

Democracy, Colonization, and Human Capital in Sub-Saharan Africa

David S. Brown

This article examines an empirical anomaly. In most developing regions, poor democratic nations enroll more primary school students than their authoritarian counterparts. Regime type, however, cannot account for the wide variance in enrollment in Africa. This study demonstrates that colonial heritage is a good predictor of primary school enrollment for low-income countries in Africa. Additional analysis shows that colonization's impact on education has not diminished since independence. Rather, the initial differences in enrollment between the former French and British colonies have grown over time. The results hold important implications for the study of political institutions and their impact on economic development. Even after they no longer exist, political institutions can have substantial lingering effects on important developmental outcomes.

Recent contributions to economic growth theory place an increasing emphasis on the accumulation of human capital (Lucas 1988; Romer 1989; Barro 1991). Human capital, in current economic parlance, refers to the skills and knowledge workers bring to bear on production. Empirical evidence suggests that differences in the stock of human capital can explain the disparities in economic growth we observe among countries (Denison 1985; Schultz 1989; Barro 1991). Moreover, some research indicates that raising the level of education is the most efficient way to accumulate human capital in the poorest countries, hence improving their standard of living (World Bank 1991; Schultz 1993). At the same time, a substantial literature extols the virtues of democratic institutions, arguing that the political practices and freedoms associated with democracy have a positive impact on long-term growth.¹ Given the attention education and democracy have received in attempts to explain economic development, exploring the relationship between the

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two can provide useful information: determining whether authoritarian or democratic regimes provide more educational opportunity for their citizens can either establish or rule out an important causal link that connects democracy to growth. Estimates from a group of developing regions indicate that low-income democracies enroll a larger percentage of their school-age population than do low-income authoritarian regimes. This result, however, does not hold for Africa. The following analysis explains why.

Several explanations come to mind. First, countries in Sub-Saharan Africa are by an order of magnitude poorer than the rest of the developing world. Perhaps in the poorest African economies, regime type's effects are mitigated by factors associated with extreme poverty. Upon closer inspection, however, Africa's extreme poverty explains very little: there is a tremendous amount of variation in school enrollment among Africa's poorest countries. The variance in school enrollment among the low-income cases is associated with contrasting educational and administrative policies adopted by the British and French colonizers. Surprisingly, the initial differences in enrollment between the former French and British colonies have increased over time. The increasing gap between enrollment in the former French and former British colonies implies that the effect of political institutions can continue to grow well after the formal institutions no longer exist.

The analysis proceeds as follows: section two establishes democracy's impact on primary school enrollment in general; section three describes the difference that exists between Sub-Saharan Africa and the rest of the developing world; section four examines the large variance in primary and secondary enrollment among the poorest countries of Africa; section five states the implications the analysis holds for future work on political institutions and economic development.

Democracy and Human Capital in the Developing World

In order to establish how different Africa is vis-à-vis other developing regions, let me start by establishing the empirical relationship that exists between democracy and human capital formation.² I begin by presenting the variables then proceed with a discussion of the statistical model.

Variables and Model

The data form an unbalanced panel data set: for each country, there are 16 possible cases drawn from the years 1960, 1965, 1970, and 1975–1987. The number of observations from each country varies from a minimum of 2 to a maximum of 16. Although for some analyses data from every region in the world (136 countries) were used, I focus on 94 developing countries in the Middle East, Sub-Saharan Africa, South and East Asia, Central America, and South America. Several outlying cases demand special attention. To avoid simply dropping them from the analysis, I used dummy variables to account for the anomalies.

Middle-Eastern oil exporters represent the most pronounced outliers. Karl's classification of capital-surplus oil producers (Saudi Arabia, Kuwait, Libya, Qatar, and the United Arab Emirates) provides a useful guide to identify which cases merit special consideration on strictly theoretical grounds (Karl 1997). The dis-

inction between capital-surplus oil producers and other oil exporting countries rests on whether their domestic economies can absorb the revenue generated by oil exports. The capital-surplus oil exporting countries stand out simply because the overwhelming wealth generated by oil exports distorts the relationship between GDP per capita and primary school enrollment. The Gambia represents the only other country that warrants special treatment. With its extremely low level of income, relatively high democracy score, and poor performance in education—during the 1970s primary school enrollment averaged 30 percent—The Gambia represents a peculiar case.³ Its poor performance is no doubt related to having achieved independence (1970) relatively late and to its extremely low standard of living: The Gambia's high infant mortality rate (170 deaths per 1,000 live births in the 1980s, the highest in Western Africa) and low life expectancy illustrate the severe conditions faced by a majority of its citizens.⁴ Dummy variables were included in each regression to account for these cases.

Primary School Enrollment (Dependent Variable)

To gauge the level of educational opportunity available in society, I use primary school enrollment ratios: the percentage of school-age children who attend primary school.⁵ Although using enrollment rates presents some problems, they are far outweighed by the difficulties associated with comparing cross-national figures on public expenditures on education.⁶ Tracking government expenditures on education presents several problems: (1) converting currency values cross-nationally and inter-temporally can lead to inaccuracies; (2) it is difficult to control for, let alone obtain figures on, the varying degrees of state, local, and federal responsibility for spending on education; (3) varying methods in government accounting makes collecting standardized figures for a large number of cases extremely problematic.

