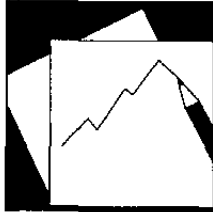


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Will There Be New Emerging-Market Economies in Africa by the Year 2020?

Jean-Claude Berthélemy and Ludvig Söderling

IMF Working Paper

African Department

Will There Be New Emerging-Market Economies in Africa by the Year 2020?

Prepared by Jean-Claude Berthélemy and Ludvig Söderling¹

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Abstract

<p>The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.</p>
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This paper examines past African growth experience and attempts to simulate future ones. In addition to more commonly used determinants of total factor productivity, a measure of the effect of labor reallocation and an index of economic diversification are constructed and included as factors for long-term growth. A simple model is constructed for the purpose of simulating growth scenarios up to the year 2020 for Burkina Faso, Côte d'Ivoire, Ghana, Mali, Tanzania, and Uganda. Even if one makes relatively optimistic assumptions, Africa is not likely to reach "Asian tiger" levels of growth. The results also suggest that growth will depend, to a large extent, on educational investments and productivity gains in agriculture.

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Keywords: Africa, growth, productivity, education, labor reallocation, diversification

Authors' E-Mail Addresses berthele@univ-paris1.fr; Lsoderling@imf.org

¹ Mr. Berthélemy is a Professor of Economics at University of Paris 1 Panthéon-Sorbonne and Mr. Söderling is an Economist in the African Department. We are grateful to Pierre van den Boogaerde, David Coe, Markus Haacker, Jun Il Kim, Arend Kouwenaar, Donal McGettigan and Papa Ousmane Sakho for helpful and valuable comments. Any remaining errors are the sole responsibility of the authors.

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I. INTRODUCTION

About 1995-96, a significant upturn in growth occurred in Africa. Even though this could to some extent be explained by favorable cyclical factors, it also reflected real progress in economic reforms, governance, and democratization achieved by a number of African countries. Certainly, other African countries sank into crisis. Africa ended the twentieth century with a mixed record. Therefore, it is essential to attempt to determine which economic developments were coincidental and which, on the contrary, were the result of fundamental tendencies.

The answer to this question is of great consequence for Africa. Excluding a small number of true economic successes affecting only a small part of the African population, such as Botswana and Mauritius, it is indeed the first time since the period of independence that the possibility of an economic takeoff in Africa is conceivable. Of course, it remains unlikely that Africa as a whole will enjoy rapid growth and development in the two decades to come. Nevertheless, it is imaginable that an increasing number of countries find the way to strong and sustainable growth, pulling their neighbors along through positive spillover effects.

This paper draws on results from an Organization for Economic Cooperation and Development (OECD) Development Center research project entitled "Emerging Africa",² the purpose of which was to identify the potential for certain promising countries to lead the way toward economic emergence. In contrast to the recent report "Can Africa Claim the XXIst Century?" sponsored by the World Bank, our objective is not to draw up a complete panorama of growth perspectives in Africa. The inconvenience of this partial perspective is compensated for by the advantage of a more realistic approach, because it is centered on a careful evaluation of countries' actual potential for growth.

In Section II, economic growth experiences recorded during the 1990s are examined. About 10 countries made real economic progress and recorded average income growth rates higher than 5 percent per year. Moreover, it is encouraging to observe that other countries seem to have begun to follow a similar path by the middle of the decade. It is particularly noteworthy that growth in Africa in the 1990s cannot reasonably be attributed to developments in the external environment, as the terms of trade generally remained unfavorable, both in fast- and slow-growing African countries.

Section III proposes a long-term assessment of economic growth in Africa, based on an analysis of all episodes of strong and sustained growth observed since independence. In fact, a significant number of rapid-growth episodes – as many as 16 – have been observed in the sub-Saharan region since the early 1960s. However, the majority of these rapid growth episodes ended before economic development was effectively consolidated. A study of the sources of

² Both authors worked at the OECD Development Center at the time the project was carried out. A full report of the project is available in French and English – see Berthélemy and Söderling (2001b). Further information is available on the website of the Development Centre at www.oecd.org/dev.

growth delivers several explanations of such developments, the first of which is very simple and common to many economies: growth in Africa was often underpinned by ambitious investment programs and was subsequently interrupted when these investment programs turned out to be unsustainable, principally because of weak capital productivity. Several structural factors can also be identified that influenced total factor productivity growth in the African economies. These factors were not limited to the traditional adjustment policies implemented in Africa, although this study does confirm that measures such as opening to trade and making adjustments in the foreign exchange market unmistakably played a role. It is shown, in particular, that long-term factors, such as investment in human capital, reallocation of labor out of agriculture, and the diversification of the economy, also must be taken into account.

In Section IV, we propose growth scenarios to 2020 for a selection of six countries by combining previous results and a review of national policies and developments. The six countries are ones that seemed promising when this research project started: Burkina Faso, Côte d'Ivoire, Ghana, Mali, Tanzania, and Uganda. Our scenarios show that, given the efforts of African countries in terms of investment for development, notably in human resources, "Asian-style" growth will no doubt be out of reach during the next two decades. However, under the assumption that substantial effort is made to orient policies in favor of growth, a significant increase of per capita income – of the order of 2 to 3 percent a year – is possible. This is a lot and a little at the same time: a lot compared with the past performances of Africa over such a long period, and little in view of the underdevelopment of these countries compared with the rest of the world and in view of the objectives stated by the international aid community. In all of the studied cases, the countries are predicted to remain poor in 2020.

Section V presents concluding remarks.

II. CONTRASTED DEVELOPMENTS IN THE 1990S

Sub-Saharan Africa in the 1990s was marked by an improvement in economic performance. While GDP per capita in the region declined at an average annual rate of 1.2 percent in the 1980s and 2 percent between 1990 and 1994, it increased by 0.8 percent a year from 1994 until 1998. In 1994, Africa's GDP per capita was approximately at the same level as 30 years earlier. Between 1995 and 1998, the improved economic performance of a number of countries created a certain amount of hope of a renewal in Africa, although the progress was modest and far from universal.³

In this section, we divide the African countries for which data are available into four groups of 11 countries each (12 in one group when South Africa is included in the analysis), classified according to growth performance. Although the analysis in this section is partial and

³ In fact, over the 1990-98 period, there was a gap of 25 percentage points of annual growth between the best performer (Equatorial Guinea) and the worst (the Democratic Republic of the Congo).

descriptive, some interesting conclusions can be drawn. The list of countries appears in Table 1, with their respective weights in the population of the sub-Saharan African region.

Table 1. Distribution of Countries According to Growth Performance During 1990-98
(Numbers denote 1995 percentage in the Sub-Saharan African population unless otherwise indicated)

High-growth countries Average annual growth =5.7 percent	Medium-high-growth countries Average annual growth =3.5 percent	Medium-low-growth countries Average annual growth =2.4 percent	Low-growth countries Average annual growth =-0.7 percent
Benin	1.0Chad	1.2Gambia, The	0.2Angola 2.0
Botswana	0.3Burkina Faso	1.7Kenya	4.8Burundi 1.1
Cape Verde	0.1Côte d'Ivoire	2.4Niger	1.6Cameroon 2.3
Equatorial Guinea	0.1Ethiopia	10.0Nigeria	19.6Central African Republic 0.6
Eritrea 1/	0.6Gabon	0.2Rwanda	1.3Comoros 0.1
Ghana	3.0Guinea	1.2Sao Tomé and Príncipe	0.0Congo, Rep. of Congo, Dem. 0.5
Lesotho	0.3Malawi	1.7Senegal	1.5Rep. of 7.8
Mauritius	0.2Mali	1.7South Africa	6.7Guinea-Bissau 0.2
Mozambique	2.8Mauritania	0.4Swaziland	0.2Madagascar 2.4
Sudan	4.6Namibia	0.3Tanzania	5.2Sierra Leone 0.8
Uganda	3.4Seychelles	0.0Togo	0.7Zambia 1.6
		Zimbabwe	1.9
Total share in African population	16.4	20.8	43.7 19.4

1/ Included from 1992.

Sources: World Bank, 2000, *World Development Indicators (Washington)*; and authors' calculations.

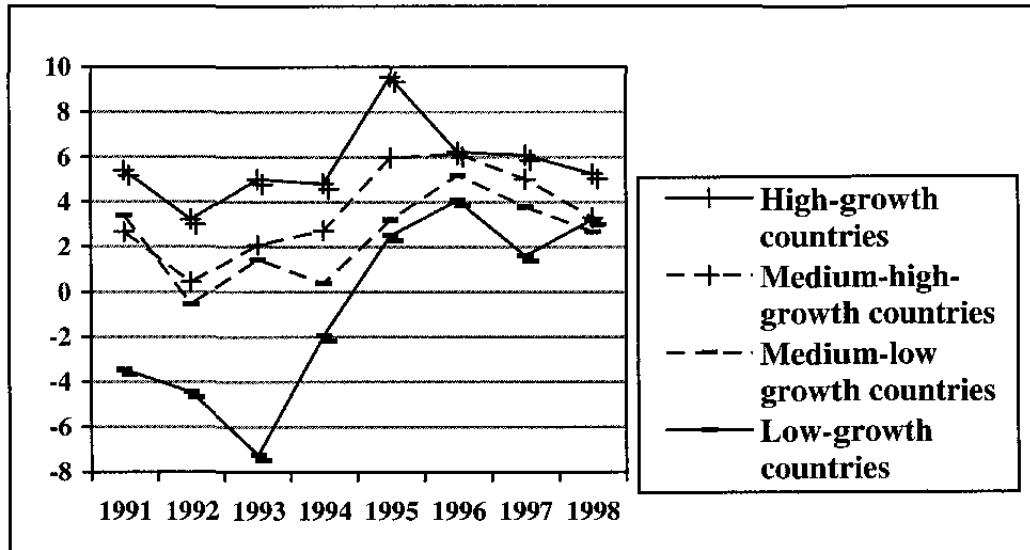
These groups are rather diverse. One may be surprised to find Sudan among the high-growth countries, but it should be kept in mind that growth is measured here in real terms. Considering the substantial depreciation of the Sudanese pound at the beginning of the decade, per capita income in current dollars actually fell in Sudan over the period. To some extent, this first group could be subdivided into countries for which growth is the result of post-conflict reconstruction (notably Eritrea, Mozambique, and Uganda), and the others for which growth rests more explicitly on longer-term economic fundamentals (notably Botswana, Lesotho, and Mauritius).

