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Research Paper No. 2004/3

Economic Growth, Income Distribution and Poverty: Time-series and Cross-country Evidence from the CFA-zone Countries of sub-Saharan Africa

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January 2004

Abstract

The causes of the slow growth of CFA countries are investigated. There is little difference in this respect between the CFA and other sub-Saharan African countries. Since 1970, GDP growth in the CFA countries has shown no significant trend but one or two medium-term fluctuations (positive in 1979-83 and negative in 1989-93). Internationally, the income share of the poorest 20 per cent of the population of any country has improved most in poor countries, and there is no evidence that this does not apply to CFA countries also.

Keywords: Africa, growth, inequality

JEL classification: D31, O4, O55

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This study has been prepared within the UNU-WIDER project on 'Long-Term Development in the CFA-zone Countries of sub-Saharan Africa', directed by David Fielding.

UNU-WIDER gratefully acknowledges the financial contribution to the project by the Finnish Ministry for Foreign Affairs.

UNU-WIDER also acknowledges the financial contributions to the research programme by the governments of Denmark (Royal Ministry of Foreign Affairs), Norway (Royal Ministry of Foreign Affairs), Sweden (Swedish International Development Cooperation Agency – Sida) and the United Kingdom (Department for International Development).

ISSN 1810-2611 ISBN 92-9190-580-1 (internet version)

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Camera-ready typescript prepared by Janis Vehmaan-Kreula at UNU-WIDER
Printed at UNU-WIDER, Helsinki

Introduction

This paper focuses on growth in the CFA countries over the past few decades, and in the final part we also address issues of income distribution and poverty alleviation. In particular we investigate whether recent growth models explain the growth of CFA countries and, if so, what variables account for CFA growth performance. This is the subject of Part 1 of the paper. In Part 2 we investigate the trends and major fluctuations in CFA growth since 1971. In Part 3 we consider the evolution of income distribution, the share of the poorest 20 per cent in total income, and the growth of the average incomes of the poorest 20 per cent. In Parts 1 and 3, we use cross-country regressions instead of the panel-data method. The panel-data method is useful for deducing the short term relationship between variables, but the cross-country method reveals long-term relationships more accurately. Our interests here are the latter rather than the former.

1 Growth performance in an international context

Table 1 shows regional averages of some economic measures for all developing countries, sub-Saharan Africa (excluding the CFA), BEAC and UEMOA. It is obvious that UEMOA-zone countries experienced rather poor economic performance in growth rates, even relative to the rest of sub-Saharan Africa, and the BEAC-zone's economies also grew slightly more slowly than the average of the rest of sub-Saharan Africa. Central government savings are much higher in BEAC and UEMOA not only than the rest of sub-Saharan Africa but also than the rest of developing countries. Since most developing countries have had substantially more inflation than the CFA countries, this statistic probably reflects the much lower levels of seigniorage revenue in the CFA. The difference between labour force growth and population growth is negative for the BEAC-zone and UEMOA-zone countries, which indicates that demographic developments have been unfavourable for these countries' economic performance. Whilst the BEAC countries experienced higher terms of trade growth than the average of developing countries, that of the UEMOA countries was negative but better than the average of the rest of sub-Saharan Africa.

Table 1
Regional average of economic measures

Variable	Developing countries (excl. SSA)	SSA (excl. BEAC and UEMOA)	BEAC	UEMOA
Economic growth (%), 1965-90	2.05	0.97	0.82	0.18
Initial GDP per capita (log), 1965	8.09	7.31	7.46	7.17
Openness, 1965-90	0.26	0.09	0.00	0.04
Initial life expectancy (log), 1965	4.02	3.77	3.75	3.67
Central govt savings, 1970-90	2.80	2.98	7.81	5.84
Tropical climate	0.57	0.87	1.00	1.00
Institutional quality, 1980	4.89	4.44	4.91	4.66
Primary product exports/GDP, 1970	0.17	0.21	0.15	0.13
Labour force growth minus population growth, 1965-90	0.38	-0.04	-0.25	-0.18
Democracy, 1975	0.41	0.27	0.17	0.06
Male schooling (secondary + higher), 1965	0.77	0.22	0.67	0.08
Terms of trade growth, 1965-90	0.69	-1.15	2.71	-0.38

Note: See Appendix 1 for details.

Table 2 shows the results of re-estimating two growth models—Bleaney and Nishiyama (2002) and Sachs and Warner (1997)—with dummy variables for sub-Saharan African regions. The sub-Saharan Africa dummy is statistically insignificant at the 10 per cent level in the Bleaney-Nishiyama model. Likewise, decomposing the sub-Saharan Africa dummy into the BEAC-zone, the UEMOA-zone, and the rest of sub-Saharan Africa, none of these regional dummies is statistically significant at the 10 per cent level. This body of evidence suggests that the independent variables included in the Bleaney-Nishiyama model—at least statistically—explain the regional uniqueness in economic growth rates of sub-sets of sub-Saharan Africa as well as the whole sub-Saharan Africa. In columns 3 and 4, this exercise is repeated for the Sachs-Warner model. This model also fits sub-Saharan Africa well, but the estimated coefficient on the BEAC zone dummy is statistically significant at the 5 per cent level.

Table 3 shows the contribution of each independent variable to economic growth in OECD and sub-Saharan Africa, *relative to other developing countries*. We use the Bleaney-Nishiyama growth model to estimate the contribution of each independent variable to economic growth in the CFA countries compared with the rest of sub-Saharan Africa and other developing countries. Each independent variable was regressed on a constant, an OECD dummy and a sub-Saharan Africa dummy.[1] The coefficients of these dummies indicate how the average level of each variable differs between the OECD, sub-Saharan Africa and other developing countries. The estimated coefficient on each regional dummy was then multiplied by the coefficient of each regressor in the Bleaney-Nishiyama model to derive the estimated growth effect. Then, to decompose sub-Saharan Africa, we also regressed each independent variable in the Bleaney-Nishiyama model on a constant, dummy variables for OECD, Non-CFA sub-Saharan Africa (NCFASSA), the BEAC-zone and the UEMOA-zone, and repeated the same calculation. Thus, for example, the +1.43 for per capita income for sub-Saharan Africa (SSA) indicates how much faster SSA is predicted to grow than other developing countries (because of its low initial per capita income level). Sub-Saharan Africa has a strong advantage in initial low per capita income through the convergence effect (since there is a well-evidenced tendency that the lower the initial income, the faster the subsequent economic growth). On average, the convergence effect adds 1.5 percentage points to economic growth of sub-Saharan Africa. Budget management, proxied by central government savings, in sub-Saharan Africa is better than in the other developing countries, and this adds 0.1 percentage points to sub-Saharan Africa's economic growth. However, sub-Saharan Africa performs very poorly in terms of the other explanatory variables, which offset good potential for rapid economic growth through the convergence effect. The low degree of democracy, the limited openness to international trade, and negative terms of trade growth each reduce growth by 0.3 percentage points. Sub-Saharan Africa does not suffer much from specialization in primary product exports or from low institutional quality, although these factors are important to OECD countries in offsetting the disadvantage of their high initial per capita incomes. The geographical disadvantage of sub-Saharan Africa is evident in the effects of tropical climate, which takes a quarter percentage point off the annual economic growth rate. The low stock of human capital,

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[1] In Bleaney and Nishiyama (2002), we included dummy variables for Latin America and Caribbean, and for East Asia as well as the OECD dummy and the sub-Saharan Africa dummy; therefore, these regions were compared with the rest of the world. However, in this investigation, we focus on values of economic measures for the CFA-zone countries of sub-Saharan Africa, relative to developing countries other than sub-Saharan Africa.