Some complications with enrollment rates deserve our attention. Enrollment rates do not distinguish between students enrolled in public and private schools; figures on private versus public enrollment are not available for large, cross-national studies. The problem appears less severe when we recognize the extent to which governments contribute to private education through subsidies, low cost loans, and scholarships. Evidence exists suggesting that private sectors do not crowd out government expenditure in education. James, for example, argues there is a strong positive relationship between the private sector's size and the number of subsidies provided by government (James 1987, 7). Furthermore, there is no *a priori* reason to believe the size of the private sector is confounded with regime type. If no correlation exists between regime type and the size of the private sector, then excluding the information simply reduces the strength of the observed correlation and biases toward zero the parameter estimates. Even if the data were available, their accuracy would be questionable since the distinction between public and private resources can be very difficult to establish (James 1987).

Figures for primary school enrollment were obtained from the World Bank.⁷ The figures for primary school enrollment are expressed as a ratio: the number of students enrolled in primary school over the number of children in the country's school-age group. Counting children who are older or younger than the prescribed

school age produces ratios that exceed 100. I conducted several tests to confirm that the cases above 100 percent do not significantly impact the results.⁸ Moreover, problems of comparison emerge only if we assume that the primary enrollment data measure the amount of knowledge being passed on to a specific school-age population. If we interpret the enrollment ratio as simply the government provision of basic education, controlling for population, the scores above 100 percent are valid. While it is unlikely educational standards are high in cases above 100 percent, these countries may enroll more primary school students given their age-appropriate population. In developing countries where many lack a basic education, governments are compelled to provide primary education for the school-age population in addition to providing education for those who never attended primary school as children.

Some governments intentionally misreport enrollment figures. The results will be biased, however, only if regime type is confounded with misreporting. Whether regime type is associated with misreporting is not clear. Although democrats may feel compelled to inflate figures for electoral purposes, they may also be subject to a more aggressive press and politically active population, making it more difficult to mislead. Authoritarians may, in fact, be less constrained in attempts to inflate enrollment figures. Though endowed with the tools necessary to mislead, authoritarians may, however, lack the incentive: they are not subject to electoral constraints. I have seen no evidence for either argument. Therefore, I assume democracy is not confounded with inflating enrollment figures.

Income

Per capita income is included in the model as an independent variable since it influences the individual's decision to enroll in school (Psacharopoulos 1985; Schultz, 1961). Some question whether income can help explain enrollment (Meyer et al. 1977; Meyer et al. 1992), arguing enrollment rates are generated by a state role in society that evolves according to the state's position vis-à-vis the world system. The debate over income and its role in explaining enrollment cannot be settled here because of space constraints. I control for GDP per capita to provide a strong, yet realistic test of democracy's impact on enrollment. Summers and Heston's Penn World Tables (Mark 5.6) provides a measure of per capita income based on purchasing power parities (Summers and Heston 1991). The measure I use (coded RGDPCH in the Summers and Heston data set) allows for cross-temporal as well as cross-sectional comparisons. I logged the GDP/capita variable so that linear methods of estimation could be employed.

Democracy

The measure of democracy I use is based on the DEMOC score found in Gurr's Polity III data set. Gurr's DEMOC score is an additive eleven-point scale based on four dimensions of democracy: competitiveness of political participation, competitiveness of executive recruitment, openness of executive recruitment, and the constraints on the chief executive.⁹ Although in theory a continuous measure, most of the cases are concentrated in the upper and lower extremes: democracies typi-

cally score 10 while authoritarian regimes score 0. Given its pronounced bimodal distribution, I transformed Gurr's measure into a dichotomous variable. To operationalize the dichotomous measure, I classified cases with scores of six and above as democratic and cases below six as authoritarian.¹⁰ By transforming Gurr's measure into a dichotomous variable, we can obtain a more direct and tangible interpretation of the estimates. To test whether my results were driven by Gurr's coding, I re-estimated all of the regressions using a dichotomous measure of democracy developed by Alvarez, Cheibub, Limongi, and Przeworski (Alvarez et al. 1996). The results reported in the following paragraphs did not change from one classification scheme to the other.

Statistical Model

The statistical model forms an analysis of covariance (ANCOVA) designed specifically to test whether democracy influences the relationship between enrollment and income. The model estimates separate regression lines for the democratic and authoritarian cases, allowing us to test directly whether the two intercepts and the two slopes differ significantly from each other. The difference between the intercepts of the democratic and authoritarian regression lines is represented by β_2 , while β_3 records the difference between their slopes.

$$\begin{array}{l} \text{Enrollment} = \alpha \\ + \beta_1 \text{ GDP/capita} \\ + \beta_2 \text{ Democracy Dummy} \\ + \beta_3 \text{ GDP/capita} * \text{ Democracy Dummy} \\ + \epsilon \end{array} \quad (1)$$

Dummy variables for Central America, South America, the Middle-East, and Sub-Saharan Africa were included in all of the regressions to account for the heterogeneity of the data between regions. Since a constant is included in the model, the dummy for the South and East Asian cases was not included.¹¹

Results and Interpretation

Although the OLS estimates indicate that democracy's effect is significant, the standard errors of the coefficients may be underestimated due to the panel structure of the data. When applying OLS to panel data, autocorrelation and heteroskedasticity become a concern. Specifically, the errors for each unit (country) at time t may be correlated with the errors for time $t-1$, violating the OLS assumption that the errors are uncorrelated, causing us to underestimate the variance of the parameters. Heteroskedasticity might be a problem if developments in one country affect outcomes in one or more of its neighbors. If so, the errors from one unit (country) will be correlated with another. To account for autocorrelation, I estimated the same regression using two random effects models.¹² One of the random effects models accounts for autocorrelation (AR1) while the other does not.¹³ The results from both random effects models do not differ significantly from each other or from the OLS model. I estimated the same model using White's consistent estimator of the standard errors in addition to estimating a Weighted

Table 1
Regression Results: Dependent Variable is Primary School Enrollment Ratio