These groups are of comparable demographic size, except for Nigeria, which represents about 20 percent of the population of the region and inevitably doubles the weight of the grouping to which it belongs. In each of these groups, there are countries of very different size. In order to avoid giving excessive weight to small countries, all group averages have been weighted either by GDP or by population, depending on the nature of the indicator.

It is also interesting to note that no group is very strongly concentrated geographically, even though countries with weaker performances tend to belong to Central Africa (with the notable exception of Equatorial Guinea, which is the strongest performer of the decade, due to its

growing oil production), while well-performing countries are somewhat concentrated in Eastern Africa. In other words, even though one finds a degree of geographic concentration in our grouping of countries, it appears that no region of Africa is systematically excluded from economic development.

Figure 1. Percentage Growth Rate of GDP (Excluding South Africa)



Sources: World Bank (WDI 2000); and authors' calculations.

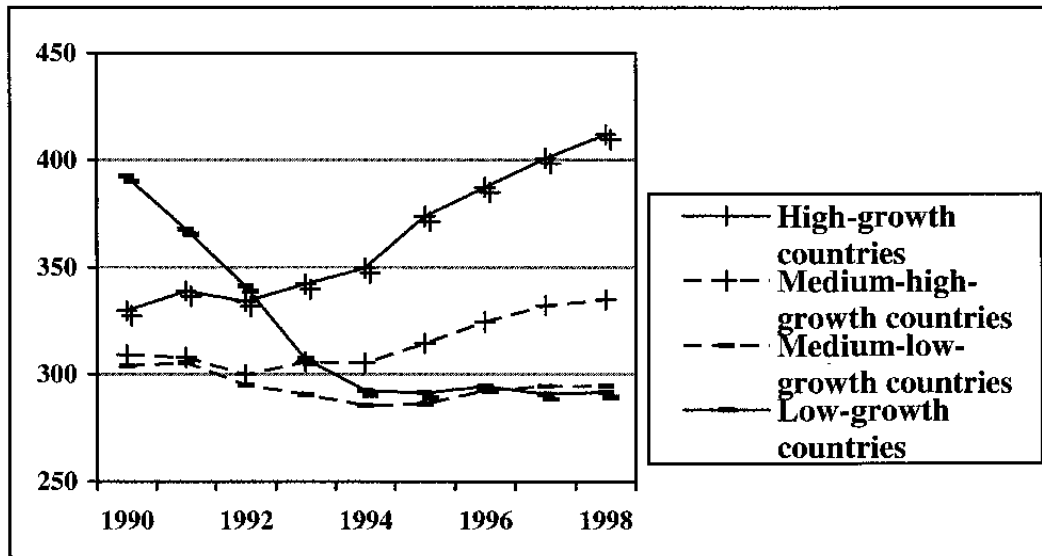
Figure 1 clearly shows that the group of countries with the strongest growth performance has enjoyed high growth rates from the beginning of the decade, even when the African region as a whole experienced very modest or negative growth. For some countries, such as Botswana, Ghana, Mauritius, and Uganda (and to a certain extent Lesotho), this strong growth began well before the 1990s. At the same time, as we will show in Section III, some of the countries with a poor growth record in the 1990s were actually among the better performers in the 1970s and 1980s. The history of Africa since independence is full of examples of rapid-growth episodes, which eventually came to an end. This is the case in particular for Cameroon, Kenya, Tanzania, and Togo.

It appears that strong growth observed in the first group reached a maximum in 1995, and decreased afterward. On average, this group grew at a pace constantly above 5 percent a year, which allowed it to benefit from a substantial increase of its GDP per capita, as shown in Figure 2.

Moreover, there seems to be a certain amount of convergence in the growth rates of the different groups. For example, the countries from the second group, which until 1995 had an average growth rate lower by 2 percentage points than that of the best performers, caught up in terms of growth in 1996. Similar developments can be observed for the two other groups. Even though there is a significant number of countries without any improvement of per capita income (14 countries in 1998, representing 53 percent of the regional population), this result is encouraging

as far as it seems to indicate that certain countries began to imitate the best performers. This is the case with several countries in the group of countries with medium-high-growth performances, such as Burkina Faso, Côte d'Ivoire, Ethiopia, Guinea, Mali, and Mauritania (however, among these countries, Côte d'Ivoire fell into crisis again in 1999, and Mali has also experienced economic difficulties lately).

Figure 2. GDP Per Capita in Constant U.S. Dollars of 1995 (Excluding South Africa)

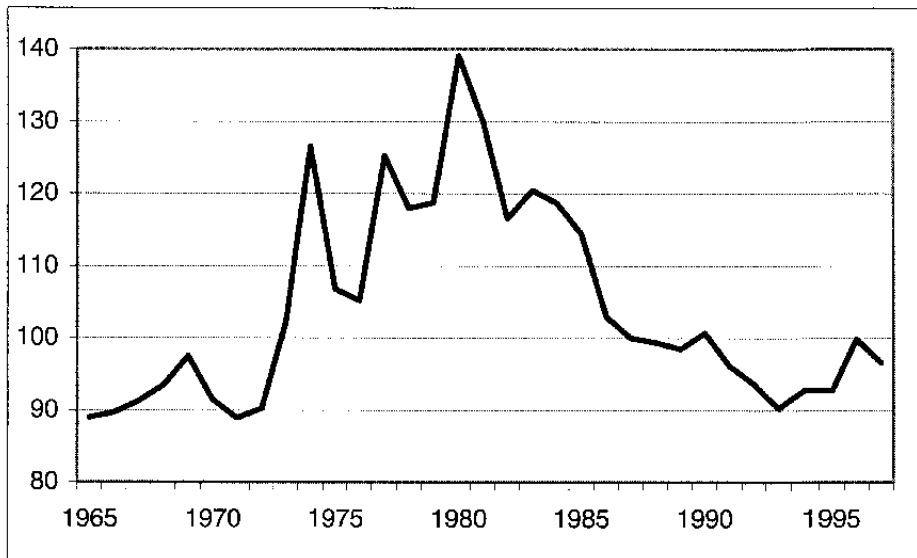


Sources: World Bank (WDI 2000); and authors' calculations.

Figure 2 shows that, in the 1990s, the group of countries with strong growth, which started the decade with a GDP per capita level comparable to the average, has already outperformed the other groups (excluding South Africa) by about 30 percent in 1998.

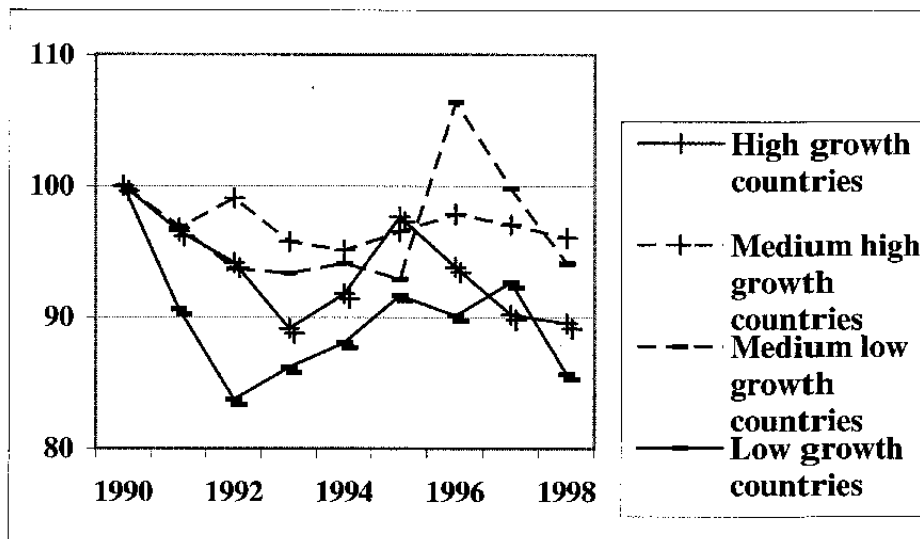
As mentioned above, it should be noted that in the past decade, the growth performance of the African region has not been strictly bound by the evolution of its terms of trade, which can be considered as a good indicator of their international environment. Certainly, Figure 3 indicates clearly that the massive fall of the terms of trade of the region observed in the 1980s slowed down in the 1990s, even though the trend remained rather unfavorable. But, comparing the evolution of the terms of the trade by group of countries (Figure 4), it is noticeable that countries with fast growth did not enjoy a more favorable environment than the others in the 1990s. Consequently, the international environment does not explain the diversity of performances observed among various African economies. These differences have mainly internal causes.

Figure 3. Evolution of the Average Terms of Trade of Sub-Saharan Africa



Source: World Bank, 2000, *African Development Indicators* (Washington).

Figure 4. Evolution of the Terms of Trade by Group of Countries



Sources: World Bank, WDI 2000; and authors' calculations.

It is clear that the improvement of growth performance in the region was coupled with progress in other macroeconomic indicators, such as inflation and the fiscal balance. Table 2 indicates that inflation was relatively high in the region at the beginning of the decade. This was particularly so in countries with strong growth, such as Ghana and Mozambique which had historically experienced high rates of inflation. However, with the exception of Ghana, where there was still double-digit inflation at the end of the decade, the strong performers had to a large extent managed to curb inflation by the end of the 1990s. On the other hand, the two groups of countries with medium growth performances experienced relatively low inflation throughout the 1990s. In part, this is explained by the fact that the large majority of CFA franc

Zone countries—where monetary policy prevents the risks of high inflation—belong to these intermediate groups. These observations suggest that low inflation is not a sufficient condition for high growth in Africa, although persistently high inflation appears to hamper growth as indicated by the group of poor performers.

