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Was British Rule More Benign?

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Abstract

British colonial rule has often been praised for its comparatively benign features, such as its support for local educational development. This paper studies the origins of formal education in sub-Saharan Africa arguing that the beneficial effects of British educational policy should not be overstated. British African colonies showed significantly higher school enrolment rates in the late colonial era, but these were not the result of impressive investment efforts. Missionary schools provided the bulk of education to native Africans at extremely low costs. We show that local African conditions affecting the African reception of missionary education explain much more of the variation in colonial educational outcomes than metropolitan identity.

Keywords: Africa, colonial rule, educational policy, educational finance, missions, agency

JEL Codes: N37, N47, I20, I22, I28

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1. Introduction

Metropolitan identity is a much cited determinant of comparative colonial development. The consensus view is that British colonial rule was more 'developmental' in comparison to other European colonial powers. Notable scholars have lauded the classical virtues of liberal political and economic institutions, which are supposed to have set the spirit of the 'British World Order' apart from other imperial philosophies (North, 1989; Ferguson, 2002). Well known empirical studies have argued that British rule is positively correlated with the quality of present-day government institutions (La Porta et al., 1999), post-colonial levels of capital investment (Bertocchi and Canova, 2002) and post-colonial rates of economic growth (Grier, 1999; Bertocchi and Canova, 2002).

Education is widely considered as a key aspect of the comparatively benign British legacy. This has not only been argued for the Americas (Mariscal and Sokoloff, 2000; Frankema, 2009) and Asia (Booth, 2003)[1], but also for sub-Saharan Africa, where school enrolment rates in British colonies were undeniably higher than in French, Spanish and Portuguese territories at the eve of independence (Benavot and Riddle, 1988; Brown, 2000). The British colonial educational legacy had persistent effects in the post-colonial era as well. Lloyd et al. (2000) show that the transition from high to low fertility rates has only been completed in five sub-Saharan African countries, all of which were former British colonies (i.e. Ghana, Botswana, Zimbabwe, Kenya and South Africa). These countries had established universal primary education by the end of the twentieth century (or earlier), which according to Caldwell (1980) is a precondition for the structural decline in the number of children per women. Bolt and Bezemer (2009) argue in line with Glaeser et al. (2004) that colonial education is key in explaining long run growth disparities in Africa and that the former British colonies grew faster as a result of their educational lead.

This study does not question the educational lead of British African colonies neither its positive long term effects. This study questions to which extent the British colonial education record in Africa can be attributed to British colonial policies in the first place. Our departure point is the empirical observation that school enrolment rates *within* British Africa varied at least as much as those between British and non-British ruled colonies. Previous studies focusing on metropolitan identity have largely ignored this *within-group* inequality.[2] But if British 'developmental' policies were successful in boosting primary school enrolment rates in some places, then why not in all?

An analysis of educational investment in British Africa reveals that financial support was fairly unimpressive before the Second World War. Education policies only became 'pro-active' in the brief period of post-war colonial rule, but this was also the case in French, Belgian and Portuguese Africa. With 'pro-active' we mean that education policies are backed up by the material,

[1] Booth has focused on the contrasts between British rule in Malaysia and Dutch rule in Indonesia.

[2] This observation of inequalities in long term development among former British colonies has also been the departure point of Matthew Lange's recent book (2009) *Lineages of Despotism and Development. British Colonialism and State Power*.

administrative and institutional resources necessary to achieve certain delineated educational development objectives. Prior to 1940, however, the degree of involvement of Christian missions explains nearly all of the variation in colonial educational outcomes.

A regression analysis demonstrates that local conditions such as country location, disease environment, the presence of Islam and the degree of native resistance against colonial rule, explain much more of the variation in school enrolment rates in the late colonial era (1938-1950) than the identity of the metropolitan state. It is probably true that British colonies offered a better climate for missionary work to different denominations. After all, a dummy variable for metropolitan identity shows a consistently positive sign. But the regression-coefficient of this variable decreases by more than 75% once we control for variation in local conditions affecting the 'African reception' of missionary activity. The main claim of this paper, therefore, is that a proper understanding of variations in human capital accumulation in sub-Saharan Africa requires a reconsideration of the role of native Africa agency and a de-emphasis of European colonial policy effects.[3]

In section 2 we discuss the literature on African colonial education in more detail. Section 3 analyses the variation in educational development and investment *within* British Africa. Section 4 develops various hypotheses with respect to local African conditions affecting the reception of missionary work, tested in an OLS regression framework in section 5. The paper concludes in section 6 with some speculative afterthoughts on the question why, after all, Africans in British territories embraced the work of Christian missionaries more often than elsewhere.

2. Varying perspectives on the long run development of African education

There were various ways in which African communities organized the transmission and accumulation of skills and knowledge before, during and after European colonial intervention. After all, the transmission of agricultural knowledge and skills was crucial for human survival in many of Africa's fragile ecological environments (Illife, 2007). Most of the 'education', however, took place in the informal spheres of the extended family, tribal network, village community or trading network. The development of 'formal education' differed in the sense that children (and adults) congregated in a classroom setting according to a predetermined weekly schedule in order to engage in prescribed curricular activities. Formal education in Africa thus adhered to the organizational principles of European education and only really took off under colonial rule.

Formal education also differed because of its non-vocational approach, focusing on the acquisition of reading and writing abilities instead of learning on the job. With the primitive means the schools for native Africans were set up, formal education was not necessarily more rewarding than

[3] Gareth Austin (2008) has recently made this point in a wider survey of the nature and impact of colonial rule in Africa. See especially pages 998 and 1008-9.

'traditional education', nor did the former replace the latter. But in the long run formal education is a necessary condition for the acquisition of, what Mokyr calls, 'propositional knowledge' (2002: pp. 4-5), which is required to understand the mechanisms underlying certain techniques or practices (i.e. 'prescriptive knowledge'). For this reason a separate study on the colonial origins of formal education is legitimate: it initiated the development towards universal primary schooling, a trajectory which still has to be completed (Clemens, 2004). It is, therefore, not surprising that the great differences in colonial educational legacies have received much attention in the literature.

For the assessment of colonial educational legacies most scholars have used late colonial primary school enrolment rates (Benavot and Riddle, 1988; Brown, 2000; Lloyd et al., 2000; Bertocchi and Canova, 2002; Cogneau, 2003; Bolt and Bezemer, 2009). Figure 1 shows the primary school enrolment rates of 42 African countries (40 colonies, 2 independent) around 1950, subdivided by metropolitan power (see Appendix table 1 for the details). The figure shows that the British African unweighted average of 24.2 is considerably higher than the French (9,4) or Portuguese (8,5) average. A one-way analysis of variation (ANOVA) of the two major colonial powers, Britain and France, verifies the statistical significance of this *between-group* difference with a confidence level of 0.995.

