicum growth of less than 1 percent during the post-independence period. Much of this positive effect of the syndrome-free (SF) regime is attributed to its positive influence on TFP. Meanwhile, the role of governance, as measured by constraint on the executive has not been inconsequential, providing an overall positive, albeit nonlinear impact on growth. Improvements in the terms of trade would also tend to increase growth. Nonetheless, even accounting for these factors still reveals a positive effect of a syndrome-free regime.

Fourth, the current paper argues, as in the Growth Project, that the syndromes can be explained by the policy environment within which African leaders operated. This observation has the crucial implication that removing the syndromes in order to raise growth would require that the environment be appropriately altered. Fortunately, the evidence suggests that this record has been improving steadily in recent times, with SF increasing steadily. The bad news, though, is that the improvements are accompanied by increasing incidence of failing states. Finding a solution to such state-failure problem,

then, is critical, if the present momentum toward growth is to be accelerated, or at least maintained.

Fortunately, SF seems positively correlated with good governance. We find that improving controls on the executive might be a way of accomplishing this feat. With the additional evidence pointing to deepening electoral competitiveness (EC) as a growth-enhancing strategy (Fosu, 2008d), it will be interesting to explore next how EC may be related to augmenting SF as well as attenuating state failure.

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Table 1. GDP growth (annual %), 5 year averages

Country Name	Code	61-65	66-70	71-75	76-80	81-85	86-90	91-95	96-00	01-05	2006	Avg
Angola	AGO						3.28	-3.78	6.43	10.55	18.56	4.81
Benin	BEN	3.28	2.69	1.42	4.09	4.66	0.89	4.25	5.35	3.88	4.10	3.40
Botswana	BWA	6.32	11.02	18.15	12.23	10.01	11.87	4.06	8.35	5.43	2.15	9.55
Burkina Faso	BFA	2.99	2.91	3.09	3.59	4.18	3.01	3.96	6.78	6.22	6.39	4.13
Burundi	BDI	1.94	7.60	0.64	4.23	5.35	3.73	-2.40	-1.34	2.20	5.13	2.50
Cameroon	CMR	2.71	1.61	6.70	6.86	9.40	-2.22	-1.86	4.75	3.66	3.76	3.52
Cape Verde	CPV					8.62	3.50	5.23	6.40	5.16	6.09	5.79
Central African Rep.	CAF	0.71	3.23	1.95	0.70	2.29	0.04	1.09	2.38	-0.88	4.10	1.34
Chad	TCD	0.65	1.45	0.90	-4.55	9.18	1.94	2.44	2.65	15.29	0.47	3.27
Comoros	COM					4.29	1.62	0.89	1.47	2.79	0.50	2.15
