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Chapter 1

Policy Plus: African Growth Performance 1960-2000

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Contents:

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1. Introduction[2]

The Growth project was conceived in 1997 as a collaborative effort of Harvard University, Oxford University, and the African Economic Research Consortium, and formally launched with the presentation of framework papers and the commissioning of 27 country case studies at a Harvard University workshop in March 1999. The project was designed to produce the first major, comprehensive assessment by African research economists of the growth experience of Sub-Saharan Africa (SSA) in the post-independence period.

The urgency of understanding Africa's growth record is apparent in Figure 1, which applies to all developing countries for which we have growth data, and in Table 1, which focuses on the subset for which we also have a set of human development indicators. We focus on the period from 1960 to 2000, corresponding roughly to the period of political independence for the bulk of the continent. Averaging across the countries of SSA, the story can be cast as one of modest progress: real GDP per capita rose by 60 percent over the full period, and human development indicators showed a decided improvement. But from a comparative perspective the record is profoundly unsettling. By every measure in Table 1, the SSA average in 2000 was below the level other developing countries had attained by the 1960s. This outcome is all the more remarkable given the growth and transformation of the world economy after 1960. Non-African growth consistently and dramatically outpaced African growth, with the result that Sub-Saharan real incomes fell by nearly half relative to industrial-country incomes and by only slightly less than half relative to incomes in other developing regions. By every measure in Table 1, the gap between African countries and other developing regions widened between 1960 and 2000.

Two research questions motivated the Growth project. For SSA as a whole and on a country-by-country basis,

- What were the key growth opportunities and constraints?
- What explains success or failure in seizing the opportunities?

We approached these questions by combining global evidence on the determinants of growth with country-based work on the microeconomic behavior of firms and households, the organization of markets, and the political economy of policy. In a two-stage approach, research teams first used cross-country regression models to place their country's growth in comparative perspective and identify its major proximate determinants over time. The bulk of the research then took place at the country level, where the task was to marshal evidence on why the determinants evolved as they did. Episodes that were poorly captured by the first stage motivated a search for country-specific mechanisms omitted from the cross-country models. The two stages of analysis

[2] The structure of the Growth project reflects the sustained collaboration of a steering committee composed of O. Ajakaiye, J. P. Azam, R. Bates, A. Fosu, B. Ndulu, D. Njinkeu, P. Collier, S. Devarajan, J. W. Gunning, S. O'Connell, and C. Soludo. Portions of this introductory section are drawn from O'Connell (2004) and Fosu and O'Connell (2005).

disciplined and informed each other, producing unified and comparable accounts of individual-country experience.

With 27 country studies covering nearly 60 percent of Sub-Saharan countries and over 80 percent of regional population and GDP, the Growth project is by far the most comprehensive country-based assessment of Africa's growth experience to date.[3] Table 2 shows the country cases along with their relative GDP and population shares in Sub-Saharan Africa and the ratios of their GDPs per capita to the regional average (all in 1960). The sample intentionally over-weights large countries (by GDP or population), reflecting their importance for region-wide performance. At the other end of the size distribution, it includes Botswana and Mauritius, both tiny in terms of population; these countries loom large as examples of sustained growth success, not just within Africa but on a global basis. Collapsed states like the Democratic Republic of Congo or Somalia, where data limitations are severe, are under-represented to some degree, although as we will see, state breakdown represents a plausible characterization of over 10 percent of the country-years in our sample.

Figure 2 depicts the episodal analysis the country teams were asked to adopt in organizing the central themes of their case study. Each country's growth experience was to be divided into a small set of episodes corresponding to major changes in the incentive structure facing private economic activity, particularly with respect to government interventions in markets. Within each episode, researchers focused on two questions. First, how did policies and shocks combine to produce the observed growth outcomes? Researchers developed microeconomic evidence linking policies and shocks to the resource allocation decisions of households and firms, and particularly to the scale and *ex ante* efficiency of investment in human and physical capital. Where growth appeared to be dominated by factors poorly proxied in cross-country growth regressions, these factors were identified and evidence brought to bear on their importance. Second, why were these policies chosen? Researchers developed evidence on the beliefs of the political elite, the interests to which they responded, and the institutions through which political competition was mediated.

The structure of this synthesis volume reflects a two-way taxonomy developed by the project editors in the course of reviewing draft versions of the country studies. The period since 1960 has been one of steady increases in the share of trade in world GDP, making success or failure at engaging with international markets a central determinant of development success. To proxy for growth *opportunities*, we re-grouped the country studies—previously organized by sub-region—by aspects of location and resource endowment that have powerfully differentiated growth experience on a global basis. As discussed in detail in Chapter 2, the high-opportunity *coastal, resource-poor* group includes countries like Tanzania or Senegal; the low-opportunity *landlocked, resource-poor* group includes countries like Burkina Faso and Burundi; the *resource-rich* group includes economies like Botswana or Nigeria.

[3] A number of country teams had access to excellent recent country studies from the *EAGER* project and/or the *Emerging Africa* project (Berthelemy and Soderling (2001, 2002)), both of which provide sustained treatments of country-level growth experience that are deeply informed by the cross-country literature.

Growth depends on the interaction of opportunities with *choices*. After an intensive review of the draft country studies, the editorial team identified four broad anti-growth syndromes that emerged repeatedly in the country evidence. Three directly reflect the choices of incumbent state actors – in turn, control or *regulatory* regimes that severely distort productive activity and reward rent-seeking, regimes of *ethno-regional redistribution* that compromise efficiency in order to generate resource transfers to sub-national political interests, and regimes of *intertemporal redistribution* that aggressively transfer resources from the future to the present. The fourth, *state breakdown*, refers to situations of civil war or intense political instability in which a government fails to provide security or to project a coherent influence in a substantial portion of the country. We asked country teams to corroborate our proposed classification of episodes and syndromes for their country, a process that led in some cases to substantial modifications. The editorial team then extended this judgmental classification to all other African countries, based on a consultation of the relevant literature. These syndromes do not exhaust the ways in which African governments have actively shaped the growth environment, and in a substantial portion of episodes, countries avoided all four syndromes, a category we call *syndrome-free*. Nor do the patterns revealed in our two-way taxonomy constitute a complete account of growth outcomes; this requires controlling for exogenous shocks and initial conditions, and for a wide range of detailed and often country-specific and opportunities and choices. But the analysis of opportunities, episodes, and syndromes constitutes the heart of our contribution to understanding African growth experience.

In Sections 2 and 3 below we provide background for the synthesis and country studies by laying out the main stylized facts of African growth and interpreting these observations from the viewpoint of the growth econometrics literature. Section 4 previews the main conclusions of the synthesis, including the argument that avoiding anti-growth syndromes is both a necessary condition for sustained rapid growth and a sufficient condition for the avoidance of short-run collapses. In Section 5, we return to the growth literature and country evidence to explore the scope for opportunity-specific growth strategies looking ahead.

2. Five features of African growth

The global econometric literature relevant to understanding Africa's growth experience is immense.[4] Recent Africa-focused surveys include Collier and Gunning (1999) and our own framework paper for the Growth project (O'Connell and Ndulu (2001)), which cover

[4] The cross-country literature on economic growth now has its own journal (the *Journal of Economic Growth*, since 1995), a Ph.D.-level text by Barro and Sala-i-Martin (1995), undergraduate-level texts by Jones (1998) and Van den Berg (2001), and a forthcoming *Handbook of Economic Growth* in the North-Holland series. As many have observed, most of the key ideas in the modern growth literature have precursors dating from the 1950s or earlier. The emergence in the late 1980s of global datasets with wide developing-country coverage provided key impetus for the contemporary literature, as did the successes of "new growth theorists" in formally breaking out of the neoclassical tradition of diminishing returns to capital and exogenous technological progress. Easterly (2001) provides a masterful introduction to the interaction between the modern growth literature and development experience.

the literature through the late 1990s. Much has been added since then, and we provide a highly compressed update in Section 4 below. We start, however, by setting out five observations with which any account of African growth performance must contend.

Slow factor accumulation and slow productivity growth. Table 3 employs a standard growth-accounting framework to decompose the growth in real GDP per worker into the contributions of physical and human capital accumulation per worker and a "productivity growth" residual. The underlying production function is Cobb-Douglas in physical capital and effective labor, where the latter is human capital per worker multiplied by the population of working age. Exploiting the Cobb-Douglas structure, we scale output and physical capital by effective labor and write the production function as[5]

$$ypw_{it} = A_{it} \cdot kpw_{it}^{\alpha} hpw_{it}^{1-\alpha}, \tag{1}$$

where ypw_{it}, $kpw_{i,t-1}$ and $hpw_{i,t-1}$ are real GDP per worker, physical capital per worker, and human capital per worker in country *i* in year *t* (output is produced using the end-of-previous-period capital stocks) and A_{it} is the level of total factor productivity (TFP). Following Collins and Bosworth (1996), we set the share of physical capital in national income to $\alpha = 0.35$. We can then obtain the implied growth of TFP over any *k*-year period from the exact decomposition

$$\Delta_k \ln ypw_{it} = 0.35\Delta_k \ln kpw_{i,t-1} + 0.65\Delta_k \ln hpw_{i,t-1} + \Delta_k \log A_{it}, \tag{2}$$

where Δ_k denotes a *k*-period average difference ($\Delta_k x_t \equiv k^{-1}(x_t - x_{t-k})$ for any variable x_t). The second and third terms on the right-hand side of (2) give the contributions of physical and human capital accumulation per worker to the growth of real GDP per capita; on the right-hand side, *ex post* TFP growth is calculated as a residual.

Table 3 applies equation (2) by region for the full period 1960-2000. In the bottom row we compare the 18 countries in SSA for which data are available with 41 other developing countries. While low investment rates are an important part of the African growth story, measured capital accumulation accounts for only about half of the long-run differential in growth rates of real GDP per worker. The other half reflects the stagnation

[5] Collins and Bosworth (1996) perform the same calculation using GDP and capital stock series measured in constant local currency. They assume a Cobb-Douglas production function with effective labor input given by *hL*, where *h* is a measure of education per worker and *L* is the labor force. Capital's share is .35. The capital stock is estimated from starting values in 1960 using the perpetual inventory method with a depreciation rate of 5 percent. To apply the decomposition to PPP-adjusted real GDP series, we first converted the initial capital stock to PPP dollars by assuming the same ratio between PPP-adjusted and constant-local-currency initial capital stocks as between PPP-adjusted and constant-local currency investment rates (this is required to reflect the very different relative price of investment in PPP-adjusted data versus national accounts: investment tends to be much more expensive at international than domestic prices in low-income countries.). We then recalculated the capital stock series using investment at constant international prices. The education contribution is identical to the one used by Collins and Bosworth (we thank Susan Collins for access to an updated version of the 1996 data).

of African productivity. The striking fact is that between 1960 and 2000, cumulative productivity growth in SSA was as likely to be negative as positive. Using a similar methodology, Hall and Jones (1999) estimated the *level* of total factor productivity in the late 1980s, on a consistent cross-country basis. They showed that the differences in PPP-adjusted incomes in Table 1 are mainly driven by differences in the apparent productivity of measured inputs, rather than by differences in their availability per worker.