Table 2
Growth models and the dummies for the African regions

(Dependent variable: Annual average growth rate of PPP-adjusted real GDP per capita, 1965-90)

	BN + SSA	BN + BEAC+ UEMOA + NCFASSA	SW + SSA	SW + BEAC+ UEMOA + NCFASSA
Constant	-23.91**	-21.56*	-64.83	-22.95
	(-2.24)	(-1.97)	(-1.60)	(-0.59)
Per capita income (Y)	4.78*	4.43	-1.48***	-1.42***
	(1.81)	(1.67)	(-5.82)	-6.05)
Per capita income squared	-0.43***	-0.40**		
	(-2.68)	(-2.49)		
Openness	1.53***	1.55***	11.27***	12.04***
	(5.02)	(4.99)	(3.81)	(4.39)
Openness times Y			-1.14***	-1.23***
			(-3.16)	(-3.70)
Land-lockedness			-0.42	-0.16
			(-1.54)	(-0.59)
Life expectancy	3.13***	2.88***	35.80*	14.93
	(3.65)	(3.20)	(1.73)	(0.75)
Life expectancy squared			-4.14	-1.58
			(-1.57)	(-0.62)
Central Govt savings	0.071***	0.070***	0.12***	0.085***
	(2.81)	(2.78)	(5.08)	(3.65)
Tropical climate	-0.67***	-0.64**	-0.62**	-0.70**
	(-2.70)	(-2.52)	(-2.14)	(-2.56)
Institutional quality	0.35***	0.35***	0.36***	0.35***
	(4.09)	(4.00)	(3.72)	(3.91)
Primary product exports/GDP	-4.50***	-4.88***	-4.02***	-4.28***
	(-5.00)	(-5.22)	(-3.82)	(-4.35)
Labour force growth minus population growth	0.97***	1.04***	0.82*	1.27***
	(2.71)	(2.68)	(1.94)	(3.07)
Democracy	4.10***	3.69***		
	(3.70)	(3.26)		
Democracy squared	-3.35***	-3.04***		
	(-3.23)	(-2.90)		
Male schooling	0.38***	0.35**		
	(2.71)	(2.39)		
Terms of trade growth	0.21***	0.20***		
	(3.85)	(3.32)		
Sub-Saharan Africa dummy	-0.18		-0.26	
	(-0.46)		(-0.60)	
BEAC dummy		0.10		1.51**
		(0.16)		(2.35)
UEMOA dummy		-0.78		-0.79
		(-1.43)		(-1.41)
Non-CFA sub-Saharan Africa dummy		-0.11		-0.41
		(-0.27)		(-1.03)
Adjusted R-squared	0.896	0.897	0.835	0.859
Standard error	0.617	0.613	0.797	0.737
No. of observations	70	70	84	84

Note: Figures in brackets are *t*-statistics. One asterisk (*), two asterisks (**) and three asterisks (***) designate statistical significance at the 10 per cent, 5 per cent and 1 per cent significance levels, respectively. Regressions labeled BN reproduce the model of Bleaney and Nishiyama (2002), and those labeled SW reproduce the model of Sachs and Warner (1997). For tropical climate, we use our own variable which amended measurement errors in Sachs and Warner's original. A full list of the amendments is available from the authors on request. For life expectancy, we use log of life expectancy in 1965 in order to minimize any possible endogeneity problems, whilst we use the 1970 value for the Sachs-Warner model as they did in their paper.

Table 3
Explaining regional difference in growth rates

	OECD	SSA	Non-CFA SSA	BEAC	UEMOA
Comparative per capita GDP growth	+0.63	-1.25	-1.07	-1.23	-1.87
Independent variable					
Per capita income	-2.78	+1.43	+1.41	+1.24	+1.64
Openness	+1.04	-0.31	-0.28	-0.42	-0.35
Life expectancy	+0.74	-0.87	-0.80	-0.86	-1.11
Central Govt savings	-0.17	+0.09	+0.01	+0.03	+0.02
Tropical climate	+0.38	-0.24	-0.21	-0.30	-0.30
Institutional quality	+1.36	-0.12	-0.15	+0.01	-0.08
Primary product exports/GDP	+0.46	-0.03	-0.15	+0.11	+0.23
Labour force growth minus population growth	-0.15	-0.49	-0.44	-0.66	-0.58
Democracy	+0.05	-0.30	-0.20	-0.28	-0.62
Male schooling	+0.31	-0.20	-0.21	-0.04	-0.26
Terms of trade growth	-0.50	-0.26	-0.38	+0.42	-0.22

Note: All numbers are relative to the omitted region (that is, developing countries except for sub-Saharan Africa). Figures reflect the data for the full sample of countries (more than 100 for each variable, not just those used in the regression).

represented by male schooling, costs 0.2 percentage point in sub-Saharan Africa's annual growth rate. The greatest disadvantage for Africa's economic growth is poor health, proxied by life expectancy, and large non-working population, proxied by labour force growth minus population growth. While the former reduces annual economic growth by 0.87 percentage points, the latter takes off half a percentage point.

The last three columns of Table 3 enable us to scrutinize the BEAC-zone and the UEMOA-zone countries. For most independent variables, the estimated figures of the BEAC and UEMOA regions are very close to those of the mean for sub-Saharan Africa, suggesting that the BEAC-zone countries, the UEMOA-zone countries and the rest of sub-Saharan Africa confront similar socio-economic problems in achieving faster economic growth. However, there are some notable differences between those three regions. For the BEAC-zone countries, the relative contributions of institutional quality, primary product exports, and terms of trade growth are positive, whilst those for the average of sub-Saharan Africa are negative. This is, however, more than offset by more negative openness and labour force growth. On the other hand, the growth rate of the UEMOA-zone countries is pulled down by poor performance in life expectancy, institutional quality and democracy, whilst their low dependence upon primary product exports relative to the other developing countries is estimated to have added 0.23 percentage points to their annual economic growth rate.

In general, what these results show is that the CFA countries are not very different from the rest of sub-Saharan Africa in the dimensions which seem to be important in determining growth rates. Although the growth rates of CFA countries have tended to be

slightly inferior to the SSA average, the difference is sufficiently small that the econometric models estimated on a large sample of countries also fit CFA countries.