Table 2. Average Rates of CPI Inflation (Percent)

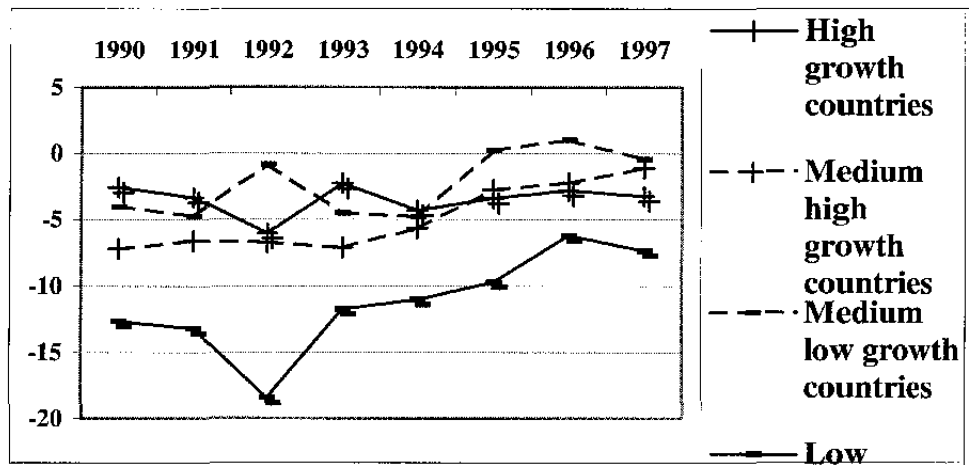
	1990	1998
High-growth countries	33	9
Medium-high-growth countries	8	6
Medium-low-growth countries	9	11
Low-growth countries	33	24
Overall average	19	12

Sources: World Bank (WDI 2000); African Development Bank (selected statistics on African economies in 2000); and authors' calculations.

Notes: The groups are defined as previously in reference to the performances of GDP growth over the period 1990-98. Averages by group are weighted by 1995 GDP levels.

Figure 5 gives a similar indication regarding fiscal policy. First of all, an overall improvement in the fiscal balance during the decade is evident. However, the link between control of the budget deficit and return to growth is far from mechanical. The medium growth countries showed a fiscal performance comparable to that of strong growth countries throughout the 1990s, even surpassing the high growth group towards the end of the decade. On the other hand, one notices once again that the group of countries with weak growth is characterized by poor fiscal management, recording average budget deficits on the order of 12 percent of GDP at the beginning of period and of 7 percent at the end of period.

Figure 5. Overall Fiscal Balance/GDP In Percent (Excluding South Africa; in Percent)



Sources: World Bank (WDI 2000); and authors' calculations.

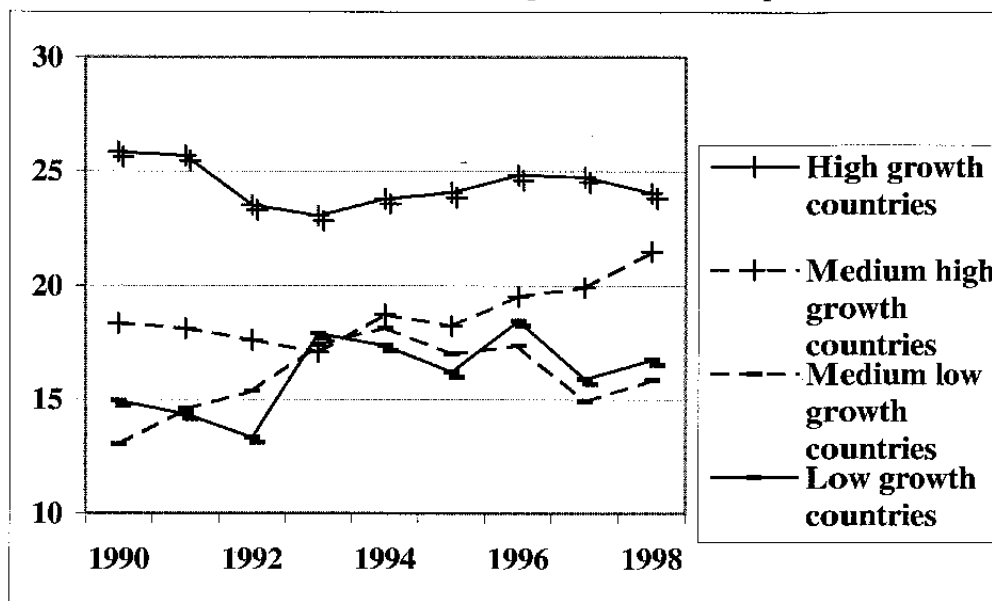
Notes: the groups are defined as previously in reference to GDP growth performances over the period 1990-98. Average by group are weighted by 1995 GDP.

On the whole, traditional macroeconomic policies seem far from being sufficient explanatory factors of growth in the region during the 1990s. The best countries from the point of view of

control of inflation and budget deficits are not necessarily the fastest growing ones, although it seems clear that low growth countries also tend to be the ones with the worst macroeconomic policies. One likely interpretation is that while macroeconomic stability cannot by itself be a factor for sustained strong growth, lack thereof is likely to thwart growth. Ghana (until recently) and Uganda are prominent examples of economic success coinciding with macroeconomic adjustment. But in order to maintain durable growth, it is also necessary to promote investment and to implement policies for structural change.

The role of structural change will be commented on in the following section. Aggregate data already give an idea of the role that investment has played in African growth in the 1990s. Figure 6 reveals in a clear way an essential difference between countries with fast and slow growth. Fast-growing countries invested much more, with an average ratio of investment to GDP on the order of 25 percent, whereas this ratio was substantially lower than 15 percent for the other groups, except the group of countries with medium-high growth performance, which realized an almost continuous progress to exceed an investment ratio of 20 percent by 1997.

Figure 6. Investment/GDP Ratio (Excluding South Africa, in percent, constant prices)



Sources: World Bank (WDI 2000); and calculations of the authors.

However, within the group of high-growth countries, Uganda is unusual, with an investment rate comparable to that of the lower-growth countries. This suggests that a certain degree of caution is warranted when evaluating the long-term growth prospects for the country unless progress is made in this domain. At the same time, in the groups of countries with low growth, there are examples of high investment rates without growth, as in Congo-Kinshasa (investment rate of the order of 30 percent), in Swaziland and, until 1995, in Tanzania. Thus, a high investment rate is neither a panacea, nor, at least in the short run, a necessary condition for growth. Furthermore, the effect of investment cannot always be distinguished from productivity

improvement as investment is partially a result of structural changes, notably in the form of improvements of the institutional framework.

The above analysis indicates that there is no single factor that can explain the success or failure of African growth. In fact, in an environment where so many economic shortcomings coexist, it is essential to take a holistic view. Success in one area can be entirely undermined by failures in others, although certain weaknesses can be temporarily compensated for by strong policies in other areas.

III. AN ASSESSMENT OF EXTENDED GROWTH EPISODES IN AFRICA

There have been several examples of sustained rapid growth in Africa since independence. As mentioned above, the aim of this study is to make a comparative study of these extended growth periods and thereby draw some conclusions for the future. We define an extended period of strong growth as an uninterrupted period of ten years or more, during which time the five-year moving average of annual GDP growth exceeds 3.5 percent. By using a sufficiently long period of time, we exclude countries experiencing transitory surges in growth due to favorable external factors, such as a temporary improvement in the terms of trade or increased demand due to the economic cycles in the global economy. We use a five-year moving average as opposed to annual growth rates for similar reasons. This way we avoid having to exclude strong performers experiencing a temporary trough in growth. Once the countries have been selected, the beginning of the growth period is considered to be the first year (included in the five-year average) for which GDP growth exceeded 3.5 percent. Similarly, for the interrupted growth experiences, the period is considered to end with the first year of growth inferior to 3.5 percent, within the last five-year average.

Table 3 summarizes all eligible growth periods, selected from a sample of 40 sub-Saharan African countries according to the definition described above.

The next step is to analyze factors that may explain such extended growth periods. Some countries (Ethiopia, Gabon, Lesotho, Namibia, Togo, and Tanzania), or parts of extended growth periods (Botswana before 1970, South Africa before 1961) are eliminated in our analysis below, due to lack of other data that were necessary to evaluate and analyze growth factors. On the other hand, we add those countries that we have selected as benchmarks for our analysis of future growth prospects in the next section, but for which strong growth is relatively recent. The countries in question are Burkina Faso, Côte d'Ivoire, Mali and Tanzania. In these four countries, rapid growth has been observed since 1994 (for franc zone member countries) or 1995 (Tanzania). The period of observation for these countries is very short, because our data base for the econometric exercise is complete only until 1996; however, the most recent data available show that these countries have continued to grow at least until 2000 at a pace well above 3.5 percent a year, with the exception of Côte d'Ivoire, where real growth decelerated in 1999 and became negative in 2000.

Table 3. Sustained Strong Growth Experiences in Africa

Country	Start	End	Length of Period	Average Growth
Botswana	1965	...	33+	9.1
Cameroon	1967	1986	19	7.0
Côte d'Ivoire	1960	1978	18	9.5
Ethiopia	1960	1972	12	4.5
Gabon	1965	1976	11	13.1
Ghana	1983	...	15+	4.7
Kenya	1961	1981	20	6.7
Lesotho	1970	1982	12	9.9
Malawi	1964	1979	15	6.6
Mauritius	1980	...	18+	5.4
Mozambique	1986	...	12+	7.1
Namibia	1961	1979	18	6.4
South Africa	1960	1974	14	5.1
Tanzania	1961	1975	14	5.7
Togo	1960	1974	14	6.8
Uganda	1986	...	10+	6.1

Sources: World Bank (World Development Indicators); and author's calculations.

