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Colonial legacies and economic growth

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Abstract. Much of the work on colonialism has been theoretical or anecdotal. In this paper, I close the gap between the literature on development and new growth theory by testing the effect of colonization on subsequent growth and development. In a sample of 63 ex-colonial states from 1961–1990, I find that colonies that were held for longer periods of time than other countries tend to perform better, on average, after independence. Finally, I show that the level of education at the time of independence can help to explain much of the development gap between the former British and French colonies in Africa.

> There is much cherished myth that the character of modern colonies differed widely according to which European state owned them . . . Such distinctions flattered national vanities . . . yet fundamentally such distinctions were unimportant. D.K. Fieldhouse (1966).

1. Introduction

Development theorists have long hypothesized whether the identity of the colonial power mattered for subsequent growth and development. Many authors, such as Fieldhouse (1966) and von der Mehden (1969) once concluded that the colonial experience was insignificantly different under the major colonial powers. Recent research though has shown that colonialism did significantly affect development patterns and that the identity of the colonizing power is important to subsequent growth (see Grier, 1997; Bertocchi and Canova, 1996; Hanson, 1989; and Harrison, 1985).

In Grier (1997), I pooled data from 63 ex-colonial states over the period 1961-1990 and found that former British colonies perform significantly better on average than their French and Spanish counterparts. In this paper, I examine whether the duration of colonization has a significant effect on later development and growth and whether human or physical capital in place at the time of independence can help to explain why British colonies perform significantly better than French ones.

In the first empirical application of the paper, I pool data from 63 former colonies and find that the length of colonization is positively and significantly

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correlated with economic growth overthe 1961-1990 period. While the direction of causality is not conclusive, I find no evidence to support exploitation theory. Given that a country was colonized, since it would be impossible to test the counterfactual hypothesis, the longer it was held by the mother country, the better it did economically in the post-colonial era.

In the second empirical application, I reduce my sample to 24 countries in Africa, which helps to impose a ceteris paribus constraint and allows me to better anaylze the findings. In this reduced sample, I find that the length of colonization is still positively and significantly related to economic growth and that former British colonies still outperform their French counterparts. In an effort to explain these two results, I add two variables to the regression, representing human and physical capital at the time of independence. I find that the newly independent British colonies were significantly more educated than the French ones. In a multivariate growth equation including the duration of colonization and the identity of the colonizing power, I find that the inclusion of education at independence can explain the development gap between the former British and French colonies and the positive relationship between length of colonization and growth. These results substantiate Barro's (1991) finding of conditional convergence when human capital is included in the equation.[1]

The paper begins by looking at the literature on differential colonial development. I examine some of the differences between the British, Spanish, and French colonial empires, and explain why we might expect the identity of the colonizing power to have a permanent effect on economic growth. Section 3 describes the data and variables used in the paper and examines the current state of the convergence debate, explaining why the relevance of my results are independent of any particular model. Section 4 pools data from 63 ex-colonial states for the years 1961-1990 and estimates several regressions to test whether the identity of the colonizing power and the duration of colonization are correlated with average real GDP growth. Section 5 reduces the sample to 31 African countries and looks at the relationship between colonialism and subsequent African development. Section 6 tests whether the level of education and infrastructure at independence can explain subsequent economic growth and Section 7 summarizes the results and discusses potential extensions of the model.

2. The British, French, and Spanish colonial empires

The French colonial empire differed greatly from the British in its political and economic treatment of the colonies. While the British had agencies that dealt with colonial affairs, their empire was never as rational or centralized as

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the French one. D.K. Fieldhouse (1966: 308), in his examination of the major colonial empires, writes about the French,

> The French approached the constitutional relationship between colonies and metropolis with an assumption derived from the republican principles of 1789. The republic was one and indivisible: colonies were an intrinsic part of it, and should ideally be assimilated to it in every particular... This meant not only a single tariff system, but application of the metropolitan pattern of local government and laws, representation of colonists in the French assembly, and full cultural assimilation.