Modest advances in human development. Table 1 shows that over the entire 1960-2000 period, the gap between African literacy rates and life expectancies and those in other developing regions did not widen as rapidly as did the gap in incomes. In Figure 4 we provide an alternative perspective on the same phenomenon. We plot the estimated coefficients $\hat{\gamma}_t, \hat{\gamma}_{t+1}, ..., \hat{\gamma}_{2000}$ along with their 2-standard-deviation bounds from OLS equations of the form

$$d_{it} = \alpha + \beta \ln yppp_{it} + \sum_{j=t}^{2000} \gamma_j (SSA_i \cdot year_t), \tag{3}$$

where *d* is the life expectancy rate at birth or the adult illiteracy rate. At the time of political independence for much of SSA, life expectancy rates were 15 years below those of countries with similar incomes globally; adult illiteracy rates were 25 percentage points higher. By the early 1990s, African illiteracy rates were statistically indistinguishable from those of similar-income countries. Life expectancy rates had also converged steadily to global income-adjusted norms for much of the period, but in contrast with literacy rates they show a marked slowdown starting in the mid-1980s and a striking reversal with the onset of HIV/AIDS in the 1990s.

Limited structural transformation. In Ndulu and O'Connell (2001) we documented the limited degree to which the economies of SSA have diversified out of traditional agriculture, which continues to provide the livelihoods for the bulk of African populations. A similar observation holds with respect to the diversification of exports (Berthelemy and Soderling (2001, 2002)). African exports have tended to remain concentrated in a narrow band of primary commodities, and in many cases have become more concentrated over time via the exploitation of mineral resources. In Chapter 2 we use global data on primary commodity exports and rents from energy, mineral and forest resources to identify resource-rich economies. Comparing SSA with other developing regions outside of the Middle East and North Africa, a stark difference already existed in 1960 with 12.5 percent of the SSA sample classified as resource-rich and only 7 percent of the non-SSA sample. Over time this difference expanded as another 16.7 percent of the African sample acquired resource-rich status compared to only 10.5 percent of the non-African.

Volatile growth. Table 4 examines the intertemporal variation of growth rates within countries, both on a year-to-year basis and over longer periods. Annual growth in SSA has been highly volatile, and this is true both of growth itself and of the unpredictable component of growth, proxied here by the prediction error from a country-by-country AR(2) process. 5-year averages smooth out this volatility considerably—consistent with

the presence of transitory shocks to growth (including classical measurement error)—but medium-term volatility remains distinctly higher in SSA than elsewhere.

Since volatility tends to decrease with income on a global basis, we check at the bottom of the table whether African volatility remains high after conditioning on the region's low income. The answer is yes for the annual data: the standard deviation is roughly 2 percentage points higher for African countries than would be predicted on the basis of income alone. But the volatility of African growth looks less distinctive when we move to 5-year periods; the SSA effect becomes small and statistically insignificant. From this perspective, it is not the medium-term volatility of African economies that is unusual, but rather the persistence of low income during a period of global growth and the concomitant lack of structural diversification. These imply a continued exposure to substantial medium-term volatility.

Period-to-period correlations between 5- and 10- year non-overlapping averages provide a further indication of the episodal character of African growth: correlations are virtually zero across 5-year periods but rise to 0.30 across decades, consistent with protracted but ultimately temporary periods of boom and bust.

Diversity over time and across countries. The long-run averages in Table 1 conceal considerable diversity, both in the region's comparative performance over time and in the experience of individual countries. Figure 4 demonstrates these points by disaggregating the growth accounting decomposition reported in Table 2. For each indicator, the heavy line shows the SSA mean calculated at non-overlapping 5-year intervals (dotted heavy lines show the high-performing Asian economies). Vertical bars show bounds of plus and minus one "within-SSA, within period" standard deviation around these means. Thin lines show +/− 1 standard deviation bounds around the half-decadal means for all other developing countries. The *y*-axis scale shows the long-run non-SSA mean and, for purposes of scaling, the range of the non-African standard deviation bounds. It is clear that rapid growth is not unusual in SSA: many individual countries have out-performed the developing-country mean on a 5-year basis. Sustained growth has nonetheless been unusual, with only Botswana and Mauritius consistently growing at rates exceeding the long-run mean for developing countries.

Figure 1, and to a lesser degree Figure 4 (which covers many fewer countries), suggests that a substantial portion of Africa's long-run growth shortfall occurred between the mid-1970s and the mid-1990s. This is particularly true of population-weighted growth rates (Figure 1), where the dramatic success of China, India and Indonesia pulls the non-African average upwards starting in the late 1970s. Part of this story is a steady collapse of physical capital deepening in Sub-Saharan Africa, both in absolute terms and relative to other developing regions. Physical investment, in contrast, makes virtually no contribution to the favorable performance of African growth in the second half of the 1990s; the growth increase is entirely accounted for by the productivity residual (an observation emphasized by Berthelemy and Soderling (2001))

3. The view from growth econometrics

Growth accounting decompositions provide a useful organizing structure but are not designed to deliver a causal account of growth. To observe that capital deepening made a substantial contribution to growth in Mozambique in the 1990s, for example, is not to resolve the question of whether capital deepening determined growth, growth determined capital deepening, or both responded to a third factor like the resolution of civil war. What are the *determinants* of the growth record we have just outlined?

Cross-country regressions provide a natural approach to this question, and we used this literature both to structure the country studies and to develop our synthesis of the case material. Like growth accounting, the typical growth equation starts from an aggregate production function. In the augmented Solow model of Mankiw, Romer and Weil (1992), for example, the aggregate production function takes the form $Y_{it} = K_{it}^{\alpha} H_{it}^{\beta} (A_{it} \cdot L_{it})^{1-\alpha-\beta}$, where *K*, *H* and *L* are aggregate physical capital, human capital, and raw labor and *A* is the level of total factor productivity. Physical and human capital per *effective* worker approach unique steady-state values in this model, implying that output per effective worker, $\tilde{y} \equiv Y / AL$, also converges to a steady state. Convergence is monotonic and proportional to the distance from the steady state. The growth of output per *actual* worker over any *k*-year period is therefore given by

$$\Delta_k \ln y_{it} = -\gamma \ln y_{i,t-k} + \gamma \ln \tilde{y}_i^* + \Delta_k \ln A_{it} - \gamma \ln A_{i,t-k}. \quad (4)$$

where $\gamma > 0$ is the speed of convergence.

Equation (4) is the basis for estimating econometric growth models of the form

$$\Delta_k \ln y_{it} = -\gamma \ln y_{i,t-k} + \phi' x_{it} + \lambda' z_i + \varepsilon_{it}. \quad (5)$$

where ε_{it} is a country/year disturbance. The presence of lagged income is a hallmark of the neoclassical growth paradigm, in which diminishing returns to all forms of reproducible capital (including human) ultimately limit the contribution of capital accumulation to growth. In this setting the vectors x_{it} and z_i capture time-varying and time-invariant determinants of the three other variables in equation (4): steady-state income per effective worker, the rate of productivity growth, and the initial level of productivity. In models with constant or increasing returns to capital accumulation (e.g., Lucas (1988)), there is no limit on the potential contribution of capital accumulation to growth. The initial income term is therefore absent, and equation (4) is derived more directly from an equation like (2), with the *x* and *z* variables operating via factor accumulation or productivity growth or both.[6]

[6] While constant or increasing returns to reproducible capital strongly differentiate the qualitative predictions of endogenous growth models from those of their neoclassical counterparts, nothing in the growth accounting results we presented earlier depends on this distinction. To see this, consider a neoclassically-grounded growth accounting calculation, which yields

The most tightly specified version of (5) comes from the Solow model itself, which ties down steady-state income as an increasing function of the shares of physical and human capital investment in GDP and a decreasing function of the replacement-investment term $n_{it} + \delta + g$ where *n* is the population growth rate, δ is the rate of depreciation of capital, and *g* is the rate of global technical progress. In an important background paper for the project, Hoeffler (2002) estimated such a model and confirmed the significance of factor capital accumulation and population growth both on a global basis and for the African sub-sample.

The augmented Solow model treats technological progress as exogenous and does not model the saving rates and other parameters that tie down the balanced-growth path. Starting in the late 1980s, researchers have used equation (5) to explore the direct impact of a wide range of theoretically justifiable determinants of factor accumulation and productivity growth (an influential early example is Barro (1991)). In O'Connell and Ndulu (2001) we reviewed that literature through the late 1990s, emphasizing the importance of *demographics*, *geography, external shocks*, *economic policies*, *institutional quality*, and *political stability* in global growth and tracking African values of these determinants over time (see also Collier and Gunning (1999)). In a two-step process, we developed a set of representative specifications that could be used by country teams to locate their own country's experience in the global space of growth determinants and outcomes.[7] Given the questionable exogeneity status of many of the determinants, we interpreted these regressions cautiously, as linear projections of growth on other variables. Under reasonably mild conditions, linear projections uncover the expected value of growth conditional on the determinants, and we therefore referred to these regression models as *pooled conditional models*. Table 3a shows the conditional models estimated for 5-year non-overlapping averages in O'Connell and Ndulu (2001).

In Table 3b we use these models to decompose the deviation of period *t* growth from the sample mean $((g_{it} - \bar{g}),$ where $g_{it} \equiv \Delta_k \ln y_{it})$ into the sum of a country/period residual and the regression-weighted sum of country/period deviations in the growth determinants. Using a hat (^) to denote an OLS estimate, the table reports a version of:

$\Delta_k \ln y_t = \alpha \cdot \Delta_k \ln k_t + \beta \cdot \Delta_k \ln h_t + (1-\alpha-\beta) \cdot \Delta_k \ln A_t$, in contrast to equation (2) which comes from the endogenous growth model of Lucas (1988). The impact relative to our calculation is to shift $(1-\alpha-\beta)\Delta_k \ln h_t$ into the estimated residual. But measured human capital grows only very slowly, as new workers with higher levels of educational attainment replace older workers. Rates of human capital accumulation therefore contribute very little to observed growth differentials, and this modification would make little practical difference.