Congo, Dem. Rep.	ZAR	2.82	3.84	2.49	-1.45	1.86	0.01	-7.12	-3.89	4.05	5.08	0.39
Congo, Rep.	COG	3.40	5.00	8.04	5.15	10.57	-0.26	0.50	2.48	4.32	6.40	4.40
Cote d'Ivoire	CIV	8.03	9.73	6.44	4.52	0.32	1.18	1.51	3.22	-0.01	0.85	3.82
Equatorial Guinea	GNQ						1.36	7.05	35.43	27.00	-5.56	16.60
Eritrea	ERI							12.51	1.17	3.67	-0.98	5.36
Ethiopia	ETH					-1.21	5.27	1.34	4.92	5.75	8.99	3.44
Gabon	GAB	8.24	5.58	18.09	0.40	2.56	1.73	3.13	0.41	1.74	1.18	4.58
Gambia, The	GMB		4.54	5.54	4.41	3.23	4.10	2.11	4.50	3.92	4.50	4.06
Ghana	GHA	3.10	2.98	0.01	1.04	-0.25	4.81	4.28	4.32	5.04	6.20	2.89
Guinea	GIN				2.60	2.02	4.21	3.90	4.25	3.08	2.82	3.33
Guinea-Bissau	GNB			3.20	-0.61	6.45	3.78	3.18	1.06	-0.12	4.20	2.47
Kenya	KEN	3.49	5.88	10.02	6.35	2.53	5.64	1.61	2.16	3.61	6.11	4.62
Lesotho	LSO	7.64	2.77	5.76	10.26	3.09	5.86	4.00	3.24	2.86	7.17	5.10
Liberia	LBR	3.20	6.63	1.61	2.18	-1.88	-16.48	-21.66	39.34	-3.36	7.80	1.21
Madagascar	MDG	1.38	4.68	0.66	1.46	-1.55	2.75	-0.28	3.84	2.60	4.89	1.80
Malawi	MWI	4.64	4.99	7.60	4.89	2.17	2.32	3.52	3.92	1.06	7.42	3.98
Mali	MLI		3.36	3.41	4.92	-2.25	3.86	2.99	5.19	6.39	5.30	3.53
Mauritania	MRT	11.62	5.45	0.71	2.86	0.92	2.47	3.26	2.61	4.04	11.70	3.94
Mauritius	MUS					4.33	7.39	5.13	5.38	4.15	3.54	5.21
Mozambique	MOZ					-4.62	5.62	2.68	7.52	8.60	7.97	4.11
Namibia	NAM					-0.19	2.68	4.96	3.51	4.78	2.90	3.14
Niger	NER	6.26	-0.46	-2.11	5.37	-2.32	2.60	0.81	2.92	4.22	4.80	1.98
Nigeria	NGA	4.54	5.59	5.79	4.05	-2.75	5.42	2.49	3.08	5.71	5.20	3.80
Rwanda	RWA	-1.65	7.59	0.84	10.29	2.68	1.50	-3.95	9.80	5.40	5.30	3.65
Senegal	SEN	1.99	1.99	2.48	1.19	2.92	2.38	2.09	4.12	4.68	2.30	2.64
Seychelles	SYC	3.70	3.81	7.14	8.56	0.92	5.56	2.90	6.28	-1.72	5.30	4.15
Sierra Leone	SLE	4.38	4.18	2.36	2.27	0.87	1.09	-5.05	-3.55	13.91	7.37	2.39
Somalia	SOM	-1.09	3.99	4.52	3.88	2.54	1.25					2.43
South Africa	ZAF	6.81	5.15	3.66	3.12	1.40	1.68	0.89	2.80	3.89	4.99	3.30
Sudan	SDN	1.95	1.43	4.99	2.69	0.83	4.55	5.13	6.46	6.48	11.80	4.01
Swaziland	SWZ			9.57	3.15	2.61	10.26	2.88	3.31	2.38	2.08	4.80
Tanzania	TZA						5.40	1.80	4.08	6.54	5.94	4.53
Togo	TGO	10.14	6.66	3.75	5.07	-0.24	2.51	0.61	4.52	2.18	4.10	3.91
Uganda	UGA					0.70	5.09	7.05	6.55	5.64	5.44	5.02
Zambia	ZMB	6.20	1.59	2.46	0.44	0.53	1.64	-1.28	2.84	4.78	6.20	2.22
Zimbabwe	ZWE	3.56	9.37	4.91	1.72	4.36	4.60	1.39	0.89	-5.32		2.77
n = 46												
SSA simple average		4.10	4.59	4.61	3.66	2.41	2.92	1.56	5.15	4.58	5.01	3.76
WB SSA weighted average		5.19	4.70	4.30	3.11	1.13	2.61	1.17	3.43	4.55	5.60	3.40