Notes: Figures are logarithmic growth rates over the period defined by start and end period as indicated above; "..." indicates that the growth period continues after 1998 (last year of observation; for such countries, average growth is calculated up to 1998.

A. Analytical Framework

Most of the recent comparative literature on African growth is based on cross-section or panel data equations which explain growth rates in a conditional convergence equation – see e.g. Collier and Gunning (1999) for a synthesis. Interpreting these equations as long-term relations is appropriate only if the economies in question can be assumed to be close to their steady state, as in Mankiw, Romer, and Weil (1992). For African economies, this is a very strong assumption. Therefore, we prefer to adopt an alternative approach, which consists of estimating a level equation, in which GDP per unit of labor is regressed on capital per unit of labor and variables explaining total factor productivity. In order to show that such an equation can be considered as a long-term relation, co-integration tests are performed using the Levin and Lin (1993) method. Moreover, we estimate an error correction model based on this long-term equation, which is similar to a growth equation, but explains only short-term growth movements.⁴ Finally, another difference of our method compared with the most common approach is that we decided to estimate our model on African data only, rather than on a larger

⁴ The error correction model will not be shown, to save space. The interested reader is referred to an earlier version of Berthélemy and Söderling (2001a), available on line at www.oecd.org/dev, Technical Paper 150.

sample. Thereby we avoid the risk of mixing countries with very different growth experiences, and possibly heterogeneous parameters. Such heterogeneity in parameters may result from the existence of multiple equilibria, as African economies may find themselves in a poverty trap equilibrium. In such circumstances, estimating parameters on Africa alone is certainly more appropriate than using parameters estimated on a wide sample of countries.⁵

The core of our analysis is a Cobb-Douglas production function, with constant returns to scale, explaining the long-term relation between income on one hand and labor and capital as well as productivity variables on the other.

$$\frac{Y}{L} = \left(\frac{K}{L}\right)^\alpha * TFP, \quad (1)$$

where $Y = \text{GDP}$, $L = \text{labor}$, K the capital stock, and TFP is total factor productivity, which is determined by the following set of variables:

- A human capital stock series, defined as the average number of schooling years in the working age population;
- An index of the effect of labor reallocation on aggregate productivity;
- An index of economic diversification;
- Imports divided by labor;
- The black market premium in the exchange rate market (separated between CFA and non CFA countries), which is used as an index of domestic price distortions;
- The number of revolutions and coups (lagged);
- A country dummy variable, which takes account of cross country productivity differentials;
- A country-specific determinist trend, accounting for differences in exogenous productivity growth among countries.

Most of our independent variables have been used in several previous studies and therefore do not require theoretical explanation here. The interested reader will find such explanations in Berthélemy and Söderling (2001a).

We restricted the parameter of the labor reallocation effect to its theoretical value equal to one.⁶ The least-square dummy variable method (fixed effects method) used here appeared to be preferable to the random effect method, according to the Hausman test.

⁵ See Berthélemy and Varoudakis (1996). For a recent application of such ideas on growth and finance equations estimated for Africa, see Berthélemy (2000).

⁶ The definition of this variable is based on Syrquin (1986). See Berthélemy and Söderling (2001a) for details.

We find an elasticity of GDP to capital equal to 0.4, which seems plausible given the extremely low level of capital endowment of African economies. We also find a positive and significant impact of human capital on GDP, with a rather high elasticity (0.25). Moreover, the black market premium turned out negative and significant for the non-CFA countries and nonsignificant for the CFA countries. The non-significance of the black market premium for the CFA countries is logical due to the guaranteed currency convertibility supported by France. Moreover, conflicts have a negative impact on GDP as observed by the negative and significant coefficient for the dummy for conflicts. Furthermore, imports divided by labor has a positive and significant impact on labor productivity. Overall, the properties of this estimated equation look reasonable.

Table 4. Panel Data Estimates of the Production Function

Dependent variable: Ln(GDP/labor)			
Variable	Coefficient	Standard Error	t-statistic
Ln(Capital/labor)	0.397	0.032	12.60
Ln(Human capital)	0.251	0.044	5.75
Ln(Labor reallocation effect)	1.000
Ln (Diversification)	0.043	0.013	3.48
Ln (Imports/labor)	0.123	0.015	8.19
Ln (Black market premium), CFA countries	0.007	0.156	0.05
Ln (Black market premium), non-CFA countries	-0.041	0.009	-4.76
Number of revolutions and coups (lagged)	-0.014	0.007	-2.13

Estimation method: within (fixed effects)
 Number of observations: 760
 Number of countries: 27
 Hausman test: $\chi^2(8)=1001$

Source: Authors' calculations.

Note: Trends and fixed effects are not reported.

Unit root tests performed on residuals of the above reported equation show that these residuals are stationary, while the dependent and explanatory variables are I(1). This equation can therefore be interpreted as a long-term, approximately co-integrated, relation.

B. Growth Accounting

In our database, there are 14 countries with sustained growth. For the purpose of this paper we add Burkina Faso, Côte d'Ivoire (henceforth referred to as Côte d'Ivoire II, to differentiate this recent growth episode from the historical one observed from 1960 to 1978, called Côte d'Ivoire I), Mali, and Tanzania, for which we shall build growth scenarios in Section IV. Table 5 reports their growth performances as well as contributions of capital and total factor productivity (TFP) to growth for the relevant periods of time.

We display contribution to growth of labor productivity (GDP/labor) rather than GDP. Although this is not the standard way of presenting growth accounting, this method is preferable because it cancels out the consequences of vast differences in population growth, which would bias country comparisons.

Table 5. Growth Accounting for Selected Economies

Country	Period	Memo:		Average Annual Growth (%)		Contribution to Growth (%)		
		GDP Growth	Labor Growth	GDP/Labor	Capital/Labor	TFP	Capital/Labor Ratio	TFP
Failed takeoffs								
Cameroon	1967-86	7.0	2.0	4.9	6.8	2.2	54.5	45.5
Côte d'Ivoire	1961-78	9.5	3.1	6.4	7.9	3.2	49.2	50.8
Kenya	1961-81	6.7	3.3	3.4	2.5	2.4	29.2	70.8
Malawi	1964-79	6.6	2.5	4.1	8.6	0.7	83.3	16.7
South Africa	1961-74	5.3	2.8	2.5	3.7	1.0	58.5	41.5
Average		7.0	2.7	4.3	5.9	1.9	54.9	45.1
Current long growth periods								
Botswana	1970-96	10.3	3.1	7.2	8.4	3.9	46.2	53.8
Ghana	1983-96	4.8	2.9	1.9	0.0	1.9	-0.3	100.3
Mauritius	1980-96	5.5	2.1	3.4	1.4	2.9	15.9	84.1
Mozambique	1986-96	6.2	1.9	4.3	1.2	3.8	11.4	88.6
Uganda	1986-96	6.3	2.5	3.8	1.8	3.0	19.4	80.6
Average		6.6	2.5	4.1	2.6	3.1	18.5	81.5
Recent growth experiences								
Burkina Faso	1994-96	4.7	2.1	2.6	0.2	2.5	3.3	96.7
Côte d'Ivoire II	1994-96	6.7	2.3	4.4	-0.9	4.7	-8.2	108.2
Mali	1994-96	5.0	2.7	2.4	2.7	1.3	44.8	55.2
Tanzania	1995-96	7.2	2.9	4.3	-3.0	5.5	-27.2	127.2
Average		5.9	2.5	3.4	-0.2	3.5	3.2	96.8

Source: Authors' calculations. Note: Logarithmic growth rates.

Table 5 reveals a distinct difference between the current growth periods and the earlier episodes that ended in the 1970s or the 1980s. The early growth episodes relied principally on capital deepening. By contrast, in the current growth periods, capital accumulation has only accounted for approximately 18 percent of growth on average. Ghana shows a slightly declining capital ratio. In other words, its growth process relies entirely on productivity gains, while capital accumulation does not contribute at all. The situation is similar in Mozambique and Uganda, although investment has played a somewhat larger role there than in Ghana. The only country among the current growth periods relying both on capital accumulation and productivity gains is Botswana.

The surprisingly moderate contribution of capital accumulation in Mauritius can partially be explained by the fact that Mauritius invested substantially prior to its takeoff. According to our data, Mauritius's capital stock increased by nearly 5 percent annually on average during the

decade preceding the high-growth period. Moreover, the trend of the investment rate has again increased recently, from 20 percent of GDP on average during the first part of the studied period to 28 percent on average during the last decade. This is a result of increasing labor costs, inducing many firms to use more capital intensive technologies. Hence, one would expect an increasing contribution of capital accumulation to growth in the future.

In Burkina Faso, Côte d'Ivoire II, Mali, and Tanzania, the contribution of TFP gains in recent years is similarly high, and even above 100 percent in Côte d'Ivoire II, where the capital/labor ratio declined between 1994 and 1996.

It is well known that in emerging countries, particularly in Asia, success stories resemble the early growth episodes in our sample to the extent that they relied heavily on capital accumulation. (see Young, 1995, and, for a treatment comparable to the one used here, Berthélemy and Chauvin, 2000). A major question is therefore why these episodes ended much earlier in Africa than in East Asia. Although there are serious noneconomic explanations in a number of cases (such as the social and political unrest in South Africa), some economic factors may be considered. To this end, we have also estimated an investment equation.

C. Analysis of Sources of Capital Deepening

Our analysis reveals that capital accumulation depends on factors from two categories: first, variables influencing the capacity to finance investments – in our equation (a) capital inflows, mainly from foreign aid in the form of grants or net debt flows, and (b) the terms of trade. The second category is factors affecting the incentives to invest. These variables include (a) the overall efficiency of the economy, measured by the marginal productivity of capital estimated from the long-term production function, and (b) political risk.