[7] We first developed a base specification involving initial conditions, geography, and external shocks, and then documented the partial correlations of a wide range of policy, institutional and political stability variables with growth, holding the base variables constant. We then developed a final set of specifications that incorporated groups of strongly-performing variables that captured the main themes of the empirical literature.

$$(6) \qquad g_{it} - \bar{g} = -\hat{\gamma}(\ln y_{i,t-k} - \overline{\ln y}) + \sum_j \hat{\phi}^j (x_{it}^j - \bar{x}) + \sum_l \hat{\lambda}^l (z_i^l - \bar{z}) + \hat{\varepsilon}_{it}$$

in which we have re-grouped variables by analytical category (see Table 4c) and aggregated over regions and periods.[8]

No single specification, of course, can do justice to the question we posed at the outset of this section; there are too many potential determinants and the level of aggregation raises fundamental questions of exogeneity and identification (Temple (1999)).[9] The purpose of these decompositions is nonetheless to provide some indication of the relative importance of different growth determinants, both cross-sectionally and in the experience of individual countries. In Table 4b, the policy variables account for something close to half of the predicted deviation of African growth from the global average. A central message of our 2001 paper was therefore that case analysis of African growth must focus to a substantial degree on the determinants and microeconomic impacts of policy and governance.

Econometric research continues apace, and ongoing developments are reflected in throughout this synthesis volume. A "short list" of noteworthy contributions that draw on global data to make Africa-relevant contributions—the earliest of which were included in our 2001 survey—would now include Sachs and Warner (1995) on outward orientation; the same authors (1997, 2001) on the natural resource curse; Bloom and Sachs (1998) on geographical and demographic constraints; Masters and McMillan (2001) on tropical location and the disease environment; Easterly and Levine (1997) on ethnic fractionalization and policy; the same authors (1998) on neighborhood (spillover) effects; Collier (1999) and Collier and Hoeffler (2004) on civil wars; Mauro (1995) on corruption; Knack and Keefer (1995)) on the rule of law; Acemoglu, Johnson and Robinson (2001) on institutional legacies of the colonial period; Guillaumont, Guillaumont Jeanneney and Brun (1999), Dehn (2000), and Blattman, Hwang, and Williamson (2004) on vulnerability to external shocks; Burnside and Dollar (2000) on aid; and Glaeser, *et al* (2004) on political leaders. Each of these papers has introduced one or two novel growth determinants into the empirical literature, deriving leverage over Africa's experience mainly via the tendency of African values to cluster in the lower or upper quartiles of the determinants being studied. Other cross-country studies have focused explicitly on explaining within-Africa growth differentials, either by restricting attention to Africa-only samples or by allowing parameters to vary across regional sub-samples; notable among these are include Ghura and Hadjimichael (2002) on sources of African growth, Block (2001) on differences between African and non-African growth

[8] Since the average OLS residual is zero by construction, the decomposition is exact. The orthogonality of fit and residual also affords a clean attribution of the relative contributions of observed and unobserved determinants of growth to the overall conditional mean. The latter property does not hold for individual determinants, however, because they are mutually correlated.

[9] Researchers have attempted to reduce the dimensionality problem by isolating determinants that are robust to the inclusion or non-inclusion of other variables (e.g., Levine and Renelt (1993), Artadi and Sala-i-Martin (2003)) and by constructing portmanteau variables that aggregate a variety of related proxies (e.g., the celebrated Sachs and Warner "openness" variable, or the "diversion" variable constructed by Hall and Jones (1999)). Our grouping of variables in Table 3b is in the latter spirit.

dynamics, Fosu (1992, 2002) on political instability, and Berthelemy and Soderling (2001) on episodes of rapid growth.

4. Episodes and syndromes: lessons from the country studies

Throughout this volume we emphasize four often interrelated factors that play a powerful role in the global growth evidence and that emerge repeatedly in our country studies:

- Resource endowments inviting a narrow commodity specialization and providing large and volatile rents to political incumbents.
- Policy-driven distortions in the composition of investment and the allocation of existing labor and capital across sectors or firms.
- Diversion of productive resources into rent-seeking and other forms of distributional struggle, including civil war.
- Remoteness from middle-to-high-income world markets, implying high costs of trade and technology transfer.

The salience of the first three factors varies not just across countries but also within countries, in many cases shaping the periodization chosen by the country author and serving as a central theme in the overall story line. The fourth factor is closer to being time-invariant, and its importance therefore emerges mainly at the synthesis stage.

Slow growth may be driven by an absence of favorable growth opportunities or by a failure to seize such opportunities as exist. Resource endowments and geographical location form the basis of our division of countries by growth opportunities, a theme we pursue further in section 5 below.[10] Here we focus briefly on policy distortions and distributional struggle, which are at the heart of our analysis of policy syndromes.

As outlined in detail in Chapter 2, we have created a time line for each country indicating the periods during which a distinct anti-growth bias can be detected in the policy or, more broadly, governance environment. The analytical basis for each syndrome, the judgmental criteria employed by the editorial team in identifying its occurrence, and the political economy of its adoption and/or abandonment are the subjects of individual syndrome chapters (Bates on controls, Collier and Gunning on intertemporal redistribution, Azam on ethno-regional redistribution, and Bates on state breakdown; see also Fosu and O'Connell (2005)). Table 5 summarizes the resulting classification, showing the population-weighted distribution of country/years by opportunity group and syndrome. Regulatory regimes form the largest category by far, and occur most frequently in landlocked, resource-poor countries although the difference by opportunity group is small. Syndrome-free cases come second; in a challenge to the highly pejorative

[10] For editorial purposes the identification of high-opportunity *coastal, resource-poor*, low-opportunity *landlocked, resource-poor*, and *resource-rich* countries must be time-invariant, because each country appears in only one group of country studies. In the econometric work of Chapter 2, Collier and O'Connell adopt a time-varying classification. Nigeria (for example) becomes resource-rich in 1971 when its exploitation of oil resources passes a quantitative threshold. For 1960-70, Nigeria is classified as coastal and resource-poor.

thrust of the African political economy literature, we find that African governments steered clear of our anti-growth syndromes nearly a third of the time. Ethno-regional redistribution, intertemporal redistribution, and state breakdown come next, each occurring in fewer than 20 percent of the country/years. Resource-rich countries show the highest frequency of both redistributive regimes, a difference that becomes large if population weights are used, reflecting the prevalence of these syndromes in Nigeria.

Figure 5 tracks the occurrence of syndromes over time. Regulatory regimes show a distinct pattern: already prevalent in 1960, they increase sharply during the 1970s, reaching a peak in the early 1980s. They decline slowly throughout the 1980s and then sharply between the late 1980s and early 1990s. The redistributive regimes show a similar but more muted pattern, with the result that syndrome-free status declines steadily from over 60 percent of countries in 1960 to below 20 percent by the mid-1970s. The restoration of syndrome-free status comes gradually during the 1980s and then increases sharply in the early 1990s before stabilizing at just under half of the sample. State breakdown is the only category that shows a monotonic trend: it rises gradually over time and then increases sharply starting in the late 1980s, affecting more than a quarter of countries in SSA by 2000. The policy environment therefore shows a distinct divergence during the 1990s, as regulatory and redistributive regimes are replaced by a combination of syndrome-free status and state breakdown.

The sources of these developments are explored in detail in the syndrome chapters and country studies and in the chapter by Ndulu on the global intellectual environment. Their implications for growth are explored econometrically by Collier and O'Connell in Chapter 2 and by Fosu and O'Connell (2005). Collier and O'Connell (2005) find that controlling for exogenous shocks, the marginal impacts of individual syndromes on growth are strikingly consistent, statistically significant, and large. The regulatory syndrome and both redistributive syndromes each reduce predicted median growth by roughly a full percentage point on an annual basis, while state breakdown reduces predicted median growth by slightly more than 2 percentage points. The impacts of regulatory regimes and state breakdown remain strong when unobserved country heterogeneity is controlled for via fixed country effects, confirming the salience of these regimes within the country narratives. The impact of redistributive regimes, in contrast, is less robust to controlling for unobserved heterogeneity. This is consistent with Azam's chapter on the political geography of redistribution, if we interpret ethno-regional polarization as a slowly-evolving unobserved variable whose presence is proxied by episodes in which aggressive redistribution dominates the growth environment. The impact of polarization on growth may occur not just via the use of distortionary instruments to redistribute resources to favored (or threatening) groups, but also via a high *ex ante* risk of predation by state or non-state actors, or of state breakdown.

Fosu and O'Connell (2005) aggregate the four anti-growth syndromes into a single dichotomous variable indicating whether a country is syndrome-free in a particular year or displays one or more of the anti-growth syndromes. They identify a *growth collapse* as a year in which a 3-year centered moving average of growth is negative, and a period of *sustained growth* as a year in which a 5-year centered moving average exceeds 3.5

percent (roughly a point above the long-run developing-country median). The probability of sustained growth is below 20 percent in the presence of one or more syndromes; it is 44 percent for syndrome-free countries, and the difference is highly statistically significant. At the same time, the probability of a growth collapse is below 20 percent for syndrome-free countries and nearly 50 percent countries displaying one or more syndromes. Syndrome-free status emerges as (virtually) a necessary condition for sustained growth in SSA and (virtually) a sufficient condition for avoiding the short-run growth collapses that have so often undermined growth over longer periods.

In Figure 6 we provide a compressed representation of the leading themes that emerge from our analysis of the country evidence on policy and growth. State breakdown has disproportionately affected resource-rich and landlocked countries in SSA; but wherever it occurs, growth stops. For countries that steer clear of breakdown, avoiding the regulatory and redistributive syndromes constitutes a second critical step. Where syndromes emerge, growth again stops, with high probability. If there is a single dominant lesson from the country evidence, it is that in the opening decades of political independence, African governments systematically under-prioritized the core functions of securing peace, husbanding national assets, and creating a minimally supportive environment for trade and private investment. Governments that succeeded in performing these functions avoided growth collapses and created a platform for moderate to rapid growth. The spread in outcomes among syndrome-free countries was wide, reflecting the diversity of *ex ante* opportunities and perhaps, at the deepest level, the differential success of countries at identifying and removing binding constraints.