Model	OLS (R ² =.40) n=1295 (all regions)	OLS (R ² =.41) n=964 (developing regions)	White's (R ² = .41) n=964 (developing regions)	Random Effects (R ² = .42) n=537 (all regions)	Random Effects AR1 (R ² = .42) n=537 (all regions)
Constant	-33.37 (-3.50)**	-70.03 (-6.69)**	-70.02 (-6.75)**	-72.39 (-5.26)**	-62.82 (-4.29)**
GDP per capita	35.84 (13.4)**	48.55 (14.95)**	48.55 (15.82)**	46.61 (11.05)**	44.10 (9.90)**
Democracy Dummy	65.46 (4.64)**	70.54 (3.49)**	70.54 (3.63)**	80.51 (3.98)**	65.70 (2.92)**
GDP & Democracy	-17.95 (-4.35)**	-19.32 (-3.22)**	-19.31 (-3.41)**	-22.56 (-3.8)**	-18.55 (-2.86)**
Africa	-6.57 (-2.04)*	-6.49 (-2.81)**	-6.49 (-2.55)**	—	—
Central America	5.7 (1.95)	-1.15 (-.44)	-1.15 (-.52)	—	—
Middle East	-9.49 (-2.83)**	-10.11 (-3.34)**	-10.11 (-3.95)**	—	—
South America	11.28 (3.61)**	3.53 (1.18)	3.53 (1.60)	—	—
Oil Exporters	—	-45.06 (-8.19)**	-45.06 (8.78)**	—	—
The Gambia	—	-46.30 (-5.41)**	-46.30 (-11.55)**	—	—

Notes: 1) numbers in parentheses are t-ratios; 2) * denotes $p \leq .05$ and ** denotes $p \leq .01$; 3) Dummy variables for every region were included in the 'all regions' OLS regression but coefficients for Western Europe, Eastern Europe, and European settled countries are not reported in Table 1 for presentation purposes; 4) Footnote 12 explains why the random effects models have a substantially smaller N (N=537); 5) Dummy variables for the capital-surplus oil producers and The Gambia were included in every 'developing region' estimation; 6) Japan was not included in the 'developing regions' regressions.

Least Squares (WLS) regression to account specifically for the problem of heteroskedasticity. The estimates generated by White's procedure and WLS were not significantly different from the OLS results.¹⁴

A distinct pattern emerges from the results presented in Table 1: low-income democracies outperform their authoritarian counterparts in terms of primary school enrollment. The gap between low-income democracies and authoritarian regimes is both statistically and substantively significant. Some examples using predicted values generated by the OLS model illustrate democracy's effect. Regime type's impact is pronounced among the low-income cases (\$500–\$2,000 per capita). At the \$583 per capita income level (2.77 logged; e.g., Nepal 1960), dictatorships enroll approximately 64 percent of the school-age population while democracies average 82 percent. An important difference remains at the \$1,000 income level: enrollment rates in democracies are 12 percentage points higher than their authoritarian counterparts. Only when per capita incomes reach \$4,365 (3.6 logged; e.g., South Korea 1986) do enrollment rates in authoritarian regimes equal those of democratic regimes.

Africa and the Developing World

Despite the evidence that links democracy with the accumulation of human capital within the developing world, an important regional anomaly exists, warranting further investigation. In direct contrast to other developing regions, regime type fails to account for the large variance in enrollment in Africa. To demonstrate the difference between Africa and the rest of the developing world, a simple analysis of covariance model is estimated to show the parameter heterogeneity between Africa and the rest of the developing world. The following model is used to test whether democracy's impact on primary school enrollment (controlling for GDP/capita) in Africa differs significantly from other developing regions:

$$\begin{array}{rcl}
 \text{Enrollment} & = & \alpha \\
 & & + \beta_1 \text{ GDP/capita} \\
 & & + \beta_2 \text{ Democracy Dummy} \\
 & & + \beta_3 \text{ GDP/capita} * \text{ Democracy Dummy} \\
 & & + \beta_4 \text{ Regional Dummy} \\
 & & + \beta_5 \text{ Regional Dummy} * \text{ GDP/capita} \\
 & & + \beta_6 \text{ Regional Dummy} * \text{ Democracy Dummy} \\
 & & + \beta_7 \text{ Regional Dummy} * \text{ GDP/capita} * \text{ Democracy} \\
 & & + \varepsilon.
 \end{array} \quad (1)$$

Results

The estimates from the ANCOVA model are reported in Table 2. The results show there is a significant difference between Africa and the other developing regions along every possible dimension. The coefficients for the Democracy Dummy Variable and the interactive term between the Democracy Dummy Variable and GDP/capita (logged) suggest that democracy's impact on enrollment in Africa is negligible (the null hypothesis could not be rejected at the 95% level of confidence). The estimates reported in Table 2 not only indicate that democracy's impact on enrollment is muted in Africa, the results show democracy's impact on

enrollment in the other developing regions is significantly different. The last two terms in Table 2 indicate that the difference between the authoritarian and democratic regression lines in Africa is significantly different from the other developing

Table 2
Tests for heterogeneity between Africa and four other developing regions
(Central America, South America, South and East Asia, and the Middle East)
The Dependent Variable is Primary School Enrollment