The consequence of this philosophy was a centralization of power in Paris and an autocratic system of colonial government that did not leave governors much freedom or latitude in dealing with local problems. Education was a key component in the French philosophy of a centralized empire. Very few Africans received the benefits of a colonial education, and those that did were isolated and alienated from their original cultures. Most were boarded and were able to go home only in the summertime vacation. Students were required to speak French, and all vernacular languages were forbidden, which resulted in large numbers of the population failing to achieve any kind of literacy. Corbett (1972:30) states that, "In the late 1960s, up to 95% of the population in France's former Black African territories were illiterate. They included hundreds of thousands who were carried on school rolls for a year or two but who never achieved an acceptable degree of efficiency in the official language".

The British were more decentralized in their colonial approach. In 1839, it was agreed that the British government, and her agents thereof, should have total control over four areas: the constitution, foreign relations, international trade, and public lands. The last two were quickly eliminated, as the British did not want to give cause to rebellion or discord in the colonies. Issues outside of this domain, such as domestic policies and budgetary matters, were resolved by the colonial legislatures. Local governments were allowed to keep all revenue surpluses.

After 1765, the British did not automatically impose their constitution on the indigenous culture, but tried to individualize each country's constitution to its specific needs. The British recognized six different forms of colonial holdings, including: original Caribbean colonies, settlement colonies, protectorates, mandated territories, regular dependencies, and the special case of India. British colonial education policies made a conscious effort to avoid alienating the native culture, by teaching in the vernacular languages and training teachers from the indigenous tribes.

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Unlike the French colonial empire, the British never had a specific secretary or agency that was responsible for the entire empire. One important reason for this decentralization was the fact that the British had a free trade policy since 1830. Colonial trade was open to all foreign countries and in 1846, colonies were no longer forced to give British goods preferential treatment. Much of the political power that the Spanish and French had over their dominions was needed to enforce restrictive trade measures. British colonies have a long history of free trade, while the French enforced mercantilist and protectionist measures in colonial trade.

Another marked difference between the colonial empires was the degree of openness in international trade. The Spanish were probably the most constrictive of three, establishing a mercantalist system of trade that allowed colonies to trade only with Spain herself. Seville was the only port allowed to engage in transatlantic trade. The Seville merchants, the most powerful guild in Spain, controlled all incoming and outgoing trade with the Indies. In Mexico, Veracruz was the only legal port for international trade. The powerful Mexican guild, called the *consulado*, controlled all goods that entered or exited through Veracruz.

Spain had a monopoly, convoy system where fleets were sent periodically throughout the year from Seville or Cadiz to established colonial ports. The convoy system was the easiest way for Spain to secure its trade monopoly, and protect the trading ships from possible seizure by the English or Dutch (Brading, 1971: 95).

The French also imposed a strict, mercantilist system on colonial trade. French colonies were forced to import from France (or at least through her), to sell their goods only to France, and to use French ships (Fieldhouse, 1966: 306). A brief relaxation in these laws occurred in the late 19th century, when the French government was attempting to smooth relations with Britain. By the 1880s, the long standing French-British enmity returned, and colonial trade reverted back to the mercantilist system (see Fieldhouse for an excellent analysis of the French and British Empire).

The British, French, and Spanish had very different colonial philosophies. It is perhaps not surprising that the former British colonies have performed significantly better in the postcolonial era, given the fact that British decentralization and flexibility allowed colonies to adopt the institutions that best suited their situation. While centralization and bureaucratisation may have helped the Spanish to gain a foothold in the New World, and allowed the French to pursue the "republican ideal" in West Africa, it may have established colonial institutions and customs that were not conducive to development and growth after the colonial period.

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3. Data and variables

My empirical work addresses two questions. First, does the length of the colonization period matter for subsequent growth and development? Second, can education levels at the time of independence explain why British ex-colonies perform significantly better than their French counterparts.

In the first empirical application of the paper, I perform a cross national study of 63 ex-colonial states and test to see whether the length of colonization is correlated with subsequent growth rates. (see Appendix 2 for a listing of the countries included). In the second empirical application, I reduce the sample to British and French Africa and test whether the duration of colonization matters for later development and whether human or physical capital levels at the time of independence can help to explain why British ex-colonies perform better on average than French ones.