[Figure 1]

Conventional explanations of this remarkable difference focus on colonial policies: the British preferred to 'outsource' most of their education to private voluntary agencies, in particular the Protestant, Anglican and Catholic missions, while the French opted for public schools financed by the French colonial government. The different approaches of colonial education have often been attributed to French anticlerical sentiments. The Dreyfus affair (1898-99), for instance, re-enhanced political support for a strict separation between church and state in the France and its overseas territories (Subramanian, 1979). When the federation of French West Africa was formally established in 1904 the colonial government became legally endowed with the responsibility for education. The French restricted the activities Christian missions, and especially non-Catholic missions, while the British welcomed missionaries of all denominations to support their system of indirect rule in Africa (Cowan et al., 1965; Collins, 1970; Brown, 2000; Lloyd et al., 2000).

These policy differences can be illustrated by a few figures. In the British Gold Coast colony and protectorate only 8% of the primary school students went to government schools around at the eve of World War II. The other 92% went to mission schools of Anglican, Protestant or Catholic denomination or to Islamic schools. Within the latter group circa two-thirds of the students attended schools eligible to some financial aid from the colonial government and the other third went to so-called 'non-aided schools', relying exclusively on private school fees and missionary funds.[4] In

[4] The data are taken from the *Blue Book of the Gold Coast Colony and Protectorate*, 1938. Full details of this and other sources are to be found at the bottom of appendix table 2.

neighboring Côte d'Ivoire, which was then part of the French West African federation, 52% of the students attended government schools, 11% went to missionary schools and 37% went to the so-called *écoles coraniques* (Islamic schools). Although enrolment rates in French West Africa (ca. 3,6%) were less than half of British West Africa (ca. 9,0%) in 1938, the average amount of government expenditure per student was much higher in the French colonies: an estimated £2.32 as opposed to £0.92.[5] These spending patterns show the bigger involvement, yet smaller effectiveness of the French in supplying primary education to its colonial subjects. A liberal attitude regarding missionary work helped the British to expand colonial education without burdening the tight local colonial budgets.

It has also been argued that the French deliberately neglected the development of primary education at the expense of higher education, as they were primarily interested in training an indigenous elite to be employed as professional administrators (Debeauvais, 1964; Crowder, 1970). To achieve this goal government schools adopted the French curriculum and language of instruction (Collins, 1970). Missionary schools were also encouraged to teach in French. Lewis points out that missions had a preference for using the vernacular because they were involved in a global competition for new church members and were not interested in the creation of overseas 'Frenchmen' (Lewis, 1970: p. 175). This problem did not occur in the British territories, because the British were promoting the use of the vernacular anyway. The British, so we are told, paid more attention to primary education. They considered higher education as a potential threat to their supremacy, as it could fertilize the voice of anti-colonial intellectuals (Cowan et al., 1965; Collins, 1970; Brown, 2000; Lloyd et al., 2000; Bolt and Bezemer, 2009).

It remains the question, however, whether these differences in policy-orientation were really that important. As figure 1 clearly shows, British education policies were not effective in all of their African colonies: in 1950 gross primary school enrolment rates *within* British Africa ranged from a minimum of 1% in British Somaliland to a maximum of 59% in Lesotho (Basutoland). So there is a lot more to explain than differences *between* metropolitan powers. Moreover, the aforementioned differences in educational policy are not always supported by empirical observations. The idea, for instance, that the French tended to put more emphasis on higher education does not square with the data. In 1938 only 1.1% of primary school students in French West Africa continued into higher education. In British West Africa this was 1.6% (see footnote 5 for sources). Post-primary education was essentially negligible before 1940 in both areas: higher rates of educational spending by French

[5] Territories of French West Africa include: Senegal, Ivory Coast, Guinea, Mali (French Sudan), Niger, Mauritania, Dahomey (Benin), Upper Volta (Burkina Faso); Colonies (including Protectorates) in British West Africa: The Gambia, Sierra Leone, Gold Coast (Ghana) and Nigeria. For the conversion of French Francs into British Pounds we constructed an education expenditure Purchasing Power Parity (PPP) based on accounts of teacher salaries. Using the formal exchange rate biases the comparison as the French Franc tended to be greatly undervalued vis à vis the British pound in the 1930s. We estimated the FFR/£ at 84 to 1. The sources for British West Africa: *Blue Book for the Colony of The Gambia 1938*, Government Printing Office; *Blue Book for the Gold Coast Colony* 1938, Accra; *Blue Book of Sierra Leone 1938*, Government Printing Office and *Blue Book for the Colony and Protectorate of Nigeria 1938*, Lagos. For French West Africa *Annuaire Statistique de l'Afrique Occidentale Francaise*, troisième volume 1936-1938, Paris 1939.

colonial governments were, therefore, *not* caused by an expensive and elaborate system of higher education but merely by a larger involvement of the colonial government in education *per se*.

We should also be careful not to conflate British education policy with Protestant religious philosophy. In many places, but especially in Southern and Eastern Africa, Protestant missions had already established the practice of vernacular teaching before the British effectively occupied the area (Oliver, 1962). As a distinguishing feature of Protestantism the ability to read the bible in 'pagan' language was one of the principal issues of the Reformation. As European missionaries depended on native African catechists for much of their evangelical work (see next section) the adoption of the vernacular was much more efficient. It also does not mean that there was no demand for English-taught education. Mastering the metropolitan language was a precondition for climbing in the hierarchy of any colonial administration and this was the major reason for local chiefs or village heads to send their children to English-taught schools (Berman, 1975; Windel, 2009).

For an accurate understanding of the variation in colonial enrolment rates it is crucial to see that the gap was established prior to World War II and did *not* widen any further in the two decades thereafter. Right after World War II all colonial powers started to upscale their investments in order to increase school enrolment rates. Appendix table 1 presents the average enrolment rates in British, French and Portuguese Africa in 1938, 1950 and 1960. The table shows that the average post-1940 rise in enrolment rates was actually smaller in British Africa than elsewhere. In other words, the British lead in African education was mainly due to the high rate of activity of missionaries in the British colonies prior to 1940, rather than supposedly effective educational investment policies in the postwar years. The pre-1940 differences in enrolment rates were nonetheless important because they remained quite persistent over time. Figure 2 shows a scatter plot of primary school enrolment rates in 1938 and literacy rates around the year 2008, showing a surprisingly strong correlation ($R^2 = 0.64$).[6]

[Figure 2]

Woodberry and Callego (2010) have recently argued that current educational performances are significantly better in areas where Protestant and Catholic missions competed on equal terms. Competitive pressures led to greater activity by different denominations to win converts. This would explain much of the educational lead of British African colonies, because the French, Belgians, Spanish and Portuguese had, to varying degrees, adopted measures to reduce competition from non-Catholic missions. This is a powerful argument to endorse the view that British institutions indeed produced better educational outcomes. However, the authors treat local African conditions as a set of 'control variables' in their regression analyses (2010: pp. 314-321) and, surprisingly, leave the

[6] Nunn (2010) has found a comparable long term relationship between early missionary presence (around 1923) and present-day Christian self-identification. Huillery (2011) found long term persistent effects of private and public investments in French West Africa.

presence of Islam or native resistance entirely out of their equation. Huillery's research (2011) on French West Africa explicitly looks into the effect of native African resistance on settlement and investment patterns in colonial Africa and her results point in a similar direction: native resistance against colonial encroachment affects the development of social welfare in the long run.