Subsequent chapters explore the reasons for the continent's long detour into growth syndromes and the growth prospects uncovered by the economic and political reforms that swept the continent beginning in the mid-1980s. Strong political leadership is a feature of all sustained high performers in our sample—notably Mauritius among coastal, resource-poor economies, Malawi among landlocked, resource-poor economies, and Botswana among resource-rich economies. Institutional legacies feature importantly in some cases (Botswana, Mauritius), but in many others public sector performance has been endogenous to the political dispensation of powerful leaders (Malawi, Uganda since the mid-1980s). In the latter cases, high performance has not often outlasted political succession. Ethno-regional polarization poses a continuing challenge to effective governance in many of our cases (Azam, Chapter 7 and Bates, Chapter 8) and in concert with low education levels complicates the short-run relationship between democratization and the growth environment (Bates, Chapter 9).

Do growth-promoting governments "merely" perform core functions, or do they intervene at ambitious scale to remove binding constraints on growth? The dichotomy is misleading because the manifest difficulty of committing to core functions suggests that governments that steered clear of syndromes achieved this as a matter of ambitious and purposive strategy. But neither generalization holds in our sample. Instead, two features appear common across our cases of sustained growth success: first, the degree of market intervention was kept in proportion to government capability—remaining a good bit lower, for example, in Botswana and post-conflict Uganda than in Mauritius. Second,

successful governments articulated growth strategies that committed government to adequate provision of core functions and accommodated private sector accumulation as a central component of development. Where such a commitment emerged from policy reform—as in most cases—the duration over which policy remained syndrome-free played a key role in establishing credibility.

5. Implications for Growth Strategy in Africa

Three major lessons from this research are pivotal for shaping growth strategy for Africa, two of which relate to policy choice. One is that avoiding policy mistakes or in this project's lingo being syndrome-free, is the single most important choice for closing the growth gap between Africa and other regions. This is referred to as avoiding "sins of commission" (Collier and Gunning 1999).

Secondly, and again related to policy choices, is that the distinctly different composition of opportunities that Africa has in contrast to other regions, weighs heavily both on proneness to making policy mistakes, as elaborated below, and engenders unusually high transactions cost of development. The policy connection here relates to avoiding under-provision of public goods in order to offset particularly the geographical and natural resource disadvantages which tend to inflict unusually high transactions cost to doing business and delivery of essential services. To put it simply the unusually high natural and locational disadvantage a large proportion of African countries face is not destiny. Rather, they can be offset with appropriate policy choices. This is referred to here as avoiding "sins of omission" – such as by providing adequate infrastructure to offset the serious locational disadvantages to trade, or using an external restraint against misuse of resource rents by tying hands (transparency and accountability) or as has been suggested in the case of averting the redistributive conflicts using public spending programs wisely (Azam, 2005).

The third lesson relates to the very distinctive demographic features of Africa compared to other regions, which weigh unusually heavily on national saving and undermine the building up of the necessary human capital needed for growth. Indeed, although we have seen earlier that controlling for levels of income and growth the human development indicators for Africa were not initially bad, but a relative deterioration of these over time has contributed to the per capita income growth differential with other regions. Enhancing human capacity by increasing the longevity of working life, improving skills and organizational effectives are all important for a strategy to close the growth differential with other regions.

It is noteworthy that several other conditioning variables have been considered in cross-country growth analyses, which we do not focus on in the project but are worthy keeping in mind. In Table 4a, the pooled conditional model of O'Connell and Ndulu (2000), included several conditioning variables in addition to those emphasized here. In particular, institutions and political stability co-vary with growth in ways consistent with theory. Geography and demography likewise are shown to matter for growth in the full sample, and their implied contributions to explaining the difference in growth

performance from the mean of the sample are substantial (a combined 1 percentage of growth).

Let us now turn to elaboration of the three areas.

Avoiding Policy mistakes

Consistent with much of the cross-country growth analysis, evidence from this research suggests that policy matters a great deal for growth. In chapter 2, Collier and O'Connell (2005) using a counterfactual, estimate the contribution of syndromes to the growth differential with other regions (p. 24). They conclude that taking forty years of African growth experience as a whole and controlling for differences in the composition of opportunities, the syndrome effect is by far the most important explanatory factor (p.24). It accounts for 52 percent of the overall growth differential, or as much as 1.8 percentage points out of 3.5 percent overall average differential in growth with other regions. This result is confirmed by a regression analysis in which they estimate the effect of the syndromes controlling for shocks and opportunity category. This magnitude of relative importance of policy mistakes in explaining the growth performance differential with other regions is corroborated by evidence from cross-country growth studies.

O'Connell and Ndulu (2000), in a framework paper for this project estimate the contribution policy variables to explaining Africa's growth differential with other regions and from that predicted by a global regression. Holding the baseline determinants constant, variation in the policy exerts a powerful influence on predicted African growth. Using a specification that includes trade openness, fiscal, financial and exchange rate policies in the bundle of policy determinants; "policy" contributes fully half of the predicted growth deviation (p.19). Furthermore, policy differential with the "East Asia Pacific" region generate growth differentials ranging between 1 and 2 percentage points, depending on the specification of the bundle referred to as policy. And there is a wide range of other studies that corroborate this same conclusion. Ndulu (1998) reported the results of counterfactual simulations of Africa's growth performance if conditions obtaining in East Asia were present in the region (table 3). Using results earlier obtained by Elbadawi and Ndulu (1995), Easterly and Levine (1996) and Elbadawi, Ndulu and Ndung'u (1997), a better policy environment as obtaining in East Asia would have raised growth by an additional 1.5% - 2.6%.

Mitigating the adverse consequences of natural resource curse and locational disadvantages

Endowments and geography condition both opportunities for growth and the policy space for government choices in exploiting these opportunities. Indeed, the growth potential and the type of policy risks (syndromes) identified in this project are influenced by whether a country is resource rich or resource poor, coastal or land locked, with ethnic or geographical fragmentation or not. Notwithstanding the importance of syndromes in explaining Africa's growth differential with other developing regions, still a significant 27 percent of the differential is accounted for by differences in the opportunity structures

between Africa and other regions (Collier and O'Connell, pp. 11, 24). Under each category of opportunities, Africa's growth performance was distinctive and underperformed the global average. The underperformance was most severe for Africa's coastal resource scarce economies (missed opportunities) and least for Africa's land-locked resource-scarce economies (poor potential). Two sources of this differential are important – proneness to syndromes and the higher cost of doing development business.

Proneness to syndromes is likely to be more important in resource-rich and coastal countries where the rent-seeking stakes are higher (from resource and trade rents), while higher transactions costs of economic activities from geographical disadvantages is likely to be more important in landlocked countries. The unusually high preponderance and population weight of resource rich countries and ethnic fragmentation in SSA presents high risk for adopting anti-growth policy regimes. It also makes both inter-temporal and ethnic- regional redistribution syndromes probably the most important and distinct policy challenges for SSA. Again in contrast to other regions unusually high proportion of Africa's population lives in remote areas or resource-poor landlocked countries (35%)-unmitigated by necessary infrastructure investments.

The cost of pursuing development in Africa is unusually high. As discussed in Ndulu (2004), geographical disadvantages and natural resource dependence combine to account for uncharacteristically high costs of development in Africa. Three dimensions of these disadvantages are worth reviewing here drawing from Ndulu (2004) – preponderance of tropical climate, geographic dislocation and economic fragmentation – disadvantages that can be mitigated with appropriate policy or investment actions.

In comparison with 3% for OECD countries and 60% for East Asia., 92 percent of Sub-Saharan Africa lies within the tropics, where the burden of disease is high and impacts negatively on life expectancy, human capital formation, and labor force participation. It is estimated that the forgone growth in Africa as a result of malaria prevalence to be a high 1.25 percent annually (Artadi and Sala i Martin (2003). Sachs and Warner (2001), find significant negative impact of a "malaria index" on growth. Easterly and Levine (2003) and Acemoglu and Robinson (2001) show an indirect impact of the disease environment on long term growth. They argue that many countries' institutions were shaped during colonization, and where the disease environment was inhospitable they introduced extractive institutions in contrast to where more hospitable disease environment allowed colonialists to settle and set up institutions conducive to long term growth.

The region is also highly fragmented. For a given geographic area, the region has the highest number of countries, with each on average sharing borders with four neighbors, often with different trade and macro policy regimes.

Table Interregional comparison of geographical and sovereign fragmentation indicators

	Average # of countries to area	Average Population. Density (people/km^2)	Average number of borders	Proportion of population in land locked countries (%)	Average Trans-portation. Costs ($)	Natural Resource Rents Dominance		
						The Regional Share[d]	The World Share[e]	Average Frequency[f]
SSA	2.00	77.65	4	40.2[a]	7,600	64	32	6
EAP	1.44	405.5	2.09	.42	3900[b]	52	13	8
ECA	1.17	74.58	4.93	23.06	-	36	11	3
LAC	1.52	119.92	2.34	2.77	4,600	80	26	7
MNA	1.60	136.27	3.94	0	2,100	78	15	5
SAR	1.67	382.94	2.75	3.78	3900[b]	38	3	3

Notes- a: Congo, Dem. Rep., Sudan and Ethiopia have been treated as 'landlocked' countries. b: Data on transportation costs is available for East and South Asia region together (Venables and Limao 1999). c: An economy which generates more than 10% its GDP in primary commodities exports is classified as a 'natural resource economy'. d: as a share of the total # of countries in each region. e: as a share of the total # of "Natural Resource" economies 93 (in the world). f: average number of times a "Natural Resource" economy generates greater than 10% rents from exports of primary commodities over the period 1960-2002.

There are 47 small economies in SSA with a median size economy's GDP of $4 billion. The region accounts for 10 percent of the World population but only for 1.2% of the world GDP. In addition to low population density, the economic density (GDP per km^2) is also extremely low.

Nearly 40 percent of the SSA population lives in landlocked countries with high transport costs and poor trade facilitation. The remoteness of population concentrations is accentuated by high internal transport costs. As a result transport costs for intra Africa trade is unusually high (including trans-shipment), estimated at nearly twice the levels in other developing regions. Limao and Venables (2001) estimated the median transport costs for intra Africa trade (including transhipments) to be $7,600 for a 40 ft container compared to median transport cost of $4600, $3900 and $2100 for Latin America and Caribbean, East and South Asia; and Middle East and North Africa respectively. Distance and landlockedness influence the country's access to large markets, hinder the country's ability to exploit economies of scale and hence lower its production efficiency (Sachs and Warner, 1995, 1997, 2001). The facts that investment in Africa is relatively expensive and half as efficient in terms of growth, are partly related to this disadvantage. Relative to other regions, the transport costs of intra-SSA trade are much higher.