In both applications, I use economic data from the Penn World Tables for the years 1961-1990. I convert these 30 years of annual data into six 5 year averaged observations per country. Averaging over the entire thirty year period could result in a loss of information because only cross-country variations would drive the results, ignoring any temporal variation in the individual countries.[2]

The dependent variable is average real GDP growth and the independent variables are drawn from the new empirical economic growth literature, including such factors as initial wealth, population changes, the standard deviation of inflation, and government consumption. The following is a brief description of the variables:

(1) Initial real per-capita GDP: The standard neoclassical model argues that less advanced countries, with lower levels of initial technology and capital, should grow faster than more advanced countries. Convergence occurs because of the diminishing returns to investment in a given technology. Dowrick and Nguyen (1989) find convergence in a sample of OECD countries. Barro and Sala-i-Martin (1991, 1992) report convergence for the U.S. states and a sample including Japan and European states. Samples that include countries with vastly different initial conditions have not supported the convergence hypothesis. Romer (1987) and Rebelo (1991) found no correlation between initial per capita GDP and subsequent economic growth rates. Following in this tradition, I test for convergence in per-capita income by using initial per-capita GDP as a variable to explain subsequent GDP growth.

(2) Colonizing country: A series of dummy variables representing the identity of the colonizing country, either Britain, France, or Spain.

(3) Population growth. As Kormendi and Mequire (1985) and Grier and Tullock (1989) show, the neoclassical growth model implies that the labor force and income will grow proportionately. While population growth is

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clearly not equivalent to labor force growth, it is a good proxy and should also have a proportionate effect on income.

(4) Inflation. I use the standard deviation of the inflation rate over each 5-year period as a proxy for stable monetary policy. Hayek (1944) and Friedman (1977) both claim that inflation uncertainty increases the variability of prices, which hampers economic growth and efficiency. Levi and Makin (1980) and Mullineaux (1979) show that variability of inflation is negatively correlated with economic growth in the United States. Thus, I expect that the variability of inflation will be negatively correlated with average economic growth.

(5) Government consumption: The effect of government spending on real GDP growth is still a hotly debated topic in the economics literature. I use only government consumption spending, excluding both government investment and transfer payments. While governrnent spending on investment projects such as infrastructure and education may be conducive to economic growth, government consumption is likely to be negatively related to real GDP growth. I use the average growth rate of government consumption spending over each 5 year period to measure the influence of policymaking on economic development.

(6) The length of the colonial period: I create a variable called TIME which measures the length of the colonial period by subtracting the date of of ficial colonization from the date of independence. The theoretical literature provides no consensus from which we could know the sign of the TIME coefficient a priori. Exploitation and dependency theorists would perhaps argue that longer colonization is more disruptive to growth and development on average than shorter periods of colonization. It is also possible that, given the fact that colonization did take place, a longer period of colonization is better on average than a shorter one because it allows the mother country to establish institutions, such as educational facilities and infrastructure, in the colonial state. One of the goals of this paper is to determine if TIME is significantly related to subsequent average economic growth.

4. Econometric results

4.1. *Does the identity of the colonizing power matter for economic growth?*

Five year averages are calculated on data from 63 countries for the years 1961-1990, resulting in 6 observations for each country and a sample size of 378 data points. I use feasible GLS with country specific serial correlation coefficients and error variances to estimate all the equations reported in this paper. I begin by testing whether Spain and France have significantly different effects on real GDP growth than Britain, controlling for population growth, initial wealth, the

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standard deviation of inflation, and the growth in government consumption. Time penod dummies are also used in the regression. The results are reported below in Eq. 1, with t-statistics in parentheses.[3]

Avg. real GDP % =

4.01 – .0000015 Initial per-capita GDP – .05 Govt. % – 1.62 French
(8.35) (.043) (2.19) (4.43)

– .829 Spanish + .642 Pop % – .0536 SD inflation (1)
(3.31) (4 77) (5.24)

N = 378; R^2 = .4653
Time dummies were estimated but not reported to save space

The results show that former French and Spanish colonies perform significantly worse than their British counterparts. Spanish ex-colonies grow .83 percentage points slower than British ones, and the French perform even worse than that, at an average of 1.62 percentage points below British colonial growth rates. As expected, the growth of government consumption is negatively and significantly correlated with average real GDP growth, as is the variability of inflation. Population growth is positively and significantly related to growth. The results provide no evidence of convergence though, as real per-capita GDP rates are insignificantly correlated with eoonomic growth.