Source: WB WDI online 2008

Table 2. GDP per capita growth (annual %), 5 year averages

Country Name	Code	61-65	66-70	71-75	76-80	81-85	86-90	91-95	96-00	01-05	2006	Avg
Angola	AGO						0.69	-6.73	3.84	7.40	15.26	1.96
Benin	BEN	1.44	0.46	-1.13	1.13	1.17	-2.38	0.53	2.19	0.59	0.90	0.46
Botswana	BWA	3.64	7.75	14.33	8.12	6.45	8.51	1.27	6.23	4.17	0.93	6.59
Burkina Faso	BFA	1.40	0.89	0.80	1.28	1.68	0.16	0.96	3.71	2.89	3.24	1.57
Burundi	BDI	0.15	5.70	-0.29	1.87	1.88	0.60	-4.20	-2.63	-1.10	1.08	0.24
Cameroon	CMR	0.44	-0.86	3.86	3.73	6.23	-5.15	-4.54	2.25	1.30	1.59	0.82
Cape Verde	CPV					6.40	1.30	2.71	3.95	2.71	3.69	3.43
Central African Rep.	CAF	-1.21	1.08	0.02	-1.74	-0.53	-2.26	-1.64	0.09	-2.49	2.30	-0.89
Chad	TCD	-1.51	-0.71	-1.50	-6.52	6.47	-1.20	-0.72	-0.75	11.19	-2.62	0.46
Comoros	COM					1.60	-1.00	-1.31	-0.65	0.64	-1.64	-0.20
Congo, Dem. Rep.	ZAR	0.11	0.70	-0.58	-4.51	-1.04	-3.07	-10.35	-6.01	1.02	1.79	-2.54
Congo, Rep.	COG	0.74	1.99	4.76	1.95	7.28	-3.10	-2.33	-0.29	1.86	4.11	1.49
Cote d'Ivoire	CIV	4.06	5.15	1.94	-0.29	-4.20	-2.71	-1.67	0.58	-1.72	-0.91	0.10
Equatorial Guinea	GNQ						-0.86	4.56	32.23	24.06	-7.76	13.91
Eritrea	ERI							12.19	-1.51	-0.51	-4.47	2.90
Ethiopia	ETH					-3.93	1.84	-0.50	1.81	2.98	6.19	0.66
Gabon	GAB	7.54	4.45	15.27	-2.23	-0.35	-1.34	0.28	-1.84	-0.03	-0.37	2.35
Gambia, The	GMB		1.55	2.04	1.06	-0.21	0.19	-1.62	0.87	0.74	1.61	0.60
Ghana	GHA	0.28	0.92	-2.57	-0.93	-3.56	1.82	1.44	1.87	2.71	4.01	0.30
Guinea	GIN				-0.19	-0.50	1.10	-0.05	1.91	1.18	0.82	0.58
Guinea-Bissau	GNB			0.96	-4.48	3.95	1.10	-0.04	-1.74	-3.13	1.12	-0.44
Kenya	KEN	0.22	2.37	6.11	2.45	-1.28	2.00	-1.49	-0.51	0.95	3.34	1.25
Lesotho	LSO	5.68	0.71	3.52	7.66	0.49	4.10	2.49	1.38	1.85	6.42	3.17
Liberia	LBR	0.47	3.65	-1.32	-0.88	-4.78	-16.32	-21.86	29.50	-5.60	3.67	-1.78
Madagascar	MDG	-1.14	2.02	-1.96	-1.27	-4.30	-0.13	-3.18	0.79	-0.26	2.06	-0.98
Malawi	MWI	2.18	2.34	4.32	1.51	-0.98	-2.90	2.14	1.03	-1.52	4.69	0.99
Mali	MLI		1.29	1.10	2.67	-4.43	1.38	0.34	2.38	3.27	2.16	1.03
Mauritania	MRT	8.85	2.76	-1.94	0.15	-1.71	-0.08	0.52	-0.27	1.09	8.74	1.21
Mauritius	MUS					3.29	6.55	3.87	4.21	3.18	2.70	4.16
Mozambique	MOZ					-6.38	5.30	-0.62	4.71	6.01	5.71	1.95
Namibia	NAM					-2.75	-1.85	1.73	0.94	3.28	1.55	0.32
Niger	NER	2.88	-3.62	-5.17	2.10	-5.18	-0.50	-2.59	-0.73	0.62	1.20	-1.30
Nigeria	NGA	2.12	3.05	3.10	0.98	-5.41	2.38	-0.40	0.33	3.10	2.75	1.07
Rwanda	RWA	-3.67	4.10	-2.24	6.73	-0.68	-1.96	0.75	2.00	2.85	2.74	0.92
Senegal	SEN	-0.87	-1.09	-0.56	-1.54	-0.04	-0.64	-0.67	1.40	1.99	-0.26	-0.23
Seychelles	SYC	1.04	1.33	4.88	6.88	0.01	4.77	1.41	4.71	-2.16	3.18	2.56
Sierra Leone	SLE	2.60	2.27	0.58	0.36	-1.16	-1.53	-5.30	-5.23	9.19	4.45	0.29
Somalia	SOM	-3.38	1.38	1.55	-5.17	2.57	0.49					-0.41
South Africa	ZAF	4.05	2.91	1.35	0.89	-1.14	-0.68	-1.22	0.41	2.58	3.88	1.08
Sudan	SDN	-0.36	-1.02	1.96	-0.49	-2.36	2.12	2.46	3.88	4.35	9.41	1.35
Swaziland	SWZ			6.54	-0.07	-0.50	6.88	-0.28	0.27	0.77	1.46	1.93
Tanzania	TZA						2.13	-1.39	1.53	3.84	3.31	1.61
Togo	TGO	8.16	2.10	1.00	2.38	-3.89	-0.84	-2.01	0.84	-0.72	1.31	0.79
Uganda	UGA					-2.48	1.24	3.38	3.39	2.33	2.08	1.59
Zambia	ZMB	3.06	-1.55	-0.93	-2.79	-2.65	-1.39	-3.84	0.38	2.83	4.22	-0.66
Zimbabwe	ZWE	0.22	5.86	1.40	-1.62	0.37	1.11	-0.95	-0.55	-6.00		-0.02
n = 46												
SSA simple average		1.64	1.87	1.80	0.55	-0.39	0.13	-0.86	2.29	2.10	2.54	1.05
WB SSA weighted average		2.63	2.02	1.52	0.07	-1.76	-0.34	-1.45	0.70	1.97	3.04	0.65