Geography and natural resource curse, however, are not destiny, their effects can be offset.Botswana, the fastest growing economy in Africa (and among the fastest globally) for the past four decades, presents a striking example. It is landlocked, natural resource

dependent and has not had a history of a settler colony. Arguably, the strength of its state capacity, its being part of the Southern Africa's relatively effective infrastructure system, customs union and monetary area (for a long period) helped offset the negative effects of remoteness and geographic disadvantages (Ndulu 2004).

Delayed demographic transition

Africa's distinct demography weighs heavily directly on *per capita* income growth and indirectly through being a drag on human capital development. In contrast to other regions demographic transition has not happened in Africa. Three features of this distinct demography stand out. One, the average population growth rate is at least 1 full percentage point above that for other developing regions, a result of which was to weigh heavily down on per capita income growth.

Secondly, we also learn from stylized facts that life expectancy in the region not only was at a significantly lower level in 1960, 15 years below non –African developing countries, but it also rose slowly subsequently so that by the 1990s it was well below the non-African developing countries average by nearly 25 years. Furthermore, Africa is the only region that has experienced a reverse trend in life expectancy recently, mostly due to the HIV/AIDS epidemic.

Thirdly, the unusually high age dependence is another demographic feature of the region. As we learnt from stylized facts, Africa's age dependency ratio, which began at the developing country's mean in the 1960s, has risen steadily until early 1990s in contrast to the rest of the developing world, which experienced a demographic transition toward a lower fertility rate. It also means that Africa's potential labor force has grown unusually slowly relative to its population. Other things being equal, a high age dependency ratio would be expected to lower growth by reducing national saving and perhaps through undermining the quality of human capital accumulation by spreading educational resources more thinly. In a growth simulation/counterfactual O'Connell and Ndulu (2000) estimate that Africa's average growth is reduced by 0.85 percentage points relative to the sample mean, and by nearly 1.5 percentage points relative to East Asia as a result of the difference in age dependence ratios.

The challenge of human capital for growth

One of our stylized facts is that SSA has done a bit better on human development indicators than it has done on real GDP growth. If initial conditions matter, this suggests that SSA has a more solid starting point for growth now than in the 1960s.

Until recently human capital variables, measured by educational enrolment or attainment, have performed poorly in the cross-country growth regressions particularly when high frequency data are used. O'Connell and Ndulu (2000) in a paper for this project, omitted human capital variables so measured from their pooled conditional models estimated on using half decadal data because the estimated coefficients were typically insignificant or

of the wrong sign. They did, however, include life expectancy among the initial conditions with the correct sign and significance.

The problems of insignificant impact of human capital on long term growth has been addressed recently in three ways – (i) better measurement of education attainment data (ii) greater care in the treatment of collinearity and endogeneity issues in estimation (Barro, 1998), and (iii) use of threshold levels of educational attainment.

Cohen and Soto (2001) and Soto (2002) using a new educational attainment data sets (with fewer measurement errors) in panel growth regressions (decadal averages) and careful treatment of collinearity and endogeneity, has led to recovery of statistically-significant, correctly signed and empirically plausible effects of human capital investment on growth. The estimated direct returns to such investment ranges from 7-10 percent. Including the indirect effects via accumulation of additional physical capital these authors find a long-run impact of education on income that is somewhat larger, 12-16 percent for each additional average year of education. In a 1998 paper, Barro finds that school attainment at the secondary and higher levels for males aged 25 and over has a positive effect on the subsequent rate of economic growth (1998, p. 18).[i] The estimated impact for this category is such that an additional year of schooling raises the growth rate impact by 0.7% per year, a very large effect indeed for slow growers (Barro, ibid, p. 18). This impact is mediated predominantly via improved capabilities to absorb technological advances.

The threshold approach has been employed in studies that that estimate the indirect impact of human capital on growth through FDI. In a cross-country empirical study to determine the effect of foreign direct investment (FDI) on growth, Borensztein, DeGregorio, and Lee tested the effect of the flow of FDI from industrial countries to 69 developing countries (1998). They found that FDI had a larger impact on growth than domestic investment, due to its higher productivity. This impact, however, obtains only when there is sufficient capability in the host country to absorb the complex technologies that come with FDI. The robust complementary effect between FDI and human capital results when the host country has the minimum threshold stock of human capital where the male population 25 years and over has at least 0.52 years of secondary schooling. This level of educational achievement is far above that of the majority of African countries. Consistent with these results ,the vast bulk of FDI into Africa flows into the mineral and energy sectors in resource-rich countries.

Most recently Lumbila (2005) investigated the factors that influence the efficacy of FDI in increasing growth in Africa. He builds on the findings from Borensztein et al (opt cit) to investigate, inter alia, the question whether education enhances the impact of FDI on growth. Using a threshold of secondary school enrolment of 25% he groups African countries with enrolments below the threshold as countries with poor human capital. He runs two separate regressions for the two categories of countries using panel data from 1980 to 2000. His results confirm the findings by the authors above about the role of human capital on FDI and growth. FDI had a larger growth impact in countries with secondary school enrolment above the threshold.

6. Conclusions

The central message of the Growth project is to confirm the critical importance of policy for long term growth in SSA. A study of more than 200 growth episodes in 46 African countries over the last 40 years confirms that absence of negative policy syndromes or policy mistakes was associated with sharply higher conditionally expected growth rate and with the successful avoidance of episodic growth collapse. In a detailed analysis of 27 country cases the project has sought to uncover the political and institutional forces of policy failure and the pathways to syndrome-free status. This project also confirms that to support growth, governments must go beyond rectifying policy mistakes, particularly to take action in ameliorating the impact of the preponderant challenges from natural resource curse and severe geographical disadvantages many countries in the region face.

We conclude by pointing to two important issues worthy of further work, both as we finalize the research summarized here and in future research on African growth.

First, much of the above discussion has employed "ceteris paribus" counterfactuals in order to isolate the individual effects on growth of policy mistakes, under-provision of public goods, or weaknesses in human capital. If there are critical synergies across these factors, or if, there are sharply increasing returns to individual state variables over some interval (as suggested by Azariadis and Drazen (1990) and Berthelemy (2005) in the case of human capital and Sachs et al (2004) for both human capital and public infrastructures), then the achievement of rapid growth by syndrome-free economies may require what Collier (2005) and others have called a "big push," with judicious policy design to avoid coordination failures. Collier (2004) identifies a nexus of three such key traps militating against Africa's growth—poor governance, conflict and insecurity, and inadequate infrastructure. The remarkable feature of this diagnosis is not the scope of its ambition; the record of Africa's opening decades is replete with the ambitions of visionary leaders who sought to engineer a sharp break from patterns of specialization and distribution inherited from the colonial era (Ndulu, Chapter 3). What is remarkable is its re-casting of growth strategy in terms of the core functions of market-friendly government – a message deeply consistent with our country evidence. In our view, the forging of a vital, credible commitment to these functions will remain the central challenge for African political leaders in the decade ahead. Understanding the political economy of such commitments will remain a central task for researchers in African economic growth.

Secondly, a simple comparison of syndrome-free growth rates over time suggests that the traction from policy improvement to growth may have decreased over time, an observation that has naturally tended to feed impatience about the importance of what we have called the policy dimension. The observation itself is contestible; Fosu and O'Connell (2005), for example, find that there is little, if any, decline in the traction from syndrome-free status after controlling for the deterioration of the external growth environment in the 1990s. But some decline in leverage of policy may well have

occurred. Transitional uncertainties associated with the simultaneous political and economic reforms of the 1985-95 period, for example, would be expected to reduce initial growth responses to economic reforms. Among resource-rich economies, Collier and Gunning suggest in their chapter on intertemporal syndromes that in the absence of strong institutions for accountability, democratic reforms may undermine the quality and credibility of economic management. Among resource-poor coastal economies, the incumbency of successful Asian coastal economies may well have created a more challenging playing field for African export diversification starting in the 1990s than existed in the earlier decades.[11] More work is needed to determine the appropriate mix between the avoidance of errors of commission and proactive interventions designed to address structurally and historically-determined growth constraints.

[11] Collier and O'Connell find in Chapter 2, however, that African coastal economies that maintained syndrome-free status for longer periods after 1980 achieved substantially greater export diversification into manufactures and services

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Tables and Figures in order of appearance in the text

Table 1. *Regional growth comparisons*

Region	N	**Initial values** (1960 or earliest year before 1965, or as indicated)				**End-to-end annual growth rates** (earliest year before 1965 to latest year between 1995 and 2000)					**Ending values** (latest year between 1995 and 2000)			
						Real GDP								
								Real GDP per capita						
		Real GDP per capita (1996 PPP$)	Gross primary enroll-ment rate, 1970	Adult illiteracy rate, 1970	Life expec-tancy at birth	Total	Popu-lation	Total	Workers per capita	Real GDP per worker	Real GDP per capita (1996 PPP$)	Gross primary enroll-ment rate	Adult illiteracy rate	Life expec-tancy at birth
SSA	35	1278.1	53.8	55.8	41.1	3.20	2.63	0.56	-0.15	0.72	2047.5	90.1	41.2	47.8
		(15.0)	(52.8)		(58.5)						(8.4)	(86.4)		(61.1)
OTHER DEV'ING	43	2591.5	90.5	26.5	53.2	4.28	2.16	2.12	0.23	1.90	6409.1	107.4	17.9	69.7
		(30.5)	(88.9)		(75.8)						(26.2)	(103.0)		(89.1)
…LAC	22	3338.4	99.1	17.4	56.4	3.52	2.08	1.44	0.42	1.03	6268	113	11.1	70.8
		(39.2)	(97.3)		(80.3)						(25.6)	(108.3)		(90.5)
...SASIA	5	934.4	58.6	55.5	45.3	4.34	2.23	2.10	-0.32	2.42	2186.3	100.1	45.2	63.8
		(11.0)	(57.6)		(64.5)						(8.9)	(96.0)		(81.6)
…EAP	9	1833.1	94	20.4	50.6	5.48	2.07	3.41	0.16	3.29	8691	101.3	11.4	69.6
		(21.5)	(92.3)		(72.1)						(35.5)	(97.1)		(89.0)
...MENAT	7	2402.5	81.9	42.3	51.7	5.09	2.48	2.61	0.13	2.48	6934.7	103	27.8	70.6
		(28.2)	(80.5)		(73.6)						(28.3)	(98.8)		(90.3)
INDUST	22	8507.6	101.8		70.2	3.45	0.71	2.74	0.34	2.41	24489.2	104.3		78.2
Total	100	3433.3	80.4	38.1	52.7	3.72	2.00	1.71	0.12	1.60	8860.2	100.6	27.1	63.9
SSA v SASIA		(136.8)	(91.8)	(100.5)	(90.7)						(93.7)	(90.0)	(91.2)	(74.9)
SSA v OtherDev		(49.3)	(59.4)	(210.6)	(77.3)						(31.9)	(83.9)	(230.2)	(68.6)

Source: PWT6.1 and World Development Indicators. Regions: SSA=Sub-Saharan Africa; OTHER DEV'ING=Other Developing (LAC=Latin America and Caribbean, SASIA=South Asia, EAP=East Asia and Pacific, MENAT=Middle East, North Africa and Turkey); INDUST=Industrial countries.
Notes: Except in the final 2 rows, the numbers in parentheses give the relevant developing-country mean as a percentage of the industrial-country mean. The final 2 rows show the SSA mean relative to the SASIA mean and the mean for all non-SSA developing regions.