Because of the vast differences in the length of colonization for different ex-colonial states, I add a variable called TIME to determine the effect of the duration of colonialism on subsequent growth, where TIME is the year of independence less the year of arrival. The most common argument against colonialism is that it exploited the native population, causing dependency and instability in the colonial states. The results reported below in Eq. 2 show that TIME is positively and significantly related to subsequent economic growth. I do not claim that longer colonization causes higher economic growth, but my findings do reject a crude form of the exploitation theory.[4] While it is possible that countries in my sample might have had higher growth rates if they had not been subjected to colonialism, the results do show that colonies that were held for longer periods of time than other colonies have had more economic success in the post-colonial era.

Avg. real GDP %=

2.7 + .000011 Initial wealth + .85 Population % – .051 Government %
(4.4) (.30) (5.96) (2.27)

–.49 SD inflation – 1.9 Spanish – 1.31 French + .006 Time (2)
(4.95) (4.24) (3.63) (3.0)

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N = 378; R^2 = 4739;
t-statistics in parentheses.
Time dummies were estimated but not reported.

The inclusion of TIME changes the relative values of the colonial dummy coefficients, making the Spanish dummy more negative than the French one. Since the average duration of Spanish colonization was 301 years and the average French colonial period was only 84 years, it is not surprising that TIME's inclusion in the estimation changes the relative values of the coefficients.

The next section of the paper reduces the sample to African countries and searches for the mechanisms behind the correlations found in this section. Reducing the sample to British and French Africa makes the results more meaningful, since it lessens any potential problems of "settler colonies", such as the United States, Canada, Australia, and New Zealand. Most of the African colonies were not significant settler countries and can thus be more easily compared.

4.2. *Does colonialism matter for African development?*

In the section above, I found that former French colonies perform significantly worse on average than British ones. It is possible that an African effect is exaggerating the development gap between the two. Because all of the French colonies were African (except Haiti, whose population is primarily African), and Africa has been characterized by poverty and underdevelopment in the last century, it may be that an African effect is biasing the earlier results. Limiting the sample to Africa also gets rid of the high-performing British outliers, like the United States and Canada, and helps to better distinguish the differences between French and British non-settlement colonies. The following equation is identical to Eq. 2, except that the sarnple is restricted to 31 African countries and does not include any of the former Spanish colonies.

Avg. real GDP %=

$$\begin{array}{llll} 3.15 - .0002 \text{ Initial wealth} + .304 \text{ Population \%} - .024 \text{ Govt \%} & & & \\ (3.77)(.64) & (1.43) & (.62) & \\ - .026 \text{ SD inflation} - 1.38 \text{ French} + .015 \text{ Time} & & & (3) \\ (1.23) & (3.73) & (3.56) & \end{array}$$

N = 192; R^2 = .3480;
t-statistics in parentheses.
Time dummies were estimated but not reported to save space.

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French ex-colonies perform 1.38 percentage points worse on average than their British counterparts. That is, even when the sample is limited to Africa, the former French colonies still lag significantly behind the British ones.

Another interesting result is that the significance of population growth disappears when the sample includes only African countries. In the extended sample, I found population growth to be positively and significantly related to economic growth. The fact that the significance disappears in the African sample implies that increases in the population growth rate are not correlated with future economic development, as the neoclassical model would predict. I also find no evidence of convergence in Africa, as the coefficient for initial wealth is insignificant.[6]

The results also show TIME to be positively and significantly related to economic growth, which implies that the length of colonization is positively related to growth and development. The next section, which examines the institutional legacies of colonialism, tries to determine why TIME is significantly related to growth and why the French ex-colonies perform worse than British ones, even when the sample is restricted to Africa.