Source: WB WDI online 2008

Table 3

Half-decadal Mean Annual SSA GDP Growth Rates (%), 1961-2005 (2nd row excludes South Africa)

1961-65	1966-70	1971-75	1976-80	1981-85	1986-90	1990-95	1996-2000	2001-2005
5.4	5.1	4.6	2.7	1.0	2.5	1.1	3.3	4.1
3.5	4.1	4.9	3.2	1.7	3.1	2.0	3.9	4.5

Source: Computations by author based on data from World Bank (2007).

Table 4

Annual growth of real GDP per worker, SSA versus Other Regions: Mean and Variability Measures, 1960-2000 (percent)

	SSA	LAC	SAS	EAP	MENA	IC	Total
Mean (m)	0.51	0.76	2.18	3.89	2.37	2.23	1.63
S. Dev (s)	3.24	2.79	1.47	2.46	3.13	1.77	2.87
CV (s/m)	635	367	67	63	132	79	176

Notes: SSA=Sub-Saharan Africa (19), LAC=Latin America and Caribbean (22), SAS=South Asia (4), EAP=East Asia and Pacific (8), MENA=Middle-East & North Africa (11), IA=Industrial Countries (20); figures in parentheses are the respective numbers of countries with consistent data over the period.

Source: Ndulu O'Connell (2003).

Table 5: Growth Decomposition for Sub-Saharan Africa

Year	Growth of Real GDP per worker	<u>Contribution of Growth in</u>		Estimated Residual*
		Physical Capital per worker	Education per worker	
1960-64	1.33	0.53	0.12	0.68
1965-69	1.74	0.80	0.20	0.75
1970-74	2.33	1.05	0.22	1.06
1975-79	0.19	0.74	0.24	-0.79
1980-84	-1.70	0.16	0.29	-2.16
1985-89	0.45	-0.22	0.34	0.33
1990-94	-1.74	-0.08	0.30	-1.95
1995-00	1.51	-0.12	0.26	1.37
Total	0.51	0.36	0.25	-0.09

* Used as a measure of growth of total factor productivity (TFP)

Source: Ndulu and O'Connell (2003)

Table 6: Evolution of Policy Syndromes in Sub-Saharan Africa (half-decadal relative frequencies)

Period	Syndrome-free	Controls	Redistribution	Inter-temporal	State Breakdown	Soft Control	Hard Control
1960-65	0.465	0.334	0.128	0.000	0.073	0.775	0.225
1966-70	0.373	0.323	0.194	0.009	0.100	0.707	0.293
1971-75	0.193	0.408	0.237	0.120	0.042	0.730	0.270
1976-80	0.106	0.432	0.245	0.149	0.068	0.633	0.367
1981-85	0.097	0.442	0.255	0.145	0.061	0.630	0.370
1986-90	0.149	0.381	0.276	0.118	0.076	0.708	0.292
1991-95	0.357	0.216	0.191	0.056	0.181	0.935	0.065
1996-00	0.435	0.147	0.176	0.039	0.203	0.956	0.044
1960-00	0.272	0.335	0.213	0.080	0.101	0.759	0.241

Notes: All syndrome/syndrome-free classifications are defined in the text. The frequencies in the first five columns have been adjusted here to sum to 1.0 for each period, as multiple syndromes for a given country-year could occur. The frequencies of the last two columns have also been adjusted here to sum to 1.0. (Source: See Fosu and O’Connell (2006) and Collier and O’Connell (2007) for raw data.)

Table 7.