Variable	Coefficient
Constant <i>Intercept of the regression line for authoritarian cases in Africa.</i>	-133.359 (-8.43)
GDP/capita Logged β_1 <i>Slope of the regression line for authoritarian cases in Africa.</i>	68.1513 (12.6)
Democracy Dummy Variable β_2: 1=Democratic; 0=Authoritarian <i>Is there a statistically significant difference between Authoritarian and Democratic regimes in Africa when all other factors are held constant at zero?</i>	-51.1766 (-1.27) NO
Interactive Term between Democracy Dummy and GDP/capita logged β_3 <i>Is there a statistically significant difference between the slope of the democratic line and the authoritarian line among the African cases?</i>	14.9505 (1.16) NO
Regional Dummy Variable β_4: 1=Central America, South America, South and East Asia or the Middle East; 0= otherwise <i>Is there a statistically significant difference between the intercept of the authoritarian line for the African cases and the intercept of the authoritarian line for the other developing regions?</i>	104.345 (5.02) YES
Interactive Term between GDP/capita logged and the Regional dummy variable β_5 <i>Is there a statistically significant difference between the slope of the authoritarian line in Africa and the slope of the authoritarian line for the other developing regions?</i>	-32.64 (-4.84) YES
Interactive term between the Democracy dummy variable and the Regional dummy variable β_6 <i>Is the difference in intercepts of the authoritarian and democratic lines in Africa significantly different from that recorded in the other developing regions?</i>	122.589 (2.56) YES
Interactive term between the Democracy dummy variable, GDP/capita logged, and the Regional dummy variable β_7 <i>Is the difference in slopes between authoritarian and democratic regimes in Africa significantly different from that recorded in the other developing regions?</i>	-33.19 (-2.22) YES

Note: Values reported in parentheses are t-ratios. T-ratios that meet or surpass the 95% level of confidence are printed in bold. The R-squared statistic for the regression is 44.3% with 847 degrees of freedom. The dummy variable for the capital-surplus oil producers was included in the estimation but because of space considerations is not reported above.

regions. For example, the penultimate term in Table 2 (β_6) answers the following question:

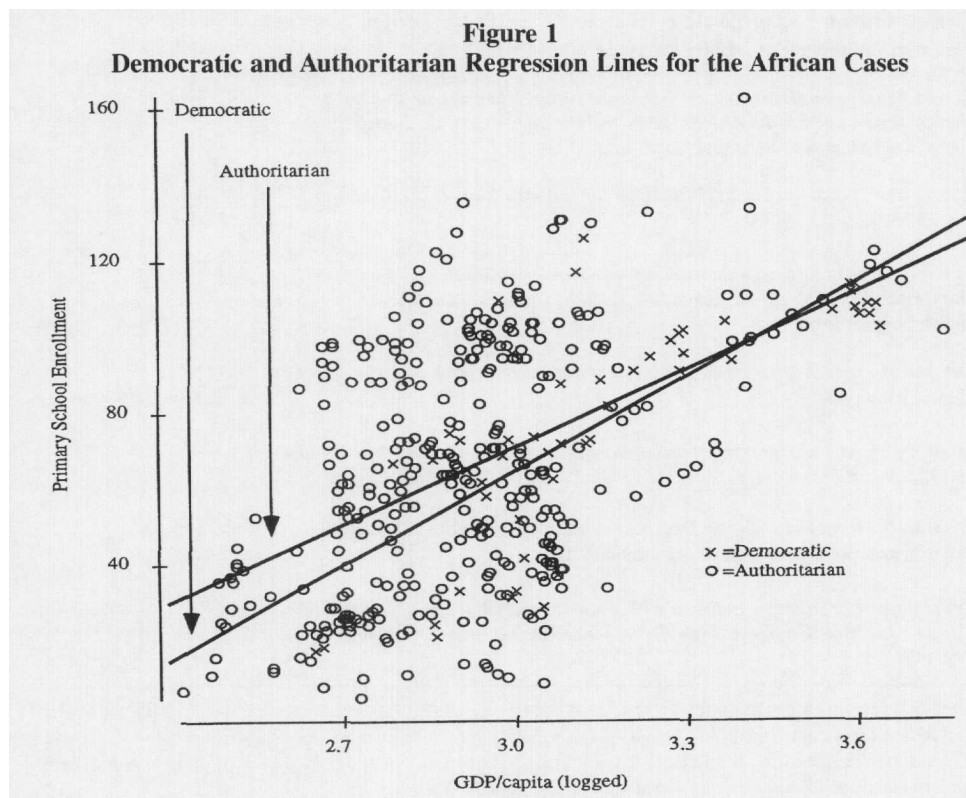
Is the difference in intercepts of the authoritarian and democratic lines in Africa significantly different from that recorded in the other developing regions?

The coefficient β_6 (122.58; with a t-statistic of 2.56) indicates that the difference between the democratic and authoritarian intercepts is much greater in the rest of the developing world.

The last term in Table 2—the three-way interactive term between the Democracy Dummy Variable, GDP/capita (logged), and the Regional Dummy Variable—specifically addresses the following:

Is the difference in slopes between authoritarian and democratic regimes in Africa significantly different from that recorded in the other developing regions?

In Africa, the difference between the slopes of the democratic and authoritarian lines ($\beta_{\text{Democratic}} - \beta_{\text{Authoritarian}}$) is positive. In the other developing regions the difference is negative. The coefficient for β_7 is significantly negative, indicating that the differences found between the slope of the authoritarian and democratic regression lines in Africa differs substantially from the differences found between the slopes of the authoritarian and democratic lines in the other developing regions.