Indeed, Christian missions in Islamic areas were from time to time confronted with fierce native resistance (Debeauvais, 1964; Daun, 2000). While there was rapid expansion in Southern Nigeria, European missions sparsely took root in the Islamic Northern provinces. The governor of Nigeria, Frederick Lugard, even prohibited the establishment of Christian missions in the Muslim heartlands of Nigeria, because he did not want to risk the destabilization of a well-functioning system of indirect rule via Muslim chiefs (Lugard, 1922: Chapter 12; Sutton, 1965: p. 64). Islamic domination put even more limitations on missionary expansion in French West Africa. As appendix table 1 shows, some of the French territories without Islamic influence, such as Madagascar (13.6%) and French Cameroon (20.7%), achieved much higher enrolment rates than either French or British West African colonies (Benavot and Riddle, 1988: pp. 206-7).

The bottom-line is that studies focusing on differences in metropolitan policies tend to neglect the variation in the native African reception of missionary education. By stressing the preferences and behavior of European policy makers they overlook the role of African agency in African educational development. To appreciate the potential importance of African agency it serves to have a look at the variation in educational development and investment *within* British Africa, so that we control for metropolitan identity.

3. Educational investment in British Africa, 1830-2000

To examine the historical evolution of formal education in British Africa we constructed a new dataset of primary school enrolment rates for the period 1830-2000 (see appendix table 2). The enrolment data prior to 1950 was collected from annual colonial blue books, which provide detailed accounts of the number of children (and adults) enrolled in government and mission schools. Inadequate population census data constrains the computation of historical enrolment rates for sub-Saharan Africa, as they are generally considered to underestimate total population for reasons not to be discussed here at length (Kuczynski, 1948; Kuczynski, 1949). To accommodate this problem we have checked the consistency of pre-war population census data with the available postwar population series in order to filter out 'implausible' rates of population growth (in most cases far too high) and replace these by more plausible hypothetical growth rates (varying between 0.5 and 1% per annum) for backward extrapolation. This should improve the estimates of Benavot and Riddle who based themselves on the 'official' census data reported by Mitchell (Benavot and Riddle, 1988; Mitchell, 2007).

In estimating the share of the age group 5-14 we follow Benavot and Riddle's claim that this share tends to fall in the range of 22 to 27% of the total population in less developed countries (Benavot and Riddle, 1988: p. 199). Given the lack of age distribution data for colonial Africa we apply a 25% share in all cases. A comparison with the UNESCO school enrolment data for the benchmark year of 1950 provides a reliability check, as these were also based on the age group 5-14.[7] Appendix table 2 suggests that the fit between our historical series (1830-1950) and the existing UNESCO series (1950-2000) is acceptable for most countries. The larger differences in the cases of Uganda, Botswana, Zambia and Zimbabwe are discussed in the notes below the table.

Keeping potential margins of error in mind, we may draw at least three conclusions. First, the data indicate that primary school enrolment rates increased exponentially after the consolidation of British rule in vast areas on the continent in the late 19th century. This is not surprising because it offered a degree of political and military protection to missionaries, which was hitherto unknown. Second, enrolment rates started to vary quite early. In colonies like Kenya and Nigeria enrolment rates were still close to zero around 1900, while in Mauritius the primary school enrolment rate was already around 20%.[8] The coastal colony of Sierra Leone even achieved enrolment rates between 60 and 80% during the second half of the nineteenth century![9] These differences further increased during the next three decades. A coefficient of variation of enrolment rates shows that the cross-colony variation rose rapidly between 1900 and 1929, remained high until 1970 and slowly decreased thereafter. Third, there is a clear geographical division in enrolment rates: educational expansion in British West Africa was far less impressive than in British South, East and Central Africa.

Christian missions were almost exclusively responsible for these diverging trajectories. Table 1 shows the total number of students on the roll in mission schools and their estimated percentage share in total enrolment around 1900 and 1938. From the circa 1.05 million scholars that were added to the rolls between 1900 and 1938, ca. 1.01 million entered via mission schools. This constituted more than 95% of the total rise in primary school enrolment. Mauritius was the exception to the rule, being the only colony where government schools had a substantial market share of around 40 to 50%. In view of Mauritius' spectacular post-colonial economic performance the causes and consequences of this outlier status are obviously very interesting, but won't enter this discussion.

[Table 1]

[7] UNESCO switched to actual school age based enrolment rates in the 1960s (*Statistical Yearbook*, various issues).

[8] Note that this relates to the age group 5-14 and that school age (5-10 years) based gross enrolment rates were about 40% higher, so that in practice more than one in four children went to primary school.

[9] The 1900 figure of 38% is far below the standard level in the second half of the nineteenth century and was the immediate, albeit short-lived, result of the devastating Hut Tax War (1898-1900) (Kilson, 1966).

The term ‘mission school’ may raise the impression of a rather standardized institution run by male European ordained pastors or priests in isolated areas across the African tropics, but this stereotypical image is highly misleading. As missions expanded after the consolidation of metropolitan rule in the late 19th century, the lion’s share of their services (religious ceremonies, education, medical care etc.) were performed by native African converts. Oliver estimates that the number of European missionaries in East Africa probably never exceeded 3,500 (Oliver, 1962: pp. 231-245). To illustrate what this actually implied: in 1938 there were a reported total of 8.456 native teachers in primary schools in Uganda against 285 European teachers, which is ca. 3% of the total. Such ratios were fairly common in British Africa. This indicates that the *Africanization* of the mission was an absolute prerequisite for educational expansion on the scale that has actually been witnessed in Africa. The fact that missionary expansion was as much an African as a ‘European’ or ‘white male’ undertaking has often been overlooked in conventional explanations of African educational development.

Mission schools were financed by a combination of sources: the colonial government budgets, which were assigned at the central state level, parts of which were allocated to native administrations. The missionary funds, most of which were initially collected in the homeland countries of the larger missionary societies (i.e. the UK, France, Italy, The Netherlands, Germany, Switzerland, Sweden and the United States), but increasingly depended on the contributions of native African converts. And the third source consisted of private and communal school fees paid by parents, parishes or villages.