Fig 1: Smoothed average growth in real GDP per capita

(countries with full set of growth observations)

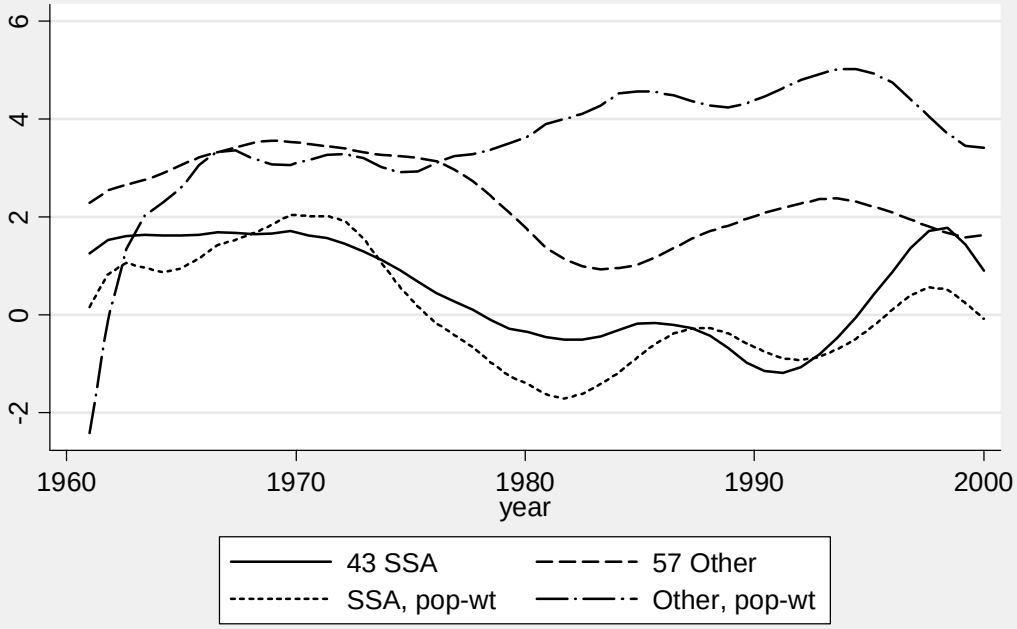


Table 2. *Countries in the Growth project*

Country	Average growth in real GDP per capita, 1961-2000	Percentage share in total SSA:		Ratio of GDP per capita to SSA average, 1960	Authors of country study
		Popula-tion in 1960	GDP in 1960		
Coastal opportunity group					
Benin	0.63	1.03	0.82	0.74	Antonin Dossou, Jean-Yves Sinzogan
Cote d'Ivoire	0.57	1.73	2.06	1.10	Benie M. Kouadio, Mahamoudou Traore
Ghana	-0.21	3.11	1.91	0.57	Ernest Aryeetey, Augustin Fosu
Kenya	1.23	3.82	2.20	0.53	Francis Mwega, Njuguna Ndung'u
Mauritius	3.70	0.30	0.69	2.11	Shyam Nath, Yeti Nisha Madhoo
Mozambique	-0.38	3.42	3.96	1.07	Clara Ana de Sousa, Jose Sulemane
Senegal	-0.24	1.46	1.98	1.25	Mansour Ndiaye, Adama Diaw
South Africa	0.88	7.97	28.96	3.37	Gertrude Hartzenburg, John Stuart
Tanzania	1.83	4.68	1.32	0.26	Benno Ndulu, Nkunde Mwase
Togo	0.86	0.70	0.46	0.61	Tchaboure Gogue, Kodjo Evlo
CO group	**0.89**	**28.22**	**44.35**	**1.16**	
Landlocked opportunity group					
Burkina Faso	1.25	2.12	1.20	0.52	K. Savadogo, S. Coulibaly, C. McKracken
Burundi	0.20	1.35	0.51	0.35	Janvier Nkuruziza, Floribert Ngaruko
Chad	-0.72	1.40	1.22	0.80	Nadjiounoum Djimtoingar, J.-P. Azam
Ethiopia	0.41	10.44	4.05	0.36	Alemayehu Geda, Befekadu Degefe
Malawi	1.36	1.62	0.50	0.29	Chinyamata Chipeta, Mjedo Mkandawire
Mali	-0.27	1.99	1.46	0.68	Massaoly Coulibaly, Amadou Diarra
Niger	-1.65	1.46	1.74	1.11	O. Samba Mamadou, Mahaman Yakoubou
Sudan	0.75	5.22	3.89	0.69	A. A. Ali, I. Elbadawi, F. Ibrahim
Uganda	1.40	3.01	1.24	0.38	Michael Atingi-Ego, Louis Kasekende
LL group	**0.31**	**28.61**	**15.83**	**0.58**	
Resource-rich opportunity group					
Botswana	6.33	0.22	0.16	0.67	Gervase Maipose, T. C. Matsheka
Cameroon	0.66	2.43	3.03	1.16	Georges Kobou, Fouda Seraphin
Congo, Rep.	1.33	0.45	0.15	0.31	Celestin Tassa, Benjamin Yamb
Guinea	0.02	1.44	2.92	1.88	Sekou Doumbouya, Fode Camarra
Namibia	0.62	0.28	0.69	2.24	John Odada, Tekaligne Godana
Nigeria	0.32	18.71	14.30	0.71	Milton Iyoha, Dickson Oriakhi
Sierra Leone	-1.36	1.03	0.82	0.74	Victor Davies
Zambia	-1.25	1.44	1.24	0.80	Inyambo Mwanawina, James Mulungushi
RR group	**0.83**	**26.00**	**23.31**	**1.06**	
Total	**0.68**	**82.82**	**83.49**	**0.94**	

Note: The comparisons are vis-à-vis all 42 countries in SSA for which we have data on population and real GDP at international prices. The RR group contains all countries classified in Chapter 2 as resource-rich for at least 1 year.

Figure 2. *Episodal growth analysis.*

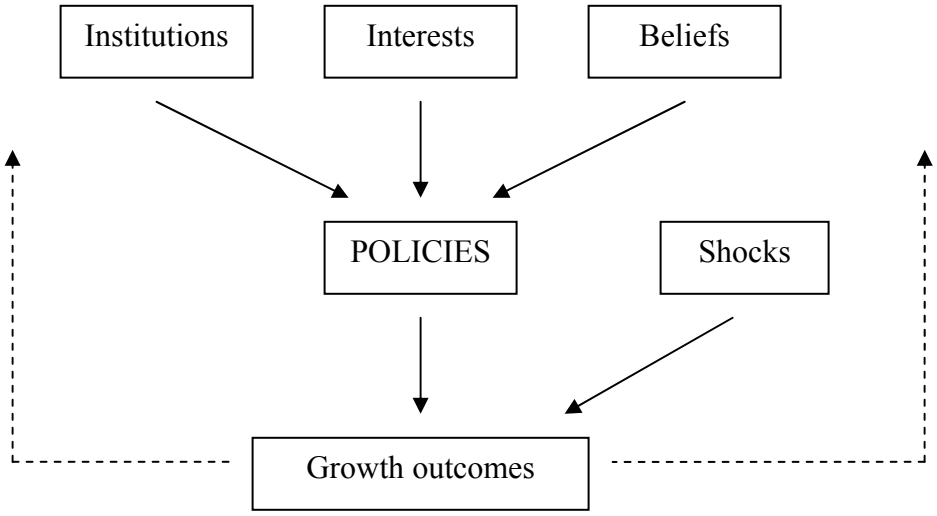


Table 3. *Regional growth accounting decompositions (annual growth rates except where noted).*

Region	N	Real GDP	Popula-tion	Real GDP per capita	Workers per capita	Real GDP per worker	Contributions of:		
							K per worker	Educ per worker	Resid
SSA	**18**	**3.25**	**2.70**	**0.54**	**-0.07**	**0.61**	**0.36**	**0.25**	**0.00**
Other Developing									
.....LAC	21	3.49	2.17	1.32	0.39	0.92	0.41	0.34	0.18
.....SASIA	4	4.45	2.23	2.22	-0.32	2.54	1.11	0.32	1.11
.....EAP	7	6.21	2.04	4.17	0.22	3.95	2.11	0.49	1.35
.....MENAT	9	4.84	2.19	2.65	0.13	2.52	1.19	0.44	0.90
Total	**59**	**4.01**	**2.32**	**1.68**	**0.14**	**1.54**	**0.76**	**0.34**	**0.43**
SSA minus Other Developing		-1.10	0.55	-1.64	-0.31	-1.33	-0.57	-0.13	-0.63

Source: PWT6.1; initial capital stock and educational contribution from Susan Collins. For definition of regions see Table 1.