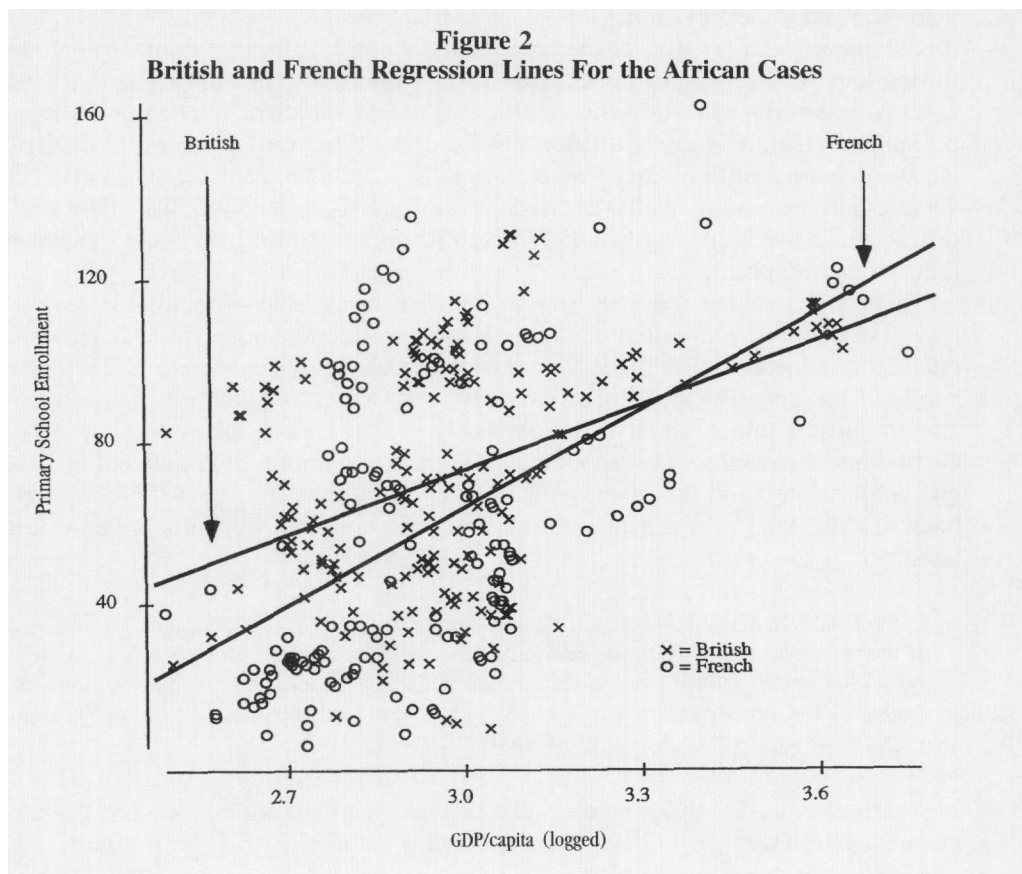
The results reported in Table 2 are unambiguous. Along every possible dimension, the estimates for Africa differ significantly from the other developing regions. A quick glance at the authoritarian and democratic regression lines for the African cases shows regime type does not provide a useful explanation for the variance in enrollment. Knowing whether a country is democratic or authoritarian offers relatively little information on the country's rate of human capital accumulation.

Africa differs from the other regions in an important way: at low levels of income there are relative few democracies. In addition to the absence of democratic regimes, one is struck by the tremendous variance in enrollment among low-income cases. What accounts for the wide disparity?

Explaining Enrollment among Africa's Poorest

What explains the variation in enrollment among Africa's poorest nations? The answer begins with Africa's unique colonial history. To examine the impact colonial heritage has on enrollment, the African cases were classified according to whether they were French or British colonies.¹⁵

Separate regression lines were estimated for both sets of colonies (Figure 2). As the scatterplot illustrates, colonial heritage accounts for the wide variance among



the poorest African nations. The former British colonies have fared relatively well compared to the former French colonies. At the \$630 income level (2.8 logged; e.g., Kenya 1960, Malawi 1979), the predicted enrollment rate for the former British colonies is 62 percent compared to only 48 percent in the former French colonies. The regression that generated these estimates is presented in Appendix B. Colonial heritage, therefore, is strongly associated with current primary enrollment rates.

The former British colonies' advantage does not, however, seem to carry over into secondary enrollment among the poorest cases. Among the low-income cases (below a logged GDP per capita income value of 2.8), a 2-sample t-Test of the means ($\mu_{\text{British}} - \mu_{\text{French}}$) produced a difference in means of -4.7 percentage points with a t-statistic of 4.5 which indicates the former French colonies outperform the former British colonies. Two questions arise from the observed patterns in the primary and secondary enrollment data: (1) What explains the difference in primary school enrollment between the former French and British colonies? (2) Why are the differences observed in the primary school enrollment data reversed in the secondary school enrollment data? How the French and British administered their colonies provides some interesting clues.

The French and British adopted very different colonial strategies. For the most part, the British pursued an "adaptationist" approach in which local tribal leaders were allowed to perform many of the same functions they had performed previous to colonization. The British avoided installing a single administrative model throughout Africa, adapting their rule to the unique circumstances within each colony. According to Ruth Berins Collier, "The French introduced common legal, political, and administrative institutions throughout French Africa, while the British were more institutionally flexible, seeking to preserve and accommodate diverse ethnic traditions, identities, and institutions" (Collier 1982, 81). The basic differences between the British and French forms of administration are evident in their education policy.

To a greater extent than the French, the British tailored education to the perceived needs of the African population. Based on several commissioned studies of education in the colonies, the British decided to focus their efforts on the dissemination of basic skills, orienting a significant part of the curriculum around literacy and imparting fundamental technical skills.¹⁶ The French, however, imposed a curriculum designed to train an elite cadre of the population in French culture, the arts, philosophy, and the sciences. Consider the following quote by Berg who, back in 1965, foresaw the eventual impact French colonial education policy would have:

In the final balance sheet that will be drawn up on the colonial experience, long neglect of the development of African human resources will surely weigh heavily on the debit side. This is particularly true in the French-speaking Africa for two main reasons, the nature of the pre-independence educational system and the special political circumstances binding French Africa to its metropole (Berg 1965, 235).