5. The colonial legacy

To determine why ex-British colonies perform better than French ones, I look at the level of human and physical capital the colonizing power left at independence. As noted above, education is an important component of growth and development. The British and French had contrasting philosophies of education, which translated into very different types of colonial education.[6] The largest difference between colonial education policies is that the British made a conscious effort to avoid alienating the native culture, by teaching in the vernacular languages and training teachers from the indigenous tribes. While most of the teachers in French Africa were imported from France, the Advisory Committee on Native Education in the British Tropical African Dependencies recommended that, "Teachers for village schools should, when possible, be selected from pupils belonging to the tribe and district who are familiar with its language, tradition, and customs" (Fetter, 1979: 132). The Committee also argued that,

> The central difficulty in the problem lies in finding ways to improve what is sound in indigenous tradition. Education should strengthen the feeling of responsibility to the tribal community, and, at the same time, should strengthen will power... Such teaching must be related to the conditions of life and to the daily experience of the pupils. It should find expression in habits of selfdiscipline and loyalty to the community (Fetter, 1979: 131).

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Students in British Africa were, for the most part, taught in their native language and in their tribal villages, which significantly eased the learning process.[7] In contrast, in the French system, most students were boarded and only able to go home for the summertime vacation. Students were required to speak French, and all vernacular languages were forbidden.[8]

Consequently, Corbett (1972) finds that only one-third of first graders in French African schools actually complete the six year primary school term, while three-fourths of the students finish the term in English speaking Black Africa. He argues that, "overcrowding, poorly qualified teachers, and irrelevant programs characterize both systems, leaving only the language of instruction to explain the divergent attendance rates" (Corbett, 1972: 30). To determine if education levels are important to subsequent economic growth, I use a variable called EDPCT, which is the percentage of the population attending primary and secondary school at independence. To find whether physical capital rates were important in determining post-colonial growth rates, I use a variable called RRPCT, which is the number of open railroad lines per square kilometer in the country at independence. Before including these variables in a multivariate equation, I first perform a simple means test to see whether British colonies had significantly higher levels of education and railroad lines at the time of independence [data from Mitchell (1982) and Keyfitz and Flieger (1990)]. Because there would be vast differences in education levels between a country decolonized in 1960 and one decolonized in 1920, I use only the African countries that won independence in a fifteen year time period (between 1955-1970), which further limits my sample to 24 countries.

With a simple means test, I test the null hypothesis that infrastructure in French and British colonies were not significantly different at independence. I could not reject the hypothesis that the two mean levels of infrastructure were not significantly different, which indicates that the development gap between the sets of ex-colonial states is not due to a difference in physical capital at independence.

In the case of human capital, I am able to reject at the 1% level the null hypothesis that mean education levels were not significantly different in French and British colonies at independence. In a regression of education at independence on TIME and a British colonial dummy, I find that both the duration of colonization and the identity of the colonizing power are significantly and positively related to education.[9]

$$\underset{\quad}{\text{EDPCT}} = \underset{(.048)}{.08} + \underset{(3.74)}{.078\ \text{TIME}} + \underset{(3.44)}{4.8\ \text{British colonial dummy}} \qquad (4)$$

$N = 24$; $R^2 = 5545$.

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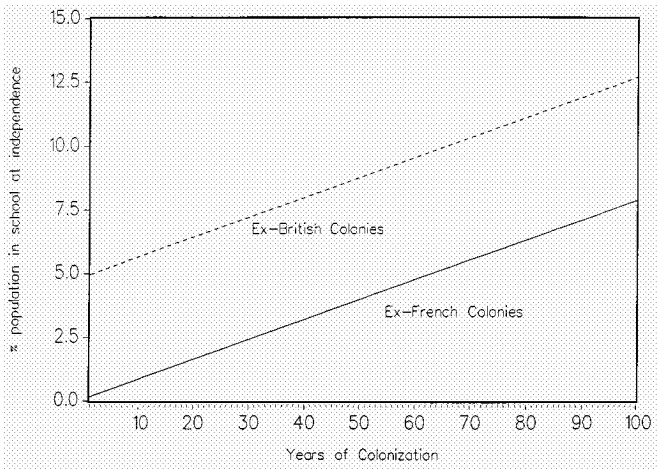

Figure 1.