2 Trends and fluctuations in growth rates

In this part of the paper we use data on real GDP growth in the six CFA countries for which a continuous series is reported in *International Financial Statistics* from 1971 to 2000. The six countries are Benin, Burkina Faso, Senegal, Togo, Cameroon and the Republic of Congo. Although other sources give annual growth data for more CFA countries, the presumption must be that these data are less accurate.

The most important single macroeconomic event during this period was the devaluation of January 1994. This was the only change of parity during the period, but it was a large one: the external value of the CFA Franc was halved. Consequently prices rose rapidly during 1994 (34 per cent on average), but also stabilized quickly (inflation was down to 13 per cent in 1995 and under 5 per cent in 1996). It would appear that the currency was substantially overvalued in the years prior to devaluation, and that the devaluation achieved a significant corrective real exchange rate depreciation. Another potentially significant period was the late 1970s and early 1980s, when the prices of coffee, cocoa and oil moved up particularly sharply. Although cocoa prices fell rapidly after their peak in 1977, coffee and oil prices stayed high until the mid-1980s.

In order to get a feel for how growth rates have evolved in the CFA, we regress the unweighted mean GDP growth rate of these six countries for each year on a constant, a time trend, and dummies for each complete five-year period. These five-year periods are constructed to run up to years ending in 3 and 8, so that the pre-devaluation period 1989-93 constitutes one period and the immediate post-devaluation period 1994-98 another. The results of this regression are shown in Table 4. The first column shows the complete regression, in which only the dummies for 1979-83 (+) and 1989-93 (-) are significant (plus the constant). After sequentially eliminating the least significant variables, starting with the time trend, we end up with the second column, which still includes the insignificant 1994-98 dummy, and finally with the third column. This regression suggests that the growth rate of GDP has been fairly constant over the period, except for a period of exceptionally fast growth during the commodity boom of 1979-83, and a period of exceptionally slow growth immediately before devaluation (1989-93). If exchange rate overvaluation was the cause of this slow growth in the early 1990s, then devaluation was definitely expansionary for the CFA countries. We have also tested for terms-of-trade effects by including the real (French franc) price of cocoa in the model, but it emerges with an insignificant (and even slightly negative) coefficient.

Table 5 shows the same regression as in the third column of Table 4 for the six countries individually. Several points stand out. One is that the growth rate of the individual countries is much more variable than that of the unweighted mean (the standard error of these regressions is more than twice as large in five out of six cases). This suggests that there are substantial uncorrelated output shocks across the CFA, which one would expect given the weight of agricultural production in the region. A second point is that all six

Table 4
GDP growth of CFA countries 1971-2000

Dependent variable	Unweighted six-country mean annual GDP growth (%)		
Independent variables			
Constant	3.36 (2.73)	3.12 (6.37)	3.42 (2.99)
Time trend	0.0037 (0.06)		
Dummy 1974-78	–0.399 (–0.30)		
Dummy 1979-83	2.82 (2.21)	3.11 (3.17)	2.80 (2.93)
Dummy 1984-88	–0.471 (–0.37)		
Dummy 1989-93	–3.72 (–2.71)	–3.40 (–3.47)	–3.70 (–3.87)
Dummy 1994-98	0.877 (0.57)	1.22 (1.25)	
R-squared	0.550	0.547	0.540
Standard error	2.01	1.90	1.92

Notes: The six countries are: Benin, Burkina Faso, Senegal, Togo, Cameroon and the Republic of Congo. The figures in parentheses are *t*-statistics.

Table 5
Growth regressions for individual countries

	Dependent variable: annual GDP growth (%) 1971-2000				
Independent variable	Constant	Dummy 1974-78	Dummy 1989-93	R-squared	Standard error
Country					
Benin	3.85 (4.32)	1.80 (0.90)	–1.33 (–0.67)	0.05	3.98
Burkina Faso	5.50 (5.35)	–3.73 (–1.78)	–4.32 (–2.21)	0.25	3.71
Senegal	3.03 (2.84)	0.97 (0.41)	–2.61 (–1.12)	0.06	4.66
Togo	3.98 (3.37)	–3.84 (–1.47)	–7.48 (–2.86)	0.25	5.22
Cameroon	3.46 (3.57)	5.96 (2.77)	–7.18 (–3.34)	0.50	4.23
Rep. Congo	1.60 (1.31)	13.6 (4.99)	–0.18 (–0.07)	0.49	5.45

Notes: Figures in parentheses are *t*-statistics.

countries have negative coefficients for the 1989-93 dummy, although the size of the coefficient varies widely. Finally, there is not the same consistency in the sign of the 1979-83 dummy, which is positive for four countries but quite substantially negative for two.

The main conclusions of this section are the following. The CFA countries have experienced roughly constant growth (though with substantial year-to-year fluctuations) since 1970, except for a period of fast growth around 1980 and slow growth in the early 1990s. The latter shows up more consistently across countries, and was probably caused by real exchange rate overvaluation that was corrected by the devaluation of January 1994. The period of exceptionally fast growth was evident only in some countries and was most likely associated with commodity price booms.

3 Poverty alleviation and income inequality

In this section, we investigate poverty and inequality in the CFA-zone countries in the cross-country framework. We first construct an empirical model of the growth rate of the income of the poor. The most serious problem here, as elsewhere, is lack of data for the CFA-zone countries. This problem is particularly serious for the quintile shares of income and the Gini coefficient, which we use in our investigation. Therefore, instead of seeking sub-Saharan Africa models or CFA-zone models, we construct cross-country models from global data of poverty and income inequality, which explain the characteristics of CFA-zone countries as well.

Our investigation in this section uses two types of income inequality data: (1) the Gini coefficients of income distribution, and (2) the poorest quintile's income shares of the total income of the economy. The most popular measure of income inequality is the Gini coefficient, which represents the entire distribution of income. The most comprehensive cross-country data of the Gini coefficients are perhaps WIDER WIID (World Income Inequality Database). We use version 1.0, the latest version of the database, which was last updated on 12 September 2000. This database incorporates Deininger and Squire's (1996) dataset of income inequality (the Gini coefficients of income distribution), which is another popular dataset. The WIID covers a large number of countries within a reasonable time period. Yet, it is a collection of data from various data sources rather than a synthesized dataset. In some cases the dataset provides multiple data for an identical country for an identical year with several data definitions, but for other country samples it includes a large number of blanks. Therefore, even for the identical country for the identical year, the choice of numbers depends on researchers' purposes and sensitivity (see Data Appendix 1).[2] The WIID database differentiates 'reliable' data from 'less reliable' data. We always chose 'reliable' data if it was available. To maintain consistency, we also always chose data of national coverage and ignored those of rural or urban coverage only.

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[2] As a consequence, recent empirical studies (Knowles 2001; Odedokun and Round 2001; Sylwester 2000, 2001) on income inequality provide appendices of the actual figures of inequality data used in the research, as we do.

We are aware that the comparison between data of different definitions (for example, income-based or expenditure-based) is far from ideal. Because of redistribution through taxation, expenditure-based Gini coefficients give the impression of less inequality than income-based data. Nevertheless gross-income data are most frequently used in international comparison because of their wider availability, and we give preference to these data for the same reason. In the absence of gross-income data, we use data based on net incomes. Expenditure data were least willingly accepted.