Five-year panel estimation with fixed country and time effects (sample period 1960-2000)Dependent variable: *gdppcga*

Regr./Spec.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Investment	0.214 ^a (2.75)	0.210 ^a (2.64)	0.235 ^a (2.92)	0.222 ^a (2.79)	0.230 ^a (2.80)	0.218 ^a (2.67)	-	0.216 ^a (2.73)
Labor	0.313 (1.14)	0.232 (0.92)	0.311 (1.14)	0.310 (1.18)	0.232 (0.93)	0.236 (0.98)	-	0.257 (1.01)
Xconst	-	-	0.290 (0.91)	2.323 ^c (1.82)	0.190 (0.63)	2.147 ^c (1.74)	-	-
Xconst ²	-	-	-	-0.307 ^c (-1.85)	-	-0.295 ^c (-1.75)	-	-
Sfree	-	1.909 ^c (1.80)	-	-	2.028 ^c (1.91)	1.912 ^c (1.83)	1.818 ^c (1.72)	2.682 ^b (2.12)
SF8100	-	-	-	-	-	-	-	-1.389 (-1.45)
Adj. R ²	0.247	0.261	0.246	0.268	0.260	0.280	0.204	0.261
SEE	3.900	3.864	3.963	3.906	3.925	3.873	3.954	3.862
# of obs	n=282	n=282	n=267	n=267	n=267	n=267	n=308	n=282

a significant at 1% level*b* significant at 5% level*c* significant at 10% level

Notes: *gdppcga* is per capita GDP annual growth (%). (source: WB WDI Online); *invest* is investment share of GDP (%) (source: Center for International Comparisons 2004 (CIC)); *labor* is annual growth average of total labor force (source: World Bank, *World Development Indicator 2004* CD-ROM); *xconst* is executive constraints. Range [1, 7], strict rules for governance = 7, no one regulates the authority = 1. 0 indicates perfect incoherence (source: Polity IV); *sfree* is syndrome-free dummy variable, which equals 1 if the 5-year period is syndrome-free, 0 otherwise (source: AERC Growth Project); *SF8100* = SFREE*D8100, where D8100 equals 1 if 1981-2000, 0 otherwise; t statistics are in parentheses.

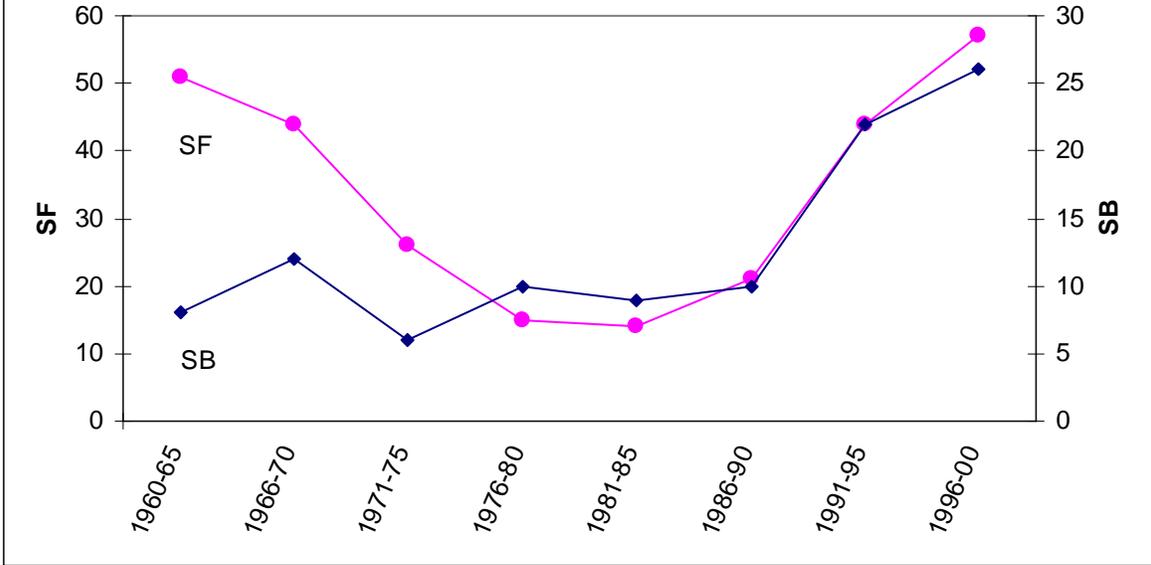
Table 8.