As our brief comparison of educational expenses in French and British West Africa already showed, the relative size of these three sources varied. On the basis of more detailed accounts of missionary school expenses we were able to estimate that the contribution of the Nyasaland government did not exceed 8% of total primary school expenses around 1938. In Uganda the contributions to the missionary societies accounted probably for 20 to 30% of their total reported costs. In the Gold Coast we find that circa two-thirds of total missionary education expenses were covered by grants-in-aid from the government, while another 30% was covered by school fees. In the Gold Coast missionary funds thus only had to fill the smaller financial gaps. In Mauritius the government paid more than 90% of total expenses, handing out as much money to the mission schools as to the fully funded government schools.

Table 2 presents colonial government educational expenditures per person enrolled between 1870 and 1950. The figures are presented in current and constant British Pounds of 1910 using a price-index of British public services from Feinstein (1972: T132). The data has been retrieved from the annual accounts of government revenue and expenditure as published in the colonial blue books and includes expenses on the education department (central administration), on government schools and the subsidies (so-called ‘grants-in-aid’) to missionary schools.

[Table 2]

The table shows vast differences in the financial support of British colonial governments throughout the period 1870-1950. Until the mid 1920s the colonial governments in East and Central British Africa hardly spent a single penny on education. In Nyasaland, for instance, the government spent £1,000 in 1913, which was raised to £2,000 in 1921, only in response to post-war inflation. In 1926, after the appearance of two authoritative reports on the state of education in British Africa by the Phelps-Stokes committee (Jones, 1922; Jones, 1925) and ensuing decrees from the colonial office in London to raise education budgets (Windel, 2009) the Nyasaland government started to upscale its education budget to £21,500 in 1938. This was still under two shillings per student, however, and comparable to the amount the Gold Coast government already spent in the 1880s. The Gold Coast government spent £3.99 per student enrolled in 1929, which was ca. 40 times as much as the Nyasaland administration. But even the commitment of the Gold Coast administration was conditional: the cut back in government revenue caused by the great depression had reduced the education budget by more than 25% of the amount per student by 1938. Yet, school enrolment rates seemed to have developed independent of public funding: 35% in Nyasaland as opposed to 8% in the Gold Coast in 1938.

Figure 3 confirms that there was no relationship between government spending and enrolment rates in British Africa before 1940. The education budget depended primarily on the relative size of the local government budget, which was much larger in the successful exporting economies of Mauritius and the Gold Coast (Frankema, 2011). Yet, the financial resources that were made available were insufficient to have an effect on primary school enrolment rates comparable to the voluntary missionary effort. In fact, only in Mauritius did high levels of government spending (£257) translate into comparatively high enrolment rates (38%).

[Figure 3]

Teacher salaries generally consumed between half to three quarters of the total education budget. European teachers, however, commanded payments in the order of 50 to 100 times the salary or subsidy paid to a native teaching assistant or African village school teacher. This is one of the major reasons why the observed expansion of missionary education between 1900 and 1940 would have been financially impossible without the majority contribution of African teachers. That Catholic missions tended to employ more European teachers than Protestant missions was also mainly a financial issue. Thanks to the celibacy, Catholic missionary societies were able to recruit many young priests willing to head a station while sharing the poor material living conditions of their community members. Protestant missionaries, who often brought their wife and children, adopted a lifestyle requiring higher salaries. As Oliver put it,

"The European parish priest of the Universities mission, living beside his church in a house of mud and thatch without wood in the doorways or glass in the windows, often quite alone and without

speaking English for weeks on end, represented indeed the very extreme of missionary assimilation to the environment. At other Protestant stations missionaries lived in comfortable bungalows set in spacious gardens […] They travelled in motor-cars, albeit old ones. Their wives and families necessitated large domestic staffs and regular visits to Europe." (1962: p. 242)

Hence, the largest protestant society in Uganda, the Church Missionary Society (C.M.S., related to the Church of England), serviced a little over half of all primary school students in the late 1920s (some 100.000 students) with a European staff of 30 to 40 teachers. This constituted about 2% of the total teaching staff. The Catholic missions who serviced roughly the other half, i.e. the White Fathers (French), the Mill Hill (British) and the Verona Fathers (Italian) had about 260 to 290 European teachers in the field.[10] Inter-African wage differentials also played a role. Frankema and van Waijenburg (2011) found a gap in nominal wage levels between British West Africa and British East and Central Africa of about 3 to 1, so that the costs of supplying education via native African teachers must have been considerably higher in West Africa.

But schooling was supplied at very low costs anyway. In the ungraded village schools (also called 'bush schools') there was often just one teacher to manage the entire school, where students of varying ages and levels received education together. In Southern Rhodesia 54% of all primary schools were run by a single person and another 34% by just two people as late as 1943. In Uganda in 1938 the average class size was estimated at 31 students, but the ungraded schools of the Protestant missions in Buganda, which were exclusively managed by native teachers, had an average of 65 students per teacher.[11] Government expenses in settler colonies like Kenya and Southern Rhodesia really put the 'British approach' in perspective. Comparing the balance sheets of separated European and African schools, table 3 shows that the circa 2.5% of European children in primary school absorbed circa one third (32.1%) of total expenses. Hence, Africans were subsidizing expensive European schools via native tax schemes (Frankema, 2010; 2011). This endorses the main argument: the development of education in British Africa had little to do with 'benign' British policies. The rise in enrolment rates prior to 1940 depended primarily on indigenous African initiative, for which Christian missions were eager to provide the required infrastructure.

[Table 3]

[10] Teachers in Islamic schools were not allowed to accept payments for teaching the Koran (Abu, 1975). Students would normally bring food for their teachers and work on their fields. Christian mission stations depended heavily on community support as well, especially in the rural hinterlands (Oliver, 1962: pp. 52-53).

[11] These calculations are based on surveys published in respectively the *Official Year Book of the Colony of Southern Rhodesia* 1952 and *the Blue Book of the Uganda Protectorate* 1938.

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4. Why did missionary education spread so unequally across Africa?

So far it has been argued that the presence of European missionaries was a necessary, but by no means sufficient condition for the spread of formal education in sub-Saharan Africa. It was the *Africanization* of the mission that determined its pace. Now we turn to the next question: why did the reception of missionary activities by native Africans vary so much from place to place? In this section we derive several hypotheses from case-studies discussed in the historical literature. These hypotheses will be tested in an OLS regression framework in section 5.