Table 6. Investment Equation

Dependent variable: growth rate of capital stock			
Variable	Coefficient	Standard Error	t-statistic
Real net capital inflows/Capital stock	0.170	0.066	2.58
Ln(Terms of trade)	0.034	0.006	5.70
Ln(Marginal productivity of capital, lagged)	0.113	0.010	11.65
Number of revolutions and coups (lagged)	-0.007	0.003	-2.35
Estimation method:	within (fixed effects)		
Number of obs:	566		
Number of countries:	26		
Adjusted R-squared:	0.50		
Hausman test:	$\chi^2(2)=18.1$		

Source: Authors' calculations.

Note: Fixed effects are not reported.

The dependence on foreign aid is rather worrisome in some cases, seeing that several African countries are struggling to reduce their debt burden. As a response to this difficult situation, debt relief has been provided by the Heavily Indebted Poor Countries (HIPC) Initiative in the cases of Burkina Faso, Mozambique, and Uganda and is expected to be provided to Mali and Tanzania in the near future⁷. Nevertheless, African countries will not be able to rely on debt flows and foreign aid as dynamic sources for financing investment. By contrast, debt is not an issue in the case of either Botswana or Mauritius, making their prospects for sustainable growth substantially brighter.

The significance of the terms of trade variable provides an important insight into the earlier growth processes. With the exception of South Africa, the past extended growth episodes all correspond to commodity booms. The surge in export prices had a double effect on investment, through increased financial resources – both from export receipts and improved access to international capital markets – in conjunction with enhanced incentives. However, when export prices collapsed, these countries were left with economies where essentially no positive structural change had taken place but where distortions had begun to increase dramatically. Sustaining these ambitious investment programs was not feasible because the foreign exchange receipts necessary to finance such expenditure dried up.

Another, complementary, explanation lies in the lack of productivity gains. As shown in our equation, investment is positively influenced by the marginal productivity of capital: low levels of productivity limit potential profits and translate into low returns on capital. Conversely, rapid productivity gains in Botswana promoted substantial investments which consequently led to a significant capital deepening as well. This process was admittedly facilitated by the country's rich endowment in natural resources, but this is not a sufficient explanation. South Africa has similar endowments but its fast-growth episode proved to be unsustainable. Mauritius is another example where high levels of productivity have promoted investment. The fact that investment has been rather weak in Ghana, Mozambique (until the end of the 1990s), and Uganda can partially be explained by their lower TFP levels. Enhanced incentives to invest will need to be derived from improvements in productivity, resulting from structural change. Some evidence of this development appears to be noticeable in Uganda and Mozambique.

On the incentive side, political instability is another factor that negatively influences investments, as shown by the lagged variable representing conflicts. Risk is an important and complex issue in Africa. According to Collier (1998), Africa was ranked the riskiest continent by the *Institutional Investor* risk rating. Our variable represents only one of many facets of risk. It would need to be considered in conjunction with other variables, such as macroeconomic stability, the quality of institutions, the reversibility of policies, the risk of expropriation by the state, the possibility to recourse in court, the availability of insurance and forward markets etc.

⁷ Côte d'Ivoire also reached the decision point in 1998, but progress came to a halt due to political considerations. However, discussions have resumed recently.

Exploring these dimensions would go beyond the scope of this study, due to the lack of systematic, long time series information on African institutions.

Other factors likely to affect investment by mobilizing domestic savings include, in particular, the strength of the financial sector (see Berthélemy and Varoudakis, 1996). Although we did not succeed in establishing statistically significant relationships in this respect, partly for lack of adequate data, these factors should also be kept in mind.⁸

D. Analyzing Sources of TFP Growth

Table 7, based on our production function equation, provides a picture of the evolution of productivity in the studied countries during their respective growth periods by dividing the TFP growth into its main sources. Again, there are some clear differences between the earlier and the current growth periods.

First, reduction of distortions in the foreign exchange market has played an important role in some of the recent good performers (Ghana Mozambique, and Uganda). Reduction of the black market premium (BMP) has in many cases coincided with broader measures of structural adjustment. The variable is therefore likely to catch some of the generally beneficial effects of macroeconomic stabilization programs and may hence be considered a good proxy for successful adjustment policies implemented in non-CFA African economies. The black market premium has been all but eliminated in these three economies, from levels of approximately 2000 percent, 4700 percent and 380 percent respectively during the relevant periods (in Uganda, the black market premium peaked at 920 percent before the studied period, in 1978). Botswana and Mauritius have had sound macroeconomic policies for a long time and the black market premium does not therefore play a visible role in the dynamics of their economies.

In CFA franc zone countries, there is no black market premium for all practical purposes. Nevertheless, the CFA franc devaluation in 1994 has played a similar role in their recovery, because it corrected the macroeconomic imbalance created by an overvaluation of their currency. This has been particularly important for Côte d'Ivoire, which had a huge unused industrial capacity until January 1994 and has been able to resume industrial activity quite rapidly after the devaluation. This is accounted for in the "other" column. In Burkina Faso and Mali, which have virtually no industrial capacity, it seems this impact has not been strong enough to compensate for other sources of TFP decline in 1995 and 1996. Our numbers should however be interpreted with caution, because they are computed on a very short period and therefore are very sensitive to the consequences of possible measurement errors.

⁸ Berthélemy and Varoudakis (1997) also argue that in a fixed effect model estimation, the role of financial development is to a large extent incorporated in the country fixed effects: the principal impact of poor financial development is that it locks the economy in a low-equilibrium trap.

Table 7. Sources of TFP Growth (Percentage Points, Annual Averages)

Country	Period	TFP Total	Contribution					
			Reduction in BMP	Human Capital	Imports/ Labor	Diversi- fication	Reallo- cation	Other
Failed takeoffs								
Cameroon	1967-86	2.2	0.0	1.5	0.5	0.0	1.4	-1.2
Cote d'Ivoire	1961-78	3.2	0.0	2.7	0.8	0.0	1.2	-1.5
Kenya	1961-81	2.4	0.0	1.0	0.0	-0.1	0.6	1.0
Malawi	1964-79	0.7	-0.1	0.0	0.5	-0.1	1.0	-0.6
South Africa	1961-74	1.0	0.0	0.3	0.6	0.1	0.5	-0.4
Average		1.9	0.0	1.1	0.5	0.0	0.9	-0.5
Current long growth periods								
Botswana	1970-96	3.9	0.0	0.8	0.4	0.2	2.0	0.5
Ghana	1983-96	1.9	1.0	0.5	0.5	0.3	0.1	-0.4
Mauritius	1980-96	2.9	0.1	0.4	0.5	0.3	0.2	1.3
Mozambique	1986-96	3.8	1.6	0.3	-0.2	0.0	0.3	1.8
Uganda	1986-96	3.0	0.8	0.6	0.6	0.2	0.3	0.6
Average		3.1	0.7	0.5	0.4	0.2	0.6	0.7
Recent growth experiences								
Burkina Faso	1994-96	2.5	0.1	1.2	1.6	0.1	0.7	-1.2
Cote d'Ivoire II	1994-96	4.7	0.1	0.4	1.8	-0.2	0.5	2.0
Mali	1994-96	1.3	0.1	0.4	0.6	-1.2	0.6	0.8
Tanzania	1995-96	5.5	-0.1	0.4	-2.6	0.1	0.7	7.0
Average		3.5	0.0	0.6	0.4	-0.3	0.6	2.2

Source: Authors' calculations.

Note: logarithmic rates. The "Other" column is the part of TFP growth rate that is not accounted for by the factors identified in previous columns.

Among structural change indicators, human capital accumulation seems to have played a more important role in the earlier periods than in recent growth episodes. However, one should keep in mind that nearly all sub-Saharan countries started from extremely low levels in the 1960s, which partly explains the high rate of growth of human capital. Nevertheless, investment in education did decrease significantly in the 1980s, leading to slower growth in the human capital stock. We see that human capital accumulation has played an important role in Botswana, Cameroon, Côte d'Ivoire I, Kenya, and Uganda. The most impressive case is Côte d'Ivoire I, where the improvement of human capital contributed 3.0 points of annual average productivity growth (conversely, Cote d'Ivoire II has performed poorly in education in the 1990s, with a decline in school enrolment rates). Mauritius' seemingly moderate growth in human capital is due to the fact that it started from a relatively high level. The country is currently at the highest level of human capital in Africa, with nearly eight years of schooling on average. Generally speaking, there is still much room for improvement in human capital in the years to come, in particular for the least advanced economies in the subsample. Assuming that they would attain

the current level of human capital of Mauritius, Mozambique and Uganda would gain around 25-30 percent of TFP while the corresponding figure for Ghana and Botswana is about 10 percent. These potential gains are significant, but they will be obtained only slowly, since the accumulation of human capital through education is a long and costly process.

Openness (determining import capacity) has contributed significantly to labor productivity in several cases both during the earlier and the current growth periods, although its contribution is more modest on average for the earlier periods. Openness has been a particularly important contributor to labor productivity gains for Botswana, Cameroon, Mozambique, Uganda and Ghana. This has also been the case recently in Côte d'Ivoire II and Mali, through the combined effects of the CFA franc devaluation and trade liberalization policies. Further, there is still progress to be made in terms of promoting exports as an engine for growth. In spite of substantial progress in trade liberalization in many cases, Africa remains relatively closed.

Reallocation of labor from the agriculture sector to more productive sectors of the economy has contributed significantly to growth both in the current and the earlier periods analyzed here. The most spectacular case is Botswana, where reallocation away from agriculture has induced an improvement in productivity of 2 percentage points on average during the studied period. In this context, the results from Mauritius merit further explanation. The modest contribution of reallocation is somewhat misleading, given the fact that the country's economy was dominated by sugar production up until the 1970s (sugar production is both an agricultural and a manufacturing activity). In Cameroon, the discovery of oil in the late 1970s provoked a substantial reallocation of labor from the agricultural sector, through a sort of "Dutch disease" mechanism. Similarly, the cocoa and coffee booms resulted in a transfer of labor mainly to the food processing industry in Côte d'Ivoire I and Kenya. It should be noticed, however, that in the cases of Cameroon, Côte d'Ivoire I, and Kenya, this reallocation did not result in an increase in diversification of the economy. In fact, the respective commodity booms induced increased specialization in these economies.