Five-year panel estimation with fixed country and time effects (sample period 1981-2000)Dependent variable: *gdppcga*

Regr./Spec.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
investment	0.458 ^a (5.84)	0.459 ^a (5.50)	0.457 ^a (5.21)	0.446 ^a (5.31)	0.448 ^a (5.08)	0.459 ^a (5.48)	0.450 ^a (5.31)	-	0.441 ^a (4.75)
Labor	0.820 ^b (2.30)	0.659 ^c (1.79)	0.666 ^c (1.79)	0.752 ^b (2.03)	0.613 (1.63)	0.665 ^c (1.78)	0.880 ^b (2.32)	-	0.227 (0.51)
Totg	0.081 ^b (2.05)	0.092 ^b (2.38)	0.087 ^b (2.16)	0.072 ^c (1.73)	0.083 ^b (2.02)	0.093 ^b (2.35)	0.143 (1.41)	0.104 ^c (1.66)	-
totg*sfree	-	-	-	-	-	-0.086 (-0.06)	-	-	-
totg*xconst	-	-	-	-	-	-	-0.023 (-0.74)	-	-
Xconst	-	-	0.218 (0.61)	1.948 ^b (2.30)	1.875 ^b (2.23)	-	0.259 (0.74)	-	-
Xconst ²	-	-	-	-0.263 ^b (-2.04)	-0.260 ^b (-2.04)	-	-	-	-
Sfree	-	2.781 ^a (3.70)	2.722 ^a (3.37)	-	2.710 ^a (3.32)	2.770 ^a (3.59)	-	2.997 ^a (3.19)	1.652 (1.43)
Adj. R ²	0.480	0.508	0.495	0.480	0.504	0.504	0.468	0.266	0.213
SEE	3.018	2.935	2.991	3.035	2.963	2.950	3.069	3.614	4.440
# of obs	n=156	n=156	n=150	n=150	n=150	n=156	n=150	n=161	n=172

a significant at 1% level*b* significant at 5% level*c* significant at 10% levelNotes: See table 7; *totg* is net barter terms of trade annual change (%) (source: WB WDI online); t statistics in parentheses.

Figure 1. Evolutions of Syndrome-free and State Breakdown regimes, 1960-2000 (%)



Appendix Table A: Growth Accounting Decomposition, African Economies, 1960-2000

		1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-2000	Total
Cameroon	Growth in Real GDP per Worker	1.39	-0.49	3.15	6.70	4.63	-2.04	-6.60	1.95	1.10
	Contribution of Physical capital per worker	-0.19	0.75	1.43	2.25	3.52	1.78	-0.79	-0.79	0.98
	Contribution of Education per worker	0.12	0.17	0.30	0.35	0.36	0.38	0.28	0.21	0.27
	Residual*	1.46	-1.40	1.42	4.11	0.76	-4.20	-6.09	2.54	-0.15
Cote d'Ivoire	Growth in Real GDP per Worker	6.99	3.20	3.02	4.56	-6.16	-0.77	-3.75	0.72	0.82
	Contribution of Physical capital per worker	1.40	1.65	1.52	2.47	0.69	-1.21	-1.88	-0.81	0.43
	Contribution of Education per worker	0.13	0.13	0.34	0.39	0.42	0.43	0.32	0.29	0.31
	Residual*	5.45	1.42	1.17	1.70	-7.27	0.01	-2.20	1.24	0.08
Ethiopia	Growth in Real GDP per Worker	2.72	1.68	1.71	-0.20	-0.55	-2.35	-0.14	2.96	0.73
	Contribution of Physical capital per worker	3.23	2.32	0.88	-0.29	1.42	0.93	0.25	1.13	1.18
	Contribution of Education per worker	0.05	0.05	0.11	0.13	0.27	0.31	0.28	0.28	0.19
	Residual*	-0.55	-0.68	0.73	-0.04	-2.25	-3.58	-0.67	1.55	-0.63
Ghana	Growth in Real GDP per Worker	0.62	-0.26	1.54	-3.74	-4.17	1.52	1.05	1.77	-0.18
	Contribution of Physical capital per worker	1.90	0.65	-0.28	-0.06	-1.19	-1.28	0.05	1.17	0.10
	Contribution of Education per worker	0.37	1.06	0.43	0.25	0.18	0.15	0.15	0.15	0.34
	Residual*	-1.64	-1.97	1.39	-3.92	-3.17	2.65	0.85	0.44	-0.62
Kenya	Growth in Real GDP per Worker	0.94	4.14	5.02	1.83	-1.05	2.02	-1.91	-0.94	1.21
	Contribution of Physical capital per worker	-0.25	0.49	1.72	0.49	-0.52	-0.79	-0.66	-0.28	0.03
	Contribution of Education per worker	0.26	0.38	0.30	0.69	0.33	0.35	0.36	0.29	0.37
	Residual*	0.93	3.26	2.99	0.64	-0.86	2.46	-1.60	-0.96	0.81
Madagascar	Growth in Real GDP per Worker	-0.51	1.34	-0.90	-0.84	-3.97	-0.06	-2.56	0.21	-0.89
	Contribution of Physical capital per worker	-0.20	0.23	0.29	-0.19	-0.28	-0.29	-0.16	-0.57	-0.16
	Contribution of Education per worker	0.05	0.05	0.19	0.23	0.35	0.38	0.31	0.30	0.24
	Residual*	-0.36	1.06	-1.38	-0.87	-4.04	-0.14	-2.71	0.48	-0.97
Malawi	Growth in Real GDP per Worker	0.33	5.11	3.59	2.96	-1.65	-0.97	-0.65	3.90	1.67
	Contribution of Physical capital per worker	4.46	4.45	4.25	2.52	0.07	-0.90	-0.11	-1.29	1.54
	Contribution of Education per worker	0.06	-0.02	0.24	0.13	0.24	0.18	0.20	0.39	0.19
	Residual*	-4.19	0.67	-0.90	0.30	-1.96	-0.25	-0.74	4.80	-0.06
Mali	Growth in Real GDP per Worker	1.40	0.67	0.40	5.78	-2.94	-0.77	-0.96	2.74	0.82
	Contribution of Physical capital per worker	0.71	0.68	0.31	0.26	0.01	0.02	0.27	-0.20	0.24
	Contribution of Education per worker	0.02	0.05	0.11	0.13	0.09	0.08	0.08	0.10	0.08
	Residual*	0.67	-0.05	-0.02	5.39	-3.04	-0.87	-1.31	2.84	0.50