Another important difference existed between the two colonizers. The French, given their mission to produce French citizens imbued with French culture and

ideas, conducted primary education exclusively in French. Taking a vastly different approach, the British taught students how to read and write in their native language. English was introduced gradually once the students had gained some semblance of literacy in their own language (Westley 1992).¹⁷ Another indirect effect emerges from the French colonizer's insistence on educating Africans in French. Notwithstanding the pedagogical problems associated with learning in a foreign language, the requirement that elementary school be taught exclusively in French limited the number of qualified teachers. This not only constrained the number of classes, it also drove up the costs of providing education (Berg 1965).

The two colonizers, then, imposed very different educational systems. The British sought to spread literacy and basic technical skills to as many Africans as possible. The French concentrated on developing an elite group of Africans schooled in the French tradition. Under the two contrasting approaches, primary enrollment was significantly higher in the former British colonies.

Given the British emphasis on primary education, it is puzzling why the 'British advantage' is not carried over into secondary enrollment. Why is the relationship between the former French and British colonies reversed in the case of secondary education?

Although the British were successful in disseminating basic skills over a large percentage of the population, they did not exhibit the same enthusiasm for secondary education. Even though the colonial powers became involved increasingly in colonial education, their growing involvement did not necessarily reflect a concern for providing higher levels of educational opportunity for Africans. In *A Sociology of Education for Africa*, Kenneth Blakemore and Brian Cooksey argue that "The main impetus behind this increasing involvement was not the desire to expand educational facilities for Africans, as might be expected from a reading of policy statements, but rather the opposite, namely, the desire to restrict the expansion of schooling, particularly of academic secondary schooling, which was deemed inappropriate for African needs" (Blakemore and Cooksey 1980, 37). The British were strong supporters of imparting basic skills to the population, but much less willing to provide opportunities at the secondary enrollment level. The French, it seems, put relatively more emphasis on higher education than did their British counterparts: the French did not charge tuition for secondary schooling whereas the British did (Mumford 1970, 66). Walter McMahon notes that public subsidies for higher education were significantly greater in the Francophone countries (McMahon 1987, 192). Evidence from the African cases shows that at low-income levels, the British were extremely successful in limiting access to secondary school given their high levels of primary school enrollment.

To illustrate the important difference between the British and French in their ability to limit the supply of secondary enrollment, I divided the secondary enrollment ratio by the primary enrollment ratio. The resulting quotient provides an indication of the emphasis placed on secondary enrollment given the country's level of primary enrollment. If colonial heritage is important, we would expect to see a difference between the former French and British colonies with respect to the ratio of secondary enrollment to primary enrollment. If the British were indeed more successful in limiting educational opportunity at the secondary level, the former British colonies will exhibit a lower ratio. I conducted a 2-Sample t-Test of

the difference in means between the French and British cases below the logged GDP/capita level of 2.8 (\$630). The difference in means between the former French and British colonies was roughly 10 percentage points ($\mu_{\text{French}} - \mu_{\text{British}}$), producing a t-statistic of 7.0 which is statistically significant at the .001 level of confidence. The higher French ratio confirms that the British were indeed more successful in limiting educational opportunity at the secondary level. At higher levels of income, there is no difference between the former French and British colonies. As GDP/capita increases, the data suggest it became more difficult for the British to limit educational opportunity at the secondary school level.