West Africa and Sierra Leone: malaria, Islam and African resistance

The coastal colony of Sierra Leone was, without doubt, the most successful example of missionary education in the nineteenth century. By the 1840s over 9.000 children and adults went to Protestant, Anglican or Catholic mission schools, which constituted around one-fifth of the total estimated population. The prestigious Fourah Bay College, founded in 1827, became the first western-style university in the region and gave Freetown its nickname; The 'Athens of West Africa' (Paracka, 2003). Freetown's founding history explains why: the city was developed by freed African slaves from North American and Caribbean plantations and the British navy used the colony to release native Africans from the slave-ships they captured along the West African coast. The Creole settler community was thus acquainted with Christian religious philosophies and education from its very inception.

Missionary expansion in the hinterland of Sierra Leone was a completely different experience, however. Proclaimed a British protectorate in 1896, the missionaries were unable to 'conquer' the inland territories, (Kilson, 1966; Crowder, 1978: pp. 61-66). The two largest tribes, the *Temne* and the *Mende*, lived in outright hostility with the Creole people in Freetown. Christian missionaries were approached with great suspicion because of their clear ties with the British-Creole administration. When the introduction of a native hut tax in the Protectorate induced violent revolts (the Hut Tax Wars 1898-1900), the hostilities were not only directed against British and Creole soldiers and traders, but also against Christian missionaries (Kilson, 1966).

The influence of Arab traders in Sierra Leone provided an alternative religious, political and economic orientation which united many of the resentments against missionary infiltration (Abu, 1975: pp. 98-99). Crowder has pointed out that violent revolts against colonial encroachment were common in large parts of West Africa and that part of the resistance was fairly well organized and hard to subdue by European armies, despite their military technological advantages, such as the Maxim gun (Crowder, 1978: pp. 45-8). The political insecurity in areas where the European colonizers were confronted with native resistance not only created difficulties for missionaries, but could also be a reason for colonial administrations to prohibit their activities. Mutual Christian-Islamic tensions and

prejudices explain why native African resistance against missionary encroachment occurred more often in Islam dominated regions than elsewhere.[12]

Sierra Leone is also known for its exceptionally high malaria incidence. Tropical diseases posed huge constraints to the establishment of mission stations, particularly in the pre-quinine era. Early missionary initiatives in West Africa, such as the Basel Mission in the Gold Coast, were frequently aborted by the death of the majority of missionaries within a few years after arrival (Jenkins, 1989). Advances in tropical medicine during the colonial era, and especially after 1900, reduced the health risks of Europeans significantly, but did not erase regional differences in disease incidence. These differences are important to explain why the rapid northward expansion of missionary stations from the tip of South Africa in the mid-nineteenth century, along the routes of Livingstone's earliest voyages, were more successful than similar attempts to enter the African interior in West and Equatorial Africa. Up to the north of Bechuanaland tropical diseases caused less trouble.

East Africa: resistance and strategic alliances

African resistance against European encroachment did not remain confined to the Islamic heartlands. In East Africa the Germans and British were confronted with different degrees of resistance during the formative stages of their colonial states. In 1884 Bismarck chartered a private company, the *Deutsche Ost-Afrika Gesellschaft*, to develop a colonial administration in German East Africa (present-day Tanzania) and foster German-African trade connections. The aggressive approach of the company in matters of native taxation and forced labour provoked a revolt in Bagamoyo in 1888, which quickly spread to other population centers along the coast, under the leadership of the slave and sugar trader Abushiri (Wesseling, 2003: pp. 184-88). This uprising was large enough to compel Bismarck to send an army to restore order. This was the first of a series of revolts the Germans were to confront in their attempt to establish colonial control. With an estimated 200.000 to 300.000 victims of an intentionally caused famine the suppression of the *Maji Maji* rebellion in 1905-07 was among the most cruel displays of European military strategy in African colonial history (Packenham, 1992: p. 622). The point here, however, is that missionary work was extremely complicated in this context.

Although the British did not commit comparable atrocities in Kenya, they too were confronted with enduring resistance from various tribes. The *Luo* and *Luhya* revolted in 1895-99, the Nandi in 1895-1906, the *Kikuyu* and *Embu* in 1904-07 and the *Kisii* in 1907-14. The *Masai* were also notorious for their hostility towards foreign intruders. The pacification of British East Africa was not concluded until around 1914, almost three decades after the Berlin conference in 1885 which formally recognized British claims over this area (Sorrenson, 1968; Wolf, 1974). The main motivation for the British to bring the area under control was to safeguard the construction and operation of the Uganda railway,

[12] Maps of missionary stations in Africa constructed by Woodberry reflect the minimal presence in the central Islamic areas of sub-Saharan Africa quite clearly. See the PREC website http://www.prec.com/ of the University of Texas Austin. See also the work of Robert Woodberry's Ph.D. dissertation (2004): *The Shadow of Empire: Christian Missions, Colonial Policy, and Democracy*, University of North Carolina, Chapel Hill.

but contemporary observers believed that Kenya could never be controlled and developed without the settlement of Europeans (Wolf, 1974: pp. 47-48). Hence, Protestant and Catholic missionaries avoided large parts of Kenya for a long time, despite the easy access provided by some of their coastal mission stations.

Instead, they preferred working in the Buganda kingdom, where the situation was different from the onset. Christian missionaries allied with the rulers of the powerful Buganda kingdom to gain the upper hand on Arab slave traders. The African reception of the gospel in Buganda was so positive that Catholic and Protestant factions ended up in a small civil war in 1892 in an attempt to establish a monopoly position in the region (Oliver, 1962; Low, 1971; Obdeijn, 1983). Order was restored after the intervention of the British East African Company supplying the Protestant faction with heavy military equipment such as snider riffles, muzzle-loaders and a maxim gun (Oliver, 1962: pp. 146-7). The British parliament could not resist the lobby by British missionary and anti-slavery societies and other protagonists of imperial expansion and hesitantly approved the proclamation of the Protectorate of Uganda in 1894: according to the missionaries a British retreat from the region would have re-invited slave traders. This scenario would destroy the reputation of the imperial project in East Africa even more than spending public money on fighting missionaries (Oliver, 1962).

As soon as political order was restored, Catholic and Protestant missions started to expand their activities, now competing on a level playing field. Missionary stations and school enrolment rates expanded at impressive rates. What exactly determined the rapid reception of Christianity in Uganda is not so easy to grasp, but the British-Buganda alliance was definitely considered beneficial to both parties. This refers to a general point in the acceptance of Christian missions: the institution of slavery was a threat to the livelihood of some communities, while it formed the basis of economic prosperity of others (Lovejoy, 2000). Nunn's assumption (2010: p. 148) following Johnson (1967) that missionaries favoured settlement in slave-trading areas in order to prevent the practice, is not that straightforward. Early accounts of missionary explorations show the opposite, namely that these areas were to be avoided, unless a certain level of security could be guaranteed by local allies or an incipient colonial government (Jeal, 2001).