Mauritius	Growth in Real GDP per Worker	3.86	-1.88	3.42	4.04	-1.55	4.95	3.37	3.83	2.50
	Contribution of Physical capital per worker	0.39	-0.40	-0.08	1.02	-0.27	0.63	1.02	0.95	0.42
	Contribution of Education per worker	0.41	0.53	0.36	0.65	0.41	0.32	0.26	0.24	0.39
	Residual*	3.06	-2.01	3.14	2.37	-1.69	4.01	2.09	2.64	1.69
Mozambique	Growth in Real GDP per Worker	0.63	4.75	0.49	-6.56	-6.84	4.71	1.05	4.88	0.50
	Contribution of Physical capital per worker	-0.44	0.19	1.04	-0.88	-0.69	0.05	0.14	1.06	0.10
	Contribution of Education per worker	0.11	0.09	0.07	0.10	0.20	0.25	0.15	0.12	0.14
	Residual*	0.97	4.46	-0.63	-5.78	-6.35	4.41	0.76	3.70	0.26
Nigeria	Growth in Real GDP per Worker	1.95	-1.72	8.34	-0.87	-6.93	2.92	0.90	-0.02	0.52
	Contribution of Physical capital per worker	1.25	1.36	3.18	3.94	0.62	-1.18	0.13	0.41	1.19
	Contribution of Education per worker	0.10	0.10	0.08	0.07	0.43	0.52	0.53	0.53	0.31
	Residual*	0.59	-3.19	5.08	-4.87	-7.98	3.58	0.23	-0.96	-0.98
Rwanda	Growth in Real GDP per Worker	-6.76	4.89	-0.43	4.60	0.16	-0.37	-14.03	7.10	-0.26
	Contribution of Physical capital per worker	-0.08	-0.01	0.83	1.95	2.13	2.04	1.53	-1.50	0.82
	Contribution of Education per worker	0.10	0.12	0.28	0.25	0.13	0.19	0.23	0.18	0.19
	Residual*	-6.79	4.78	-1.54	2.40	-2.10	-2.60	-15.79	8.41	-1.27
Senegal	Growth in Real GDP per Worker	-0.24	-2.04	-0.03	0.67	-0.96	0.61	-1.18	2.38	-0.03
	Contribution of Physical capital per worker	-0.46	-0.79	-0.26	-0.21	-0.25	-0.01	0.06	0.17	-0.20
	Contribution of Education per worker	0.00	0.04	0.33	0.16	0.14	0.17	0.19	0.20	0.16
	Residual*	0.22	-1.29	-0.10	0.73	-0.84	0.44	-1.43	2.00	0.01
Sierra Leone	Growth in Real GDP per Worker	2.71	2.75	2.17	0.03	0.49	-0.36	-3.69	-7.37	-0.66
	Contribution of Physical capital per worker	-0.09	1.02	0.39	-0.18	-0.07	-0.85	-0.33	-1.08	-0.17
	Contribution of Education per worker	0.09	0.12	0.40	0.28	0.28	0.30	0.24	0.22	0.24
	Residual*	2.71	1.60	1.38	-0.07	0.27	0.19	-3.60	-6.51	-0.73
South Africa	Growth in Real GDP per Worker	3.46	3.75	3.32	-1.32	0.61	-1.72	-2.15	0.38	0.71
	Contribution of Physical capital per worker	-0.09	0.84	1.31	1.02	0.61	-0.39	-0.51	-0.14	0.33
	Contribution of Education per worker	-0.08	0.31	0.12	-0.18	0.58	0.28	0.52	0.43	0.26
	Residual*	3.63	2.60	1.89	-2.16	-0.58	-1.61	-2.17	0.09	0.12
Tanzania	Growth in Real GDP per Worker	2.20	3.31	2.57	-0.30	-2.16	0.92	-0.59	1.29	0.88
	Contribution of Physical capital per worker	-0.85	-0.02	0.92	0.66	-0.02	-0.04	0.45	-0.26	0.12
	Contribution of Education per worker	-0.19	-0.13	-0.08	0.02	0.21	0.16	0.10	0.14	0.04
	Residual*	3.25	3.46	1.72	-0.97	-2.34	0.80	-1.14	1.41	0.73
Uganda	Growth in Real GDP per Worker	2.18	0.09	-0.58	-5.84	1.16	0.56	2.82	4.22	0.63
	Contribution of Physical capital per worker	1.10	1.63	1.08	-0.02	0.08	0.09	0.18	1.29	0.68
	Contribution of Education per worker	0.13	0.21	0.11	0.20	0.16	0.59	0.30	0.21	0.24
	Residual*	0.95	-1.75	-1.77	-6.02	0.92	-0.12	2.34	2.71	-0.30