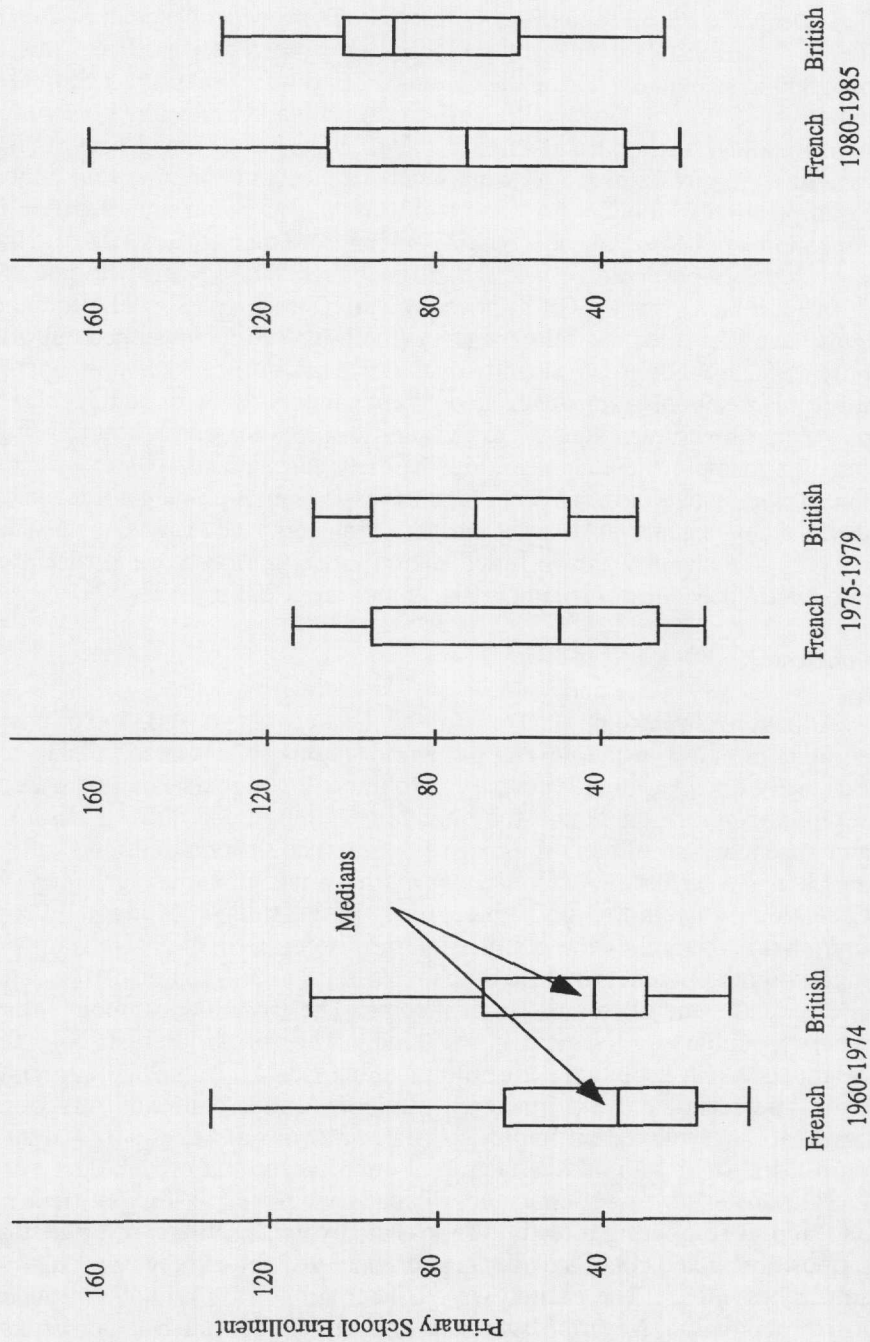
Why have the effects of colonial education policy persisted after independence? To answer the question let me first describe how the effects have changed over time. We might expect the impact of colonization to diminish gradually since the newly independent nations all developed education programs designed to increase mass education. At the Addis Ababa conference in 1961, participating nations set a number of educational goals. The main goals involved achieving universal primary education and 30 percent enrollment at the secondary level by 1980 (King 1991). It would seem, therefore, that shortly after independence the newly independent nations of Africa all struggled toward the same goal. Were the former French colonies able to catch up to the former British colonies? To evaluate the difference in primary school enrollment between the former French and British colonies over time, I constructed boxplots for three separate time periods (Figure 3).¹⁸ The "box" in the boxplots represents the inter-quartile range of the distribution while the line that intersects the box represents the median. The first set of boxplots compares former French and British colonies between the years 1960 and 1974. The second and third sets of boxplots include the years 1975–1979 and 1980–1985 respectively.

Contrary to expectations, the differences between the former British and French colonies not only persist, they increase over time. Although enrollments in both sets of countries expanded considerably, the gap between the two median rates of enrollment increased as well.¹⁹ For the first period, the difference between the two medians is 9 percentage points (the difference between the two means is not statistically significant at the .05 level). In the last period (1980–1985), the difference between the medians balloons to 20 percentage points; the difference between the means is statistically significant at the .01 level.²⁰

The challenge, therefore, is not to explain why the effects of the colonial policies have persisted over time. Rather, the challenge is to explain why the initial discrepancy has continued to grow. Has national independence exacerbated the difference? While the question deserves a more thorough investigation than is possible here, I will offer a few very tentative explanations.

From a purely data-analytic standpoint, the increasing differences in primary enrollment between the former British and French colonies suggest the expansion of enrollment is an evolutionary process heavily influenced by previous trends. In other words, the "British advantage" created a kind of virtuous cycle in which the initially high levels of primary enrollment generated the relatively high enrollment rates observed today.²¹ Supporting evidence does exist: numerous studies show that a father's occupation and level of education is an important predictor of his child's educational attainment (Blakemore and Cooksey 1980, 50). The initial

Figure 3
Boxplots of Primary Enrollment for the Former French and British Colonies (Three Different Time Periods)



success of the British colonies, perhaps, has been handed down to the next generation.

A brief look at post-independence educational policy offers another explanation. Despite a desire to break with the past after independence, the same government officials installed during the colonial period remained in office. Consequently, many policies pursued during the colonial period were pursued long after independence. According to Daphne W. Ntiri, the elites that remained in power after independence had an important impact: "The elites that colonial education created inherited the government following independence and continue to use their privileged position to monopolize the control of African states and to define national educational policies and goals" (Ntiri 1993, 360). This explains, perhaps, the growing difference observed between the former French and British colonies.

In addition to low rates of turnover in administrative personnel, economic problems have prevented radical change. As the boxplots demonstrated, enrollment in primary school has grown steadily over the years. Unfortunately, job opportunities for primary school graduates have not kept pace. Faced with high levels of unemployment, governments have grown wary of increasing enrollment. Fearing an upsurge in unemployment among an increasingly educated and politically active work force, governments have sought to limit the expansion of primary education. Cooksey and Blakemore note that "Many African governments have returned to the old colonial policies of containing growth [in education] and stressing vocational and relevant rather than academic curricula" (Blakemore and Cooksey 1980, 218).

Conclusion

Although a strong empirical relationship between regime type and primary school enrollment exists in the developing world, regime type cannot explain the wide variance of primary and secondary enrollment among Africa's poorest countries. A closer examination demonstrates the lasting impact colonization has on primary and secondary enrollment, past and present. The different administrative strategies adopted by the two colonial powers have left an enduring legacy. With an educational system founded on imparting basic skills in farming and commerce to a broad segment of the population, the former British colonies now enroll a much higher percentage of their school-age population in primary school. This is especially true at low levels of income. The British "advantage" disappears when secondary enrollment is examined. The former British colonies' poor performance in secondary enrollment is particularly conspicuous given their strong performance in primary enrollment. Again, colonial education policy seems to have played an important role. To avoid creating political and social unrest, the British limited educational opportunity at the secondary enrollment level, fearing that well-educated Africans would press for political rights in addition to competing directly for jobs held by white settlers. A further test of this proposition would entail making an additional distinction between settler and non-settler colonies.²² The French were concerned as well with over-educating the native population. Nevertheless, the French enrolled a much larger percentage of their school-age population in secondary school given the number of students in primary school.