Deininger and Squire (1996) report that, from reliable data, the 'mean difference between income-based and expenditure-based Gini coefficients is about 6.6' (p. 582) whilst the difference between other reference units is not significantly important. This is not fully satisfactory, but there is no obvious alternative.[3]

The other data on income inequality that we use are the poorest quintile's share of total income. Since WIDER WIID does not provide data on income shares, we derive them from Deininger and Squire's 1997 database. This dataset is an updated version (by adding more data from African countries) of their original dataset (Deininger and Squire 1996). Just like the Gini coefficients in WIID, the data on income shares in Deininger and Squire (1997) do not measure the same dimension of inequality in every country. Therefore, the choice of data, again, depends on the researchers' purposes and decisions. The criteria that we employed are basically the same as those for the Gini coefficients (see Data Appendix 2). No data adjustment was made for the income shares data since no reliable method of transformation for income shares of different data units exists. Observations of the closest years to 1965 and 1990 were chosen for our dataset.[4]

Note that a high (low) value in the Gini coefficient of income distribution means more (less) inequality, whilst a high (low) value in the income share of the poorest 20 per cent of the population indicates a less (more) unequal society. In a given empirical model specification, the expected sign of coefficients on these two measures are opposite to each other. To make the signs of coefficients on these inequality measures more consistent, we constructed an *income equality index* by subtracting the Gini coefficients (in a 100 point-scale) from 100. Therefore, both the income equality index and the income share of the poorest 20 per cent of the population score higher in a more equal society compared to a less equal society. Thus, hereafter, we use the income equality index—rather than the Gini coefficients—and the income shares of the poorest quintile as our two measures of income inequality.[5] Furthermore, in constructing the change

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3 The WIDER WIID (2000) *WWW Guide* (available from http://www.wider.unu.edu/wiid/wiiddoc.htm) reports that 'Gini coefficients of gross incomes are roughly 5-10 points higher than Gini coefficients of net (disposable) incomes, and Gini coefficients of (net) earnings may be roughly 5 points higher than Gini coefficients of (net) expenditure. Gini coefficients of disposable incomes may also be roughly 5 points higher than Gini coefficients of expenditure'. However, it is not clear whether these estimates are based on actual calculation or just casual observation. Further, it is not mentioned whether these estimates were derived from reliable data only or from all data including less reliable data.

4 For some countries, however, available points of time are not abundant. We allowed the data of the Gini coefficients and of the income share of the poor to have up to a seven and eight year margin, respectively, before or after each of the years concerned (1965 and 1990). These allowances are justified, considering that the Gini coefficients and income shares do not dramatically change over time and that losing observations due to an intolerance of time lag would be equally inappropriate.

5 Equivalently, one can call these variables measures of income *equality*.

variables (annual average growth rates of the income equality index and of the income share of the poor) for our concerned period 1965-90, the actual difference in years between the initial observation and the final observation was used, instead of simply assuming the difference was twenty-five years for all countries.

We define the poor as the lowest quintile group and calculate the income of the poor and its growth rate as follows. If Y is the total income of an economy with population N, and YP is the aggregate income of those defined as poor, whose population is NP, then the average income of a poor person may be decomposed as follows:

$$(YP/NP) = (YP/Y) \times (N/NP) \times (Y/N) \quad (1)$$

Equation (1) says that the average income of the poor equals their share of total income, divided by their share of population, multiplied by average per capita income. If the share of the poor in total population is defined to be constant over time (as here), then taking logarithms and differentiating with respect to time, we get:

$$d[\ln(YP/NP)]/dt = d[\ln(YP/Y)]/dt + d[\ln (Y/N)]/dt \quad (2)$$

which says that the rate of growth of the average incomes of the poor equals the rate of growth of their income share plus the rate of growth of average per capita incomes. We take (NP/N) to be 0.2, and use data on the other two terms in (1) for 1965 and 1990 (or dates as close as possible to these in the case of YP/Y) to calculate the growth rate of YP/Y.

In Table 6, in order to investigate poverty and inequality in the CFA-zone countries, we first constructed a cross-country model of the growth rate of the income of the poor. The first column shows our preferred model. The coefficient on the income share of the poorest quintile is statistically significant and has a negative sign, suggesting that the lower the initial income share of the poor, the faster the growth of the income of the poor. Equally interestingly, initial per capita income has a significant and negative coefficient, indicating that poorer countries tend to improve the income of the poor faster than richer countries. The estimated coefficient on openness to international trade is positive and significant at the 1 per cent level. This effect most likely reflects the strong correlation between openness and economic growth, so that the poor benefit from openness through economic growth. Life expectancy, measured at the beginning of the concerned period, is positive and highly significant. This suggests that investment for health in hygiene and hospitals is an effective policy to combat poverty. Central government savings, which is a key determinant of growth as shown in Table 2, helps the poor improve their income by enlarging the whole economy. Tropical climate and the size of primary product exports (measured as the ratio to GDP) have negative coefficients. This most likely reflects findings in Bleaney and Nishiyama (2002) that countries under a tropical climate and with high dependency on primary product exports experience slow economic growth. An interesting result is that the estimated coefficient on ethno-linguistic diversity, which was found to have a negative correlation with economic growth in Easterly and Levine (1997), has a small but positive coefficient here.[6] Our speculative explanation for this is

[6] The statistical significance of ethno-linguistic diversity is not because many poor countries are ethnically divided. Such an effect is captured by a variable of per capita income since it is included in the regression.

Table 6
Growth rate of the income of the poor

(Dependent variable: annual average growth rate of PPP-adjusted real GDP per capita of the poor, 1965-90)

	(A)	(A) + SSA	(A) + CFA
Constant	-23.86***	-17.72**	-24.49***
	(-3.45)	(-2.29)	(-3.13)
Income share of the poorest quintile	-3.27***	-3.25***	-3.28***
	(-8.14)	(-8.26)	(-7.99)
Initial per capita income	-3.09***	-2.95***	-3.12***
	(-8.46)	(-8.01)	(-7.78)
Openness	3.05***	3.07***	3.03***
	(5.29)	(5.44)	(5.17)
Initial life expectancy (log)	9.78***	8.02***	9.98***
	(4.75)	(3.51)	(4.23)
Central government savings	0.19***	0.19***	0.19***
	(3.03)	(3.12)	(2.97)
Tropical climate	-1.68***	-1.73***	-1.70***
	(-3.59)	(-3.77)	(-3.52)
Primary product exports/GDP	-4.31**	-3.62*	-4.26**
	(-2.23)	(-1.87)	(-2.16)
Ethno-linguistic diversity	0.012*	0.014*	0.012*
	(1.75)	(1.95)	(1.73)
Sub-Saharan Africa dummy		-1.03	
		(-1.63)	
CFA dummy			0.15
			(0.18)
Adjusted R-squared	0.784	0.792	0.778
Standard error	1.100	1.078	1.114
No. of observations	49	49	49
Diagnostic tests			
Serial Correlation	F(1,39)=0.0008		
	[0.98]		
Functional Form	F(1,39)=6.76		
	[0.01]		
Normality	$\chi^2(2)=1.52$		
	[0.47]		
Heteroscedasticity	F(1,47)=1.85		
	[0.18]		