Indeed, the Buganda Kingdom qualified as a strong local ally with a politically centralized state apparatus (Obdeijn, 1983). Bockstette et al. (2002) argue that there is a direct connection between the strength of pre-colonial and modern state institutions required for the supply of public goods such as infrastructural networks, education and health care. Gennaioli and Rainer (2007: pp. 188-192) add that centralized state institutions offered a better framework for raising the accountability of local chiefs. In their study the Buganda kingdom serves as a key example of how the central control of local chiefs helped the British to establish an effective system of indirect rule. Missions in Uganda thus benefitted from a high degree of pre-colonial state centralization. Yet, in case of organized resistance it may have worked against them, as it did in parts of West Africa. Missionary expansion in the Tukalor

empire and the Sokoto caliphate, for instance, where slave trading was also common, was greatly hampered by native resistance (Boahen and M'Baye Gueye, 1985).

Indeed, the attractiveness of Christianity, or Islam for that matter, cannot be taken for granted unless it created a credible opportunity for political and economic alliances that could enhance the security and welfare of African communities. The acquisition of the skills, knowledge and religious values which supported the white man's power and prosperity were of course inherent to such strategic considerations. Otherwise, it is hard to see why native Africans would ever have accepted the cultural arrogance of European missionaries. Traditional African customs such as the practice of slavery, polygamy, ancestor worship or infanticide conflicted diametrically with the pursuit of 'Christian civilization' envisioned by the missionaries, who publicly depicted native African cultures as barbarous and considered the banning of pagan rituals and heathen practices as a precondition for conversion (Berman, 1975).

David Livingstone: converts, commerce and the quest for the interior

The meticulously documented experiences and correspondence of David Livingstone have been used to study the location-decisions of Christian missionaries in Africa as well (Johnson, 1967). Although Livingstone's career as a London Missionary Society servant was far from representative, his biography highlights some factors that allow for generalization. First of all, Livingstone displayed an untamable drive to move away from the coastal regions in Southern Africa to explore the interior. His primary motivation was the desire to find densely populated areas in favourable climatic settings (at altitude), which would raise the potential stability and returns of the mission posts he sought to develop. As most of the African coastlines were sparsely populated and prone to a range of tropical diseases common for lowland areas, many of his successors were driven into the interior.

Second, the quest for the interior explains Livingstone's obsession with exploring 'highways of navigable rivers' in Africa. These rivers would facilitate the settlement of missionaries and the development of European-African commercial relationships. One of the great ironies of Livingstone's explorations, and in particular the disastrous Zambezi expedition (1956-1961), is that he failed to recognize the only major navigable river he ever came across, i.e. the Congo river (Jeal, 2001). Johnson shows how the Congo river-system has been exploited in the early twentieth century to open up vast areas for missionary expansion. Yet, navigable waterways are scarce in Africa and this naturally limited the impact of rivers like the Congo, Niger and Nile on missionary location decisions.

Third, in the pre-colonial and early colonial era missionaries often acted as intermediaries in African-European trade relations. Livingstone's emphasis on promoting Christianity *and* commerce, helped to legitimise the combination of economic and religious activities. This was based on the idea that legitimate trade could replace the slave trade, and in turn, make African more susceptible to the message of God. In some cases missionaries stood at the basis for the introduction of new commercial crops with spectacular consequences. The introduction of cocoa in the Gold Coast by the Basel

mission (1854) eventually evolved into one of the biggest export booms in African history (Austin, 2005). The introduction of cotton in Uganda is another classic example (Victor Buxton, 1909). Crops like cocoa, tobacco and cotton were adopted by (smallholder) peasants in various parts of colonial Africa. The transmission of agricultural knowledge became part of the ambition to improve the living standards of African converts. Hence, new opportunities for commercial cash crop cultivation raised the local reception of missionary activities, and especially the demand for agricultural education. Local African leaders who decided to allow or invite missionaries in their territories were not only making a political and cultural decision, but also an economic one.

5. Testing the impact of metropolitan identity *versus* local conditions

We will now test some of the above hypotheses in an OLS regression framework. Let us be modest about the added value of this exercise in advance. This regression includes observations from 42 African colonies (including two independent countries, Liberia and Ethiopia). This is a small sample, but not unusual in African economic historical literature. More important however, is that converting the native African reception of missionary ideas and practices (such as education) in simple quantitative terms is bound to miss much of the historical complexity. We should, therefore, only take this regression analysis as a piece of complementary evidence. The substance of our argument has been presented in the previous sections. We test the following eight hypotheses:

1) British rule had a positive impact on school enrolment rates, because it offered a more liberal political context for missionary work of all denominations than other European powers.

2) The incidence of tropical disease had a negative impact on school enrolment rates, because it raised mortality and disease rates among European and African missionaries.

3a) School enrolment rates were higher in the African interior, because the majority of Africans lived outside the disease infected lowland coastal areas. 3b) The presence of a navigable river supported missionary settlement in the interior.

4) Population density had a positive impact on school enrolment rates, because missionaries were eager to reap potential scale economies in their conversion practices.

5) African resistance against colonial rule had a negative impact on school enrolment rates, because it created political insecurity for missionaries. It also reflects a low level of receptiveness to foreign cultural and religious influences.

6) School enrolment rates were lower in core Islamic areas, because Muslims were less conducive to Christian education than people with Animist beliefs.

7) Pre-colonial state centralization had a positive impact on school enrolment rates because it facilitated the spread of missionary activities after the establishment of European rule.

8) The adoption of commercial crops such as cotton, cocoa and tobacco by native African peasants had a positive impact on school enrolment rates, because mission stations transmitted agricultural knowledge and mediated foreign trade relations. Christianity thus served an economic purpose.

The regression model is specified as follows,

$$y = \alpha + \beta_1 x_1' + \beta_2 x_2' + \beta_3 x_3' + \beta_4 x_4' \varepsilon$$

where y refers to the primary school enrolment rate, α is a constant and ε is an error term. The vectors x_1, x_2, x_3 and x_4 represent variables related to, respectively, 1) the impact of metropolitan institutions, 2) the effect of local demographic and geographic conditions, 3) the political context in which missions operated and 4) the effect of agricultural commerce on missionary expansion.

We use the *primary school enrolment rates* of 1938, 1950 and 1960 presented in appendix table 1. Vector x_1 consists of a dummy variable for *British rule.* Vector x_2 consists of a variable capturing the *malaria ecology*, the natural log of *population density* in 1938 (persons per square kilometer) and the natural log of the ratio of coastline to territorial surface (km of coast per square kilometer). Note that *malaria ecology* does not reflect the actual incidence of malaria, which is arguably endogenous to educational development, but a set of exogenous ecological characteristics determining the feasible incidence of malaria. Vector x_4 consists of a dummy variable capturing specialization in peasant cultivation of cotton, tobacco or cocoa in colony x prior to World War I.