Generally speaking, diversification is a recent phenomenon in Africa, but it potentially constitutes an important source of growth primarily for the countries currently in a phase of rapid growth. The lack of diversification in the African economies stands in stark contrast with the East Asian experiences.⁹ Up to the present, in our sample, only Botswana, Ghana, Mauritius, and Uganda have substantially succeeded in diversifying their economies. Industrial diversification in Mauritius started with the development of textile and clothing productions (Mauritius is the largest textiles exporter in sub-Saharan Africa and the third-largest exporter of woolen products in the world), and continued recently with electronic products. Moreover, services have been developed and diversified, in particular tourism and financial services. This has played a major role in sustaining economic growth. Recent and modest progress in terms of diversification in Ghana and Uganda should be interpreted with care. Uganda started from an extremely low level at the beginning of the studied period, and the sustainability of its

⁹ See Feenstra and others (1999) about the role of diversification in South Korea and Taiwan.

diversification—based on new agricultural products such as flowers rather than on manufacture—is therefore not certain. In the case of Ghana, diversification gains seem to be derived from a diminishing relative importance of cocoa to the benefit of aluminum, gems and low end wood processing. In other words, in contrast to Mauritius, the diversification in these two countries does not appear to imply a significantly increasing importance of manufacturing industries. This is probably due to the lack of capital deepening, without which these economies could not really diversify their industrial structure. As a matter of fact, these countries are still at a very low productivity level. Therefore, it appears unlikely that they will be able to pursue a growth path similar to the ones experienced by Mauritius or Botswana.

A tentative conclusion may be that – with the exception of Botswana and Mauritius - the economic takeoff is not necessarily sustainable in the currently fast growing economies, inasmuch as more capital accumulation and accelerated structural change are needed in such a process. This conclusion holds for the countries to be covered in the next section. In Ghana (despite recent setbacks), Mozambique, and Uganda, a significant portion of recent growth achievements is explained by one-off effects, notably a relatively successful macroeconomic adjustment policy (and by political stabilization as well). In Côte d’Ivoire II, Burkina Faso and Mali, positive growth performance was partially linked to the CFA franc devaluation, again a one-off change. Finally, Tanzania has experienced rather modest performances in a number of areas.

IV. BUILDING SCENARIOS FOR THE YEAR 2020

Our previous analysis allowed us to identify macroeconomic, demographic, and structural factors influencing growth performances of African economies in the last decades. In order to build growth scenarios until the year 2020, we will run a simple model over the period 1996-2020. We first describe briefly the model, then the method used to formulate basic hypotheses, followed by the results of our simulations.

A. The Model

In addition to the production function and investment function described above, this simple model includes a balance of payments constraint which connects capital flows, terms of trade, exports, and imports.

The condition that the balance of payments be in equilibrium will determine the long-term level of imports. Neglecting short-term capital flows, and assuming that the variation in reserves will be zero in the long run, this equation is written as:

$$M*P_m - X*P_x - LTFLOWS = 0 \tag{2}$$

where M and X are imports and exports respectively, expressed in volume, P_m and P_x are import prices and export prices respectively, and $LTFLOWS$ is net long-term capital flows (foreign aid, loans, and investment). Rearranging this equation gives:

$$M=X*TOT+LTFLOWS/Pm \quad (3)$$

where we have used the fact that the terms of trade (*TOT*) are equal to Px/Pm .

Rather than simulating the absolute value of exports, a more reliable way is to estimate the export to GDP ratio. It should be mentioned that attempts to estimate an export function were unsuccessful. In order to simulate the development of the export to GDP ratio, we assume that, in the case of countries currently in the process of improving their economic performances, the export ratio will tend towards an asymptotic maximum. This maximum will be chosen subjectively either as the maximum level obtained in the studied period or as the current level of a country, which can reasonably be considered as a “catch up target” in the long run. The speed of convergence towards this maximum will be determined on historical data during a relevant period. More precisely:

$$\ln(x_t)=\ln(\bar{x})-\frac{a}{t+b} \quad (4)$$

where t denotes time, x_t is the export to GDP ratio at time t , \bar{x} is the asymptotic maximum value and a and b are parameters. Moreover, the speed of convergence at time t equals:

$$v_t=\frac{d\ln(x_t)}{dt}=\frac{a}{(t+b)^2} \quad (5)$$

From (3), one deducts:

$$\ln(x_0)=\ln(\bar{x})-\frac{a}{b} \quad (6)$$

and from (4):

$$v_0 = \frac{a}{b^2} \quad (7)$$

As \bar{x} and v_0 are known from historical data, a and b can be calculated from (6) and (7).

To summarize, the production function, the investment function, and the balance of payments identity combined with the simulation of the export ratio give the following system of equations:

$$\ln(Y)=\alpha*\ln(K)+\beta*\ln(M)+(1-\alpha-\beta)*\ln(L)+Z \quad (8)$$

$$M=x*Y*TOT+LTFLOWS/Pm \quad (9)$$

$$d\ln(K_t)=\varepsilon_1*\ln(\alpha*Y_{t-1}/K_{t-1})+\varepsilon_2*(LTFLOWS_{t-1}/Pm_{t-1})/K_{t-1}+E \quad (10)$$

where Y is GDP , K is capital stock, L is labor, and Z is a (log) linear combination of the reallocation effect, the human capital stock, the diversification index, the black market premium and the number of revolutions and coups (see Table 4). Furthermore E is a combination of exogenous determinants of investment (TOT and $REVCOUR$, see Table 6). Time indices have been omitted whenever this does not cause any confusion.

The system can now be solved by iteration.

B. Assumptions for the Scenarios

The scenarios assume that the governments will continue to implement policies generally favorable for growth. As a consequence, we have formulated relatively optimistic hypotheses for the variables that can be influenced by such policies. This concerns educational investments, economic openness, structural changes such as the sectoral reallocation of labor, the diversification of the economy, and, finally, macroeconomic stabilization. For each of these factors, we tried to formulate reasonably optimistic hypotheses, based both on country reports prepared within the framework of the "Emerging Africa" project and on comparisons with benchmarks observed until present on the African continent. These scenarios incorporate two basic assumptions that, with the benefit of hindsight, may have turned out to be questionable. On one hand we decided to simply neutralize the revolution and coups variable in our growth scenarios, assuming that the political environment will stay reasonably stable in the countries studied over the next 20 years. On the other hand we suppose that governments will pursue a stable and undistorted macroeconomic framework. We used the United Nations population projections for the demographic variables (total population and population in working age as well as demographic data necessary to calculate future human capital trends). Finally, concerning environment factors (terms of trade and capital flows), we have taken a neutral stance by supposing stability compared with recent data, in level for terms of trade, and in proportion to the GDP of OECD countries (supposed to grow at 2.5 percent a year) for capital flows. We detail below only the most important hypotheses.

C. Human Capital

Concerning human capital, three kinds of factors may conceivably influence economic development: (a) investments realized in the training of individuals—which determine the average number of schooling years in the working-age population used in our previous econometric estimations; (b) the quality of education; (c) and the possible waste of human resources in rent-seeking activities. In our scenarios we quantify only the first aspect. Fragmented indications suggest that the quantity of education—such as universal primary education—is more crucial than improved quality, at the current stage of African education systems. As for the third factor, we assume that rent-seeking activities will neither increase nor decline in the years to come.

Table 8 illustrates the distance separating the economies studied here from the three most advanced African economies: Botswana, Mauritius, and South Africa.

Table 8. Indicators of Human Capital in 1996

Country	Primary Gross Enrollment Rate	Average Number of Schooling Years	Adult Illiteracy
Burkina Faso	39	1.0	80
Côte d'Ivoire	71	2.8	58
Ghana	76	5.2	34
Mali	45	1.3	65
Tanzania	66	3.3	29
Uganda	74	3.3	37
Botswana	108	5.6	26
Mauritius	107	7.8	17
South Africa	131	7.0	16

Sources: World Bank (World Development Indicators) completed by African Bank of Development (selected statistics on African economies), Nehru, Swanson and Dubey (1993), and authors' calculations.

The growth of human capital, as measured by the number of years of study in the working age population, is constrained by several parameters, but also depends on political arbitrages.

Increasing the average number of years of schooling is all the more difficult to realize as age groups to be educated are large. However, differences in population growth rates cannot fully explain different performances in human capital growth, as suggested by Table 9. Given the significant time lag between education policies and their impact on human capital, as defined in this paper, it is difficult to compare different countries directly. Furthermore, the differences in initial levels also complicate comparisons, in the sense that a higher initial level of human capital requires a greater effort just to maintain that level, let alone improve it.

Table 9. Recent Human Capital and Population Growth (1990-96)

Country	Growth Rates	
	Human Capital	Population
Burkina Faso	4.8	2.8
Côte d'Ivoire	2.8	3.1
Ghana	1.4	2.7
Mali	1.3	2.9
Tanzania	2.4	3.0
Uganda	2.8	3.1
Botswana	2.7	2.4
Mauritius	1.9	1.0
South Africa	0.8	1.8

Source: Authors' calculations from World Bank (World Development Indicators).

It is, however, revealing to contrast the strong growth of the human capital stock over the recent years in Burkina Faso with the rather weak growth in Mali, in view of their comparable initial levels and current enrollment rates, and their similar demographic growth. However, the explanation to this seemingly contradictory observation lies in the fact that Burkina Faso has had primary school enrollment rates of 40 percent since the beginning of the 1990s, while comparable progress occurred in Mali only in 1996.