Note: Figures in brackets are *t*-statistics. Figures in square brackets are *p*-ratios. One asterisk (*), two asterisks (**) and three asterisks (***) designate statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively. For life expectancy, we use log of life expectancy in 1965 in order to minimize any possible endogeneity problems. Ramsey's RESET is used to test the functional form.

that ethnically diverse countries more likely distribute their wealth in order to maintain political stability. Further, four diagnostic tests have been conducted. The model passes serial correlation, normality and heteroscedasticity tests, but fails the functional form test. However, since inequality-related data are deemed to be subject to large measurement errors, one should not be oversensitive to the test results here. In columns 2 and 3, a dummy variable for sub-Saharan Africa and a dummy for the CFA-zone countries are added to our preferred model. These two dummies are respectively not significant even at the 10 per cent level, suggesting that this model statistically explains differentials in the growth rate of the income of the poor in sub-Saharan Africa and the CFA-zone countries.

Table 7
Change in the income share of the poor
(Dependent variable: annual average change in the income share of the poorest quintile, 1965-90)

	(B)	(B) + SSA	(B) + CFA
Constant	0.76***	0.86***	0.77***
	(4.37)	(4.88)	(4.38)
Initial income share of the poor	-0.031***	-0.032***	-0.031***
	(-7.74)	(-8.20)	(-7.64)
Per capita income	-0.049***	-0.059***	-0.050***
	(-3.22)	(-3.77)	(-3.25)
Central government savings	0.0056*	0.0069**	0.0061*
	(1.70)	(2.13)	(1.81)
Initial fertility ratio (log)	-0.15***	-0.16***	-0.15***
	(-4.06)	(-4.48)	(-4.06)
Ethno-linguistic diversity	0.00063**	0.00091***	0.00069**
	(2.04)	(2.77)	(2.16)
Sub-Saharan Africa dummy		-0.052*	
		(-1.98)	
CFA dummy			-0.027
			(-0.74)
Adjusted R-squared	0.548	0.577	0.543
Standard error	0.054	0.052	0.054
No. of observations	49	49	49
Diagnostic tests			
Serial correlation	F(1,42)=0.26		
	[0.61]		
Functional form	F(1,42)=0.27		
	[0.61]		
Normality	$\chi^2(2)$=2.09		
	[0.35]		
Heteroscedasticity	F(1,47)=7.00		
	[0.01]		

Note: Figures in brackets are *t*-statistics. Figures in square brackets are *p*-ratios. One asterisk (*), two asterisks (**) and three asterisks (***) designate statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively. For life expectancy, we use log of life expectancy in 1965 in order to minimize any possible endogeneity problems. Ramsey's RESET is used to test the functional form.

In Table 7, we constructed an empirical model to investigate the change in the income share of the poor. The estimated coefficients on the initial income share of the poor and per capita income are negative. They show that the more unequal and the poorer the country is, the faster the income share of the poor increases. Central government savings have a positive and significant coefficient. Sound management of government budgets probably reflects a dimension of capability of the government, which may influence efficient policy management to handle income inequality. The coefficient on the initial fertility ratio is negative, indicating that high fertility is a more serious obstacle for the poor to improve their standard of living than the rich. Ethno-linguistic diversity is positively correlated with change in the income share of the poor, suggesting that an ethnically diverse society is more enthusiastic over income distribution. The model passes three out of four diagnostic tests, but does not succeed in the heteroscedasticity test. If a dummy for sub-Saharan Africa is added to the regression, it is significant but only at the 10 per cent level (*p*-ratio=0.054). The model is robust to the addition of the CFA-zone dummy.

Table 8
Changes in the equality index
(Dependent variable: annual average change in the equality index, 1965-90)

	(C)	(C) + SSA	(C) + CFA)
Constant	2.34***	2.44***	2.39***
	(6.55)	(7.03)	(6.62)
Initial equality index	-0.029***	-0.031***	-0.029***
	(-6.97)	(-7.61)	(-7.05)
Tropical climate	-0.22*	-0.19*	-0.23**
	(-1.92)	(-1.79)	(-2.05)
Initial fertility rate(log)	-0.39***	-0.34***	-0.40***
	(-2.95)	(-2.66)	(-3.02)
Sub-Saharan Africa dummy		-0.25**	
		(-2.47)	
CFA dummy			0.19
			(1.01)
Adjusted R-squared	0.401	0.443	0.401
Standard error	0.304	0.293	0.304
No. of observations	71	71	71
Diagnostic tests			
Serial correlation	F(1,66)=0.12		
	[0.73]		
Functional form	F(1,66)=0.85		
	[0.36]		
Normality	$\chi^2(2)$=4.19		
	[0.12]		
Heteroscedasticity	F(1,69)=6.83		
	[0.01]		

Note: Figures in brackets are *t*-statistics. Figures in square brackets are *p*-ratios. One asterisk (*), two asterisks (**) and three asterisks (***) designate statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively. For fertility ratio, we use log of fertility ratio in 1965 in order to minimize any possible endogeneity problems.

Finally, in Table 8, we show an empirical model which explains international differences in changes in income inequality between 1965 and 1990, as measured by Gini coefficients. Tropical climate and initial fertility are the only significant independent variables. The estimated coefficients on tropical climate and initial fertility are both negative, suggesting that countries under a tropical climate and with high fertility rates tend to experience slower improvement in income equality. The model passes three diagnostic tests, but does not pass the heteroscedasticity test. The model is robust to the addition of the CFA-zone dummy but not to sub-Saharan Africa dummy.

4 Conclusions

The main conclusion from our paper is that existing growth models are capable of explaining the growth of CFA countries, as well as of other SSA countries. The factors which contribute to the slow growth of the CFA over the 1965-90 period are much the same as for other SSA countries. There is no significant trend in CFA growth rates since 1970, but there have been periods of particularly high growth (around 1980) and slow growth (in the years before the January 1994 devaluation). Cross-country models of the growth of the income of the poorest 20 per cent of the population, and the change in equality (or the poor's income share) fit the CFA as well, in the sense that a CFA dummy is insignificant when added to these regressions.