Vector x_3 consists of a dummy variable for the pre-colonial *influence of Islam*, an index number for the extent of *pre-colonial state centralization* and a newly constructed index measuring the extent of *native resistance* against colonial occupation. The construction of this 'resistance index' requires some explanation. The index consists of a 1 to 5 scale where the higher scales represent more resistance or a higher level of insecurity because the colonial power refuses to invest sufficient resources in suppressing resistance. In this classification the period between the Berlin conference 1884-5 and the start of the First World War is important.

The Berlin conference marks the starting point for the full-scale conquest of the African interior. According to the Berlin resolutions claims to territory had to be substantiated by a demonstration of actual occupation. The beginning of the First World War marks the end point of the

scramble for Africa, although there remain some regions that are still not 'pacified' by that time. In this period Africa witnesses the great upsurge in missionary presence, which determines much of the expansion in networks of stations at later date. The index is constructed as follows:

(1) Under full European control before 1885.
(2) Brought under control between 1885 and 1914 by treaties with one or more dominant allies without notable armed struggles between the European power and these allies.
(3) Colonies that were 'pacified' between 1885 and 1914 by use of armed force against native contenders of European rule.
(4) Pacified between 1885 and 1914 by use of force with dramatic demographic consequences.
(5) Colonies that were not fully controlled before 1914, because of continuous revolts, slave raids or guerilla warfare.

Details of sources and variable definitions are presented in appendix table 3and 4. The regression results are shown in table 5. But before we study the regression results, we should have a look at table 4. This table sums up the expected effects of the dependent variables on school enrolment rates in the late colonial era and shows the correlation-coefficients of these dependent variables with the dummy variable for British rule.

[Table 4]

According to the selected variables the British colonies faced more favourable conditions: ecological conditions supporting a lower malaria incidence, more navigable rivers, more inland territories and higher population densities. British occupation was also confronted with lower degrees of native resistance and a smaller pre-conquest influence of Islam. Finally, the degree of pre-colonial state centralization was higher and cash crop exports developed more often in the British territories than elsewhere. The endogeneity thus makes it hard to disentangle the effects of local African conditions and British colonial policies, if we had not shown in the previous sections that British investments in education were unimpressive and, if anything, biased against native education in support of European education. Let's now turn to the regression analysis.

[Table 5]

Column 1 shows the results of our baseline regression estimating the possible effect of metropolitan identity on school enrolment 1938-1960, confirming that British ruled territories experienced

considerably higher enrolment rates in the late colonial era: around 12 to 13 percentage points above those of non-British territories between 1938 and 1950, declining to 9 percent in 1960.

Column 2 shows that if we add the demographic and geographic variables the coefficient of the British rule dummy variable roughly halves. The effects of the malaria ecology and the coastline/area ratio come out with high significance and carry the expected negative signs. The addition of these variables also increases the explanatory power of the model considerably.

In column 3 we add one of our key variables, the degree of native resistance against colonial occupation. The explanatory power of the model again increases considerably. The native resistance variable shows a highly significant negative effect, which is robust in all the other specifications. This result lends support to the hypothesis that in areas characterized by a long and intense history of armed struggle against European domination, missionaries found less opportunity to expand education and, consequently, school enrolment rates were significantly lower in the late colonial era. Moreover, adding the native resistance variable reduces the positive effect of British rule on late colonial school enrolment rates to ca. 3 percentage points or less. The dummy for British rule has become insignificant as well.

In column 4 we add the other key variable, namely the pre-colonial influence of Islam. This variable reveals a highly significant negative effect, which also turns out to be robust in the other specifications. It also shows that the effect of Islamic influence grows rapidly over time: the coefficient increases from ca. 8 to 21 percentage points between 1938 and 1960. There is an intuitive explanation for this remarkable rise: in the 1940s colonial governments started to boost their investments in primary education, causing an acceleration of primary school enrolment rates. Indeed, in some colonies school enrolment rates even doubled in just one decade (see appendix table 1). This wave of enrolment expansion lagged strongly behind in the core Islamic areas. Columns 9 to 12 show how important this trend has been in the long run development of African human capital. The regression on present-day literacy rates shows an even bigger effect: in the core Islamic areas of the pre-colonial era, which overlap largely with today's core Islamic countries, literacy rates in 2008 were ca. 22% lower than in non-Islamic areas! In fact, pre-colonial Islamic influence turns out to be single most important predictor of early 21st century literacy rates in sub-Saharan Africa.

In all other specifications the effect of British rule remains weak and largely insignificant. In column 5 we present the results for the complete model and in column 6 the results for the model which gives the best fit. Indeed, only the degree of native resistance and Islamic influence appear robust. The impact of the demographic and geographic conditions tends to decline over time, which is not surprising in view of the increasing technological and logistic capabilities of colonial powers to overcome 'natural barriers' in their 'pro-active' education policies after 1940.

Finally, we analyse the long term effects by regressing these variables on present-day literacy levels, as shown in columns 7 to 12. We follow a similar set up. The baseline regression indeed suggests an important difference between former British and non-British colonies, with literacy rates

exceeding the average by nearly 16%. But this effect quickly, although not completely, disappears when we control for local conditions. The effect of native resistance has faded away in the long run, although the negative sign is still in place. The malaria ecology still seems to matter, however, which suggests that an adverse disease environment has troubled African educational development until present. More surprising, yet, is the highly significant and robust positive effect of the peasant cash-crop export variable. This suggests that the more successful agricultural export economies of the colonial era, such as Mauritius, Gold Coast, Kenya and Uganda have benefitted in the post-colonial era from a stronger economic position that allowed their governments to support educational investments. But this relationship obviously warrants further research.

In sum, the regression analysis suggests that controlling for the role of native African agency reduces a great deal of the supposed supportive effect of British colonial policies on educational development in Africa. This corroborates the argument that better educational outcomes were not so much due to British education policies, but rather due to the fact that the British happened to occupy areas in Africa that were more 'receptive' to the diffusion of Christian missionary ideals and practices.

6. Conclusion and afterthought

That former British African colonies still benefit from a comparatively benign educational legacy is supported by quantitative and qualitative evidence. This paper has not questioned this fact, but rather its historical determinants. We have been arguing that the role of British educational policies have been given too much attention in previous explanations at the expense of local African conditions, which we show have played a much bigger role than hitherto acknowledged. The bulk of schooling was provided by Christian missions of Catholic, Anglican and Protestant denominations, not by colonial governments. In those colonies where colonial governments did supply a substantial part of schooling, enrolment rates remained very low, often under 5% of the school-age population 5 to 14 prior to 1940. Missions made the difference.