The results of this section show that the British left a more educated populace than the French in Africa. Figure 1 shows the effect of time and "Britishness" on education. While the length of colonization is positively correlated with education levels in both sets of follller colonies, there is a separate British effect that results in a higher education level for former British colonies, at every number of years colonized. The next section puts the education variable into the original growth equation to test the effect of education on growth.

6. Growth and convergence in colonial Africa

To test the effect of education on growth in a multivariate context, I include EDPCT in my original growth model. I find that its inclusion dramatically changes the results of my earlier estimation. In order to fully compare the two models though, I first need to run the original model on the restricted data set (N = 144).

Average real GDP % =

$$\begin{aligned} &2.37 - .00038 \text{ Initial real GDP} - .88 \text{ France} + .39 \text{ Pop} \\ &\quad (2.2) \quad (.945) \qquad\qquad (2.25) \qquad (1.5) \\ &+ .019 \text{ TIME} - .0017 \text{ Govt. consumption \%} - .024 \text{ SD inflation} \\ &(1.65) \qquad\quad (.045) \qquad\qquad\qquad\quad (1.27) \end{aligned} \tag{5}$$

$N = 144$; $R^2 = .3838$

Time dummies were estimated but not reported to save space

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As in the sample of 31 African countries, I find no evidence of convergence in this sample. Initial wealth is insignificantly correlated with average real GDP growth. Former French colonies still perform worse on average than British ones, an average of .88 percentage points worse. Population growth, inflation variability, and growth in government consumption are not significantly related to growth, as was the case in the extended sample (N=186). The significance of TIME has dropped some, but is still marginally related to average GDP growth. When EDPCT is included in this equation, the value and significance of the coefficients change radically.

Average real GDP % =

$$\begin{array}{l} 1.45 - .001 \text{ Initial real GDP} + .56 \text{ France} + .34 \text{ Pop} + .0146 \text{ TIME} \\ (1.2) \quad (2.06) \qquad\qquad (.796) \qquad (1.33) \quad (1.28) \\ - .037 \text{ Govt. consumption \%} - .0175 \text{ SD infl.} + .192 \text{ Education} \\ (1.1) \qquad\qquad (.99) \end{array} \tag{6}$$

$N = 144$; $R^2 = .4522$.
Time dummies were estimated but not reported to save space.

The inclusion of the EDPCT in the equation has several significant effects. First, the French colonial dummy loses its significance, to the point where French ex-colonies perform no worse on average than British ones. Second, the duration of colonization is not significantly related to average real GDP growth. Third, education at the time of independence is positively and significantly related to growth.

Fourth, per capita income becomes negatively and significantly related to growth. This finding lends substantial support for the endogenous growth model, where human capital can have a permanent effect on economic growth. Appendix 1 lists the results of means tests performed on post-colonial education rates in French and British ex-colonies. Except for 1990 (where data limitations significantly reduce the sample), I find no evidence that education rates were significantly different between former French and British colonies. That is, the impact of education at independence helped to create a persistent development gap between the two sets of colonies, even though post-colonial education rates converged.

7. Conclusion

The literature on colonialism and underdevelopment is mostly theoretical and anecdotal, and has, for the most part, failed to take advantage of the more

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formal empirical work being done in new growth theory. This essay has tried to close that gap by presenting some empirical tests of oft-debated questions in the literature.

I find that the identity of the colonizing power has a significant and permanent effect on subsequent growth and development, which would deny the validity of a crude exploitation hypothesis. Colonies that were held for longer periods of time than other countries tend to perform better, on average, after independence. This finding holds up even when the sample is reduced to British and French Africa.

I also find that the level of education at the time of independence can help to explain much of the development gap between the former British and French colonies in Africa. Even correcting for the length of colonization, which has a positive influence on education levels and subsequent growth, I find support for a separate British effect on education. That is, the data imply that the British were more successful in educating their dependents than were the French. The potential for expanding this work is enormous. Broadening the sample to include the 63 countries from the original sample might help to explain differences in Spanish and British post-colonial development. Looking further at initial and current education rates could help illuminate the impact of education and its persistence over time.