Data Appendix 1. Gini coefficients

Country name	Gini circa 1965	Data description Gini circa 1965	Gini circa 1990	Data description Gini circa 1990
Argentina	42 (1961)	G, P, ?, AP	48 (1989)	G, P, M, AP
Australia	32 (1967)*	G, P, AA, AP	41.72 (1990)*	G, H, AA, AP
Austria	29.3 (1970)*	G, P, AA, IR	31.6 (1987) *	SPDS
Bahamas	48.41 (1970)*	G, H, AA, AP	41.83 (1991)*	G, H, AA, AP
Bangladesh	34.34 (1966)*	G, H, AA, AP	37 (1986)*	G, H, AA, AP
Barbados	36.2 (1962)	I, P, AA, T	NA	
Belgium	36.37 (1969)*	G, H, AA, T	31.9455 (1992)*	G, H, AA, AP
Benin	42 (1959)	G, P, AA, AP	NA	
Bolivia	53 (1968)*	G, P, AA, AP	42.04 (1990)*	E, P, AA, AP
Botswana	57.4 (1971)	I, P, AA, EA	54.21 (1986)*	E, H, AA, AP
Brazil	57.61 (1970)*	G, H, AA, AP	60.6 (1990)*	G, HC, AA, AP
Bulgaria	22.23 (1965)*	G, P, AA, AP	24.53 (1990)*	SPDS
Canada	31.61 (1965)*	G, H, AA, AP	35.0807 (1991)*	G, H, AA, AP
Chad	35 (1958)	G, P, AA, AP	NA	
Chile	45.64 (1968)*	G, H, AA, AP	54.7 (1990)*	G, H, AA, AP
China	30.5 (1964)*	G, H, AA, AP	34.6 (1990)*	G, P, AA, AP
Colombia	62 (1964)*	G, P, AA, AP	51.32 (1991)*	G, P, AA, AP
Costa Rica	50 (1969)*	G, P, AA, AP	46 (1989)*	G, P, AA, AP
Côte d'Ivoire	51.7 (1970)	I, P, AA, EA	36.9 (1988)*	E, HC, AA, AP
Cuba	28.114 (1962)	G, P, AA, IR	NA	
Czechoslovakia	22.6 (1965)*	N, HC, AA, AP	20.1 (1988)*	SPDS
Denmark	24.908 (1966)*	G, H, AA, AP	39 (1990)*	G, H, AA, AP
Dominican Republic	45.5 (1969)	G, P, AA, AP	51 (1989)*	G, P, AA, AP
Ecuador	38 (1968)*	G, P, AA, AP	50 (1993)*	G, P, AA, AP
Egypt	40 (1965)*	E, H, AA, AP	32 (1991)*	E, HC, AA, AP
El Salvador	53 (1965)*	G, P, AA, AP	53 (1994)*	G, P, AA, AP
Fiji	46 (1968)*	G, P, AA, AP	NA	
Finland	34.2 (1966)*	G, H, AA, AP	25.5 (1990)*	G, H, AA, AP
France	47 (1965)*	G, H, AA, AP	37.2 (1984)*	G, HC, AA, AP
Gabon	64 (1960)*	G, P, AA, AP	NA	
Germany, West	38 (1964)*	N, H, AA, AP	26 (1990)*	N, H, AA, AP
Greece	44.1 (1965)	I, P, AA, T	35.16 (1988)*	E, H, AA, AP
Guatemala	29.96 (1966)	I, H, R, IR	59.06 (1989)*	G, P, AA, AP
Honduras	61.88 (1968)*	G, H, AA, AP	54 (1990)*	G, P, AA, AP
Hong Kong	49 (1966)*	G, H, AA, AP	45 (1991)*	G, H, AA, AP
Hungary	22.91 (1967)*	N, P, AA, AP	20.42 (1991)*	N, HC, AA, AP
India	31.14 (1965)*	E, P, AA, AP	29.69 (1990)*	SPDS
Indonesia	33.3 (1964)*	E, P, AA, AP	33.18 (1990)*	E, P, AA, AP
Iran	41.88 (1969)*	E, P, AA, AP	42.9 (1984)	E, P, AA, AP
Ireland	36.7 (1973)	N, H, AA, AP	35.2 (1987)*	SPDS
Israel	37.08 (1961)*	I, P, AA, T	45.3 (1992)*	I, P, AA, AP
Italy	40 (1967)*	N, H, AA, AP	32.5 (1991)*	SPDS
Jamaica	41.272 (1971)	E, H, AA, AP	41.1 (1991)*	E, HC, AA, AP
Japan	34.8 (1965)*	G, H, AA, AP	35 (1990)*	G, H, AA, AP

Kenya	63 (1964)	I, P, AA, T	57.5 (1992)*	E, HC, AA, AP
Korea, Republic of	34.34 (1965)*	G, H, AA, AP	33.64 (1988)*	G, H, AA, AP
Lebanon	55 (1960)*	G, P, AA, AP	NA	
Madagascar	53 (1960)*	G, P, AA, AP	46 (1993)*	E, HC, AA, AP
Malawi	45.2 (1969)	I, P, AA, IR	62 (1993)*	E, P, AA, AP
Malaysia	48.3 (1967)*	G, H, AA, AP	48.35 (1989)*	G, P, AA, AP
Mexico	55.5 (1963)*	G, H, AA, AP	53.09 (1989)*	G, P, AA, AP
Morocco	50 (1965)	G, P, AA, AP	39.2 (1991)*	E, HC, AA, AP
Myanmar	35 (1958)	G, P, AA, AP	NA	
Netherlands, The	35.4 (1967)*	N, H, AA, T	29.3846 (1991)*	N, HC, AA, AP
New Zealand	57.7 (1965)	I, P, AA, T	40.21 (1990)*	G, H, AA, AP
Niger	34 (1960)*	G, P, AA, AP	36.1 (1992)*	E, HC, AA, AP
Nigeria	57.94 (1970)*	N, P, AA, T	41.15 (1992)*	E, P, AA, AP
Norway	36.04 (1967)*	N, H, AA, AP	33.31 (1991)*	SPDS
Pakistan	35.51 (1966)*	G, H, AA, AP	32.38 (1988)*	G, H, AA, AP
Panama	48 (1969)*	G, P, AA, AP	57 (1989)*	G, P, AA, AP
Peru	61 (1961)*	G, H, AA, AP	46.43 (1991)*	G, H, AA, AP
Philippines	50.5 (1965)*	G, H, AA, AP	47.7 (1991)*	SPDS
Poland	26 (1965)	I, P, AA, AP	31 (1990)*	G, H, AA, AP
Portugal	40.58 (1973)	N, H, AA, AP	36.76 (1990)*	N, H, AA, AP
Puerto Rico	52.32 (1969)*	G, H, AA, AP	50.86 (1989)*	SPDS
Senegal	56 (1960)*	G, P, AA, AP	54.12 (1991)*	E, P, AA, AP
Sierra Leone	56 (1968)*	G, P, AA, AP	62.9 (1989)*	E, HC, AA, AP
Singapore	49.83 (1966)*	G, P, AA, EP	39 (1989)*	G, H, AA, AP
South Africa	56 (1965)	I, P, AA, AP	63 (1990)*	G, HC, AA, AP
Spain	31.99 (1965)*	G, H, AA, AP	32.99 (1991)*	G, H, AA, AP
Sri Lanka	47 (1963)*	G, H, AA, AP	46.7 (1987)*	SPDS
Sudan	38.72 (1968)*	G, H, AA, AP	NA	
Surinam	30 (1962)*	G, P, AA, AP	NA	
Sweden	37.9242 (1967)*	G, H, AA, AP	31.112 (1992)*	SPDS
Taiwan	32.43 (1966)*	N, P, AA, AP	30.11 (1990)*	SPDS
Tanzania	54 (1964)*	G, P, AA, AP	59.01 (1991)*	E, P, AA, AP
Thailand	42.9 (1968)*	G, H, AA, AP	48.8 (1990)*	G, H, AA, AP
Trinidad and Tobago	53.9 (1971)	G, H, AA, AP	40.3 (1992)	I, HC, AA, AP
Tunisia	42.3 (1965)*	E, P, AA, AP	41 (1990)*	E, P, AA, AP
Turkey	56 (1968)*	G, H, AA, AP	44.09 (1987)*	G, H, AA, AP
Uganda	40.7 (1970)	I, P, AA, AP	40.78 (1992)*	E, P, AA, AP
Ukraine	24.6 (1968)*	I, P, AA, EP	24.4 (1989)*	I, P, AA, EP
United Kingdom	24.3 (1965)*	N, H, AA, AP	32.3 (1990)*	SPDS
United States	34.64 (1965)*	G, H, AA, AP	37.8 (1990)*	SPDS
Uruguay	44.9 (1967)	I, H, AA, AP	NA	
USSR	26.2 (1968)*	I, P, AA, EP	27.2 (1989)*	I, P, AA, EP
Venezuela	42 (1962)	G, P, AA, AP	44.4 (1990)*	G, P, AA, AP
Yugoslavia	30.6 (1965)*	G, P, AA, IR	31.88 (1990)*	SPDS
Zambia	79.5 (1970)	I, P, AA, IR	43.51 (1991)*	E, P, AA, AP
Zimbabwe	66.27 (1968)	I, P, AA, IR	56.83 (1990)*	E, P, AA, AP