Fig 3: SSA/year interactions and 2 SD bounds

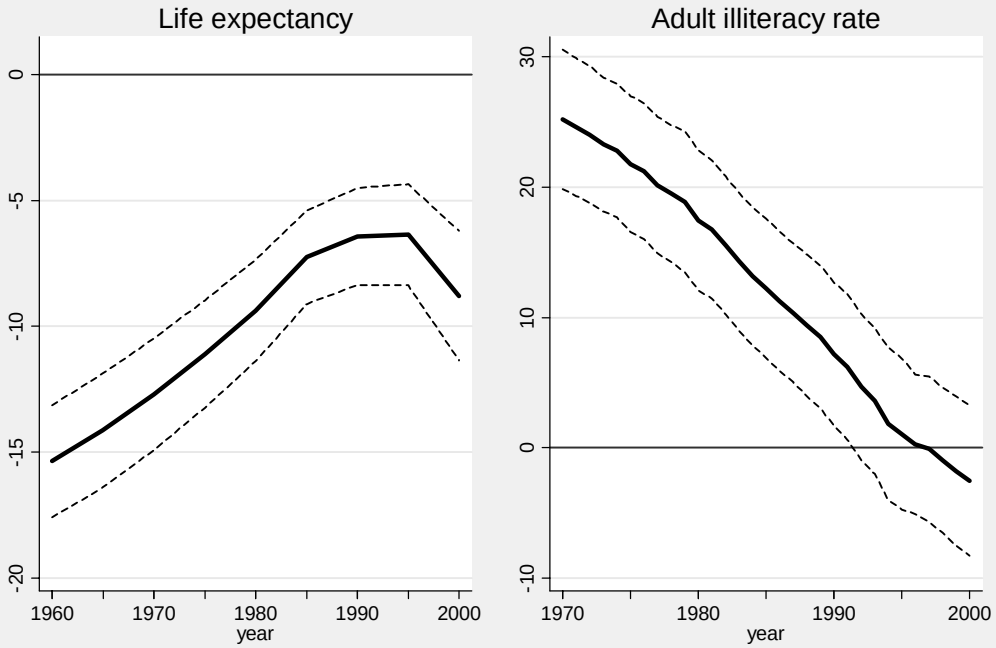


Table 4. *Regional comparisons of volatility.*

Region	N	Regional averages of country-level standard deviations				Correlation between current and lagged growth	
		Annual data		Non-overlapping 5-year averages			
		Growth of real GDP per capita	Prediction error	Growth of real GDP per capita	Prediction error	5-year periods	Decades
SSA	38	7.31	6.91	3.36	2.56	0.07	0.30
MENAT	8	5.92	5.51	2.71	1.94	0.03	-0.10
Other Developing	37	4.30	4.04	2.31	2.01	0.39	0.42
INDUST	22	2.69	2.43	1.69	1.30	0.31	0.41
Total	105	5.18	4.85	2.59	2.06	0.25	0.41
SSA intercept*		2.147***	2.081***	0.912***	0.399		
Robust standard error		0.600	0.583	0.285	0.277		

Source: PWT6.1. Prediction errors are calculated from country-by-country annual or half-decadal AR(2) processes for the growth rate of real GDP per capita. For definition of regions see Table 1. *Coefficient on an SSA dummy variable in a cross-sectional regression of country-level standard deviations on the log of PPP-adjusted per capita real GDP at PPP$ (N=105; R2 = .424 and .421). *** = significant at the 1% level.

Fig 4. Growth accounting: 59 developing countries

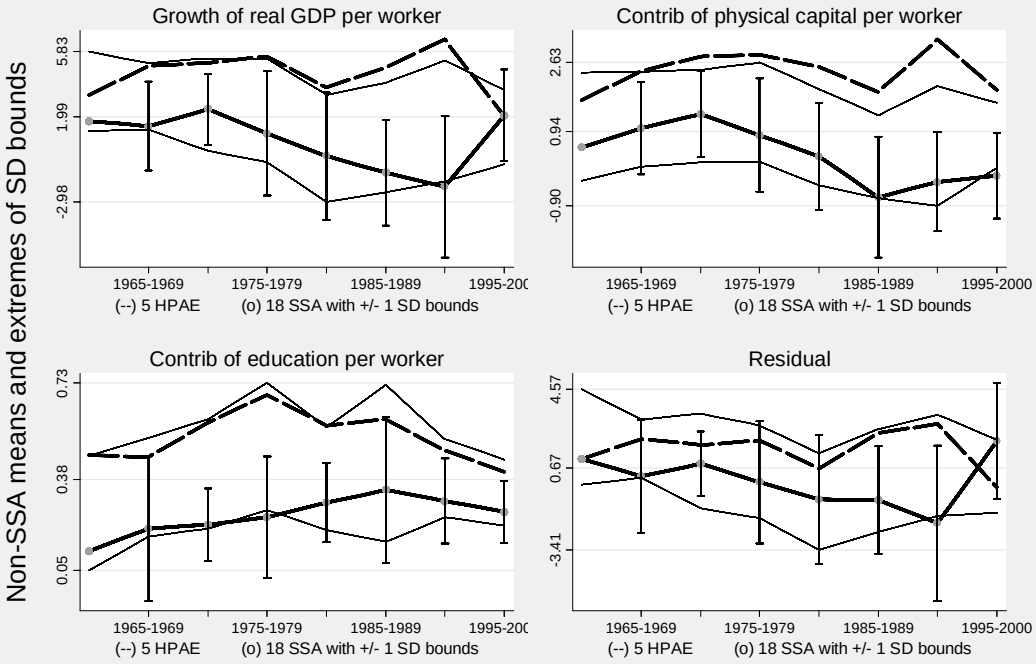


Table 4a. *Growth, policy and political instability: pooled conditional models.*

Dependent variable: growth in real GDP per capita	Specification 1		Specification 2		Specification 3		Specification 4	
		Beta coeff.		Beta coeff.		Beta coeff.		Beta coeff.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(initial income)	-1.765	-0.631	-1.698	-0.580	-1.833	-0.657	-2.065	-0.772
	-6.104		-4.951		*-5.778*		*-6.087*	
life expectancy	0.089	0.375	0.076	0.300	0.085	0.353	0.079	0.327
	2.872		2.136		*2.424*		*2.613*	
age dependency ratio	-0.052	-0.338	-0.043	-0.269	-0.047	-0.308	-0.051	-0.348
	-4.222		-3.125		*-3.492*		*-2.988*	
growth of potential LF participation	0.728	0.126	0.786	0.131	0.661	0.114	0.785	0.138
	2.711		2.622		*2.359*		*2.504*	
terms of trade shock	0.004	0.006	0.016	0.023	0.016	0.023	-0.016	-0.025
	0.146		0.530		*0.546*		*-0.546*	
trading partner growth	0.540	0.231	0.607	0.249	0.516	0.220	0.488	0.191
	2.759		2.962		*2.463*		*1.876*	
landlocked	-0.912	-0.113	-1.185	-0.143	-0.874	-0.106	-0.694	-0.086
	-2.725		-2.949		*-2.246*		*-1.559*	
political instability	-0.975	-0.137	-1.062	-0.154	-0.740	-0.109	-0.780	-0.122
	-4.220		-4.382		*-3.040*		*-2.565*	
financial depth	--	--	0.021	0.164	--	--	--	--
	--		2.842		--		--	
inflation	-0.004	-0.051	--	--	-0.003	-0.032	-0.002	-0.030
	-1.830		--		*-1.170*		*-0.766*	
black market premium	-0.007	-0.134	-0.008	-0.153	-0.008	-0.153	-0.009	-0.176
	-2.403		-2.687		*-2.399*		*-2.293*	
gov't cons./GDP (Barro/Lee)	-0.113	-0.254	-0.105	-0.225	-0.113	-0.252	-0.100	-0.239
	-4.555		-3.931		*-4.210*		*-3.681*	
ratio of manufacturing trade to GDP	--	--	--	--	0.026	0.137	0.029	0.175
	--		--		*2.721*		*3.032*	
fiscal deficit after grants/GDP	--	--	--	--	--	--	-0.103	-0.181
	--		--		--		*-2.928*	
constant	15.347	--	12.782	--	13.934	--	16.883	--
	5.365		4.449		*4.903*		*5.053*	
# of observations	422		364		363		258	
F	15.58		13.58		13.68		12.53	
Prob > F	0		0		0		0	
R-squared	0.407		0.402		0.417		0.467	
Root MSE	2.186		2.278		2.179		2.005	

Source: O'Connell and Ndulu (2000). All regressions include are estimated for non-overlapping 5-year periods 1961-1997 (final half-decade 1990-97), with a full set of halfdecade dummy variables. *t*-statistics are in italics. Variables are defined in Table 3c.

Table 4b. *Decompositions based on pooled conditional models.*

Region	Deviation of actual growth from sample mean	Contribution of: Baseline variables	Political instability	Policy	Residual
	(1)	(2)	(3)	(4)	(5)
Column 1 of Table 4a:					
SSA	**-1.24**	**-0.53**	**0.12**	**-0.73**	**-0.12**
LAC	-0.61	-0.31	-0.14	0.00	-0.19
SASI	0.12	1.06	-0.22	-0.76	0.06
EAP	2.13	1.38	0.08	0.33	0.38
MENAT	1.00	0.21	-0.01	0.19	0.69
INDU	0.57	0.06	0.05	0.61	-0.16
Column 2 of Table 4a:					
SSA	**-1.4**	**-0.42**	**0.15**	**-1.01**	**-0.17**
LAC	-0.62	-0.14	-0.17	-0.24	-0.09
SASI	0.53	1.26	-0.27	-0.76	0.34
EAP	2.42	1.53	0.11	0.25	0.56
MENAT	1.02	0.13	0	0.49	0.45
INDU	0.57	-0.31	0.07	1.1	-0.27
Column 3 of Table 4a:					
SSA	**-1.26**	**-0.32**	**0.10**	**-0.89**	**-0.19**
LAC	-0.61	-0.25	-0.10	-0.14	-0.15
SASI	0.42	1.31	-0.20	-0.91	0.28
EAP	2.32	1.41	0.07	0.50	0.37
MENAT	0.91	0.14	-0.01	0.28	0.56
INDU	0.38	-0.26	0.03	0.78	-0.16
Column 4 of Table 4a:					
SSA	**-1.14**	**-0.12**	**0.11**	**-1.05**	**-0.15**
LAC	-0.93	-0.2	-0.1	-0.18	-0.46
SASI	0.68	1.59	-0.21	-1.17	0.57
EAP	2.35	1.48	0.07	0.65	0.14
MENAT	0.71	0.18	-0.03	0.04	0.56
INDU	0.18	-0.65	0.04	0.8	0.01

Source: O'Connell and Ndulu (2000). Decompositions were calculated as described in the text, using regression coefficients from Table 4a. The decomposition applies to the regression samples only. Case-study teams received a detailed country-by-country decomposition based on column 1 of Table 4a.