Notes

1. My results also substantiate previous work by Easterlin (1981), who argued that economic development is largely determined by a country's level of education, and Hanson (1989), who found empirical evidence of Easterlin's hypothesis.
2. Quah (1993a, 1993b) argues convincingly that cross sectional regressions of time averaged data are uninformative because of possible trend breaks and variance changes in the individual country time series.
3. As the data set includes observations over a large number of countries, I test for coefficient stability across the three colonial powers and whether pooling the data into a single sample is appropriate. I divide the data by the colonizing power and calculate f-tests for the restricted and unrestricted models, and find that pooling is a feasible and appropriate technique.
4. It is possible that the metropolitan countries fought harder and longer to keep their best performing colonies, in which case the duration of colonization is simply a proxy for high real GDP rates.
5. Even when Mauritius is dropped from the sample (it is held for 158 years and had the highest level of education at independence), TIME and the British colonial dummy are still positively and significantly related to education at independence.
6. See Wieschhoff (1944), Lee (1967), McInnes (1950), and Mayhew (1933) for a good look at the differences in education under the different colonial powers.
7. The Committee also recommended that, ". . . the Native Teaching Staff should be adequate in numbers, in qualifications, and in character, and should include women. The key to a sound system of education lies in the training of teachers and this matter should receive primary consideration. The training of teachers for village schools should be carried out

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under rural conditions, or at least with opportunities of periodical access to such conditions, where those who are being trained are in direct contact with the environment in which their work has to be done. Teachers for village schools should, when possible, be selected from pupils belonging to the tribe and district who are familiar with its language, tradition, and customs" (Fetter, 1979: 132).

8. In a study of textbooks used at the primary level, Kelly (1986) found that the French colonial system was designed to teach the black students that they were better than their uneducated brethren, but that they could never aspire to be in the same ranks as a Frenchman. In that sense, the French educational system isolated the educated blacks from both their countrymen and the colonizers.
9. This substantiates Grier and Tullock (1989), who predict a bleak future for African countries, as they too found no traces of convergence and no correlation between population growth and growth.

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Appendix 1

T-test procedure #1

Schooling in former French and British colonies, 1965

BRIT	N	Mean	Std Dev	Std Error	Minimum	Maximum
0	14	0.08193166	0.05086843	0.01359516	0.01729122	0.17451404
1	9	0.11860741	0.05782979	0.01927660	0.05846027	0.21806452

Variances	T	DF	Prob > |T|
Unequal	–1.5548	15.6	0.1401
Equal	–1.6007	21.0	0.1244

For H0: Variances are equal, F′ = 1.29 DF = (8,13) Prob > F′ = 0.65.

T-test procedure #2

Schooling in former French and British colonies, 1970

BRIT	N	Mean	Std Dev	Std Error	Minimum	Maximum
0	14	0.10202343	0.06493890	0.01735565	0.02264834	0.22079189
1	9	0.12884421	0.05765735	0.01921912	0.06686356	0.22877358

Variances	T	DF	Prob > |T|
Unequal	–1.0357	18.7	0.3135
Equal	–1.0082	21.0	0.3248

For H0: Variances are equal, F′ = 1.27 DF = (13,8) Prob > F′ = 0.7562.

T-test procedure #3

Schooling in former French and British colonies, 1975

BRIT	N	Mean	Std Dev	Std Error	Minimum	Maximum
0	13	0.12090506	0.06979275	0.01935702	0.03344051	0.23390895
1	8	0.16128485	0.05903560	0.02087224	0.08700102	0.24510932

Variances	T	DF	Prob > |T|
Unequal	–1.4185	16.9	0.1742
Equal	–1.3608	19.0	0.1895

For H0: Variances are equal, F′ = 1.40 DF = (12,7) Prob > F′ = 0.6769.