Note: Figures in brackets are the years of observations. In the second and the fourth columns, an asterisk '*' indicates that the data are categorized as reliable data in our dataset. Data were categorised as reliable in our dataset if they satisfied both of the two criteria: (1) data are categorized as 'reliable data' in the WIID; (2) A gap between the year of observation and the year of concern (1965 or 1990) is no more than 5 years. In columns of data description, income definition, reference unit, area coverage and population coverage are shown in order. (1) Income definition: G = Gross income; N = Net income; I = other income, or no information on the type of income is available; E = Expenditure. (2) Reference unit: H = Household; P = Person; HC = Household per capita. (3) Area coverage: AA = All area; M = Metro Area; R = Rural area; ? = no information given. (4) Population coverage: AP = All population; IR = Income recipients; T = Tax payers; EA = Economically active population; EP = Employed population. In the fifth column, SPDS means that the data around 1990 are from the Same Primary Data Source of the data around 1965 and also the data share the identical data definition with the data employed for 1965. When data circa 1990 is available and data circa 1965 is not available, such country samples were not included in our dataset for the nature of our analysis. The figures shown are pre-adjustment values. For our analysis, +6.6 was added to the figures shown, if income definition is expenditure. Our income equality indices were constructed by [100 – Gini coefficient]. As for the change variables, which we created for the dependent variables, only if all the data used in the calculation are reliable data, the created figures were categorized as reliable data; otherwise, the created figures were included only in the largest possible sample.

Data Appendix 2. The poorest quintile's income share of the total income

Country name	Poorest quintile's income share circa 1965	Data description	Poorest quintile's income share circa 1990	Data description
Argentina	0.0700 (1961)	I, P, AA	NA	
Australia	0.0699 (1969)*	G, H, AA	0.0460 (1990)*	SPDS
Austria	0.0680 (1970)	G, P, AA	0.0690 (1987)	SPDS
Bahamas	0.0288 (1970)*	G, H, AA	0.0389 (1991)*	G, H, AA
Bangladesh	0.0690 (1963)*	G, H, AA	0.0950 (1989)*	E, P, AA
Benin	0.0800 (1959)	G, P, AA	NA	
Bolivia	0.0350 (1968)	G, P, AA	0.0562 (1990)*	E, P, AA
Brazil	0.0320 (1960)*	G, H, AA	0.0248 (1989)*	G, P, AA
Bulgaria	0.1036 (1965)*	G, P, AA	0.1054 (1990)*	SPDS
Canada	0.0713 (1965)*	G, H, AA	0.0754 (1990)*	G, H, AA
Chad	0.0800 (1958)	G, P, AA	NA	
Chile	0.0450 (1968)*	G, H, AA	0.0370 (1989)*	I, P, AA
Colombia	0.0698 (1970)*	G, H, AA	0.0360 (1991)*	G, P, AA
Costa Rica	0.0620 (1961)*	G, H, AA	0.0400 (1989)*	G, P, AA
Côte d'Ivoire	0.0800 (1959)	G, P, AA	0.0678 (1988)*	E, P, AA
Czechoslovakia	0.1010 (1965)*	N, P, AA	0.1086 (1991)*	G, P, AA
Denmark	0.0500 (1963)	G, P, AA	0.0548 (1992)*	G, H, AA
Ecuador	0.0630 (1968)	G, P, AA	0.0536 (1994)*	E, P, AA
El Salvador	0.0550 (1965)	G, P, AA	NA	
Fiji	0.0400 (1968)	G, P, AA	NA	
Finland	0.0780 (1966)*	N, P, AA	0.0778 (1991)*	N, H, AA
France	0.0190 (1962)	G, P, AA	0.0658 (1984)	G, H, AA
Gabon	0.0200 (1960)	G, P, AA	NA	
Germany	0.1053 (1963)*	N, H, AA	0.0659 (1984)	G, H, AA
Greece	0.0900 (1957)	G, P, AA	0.0619 (1988)*	E, H, AA
Honduras	0.0160 (1968)*	G, H, AA	0.0384 (1992)*	G, P, AA
Hong Kong	0.0570 (1971)	G, H, AA	0.0489 (1991)*	G, H, AA
Hungary	0.1010 (1967)*	N, P, AA	0.0667 (1991)*	N, H, AA
India	0.0880 (1965)*	E, P, AA	0.0910 (1990)*	SPDS
Iraq	0.0200 (1956)	G, P, AA	NA	
Ireland	0.0480 (1973)	N, H, AA	0.0493 (1987)*	N, H, AA
Jamaica	0.0470 (1958)	G, H, AA	0.0598 (1990)*	E, P, AA
Japan	0.0662 (1965)*	G, H, AA	0.0590 (1982)	SPDS
Korea	0.0900 (1966)	G, P, AA	NA	
Korea, Republic of	0.0580 (1965)*	G, H, AA	0.0739 (1988)*	G, H, AA
Lebanon	0.0300 (1960)	G, P, AA	NA	
Madagascar	0.0390 (1960)	G, P, AA	0.0585 (1993)*	E, P, AA
Malaysia	0.0400 (1970)*	G, H, AA	0.0458 (1989)*	G, P, AA
Mexico	0.0360 (1963)*	G, H, AA	0.0320 (1989)*	G, P, AA
Morocco	0.0710 (1965)	G, P, AA	0.0657 (1991)*	E, P, AA
Myanmar	0.1000 (1958)	G, P, AA	NA	
Netherlands, The	0.0400 (1962)	G, P, AA	0.0692 (1991)*	N, H, AA
New Zealand	0.0680 (1973)	G, H, AA	0.0458 (1990)*	SPDS
Niger	0.0780 (1960)	G, P, AA	0.0748 (1992)*	E, P, AA