Table 4c. *Variables in the pooled conditional models.*

Variable	Definition	Units	Source
Dependent variable			
growth in real gdp per capita	Average growth rate of real GDP per capita, e.g. for 1960-64.	percent	World Bank. Annual growth rates calculated as 100*[y-y(-1)]/y(-1) using national accounts data in constant local currency.
Conditioning variables			
Base variables			
ln(**initial income**)	log of real GDP per capita in the initial year of the halfdecade (e.g., 1960)	(**ynin**) chained real dollars at 1985 international prices	PWT5.6, as extended in GDN dataset.
initial life expectancy	life expectancy at birth, interpolated to the initial year of the halfdecade.	years	GDN dataset. Observations linearly interpolated to initial year of halfdecade.
age dependency ratio	age dependency ratio = average ratio of population between 15 and 65 to total population.	percent	WDI99.
growth in potential labor force participation	growth in potential labor force participation = average difference between growth rate of population between 15 and 65 and growth rate of total population.	percent	Population data from WDI99.
terms of trade shock	terms of trade shock = initial share of exports to GDP, multiplied by the average percentage difference between the terms of trade in each year of the halfdecade and the terms of trade in the initial year of the halfdecade	percent	Export share data from WDI99. Terms of trade data from GDN dataset, extended using data from S. Collins and B. Bosworth*
trading partner growth	trading partner growth rate = average growth rate of real GDP per capita among trading partners, weighted by shares in total trade.	percent	GDN dataset.
landlocked	dummy variable equal to 1 for landlocked countries and zero otherwise.		GDN dataset.
Political instability			
political instability	Political instability index = average number of assassinations, revolutions, and strikes.		GDN dataset; underlying variables from Banks.
Policy variables			

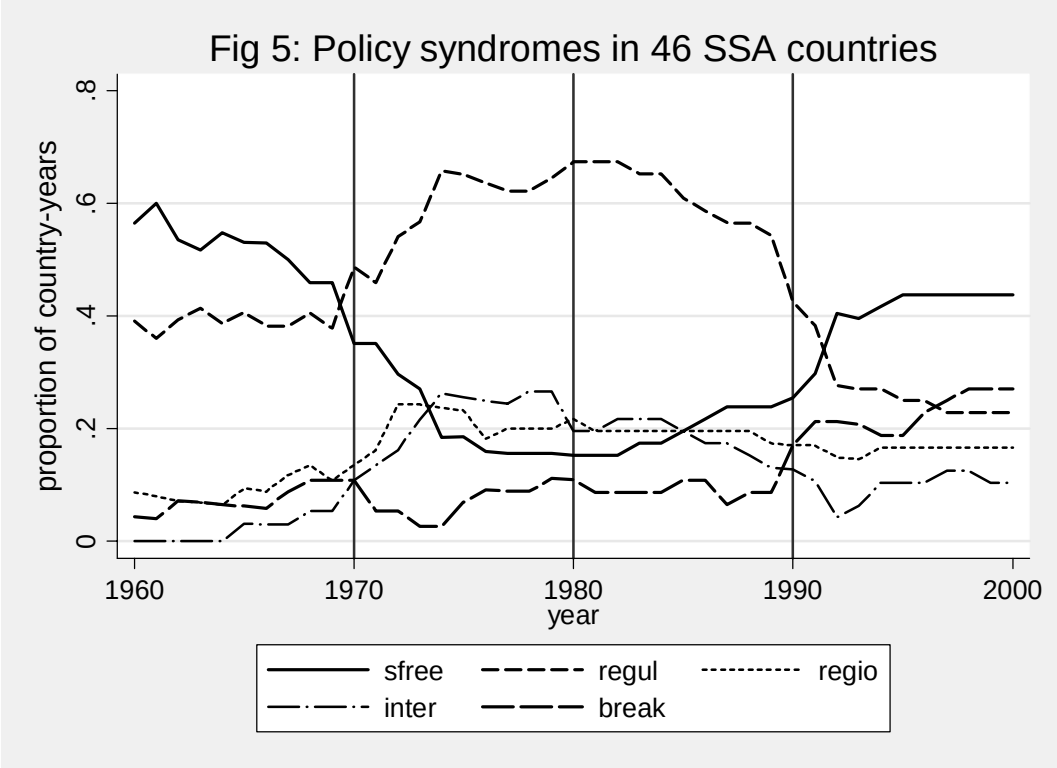
inflation	CPI inflation rate, if under 500% (otherwise entered as missing).	percent	GDN dataset, extended using national GDP deflators from IMF IFS.**
black market premium	Black market premium, if under 500% (otherwise entered as missing)	percent	GDN dataset
Gov't spending (Barro-Lee)	Government spending exclusive of defense and education.	percent	Barro/Lee 1994, extended using IMF government spending data from GDN dataset.***
ratio of manufac-turing trade to GDP	Share of manufacturing trade in GDP = ratio of imports plus exports of manufactured goods to GDP.	percent	WDI99, underlying data in current dollars.
fiscal deficit after grants/GDP	Ratio of central government deficit after grants to GDP.	percent	GDN dataset.

**The Barro/Lee variable is available in halfdecadal averages for 1960-64 through 1980-84. This variable is constructed as the ratio of real government consumption to real GDP (both in 1985 international prices), minus the ratios of nominal government spending on military and education to nominal GDP. Where the resulting variable is negative, Barro and Lee replace it with a value of .01. To extend this variable to 1985 and later, we constructed a proxy using IMF government spending data in nominal terms only. The proxy variable is the ratio of current spending to GDP, minus the ratios of spending on education and defense to GDP. We 'spliced' this with the Barro and Lee data by first rebasing the proxy ratio to ensure that it has the same mean, country by country, as the Barro/Lee variable for 1980-84. Then we filled in the Barro/Lee variable for 1985 and later using the rebased proxy ratio.

Table 5. *Opportunities and syndromes.*

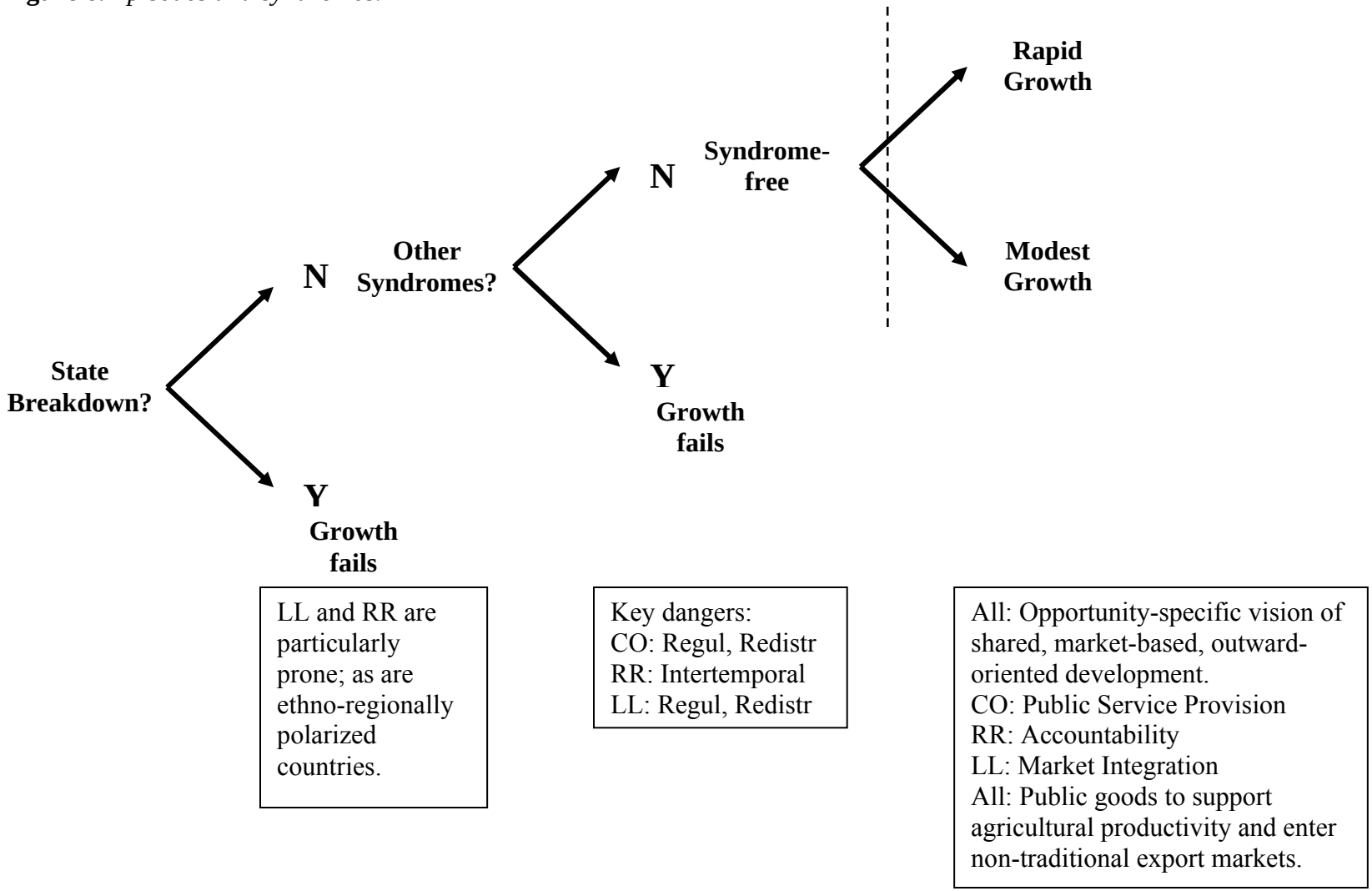
Oppor-tunity category	Distribution of years by opportu-nity category	Relative frequency of observed syndromes within each opportunity category, independence to 2000 (percent of country/population/years displaying syndromes)				
		Regulatory	Ethno-regional redistrib-utoin	Intertem-poral redistrib-ution	State Break-down	Syndrome -free
Coastal	52.5	40.4	22.8	4.1	11.1	37.8
Llocked	26.1	40.2	23.3	30.4	17.0	14.2
Resrich	21.4	15.2	73.2	63.2	6.5	7.9
Total	100	35.1	33.5	23.3	11.7	25.4

Source: Fosu and O'Connell (2005). Country/year observations are weighted by population in 1980.



Source: Judgmental classification by editorial committee based on country studies and broader literature.
Key: *sfree* = Syndrome-free; *regul* = Regulatory; *redis* = Ethno-regional redistribution; *inter* = Intertemporal redistribution; *break* = State Breakdown.

Figure 6. *Episodes and syndromes.*



[i] Barro (1998) finds that female schooling in the same education and age category does not have significant impact on growth most probably due to discriminatory practices in the labor market.