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T-test procedure #4

Schooling in former French and British colonies, 1980

BRIT	N	Mean	Std Dev	Std Error	Minimum	Maximum
0	11	0.12407477	0.07521461	0.02267806	0.05008473	0.24902114
1	11	0.17234306	0.05492295	0.01655989	0.08112324	0.26178451

Variances	T	DF	Prob > |T|
Unequal	–1.7189	18.3	0.1025
Equal	–1.7189	20.0	0.1011

For H0: Variances are equal, $F' = 1.88$ DF = (10,1) Prob > $F' = 0.3360$.

T-test procedure #5

Schooling in former French and British colonies, 1985

BRIT	N	Mean	Std Dev	Std Error	Minimum	Maximum
0	11	0.15429108	0.09566108	0.02884290	0.04392477	0.36336953
1	11	0.19126719	0.06176267	0.01862215	0.11275168	0.32466281

Variances	T	DF	Prob > |T|
Unequal	–1.0770	17.1	0.2964
Equal	–1.0770	20.0	0.2943

For H0: Variances are equal, $F' = 2.40$ DF = (10,1) Prob > $F' = 0.1837$.

T-test procedure #6

Schooling in former French and British colonies, 1990

BRIT	N	Mean	Std Dev	Std Error	Minimum	Maximum
0	11	0.12607190	0.06477711	0.01953103	0.04464858	0.25090680
1	9	0.18038150	0.05546471	0.01848824	0.11301205	0.29071083

Variances	T	DF	Prob > |T|
Unequal	–2.0194	17.9	0.0586
Equal	–1.9869	18.0	0.0624

For H0: Variances are equal, $F' = 1.36$ DF = (10,8) Prob > $F' = 0.6734$.

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Appendix 2: Division of countries in the sample, by colonizing power

A.1 Former British colonies (29)

Botswana	Nigeria	Barbados	Singapore
Egypt	Seychelles	Canada	Sri Lanka
Gambia	Sierra Leone	United States	Australia
Ghana	Swaziland	Guyana	New Zealand
Kenya	Tanzania	Malaysia	Jamaica
Lesotho	Uganda	Pakistan	
Malawi	Zambia	Hong Kong	
Mauritius	Zimbabwe	India	

A.2 Former Spanish colonies (17)

Costa Rica	Colombia	Argentina
El Salvador	Ecuador	Bolivia
Guatemala	Paraguay	Chile
Honduras	Peru	
Mexico	Uruguay	
Nicaragua	Venezuela	
Panama	Philippines	

A.3 Former French colonies (17)

Algeria	Madagascar	Haiti
Benin	Mali	
C.A.R.	Mauritania	
Chad	Niger	
Congo	Reunion	
Gabon	Senegal	
Guinea	Togo	
Ivory Coast	Tunesia	

Appendix 3: Division of countries in Africa-only sample, by colonizing power

A.1 Former British colonies (16)

Botswana	Nigeria
Egypt	Seychelles
Gambia	Sierra Leone
Ghana	Swaziland
Kenya	Tanzania
Lesotho	Uganda
Malawi	Zambia
Mauritius	Zimbabwe

A.2 Former French colonies (15)

Algeria	Niger
Benin	Senegal
Chad	Togo
Gabon	Tunesia
Guinea	Reunion
Ivory Coast	C.A.R.
Madagascar	Mauritania
Mali	

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Appendix 4: Countries included in the education sample, by colonizing power

B.1 Former British colonies (10)		*B.2 Former French colonies (14)*	
Ghana	Tanzania	Algeria	Madagascar
Kenya	Uganda	Benin	Mali
Malawi	Zambia	C.A.R.	Mauritania
Mauritius	Zimbabwe	Chad	Niger
Nigeria		Gabon	Senegal
Sierra Leone		Guinea	Togo
		Ivory Coast	Tunisia

Summary statistics

Variable	N	Mean	SD	Sum	Min	Max
EDPCT	24	0.071804	0.047874	1.723300	0.0077	0.215569
RRPCT	22	0.011945	0.022164	0.262781	0.0009	0.107404
TIME	26	65.692308	32.856986	1708.000	20.000	158.0000

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