Nigeria	0.0700 (1959)	G, P, AA	0.0660 (1992)*	E, P, AA
Norway	0.0556 (1967)*	N, H, AA	0.0540 (1991)*	SPDS
Pakistan	0.0916 (1969)*	E, H, AA	0.0840 (1991)*	E, P, AA
Panama	0.0180 (1970)*	G, H, AA	0.0200 (1989)*	G, P, AA
Peru	0.0400 (1961)	G, P, AA	0.0620 (1986)*	E, P, AA
Philippines	0.0350 (1965)*	G, H, AA	0.0520 (1988)*	G, P, AA
Portugal	0.0575 (1973)	N, H, AA	0.0570 (1990)*	N, H, AA
Puerto Rico	0.0180 (1969)*	G, H, AA	0.0290 (1989)*	SPDS
Senegal	0.0300 (1960)	G, P, AA	0.0350 (1991)*	E, P, AA
Sierra Leone	0.0276 (1968)	G, H, AA	NA	
South Africa	0.0190 (1965)	G, P, AA	0.0202 (1993)*	G, H, AA
Spain	0.0715 (1965)*	G, H, AA	0.0839 (1989)*	E, H, AA
Sri Lanka	0.0445 (1963)*	G, H, AA	0.0892 (1990)*	E, P, AA
Sudan	0.0824 (1968)*	G, H, AA	NA	
Surinam	0.1070 (1962)	G, P, AA	NA	
Sweden	0.0420 (1967)*	N, H, AA	0.0740 (1990)*	N, H, AA
Taiwan	0.0784 (1966)*	N, P, AA	0.0776 (1990)*	SPDS
Tanzania	0.0480 (1964)	G, P, AA	0.0685 (1993)*	E, P, AA
Thailand	0.0800 (1962)*	G, H, AA	0.0400 (1990)*	G, H, AA
Trinidad	0.0194 (1971)	G, H, AA	NA	
Tunisia	0.0570 (1965)*	E, P, AA	0.0586 (1990)*	E, P, AA
Turkey	0.0300 (1968)*	G, H, AA	0.0524 (1987)*	G, H, AA
United Kingdom	0.0987 (1965)*	N, P, AA	0.0778 (1990)*	SPDS
United States	0.0520 (1965)*	G, H, AA	0.0460 (1990)*	SPDS
Venezuela	0.0360 (1971)	G, P, AA	0.0361 (1990)*	I, P, AA
Yugoslavia	0.0821 (1963)*	G, H, AA	0.0733 (1990)*	G, P, AA
Zambia	0.0630 (1959)	G, P, AA	0.0557 (1991)*	E, P, AA

Note: Figures in brackets are the years of observations. In the second and the fourth columns, an asterisk '*' indicates that the data are categorized as reliable data in our data set. Data were categorized as reliable if they satisfied both of the two criteria: (1) data are categorized as 'reliable data' in Deininger and Squire (1997); (2) A gap between the year of observation and the year of concern (1965 or 1990) is no more than 5 years. In columns of data description, income definition, reference unit, and area coverage are shown in order. (1) Income definition: G = Gross income; N = Net income; I = other income, or no information on the type of income is available; E = Expenditure. (2) Reference unit: H = Household; P = Person. (3) Area coverage: AA = All area. No information on population coverage is available from Deininger and Squire (1997). In the fifth column, SPDS means that the data around 1990 are from the Same Primary Data Source of the data around 1965 and also the data share the identical data definition with the data employed for 1965. When data circa 1990 is available and data circa 1965 is not available, such country samples were not included in our dataset for the nature of our analysis. As for the change variables, which we created for the dependent variables, only if all the data used in the calculation are reliable data, the created figures were categorized as reliable data; otherwise, the created figures were included only in the largest possible sample.

Appendix 1. Descriptions of variables and data sources

Variable	Data source	Variable designation in source
[Largest possible sample] Annual average change in the income equality index for 1965-90, 100 scale	Authors, Created from Deininger and Squire (1997)	CQ1HLP
[Largest possible sample] Initial income share of the poor circa 1965, 100 scale	Authors, Created from Deininger and Squire (1997)	Q1HLP
[Largest possible sample] Annual average growth rate of the income of the poor for 1965-90	Authors Created from Deininger and Squire (1997) and Sachs and Warner (1997)	GRPILP
[Largest possible sample] Initial income of the poor circa 1965 (log)	Authors, Created from Deininger and Squire (1997)	LPI65LP
[Largest possible sample] Annual average change in the income equality index for 1965-90, 100 scale	Authors, Created from WIDER WIID	CEQLP
[Largest possible sample] Initial income equality circa 1965, 100 scale	Authors, Created from WIDER WIID	EQ65LP
Central government savings/GDP 1970-90	Sachs and Warner (1997)	CGB7090
Tropical climate	Authors, based on TROPICS in Sachs and Warner (1997)	CLIMATE
Democracy 1975	Barro (1997)	DEMOCRACY75
Fertility rate in 1965 (log)	Barro and Lee (1994)	FERT65L
Annual growth rate of PPP-adjusted real GDP per capita for 1965-90	Sachs and Warner (1997)	GR6590
PPP-adjusted real GDP per capita in 1965 (log)	*Penn World Tables 5.6*	LRGDPC65
Openness to international trade 1965-90	Sachs and Warner (1997)	OPEN6590
Life expectancy circa 1965 (log)	Barro and Lee (1994)	LLIFE65
Institutional quality 1980	Sachs and Warner (1997)	ICRGE80
Primary product exports/GDP 1970	Sachs and Warner (1997)	SXPR
Labour force growth minus population growth 1965-90	Sachs and Warner (1997)	GEAP-POP
Male schooling (secondary plus higher) in 1965	Barro and Lee (1996)	SHM25 (= SYRM25 + HYRM25)
Terms of trade growth 1965-90	Authors, Constructed from World Bank (2000). For missing data, *World Tables* 1992 and 1994 were used for TOT70 and TOT90, respectively.	TOTGR
Ethno-linguistic diversity	Sachs and Warner (1997)	ETHLING
Financial depth average 1965-90	Barro and Lee (1994)	LLY

Note: We amended Sachs and Warner's (1997) tropical climate variable so that it more accurately represents the proportion of the country that falls between the Tropics of Cancer and Capricorn. This involves some significant reclassifications including Hong Kong as 1 (not 0), Egypt as 0.2 (not 1) and Bangladesh as 0.5 (not 0.1), and rectifying some omissions in the Sachs and Warner's dataset for this variable.

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