The comparisons of Tanzania, Côte d'Ivoire, and Uganda are also revealing. Table 9 suggests that the first country recorded appreciably lower progress than the latter two. Furthermore, a more precise analysis—not obvious from the table—reveals that the performance in Uganda has been significantly better than in Côte d'Ivoire, which is a result of the former country's conscious efforts in education. Indeed, while the primary enrollment ratio has stayed around or above 70 percent since 1987 in Uganda, it has been on a constant decline in Côte d'Ivoire and in Tanzania over the last two decades. In Côte d'Ivoire, the rate declined from 79 percent in 1980 to 67 percent in 1995, to go back up to 71 percent in 1996. In Tanzania, the decline is even more striking, because the enrollment rate was close to 100 percent at the end of 1970s and dropped to 66 percent in 1996. If one takes into account the most recent progress in Uganda, where primary education now is all but universal, one sees a clear hierarchy between these three countries, in which Uganda leads over Côte d'Ivoire, which in turn progresses more rapidly than Tanzania.

Finally, Ghana distinguishes itself from the other sample countries by a significantly higher level of human capital, which to a large extent explains why the country registers a sharply weaker human capital growth rate, although primary enrollment rates are comparable to those of Uganda. In Ghana, the secondary enrollment rate is substantially higher than in the rest of the region. Available statistics (which, however, should be considered with caution), indicate a secondary enrollment rate of more than 44 percent. According to these data, Ghana is hence about to enter into a phase comparable to that of Mauritius in the 1980s and 1990s.

For the future, these comparative data suggest that a margin of maneuver exists to improve human capital growth, but this will require conscious efforts to increase primary school enrollment rates. This will necessitate the exercise of a durable political will in favor of education expenditure and, within the budget for education, in favor of primary education, in order to reduce illiteracy.

For our growth scenarios, we will calculate the evolution of the stock of human capital (measured as the average number of years of schooling) from UN demographic data and extrapolations of primary school enrollment rates. This primary human capital stock will then be added to a simple extrapolation of secondary and higher education capital stocks, except in the case of Uganda (see below). A word of caution may be warranted regarding the impact of HIV/AIDS on human capital and growth. To the extent that the UN demographic projections correctly incorporate the effects of HIV/AIDS on demographic factors, the impact on population growth and composition is taken into account by our scenarios. However, we do not

capture other effects of HIV/AIDS on growth, notably its impact on the accumulation and quality of human capital.

The enrollment rates of the studied countries have seen substantially different developments. During the last years they fell by 1 percent a year in Côte d'Ivoire and Tanzania (since 1990), remained stable in Ghana (since 1983), increased by 1 percent a year in Uganda (from 1987 to 1996), increased by 2 percent a year in Burkina Faso and 10 percent a year in Mali (since 1990).

We suppose that the decline in enrollment rates observed at the beginning of the 1990s will not continue in the future. Consequently, we assume in our scenarios that the primary enrollment rates will remain stable in Côte d'Ivoire, Ghana, and Tanzania. For Burkina Faso, which starts from very low levels, we suppose that recent progress will continue at the same pace, which in 2020 would result in a primary enrollment rate around 69 percent, comparable to the current rate of Côte d'Ivoire.

In the case of Mali, the sharp increase recorded recently is clearly not sustainable, because expenditure in the educational sector tended to fall during the same period, in proportion to GDP. They were at the end of the decade at a level comparable to that of Burkina Faso, or 2.2 percent of GDP. As a consequence, the increase in enrollment implied a decrease of expenditure by pupil and an increase of the pupil teacher ratio (with more than 70 pupils per class in 1997). To avoid an excessively optimistic scenario for Mali, we will make the hypothesis that the future increase in enrollment rates in Mali and Burkina Faso will be comparable, at 2 percent a year.

In 1998, Uganda set up a virtually universal primary educational system, which implied a significant rise in enrollment rates towards the end of the decade. However, as in the case of Mali, budgetary means did not follow, which should be translated by a decline of the quality of education. Again, to avoid too optimistic a scenario, we assume that the new system set up by Uganda will give full results, i.e. complete schooling at the primary level with equal quality, only by the year 2010. From this date onward, we can also assume that more significant progress will be realized in secondary schooling, and for this reason we assume a growth of the stock of secondary human capital from 2010 comparable to recent developments in Ghana.

The projected evolution of the total stock of human capital is reported in Table 10.

Table 10. Human Capital Growth Scenarios, 1996-2020

	Burkina Faso	Côte d'Ivoire	Ghana	Mali	Tanzania	Uganda
Level in 1996	1.0	2.8	4.2	1.0	3.2	3.1
Level in 2020	2.2	3.5	5.9	2.1	3.7	5.0
1996-2020 growth (percent)	3.1	0.9	1.4	3.1	0.6	2.0

Source: Authors' calculations.

D. Economic Openness

Economic openness is often considered a necessary factor for growth. In the analysis developed in Section III, openness to trade intervenes through the availability of currencies to finance imports, which play the role of an intermediate quasi factor of production. In the countries studied here, episodes of foreign exchange control and foreign currency shortage were marked by a significant economic decline, as in Ghana, Uganda, and Tanzania. By contrast, liberalization since the beginning of reforms allowed for economic growth, on one hand through the increase of available import volumes, and on the other through efficiency gains linked to the elimination of distortions in the foreign exchange market.

This favorable development was coupled with a restoration of exports. However, the direction of causality is not obvious. In a study on trade policies and economic performance in sub-Saharan Africa, Rodrik (1998) confirms that economic growth is the main determinant of export growth, rather than the other way around. He shows in particular that the ratio of exports to GDP is not significantly different in Africa than elsewhere, after having controlled for size, the level of development and the geographic position of countries. In other words, the claim that low export ratios explain slow growth in Africa is not undisputed. In our case, exports enter the production function only indirectly by making foreign exchange available for imports. In the simulation model, the volume of exports as a share of GDP tends toward an asymptotic maximum, as explained above. This precludes any long-term growth effect of trade openness since exports and GDP are assumed to grow at the same rate in the (very) long run. Nevertheless, convergence towards the asymptotic maximum is assumed to be very slow, and export growth will hence influence GDP growth in the medium term.

Rodrik (1998) also shows that there are vast differences among African economies in their export performances. A quick look at data for our six countries in Table 11 confirms this. For example, Côte d'Ivoire has exported twice as much as Ghana in terms of share of GDP since the 1980s, even though these two countries share a similar geographic position, size, and comparative advantages—and despite the fact that the opposite was true in 1965. This can no doubt be explained by important investments realized by Côte d'Ivoire to develop its export crops from the 1950s onward, while Ghana's export sector experienced a deep crisis in the 1960s and 1970s, mainly as a result of an oppressive cocoa marketing board in conjunction with a highly overvalued currency. Furthermore, Mali exports twice the amount of Uganda in proportion of GDP, even though both countries are landlocked and are at a comparable level of development. Uganda underwent long years of civil war and had very heavy levies on export crops (50 percent on coffee before the reforms), as well as quantitative import restrictions. Hence, it appears that export performance, which obviously depends on geographic and other conditions, is also marked by the history of the various countries.

Table 11. Export/GDP Ratios (Constant 1995 Prices; in percent)

	1988	1998	Yearly Growth Rates
Burkina Faso	15.8	14.1	-1.1
Cote d'Ivoire	35.5	44.5	2.3
Ghana	18.1	30.2	5.2
Mali	16.3	27.5	5.3
Tanzania	12.0	18.1	4.1
Uganda	9.6	13.7	3.6

Sources: World Bank (WDI on 2000); and authors' calculations.

A partial explanation of the differences of exports growth can be found in the fact that the ratio of export to GDP is correlated positively with the degree of openness of the trade policy. According to calculations made by Rodrik (1998), there is a significant correlation between the ratio of exports to GDP and the average tariff rate on foreign trade: a reduction of 10 percentage points in the tariff rate could lead to an increase of the share of foreign trade (exports plus imports) to GDP of 17 percentage points.

A classification of the African countries according to the implementation of trade reforms shows a significant liberalization of commercial policies, which in 1985 were considered as quite closed. This classification, which takes into account both tariff and nontariff barriers, is shown in Figure 7 where three stages were distinguished: closed policies (in dark gray), moderately opened policies (in light gray), and opened policies (in white).

The figure indicates clearly that Ghana, followed by Uganda, Mali, and Tanzania, liberalized their commercial policies early. For all these countries, developments were rather uniform, with the exception of Uganda, where, in 1994 and 1995, a tax on coffee exports was temporarily reintroduced to compensate on the internal market for the increase of international prices.

Figure 7. Degree of Trade Openness

Country	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Ghana	Dark gray	Dark gray	Light gray	Light gray	Light gray	Light gray	Light gray	Light gray	Light gray	White	White	White
Mali	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Light gray	Light gray	Light gray	Light gray	White	White	White
Uganda	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Light gray	Light gray	Light gray	White	Light gray	Light gray	White
Tanzania	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Light gray	Light gray	Light gray	Light gray	Light gray
Burkina Faso	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Light gray
Côte d'Ivoire	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Light gray

Source: Richaud and Varoudakis (1999).

Note: Dark gray indicates closed policies, light gray indicates moderately opened policies, and white indicates opened policies.

By contrast, Côte d'Ivoire and Burkina Faso have maintained restrictive trade policies in spite of an attempt to liberalize in the middle of 1980s and at the beginning of 1990s respectively. The two countries adopted more liberal policies only after the devaluation of the CFA franc.

The consequences of these differences in trade policies are clearly visible in the rate of export growth, as indicated in Table 11. While Burkina Faso and Côte d'Ivoire experienced little improvement in exports in the 1990s, the four other countries progressed appreciably.

An intensification of trade liberalization policies should lead to an additional increase in export ratios. This evolution will however only be a transition toward a new steady state, characterized by a more or less complete trade liberalization, and by a ratio of exports to GDP stabilized at a higher level. The experience of Mauritius, where the exports to GDP ratio began to stabilize in recent years (to reach 69 percent in 1996) constitutes a good example in this respect.

To describe a path of plausible transition towards a new higher export ratio, assumptions must be made regarding the long-term export ratio and the speed of convergence towards it. For the long-term export ratio, we take as reference either a benchmark country or the historical maximum if the country in question was more open in the past. In the case of Mali, no obvious benchmark country was available, and the African average was used instead. Table 12 summarizes these hypotheses.