Zambia	Growth in Real GDP per Worker	0.96	0.97	1.59	-3.23	-2.07	-0.76	-4.05	-1.09	-1.01
	Contribution of Physical capital per worker	-0.63	0.75	0.94	-0.61	-1.66	-2.03	-2.02	-1.55	-0.88
	Contribution of Education per worker	0.26	0.23	0.32	0.55	0.24	0.14	0.59	0.28	0.33
	Residual*	1.33	-0.01	0.33	-3.17	-0.65	1.13	-2.63	0.18	-0.46
Zimbabwe	Growth in Real GDP per Worker	0.39	2.83	5.98	-4.60	1.56	0.53	0.02	-0.25	0.79
	Contribution of Physical capital per worker	-1.06	-0.68	0.42	-0.07	-1.08	-0.73	0.78	0.06	-0.27
	Contribution of Education per worker	0.25	0.23	0.25	0.23	0.56	1.25	0.53	0.31	0.45
	Residual*	1.20	3.29	5.31	-4.76	2.07	0.01	-1.29	-0.61	0.61

Source: Ndulu and O'Connell (2003)

Appendix Table B.1. Summary statistics, sample period
1960-2000

	<u>average</u>	<u>std. dev.</u>	<u>min</u>	<u>max</u>
gdppcga	0.771	4.431	-30.453	28.781
investment	10.296	7.361	1.175	48.779
Labor	2.383	1.037	-4.325	9.247
Xconst	2.639	1.775	0	7
Sfree	0.293	0.455	0	1
SF8100	0.128	0.334	0	1

Appendix Table B.2. Summary statistics, sample period
1981-2000

	<u>average</u>	<u>std. dev.</u>	<u>min</u>	<u>max</u>
gdppcga	0.174	5.000	-30.453	28.781
investment	9.930	6.455	2.384	46.979
Labor	2.613	0.913	-3.609	7.326
Xconst	2.645	1.750	0	7
Sfree	0.255	0.437	0	1
Totg	0.219	7.012	-17.688	34.617

Appendix Table C.1. Correlogram of variables, sample period
1960-2000

	gdppcga	investment	labor	xconst	sfree	SF8100
gdppcga	1.000					
investment	0.316	1.000				
labor	0.026	0.019	1.000			
xconst	0.154	0.093	0.083	1.000		
sfree	0.259	0.077	0.076	0.263	1.000	
SF8100	0.140	0.048	0.125	0.273	0.726	1.000

Appendix Table C.2. Correlogram of variables, sample period
1981-2000

	gdppcga	investment	labor	xconst	sfree	totg
gdppcga	1.000					
investment	0.462	1.000				
labor	0.099	-0.003	1.000			
xconst	0.198	0.125	0.063	1.000		
sfree	0.286	0.134	0.079	0.335	1.000	
totg	0.219	0.124	-0.176	-0.034	-0.091	1.000