Recognizing human capital's role in determining long-term economic growth, it appears that a country's colonial past—specifically whether it was under French or British rule—will have an important impact on future economic development. Economic performance has varied dramatically between the former French and British colonies. In terms of growth in GDP/capita, the former British colonies grew 33 percent between 1970 and 1980. Former French colonies grew much slower: over the same period their mean growth rate was 11 percent. The huge difference is not explained by outlying cases. When comparing median rates, the former British colonies' economies expanded 21 percent compared with 10 percent for the former French colonies. Factors other than human capital (geography, natural resources, civil war, etc.) surely help explain some of the variance in economic performance. Nevertheless, colonization's impact on the accumulation of human capital must explain an important part of the disparity.

The implications of this study are not limited to developmental outcomes in Sub-Saharan Africa, however. The patterns of enrollment observed over time—the growing difference in primary enrollment between the former British and French colonies—suggest we need to consider the possibility that institutional influences do not always diminish with time. Instead, the growing disparity between the former British and French cases implies when political institutions die, their effects not only persist, they may actually grow.

Notes

1. For comprehensive reviews of the debate on democracy and economic performance see Inkeles and Sirowy 1990; Przeworski and Limongi 1993; Alesina and Perotti 1994.
2. A fuller statistical and theoretical treatment of democracy's impact on the accumulation of human capital can be found in Brown 1999.
3. Leverages, Cooks distances, or DFFITs do not capture The Gambia's importance since these measures are based on the influence each individual observation has on the regression. Each individual observation for The Gambia, therefore, registers very little effect. However, when considered as a cluster the Gambian cases clearly stand out.
4. The infant mortality rate was taken from the Encyclopedia Britannica [<http://www.eb.com:180>]. In 1998, The Gambia's infant mortality rate stood at 159 per 1,000 live births, representing the 6th highest in the world [<http://www.worldbank.org/data/databytopic/databytopic.html>].
5. Data that record the stock of human capital in society are problematic because they fail to indicate exactly when the capital was accumulated.
6. See Samoff 1991 for a discussion of the problems associated with comparing education statistics cross-nationally.
7. Data for secondary school enrollment rates were obtained from the same source. World Bank, International Economics Department. "World Tables of Economic and Social Indicators, 1950–1987" [Computer file]. Washington, D.C.: World Bank, International Economics Department [producer], 1988. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 1990. The data utilized in this article were made available in part by the Inter-university Consortium for Political and Social Research. The data for "World Tables of Economic and Social Indicators, 1950–1987" were originally collected and prepared by the World Bank, International Economics Department. Neither the collector of the original data nor the Consortium bears any responsibility for the analyses or interpretation presented here.
8. To test whether the OLS results were influenced by scores above 100 percent, I removed the cases above 100 percent and reestimated the regression. I also transformed the variable: all of the cases above 100 percent were transformed to 100. The effect on the OLS estimates was minimal. Finally, to account for the censored nature of the primary enrollment data, I estimated

a Tobit regression. The signs and significance of the coefficients were not significantly different from the OLS estimates.

9. For the theoretical basis of Gurr's measure, see Gurr and Eckstein 1975; Gurr et al. 1990; Jagers and Gurr 1995.
10. Varying the dividing point between 1 and 9 does not significantly alter the results.
11. Consequently, the coefficients for the developing regions give the difference between that specific region's estimate and that of South and East Asia's.
12. Since panel methods account for the large variance that exists between each country, the regressions included the entire sample of 136 countries (both developing and industrialized regions were included).
13. To estimate an AR1 model given the unique structure of the data (the first four observations for each country are available at five year intervals while the last 10 are available at one-year increments), I only used observations from 1960, 1965, 1970, 1975, 1980, and 1985. This enabled me to estimate the AR1 model and preserve the temporal range of the data.
14. The weighting variable I used was derived from the procedure presented in Wonnacott and Wonnacott for bi-weighted least squares (Wonnacott and Wonnacott 1984). Results from the weighted least squares regressions can be obtained from the author upon request.
15. Only the former French and British colonies are compared. The results are not dependent on the exclusion of the former Belgian, German, and Portuguese colonies.
16. For a discussion of the differences between the two colonial experiences with respect to education see Thompson 1981, 36–39.
17. It is conceivable that the results reported so far are biased since language has not been taken into account. The colonization of Africa, by most accounts, did not proceed along linguistic lines. In other words, political barriers that separated the French colonies from the British, Portuguese, and others, cut across language groups. It would seem, then, that the difference we see with respect to enrollment in primary and secondary school is not the product of a correlation between certain linguistic groups and French or British rule.
18. The time periods were delineated so that each period would contain roughly the same number of cases.
19. The same analysis for secondary enrollment shows that the similarities in secondary enrollment among the former French and British colonies remains stable over time.
20. The 2-Sample t-test for the first period produced a t-statistic of 1.1 with 82 degrees of freedom which is not significant at the 95 percent level of confidence (the difference in means was 5 percentage points). The 2-Sample t-Test for the last period produced a t-statistic of 2.71 with 89 degrees of freedom which is significant at the 95 percent level of confidence (the difference in means was 15 percentage points).
21. By relatively high, I mean relative to the former French colonies.
22. I would like to thank an anonymous referee for making this suggestion.

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