Table 12. Assumptions for Long-Term Export Ratios

Country	Long Term Export Ratio (percent)	Assumption
Burkina Faso	20	Openness comparable to current Mali
Côte d'Ivoire	69	Openness comparable to current Mauritius
Ghana	69	Openness comparable to current Mauritius
Mali	30	Openness comparable to African average
Tanzania	40	Openness comparable to historical maximum
Uganda	20	Openness comparable to current Mali

Source: Authors' projections.

These hypotheses are admittedly crude, but they are needed only to allow us to formulate a plausible scenario for the path of export performance in response to trade liberalization. As the point of departure is very far from the assumed long-term steady state, our results are in fact quite insensitive to the choice of these hypotheses over the period under review.

E. Changes in the Structure of Production

The accumulation of production factors alone cannot lead to durable growth, as suggested by neoclassical growth theory. The marginal returns on investment and on education would eventually decrease if the structure of production of the economy remained unchanged.

Two types of structural changes are considered here: the reallocation of production factors and diversification of the economy. In part, these structural changes may follow as a logical result of

factor accumulation. However, for this to happen the institutional framework and the structure of incentives must be right.

Virtually all emerging countries have experienced a significant reallocation of production factors, characterized mainly by a shift of labor away from agriculture. This movement results both from a structural change in the composition of domestic demand and of agricultural productivity growth, which frees the labor force for a given agricultural output. This type of shift can only be the natural result of economic forces and cannot be forced. In terms of dynamics, it is essentially the agricultural productivity growth that allows such a reallocation.

In our scenarios, we postulate that recent tendencies in labor reallocation will continue in the future. This essentially means admitting that the growth in agricultural productivity observed in the past will continue in the future. To formulate our hypotheses, we extrapolate tendencies observed since the beginning of improvements in agricultural growth – 1984 for Ghana and 1987 for Uganda. For the other countries, where reforms came later, we lack relevant historical information, and we simply choose to reproduce tendencies observed since 1990. In Burkina Faso and in Mali, significant progress was obtained in the cotton sector, which gives encouraging signs for the future, although this was called into question in Mali in 2000 by the farmers' cotton strike.

On the basis of these hypotheses, Table 13 indicates what could be the labor reallocation effect in the future. To make this calculation, we postulate that the relative productivity of agriculture and of the rest of the economy remains stable in the future, a hypothesis that has no major effect on our results.

These calculations form a cautious evaluation of the reallocation effect to be expected in the future, varying from 0.1 to 0.5 percentage points of growth per year on average from 1996 to 2020, which is in fact less than what was observed during the reference period. For Ghana, the reallocation effect is weak because labor productivity in agriculture and in the rest of the economy are fairly close. On the contrary, a relatively high effect is observed for Burkina Faso, where labor productivity in agriculture is far behind the rest of the economy. In Côte d'Ivoire, in spite of a significant decrease in the relative share of the agricultural workforce, the reallocation effect is moderate because this share is already relatively small (close to 50 percent).

Table 13. Labor Reallocation Out of Agriculture and Syrquin Effect (Annual average, where applicable)

Country	Reference Period	Past Trends			Reallocation Effect on Growth, Reference Period.	Future Trend Reallocation Effect on Growth, 1996-2020.
		Agriculture Relative Productivity in 1996	Growth in Agriculture Labor Force Share	Growth in Relative Agriculture Productivity		
Burkina Faso	1990-96	38.1	-0.2	1.4	0.8	0.5
Cote d'Ivoire	1990-96	50.7	-1.6	0.0	0.5	0.4
Ghana	1984-96	76.4	-0.3	0.0	0.1	0.1
Mali	1990-96	57.5	-0.4	1.4	0.6	0.3
Tanzania	1990-96	58.6	-0.6	0.5	0.7	0.4
Uganda	1987-96	54.5	-0.2	0.0	0.3	0.3

Sources: Authors' calculations from World Bank (*African Development Indicators*), completed for agricultural population from the African Development Bank (*African Development Report*).

Our econometric exercise revealed a positive effect of diversification on growth. This can be assumed to result from learning-by-doing effects or from investment portfolio choices. A more diversified economy allows investors to spread their risk on a larger number of projects, providing opportunities for higher capital productivity at lower risk. The question is what policymakers can do to enhance diversification. Numerous examples of African countries demonstrate that diversification can not be created by government decree. These examples include Algeria, Côte d'Ivoire, and Senegal. The driving force must no doubt come from market incentives. In other words, the government's role is to create an economic environment conducive to private enterprise.

The level of diversification reached by African economies, except South Africa, is very low. Among the countries studied here, Ghana and Uganda have seen real progress in diversification since their change of economic policy, respectively in 1983 and 1987. In our scenarios, we assume that tendencies observed since the beginning of reforms continue, which implies a rate of annual growth of diversification of 2.8 percent for Ghana and 3.1 percent for Uganda. Under these hypotheses, Ghana would in 2020 join the current level of diversification of Malaysia, the least diversified Asian tiger. Uganda, on the other hand, would remain at a level lower than that of current Ghana.

In CFA franc zone countries and in Tanzania, where economic progress is much more recent, it is not possible at the moment to observe any significant positive change regarding diversification, which is stable or slightly decreasing. As a consequence, we presume in our growth scenarios that their level of diversification will remain constant. This is coherent with the fact that these countries are less advanced in their respective reform processes than Ghana and Uganda.

F. Growth Scenario Results

Table 14 summarizes our growth scenarios by giving some key indicators for the year 2020, which should be reasonably close to the steady state. This table reports both quasi-steady state growth rates for GDP per capita, i.e. growth rates observed in the year 2020 and average growth rates over the period 1996-2020. It appears that Uganda's growth accelerates over time, while in Tanzania and Côte d'Ivoire, it slows down. Consequently, Uganda achieves the highest long-term growth of GDP per capita, about 0.5 percentage points higher than Côte d'Ivoire and Mali on an annual basis, and as much as 1 percentage point higher than Ghana. This can be explained mainly by Uganda's strong commitment to education, and a demonstrated greater progress in terms of diversification compared with the other countries in the sample with the exception of Ghana. Conversely, poor investment in education in Tanzania and Côte d'Ivoire explains why long-term growth rates in these countries are actually decelerating. The results from our scenarios indicate that investment in human capital is the single most important factor for sustained growth.

Table 14. Scenarios Overview (constant U.S. dollar of 1996, where applicable)

Country	GDP per capita in 1996	GDP per capita in 2020	Average growth rate	Quasi-steady state growth rate
Burkina Faso	240	420	2.4	2.5
Côte d'Ivoire	750	1360	2.5	2.1
Ghana	360	520	1.5	1.6
Mali	260	420	2.0	2.0
Tanzania	210	360	2.1	1.7
Uganda	310	500	2.0	2.6

Source: Authors' calculations.

Table 15 and Table 16 provide a decomposition of quasi-steady state growth rates, which is useful for a more detailed discussion of our growth scenarios.

First, it appears that demographic factors will play a major role in the end result. As a consequence of an increase in the share of working-age population in total population, GDP per capita will grow much faster than GDP per worker. This result (which obviously depends on uncertain demographic projections) is good news for the countries studied, which currently face a very high dependency ratio.

Second, although investment behaviors differ from one country to the other, the main factor explaining differences in GDP per worker growth is total factor productivity, not capital deepening.

Third, only two variables have the potential of significantly pushing total factor productivity in the studied country: education and factor reallocation. This means that the two most important policy initiatives that should be considered to enhance growth are investments in education and promotion of agricultural productivity. Performance in these areas may change economic

growth rates on the 2020 horizon by 0.5 to 1.0 percentage point. By contrast, our growth scenarios are rather insensitive to changes in other variables.

Table 15. Projections of Growth Rates in 2020 (Annual Growth Rates in Percent)

	GDP Per Capita	Effect of Change in the Share of Labor Force in Population	GDP/Labor	Capital Deepening	Total Factor Productivity
Burkina Faso	2.5	0.7	1.8	0.7	1.1
Uganda	2.6	1.0	1.6	0.5	1.0
Mali	2.0	0.6	1.4	0.6	0.8
Ghana	1.6	0.5	1.1	0.5	0.7
Côte d'Ivoire	2.1	0.9	1.1	0.6	0.5
Tanzania	1.7	0.7	1.0	0.5	0.4
Average	2.1	0.7	1.3	0.6	0.8

Source: Authors' calculations.

Table 16 Sources of TFP Growth

	Total Factor Productivity	Contribution			
		Education	Reallocation	Openness(X/GDP)	Diversification
Burkina Faso	1.1	0.7	0.4	0.0	0.0
Uganda	1.0	0.6	0.3	0.0	0.1
Mali	0.8	0.7	0.2	0.0	0.0
Ghana	0.7	0.4	0.1	0.1	0.1
Côte d'Ivoire	0.5	0.1	0.3	0.0	0.0
Tanzania	0.4	0.1	0.3	0.0	0.0
Average	0.8	0.4	0.3	0.0	0.0

Source: Authors' calculations.

V. CONCLUDING REMARKS

The results from our growth scenarios inspire only moderate optimism. According to our calculations, the countries studied, selected from a group of promising African candidates, are not likely to obtain growth rates anywhere near the 7 percent a year that is commonly considered necessary to significantly reduce poverty by 2020. Such a 7 percent growth rate target would imply some 4 to 4.5 percent annual growth of per capita GDP, depending on population growth rates, i.e. roughly twice as much as projected in our scenarios.

This may not be encouraging, but one must not lose sight of the fact that even this modest growth would constitute a sea change from the experience of past decades, when per capita GDP stagnated or fell in most African countries.

Moreover, our analysis leads to some concrete conclusions regarding policy variables that should be targeted by governments: education and agricultural productivity. It is worth noting that such growth-promoting policies would also be pro-poor.

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