The fact that missionary schools were overwhelmingly run by African teachers and teaching-assistants, rather than European missionaries, has received insufficient attention in the recent literature on African educational development. For mass education to spread under colonial rule it was not enough that native Africans simply accepted the presence of missionaries in their territories. In addition, they had to embrace the missionary effort and take it over, as it were, in order to make it grow. This was not only necessary to overcome the limited personal capacity (in numbers) of European missionaries, it was also a financial matter: African teachers cost a fraction of European teachers. Missionary funds were rapidly overstretched during the phase of missionary expansion following the establishment of colonial rule. Colonial government budgets were tight and hardly allocated any money to African education up to the mid-1920s. Exceptions like Mauritius and, to a

lesser extent, the Gold Coast only prove this rule. Hence, African private or communal school fees were crucial for the establishment and maintenance of schools in the vast African hinterland. Without the *Africanization* of the mission, primary education would have remained a marginal phenomenon.

What determined the native reception of missionary activities? We have argued that the degree of native resistance against European occupation affected the 'receptiveness' in two ways. First, longer and more intensive violent resistance created more insecurity for European and African missionaries. Second, opposition against colonial rule fed long term opposition against missionary efforts to convert Africans and destroy their 'traditional' beliefs and values: missions were, not without reason, often considered as an instrument of European cultural conquest complementing the political-military conquest. A regression analysis confirms the view that much of the supposed benign effect of British rule disappears once we control for local conditions affecting missionary expansion. Imagine the counterfactual scenario that the British colonized the French ruled territories and vice versa: would we then still have to bother about explaining the 'developmental' features of British rule in sub-Saharan Africa? We doubt it.

This conclusion, however, generates a follow-up question which we have not addressed in this study, but is worth giving some tentative afterthoughts: why, after all, were the Africans in the British colonies more receptive to the missionary zeal? Is this just a mere coincidence, or is there a relationship between missionary activity and British rule which has escaped our attention so far?

Perhaps we should start with a remark on the geographical contingencies of the scramble for Africa in the late 19th century. Given its geographic position in Europe, France has always been oriented on Africa via the Mediterranean coastline of North Africa. The French started penetrating the African continent in present-day Algeria, which it considered as a 'natural' starting point for an overseas empire. Britain did not have such a clear geographic orientation, but being the world's supreme naval power in the 19th century, it did have great strategic interests in the Southern tip of Africa (for supplying ships to Asia), which eventually became their major inroad into the 'dark continent'. These different early 'footholds' implied that the French, unintentionally, stumbled on those areas where native resistance against European rule turned out to be more severe. Given the dominance of Islam in what was to become French West Africa, the resistance against Christian-European ideology and practices, as communicated by Christian missionaries and their –civilization-education efforts, was prolonged after the pacification of these territories. From this point of view one may conclude that the British were simply 'luckier' than the French.

But there may be more to it than mere coincidence. As the world's supreme naval and industrial power, the British were also better equipped than any of its European contenders to select their spheres of influence in Africa according to their own commercial and military strategic interests. Although the French conquered the lion's share of West African territory, the fertile and densely populated areas along the strategically and commercially important Gambia and Niger rivers ended up

in British hands. But there are also indications that strategic considerations in the partitioning of Africa were directly connected to missionary interests.

While the great wave of missionary expansion occurred immediately *after* the formal establishment of colonial states in Africa, the earliest missionary explorations took place long *before* the 1880s. At the time of the partition of the African continent in formal spheres of influence, European politicians and diplomats had informed ideas about the comparative openness of Africans to missionary presence in different parts of the region. There are at least two cases which suggest that the British government was more likely to decide in favor of occupation when British missionary societies, such as the London Missionary Society, had vested interests.

The first example is the Buganda kingdom, which was flooded with missionaries once it was discovered that conversions in this area were much easier than in most other parts of East Africa. The British government (i.e. the Salisbury administration) changed its policy from non-intervention to military occupation in the late 1880s under pressure from the lobbying activities of missionary and commercial parties. In their public campaign for colonial engagement the missionaries, very much in the tradition of David Livingstone, used the 'return of the Arab slave-trade' argument to mold public opinion in favour of annexation (Mwanzi, 1985; Packenham, 1992).

A second example is the Anglo-Portuguese negotiations over the Shire highlands in Nyasaland (present-day Malawi). As appendix table 1 shows, Uganda and Nyasaland were among the colonies where Catholic and Protestant missionary societies were experiencing their fastest expansion (Linden and Linden, 1974). After his death in 1873 the reputation of Livingstone grew to mythical proportions. Since the area around lake Nyasa had been selected for missionary settlement by Livingstone himself, it became increasingly difficult for the British government to leave the area to the Portuguese. The missionary constituency in Scotland lobbied actively for British annexation of the Shire highlands (Oliver, 1962: p. 128). Hence, despite the fact that the Portuguese had set up trade relations from their bases in Mozambique with local tribes in the lake area long before Livingstone arrived on the scene (Jeal, 2001), the British eventually claimed the territory.

These cases turn the supposed causality of British colonial rule to favourable educational performance around. Potentially 'fertile' areas for Christian missionaries had a higher chance of being claimed by the British. And the British status as the major super power of the 19th century allowed them to successfully take possession of such claims.

Appendix table 1: Gross primary school enrolment rates in sub-Saharan Africa, classified by metropolitan identity, 1938, 1950 and 1960

Primary school Gross enrolment rates	**1938 (age 5-14)**	**1950 (age 5-14)**	**1960 (age 5-14)**	**1960 - 1938 *(increase)***
Botswana (Bechuanaland)	16	22	29	*13*
Gambia	3	5	7	*4*
Ghana (Gold Coast)	8	19	34	*26*
Kenya	12	26	33	*21*
Lesotho (Basutoland)	50	59	58	*8*
Malawi (Nyasaland)	35	39	21	*-15*
Mauritius	38	51	59	*21*
Nigeria	8	16	25	*17*
Sierra Leone	5	7	16	*11*
Somalia (British Somaliland)	1	1	4	*3*
Sudan	3	6	10	*7*
Swaziland	24	29	41	*17*
Tanzania (Tanganyikia)	5	10	20	*15*
Uganda	27	18	29	*2*
Zambia (Northern Rhodesia)	30	35	34	*4*
Zimbabwe (Southern Rhodesia)	33	44	48	*15*
British Africa average	**18,6**	**24,2**	**29,2**	**10,6**
Benin (Dahomey)	7	2	16	*9*
Burkina Faso (Haute Volta)	1	2	5	*4*
Cameroon (French Cameroun)	21	25	39	*18*
Central Afr. Rep. (Oubanghi-Chari)	2	7	19	*17*
Chad	1	1	10	*9*
Congo, Rep. (Moyen-Congo)	5	24	47	*42*
Côte d'Ivoire	4	6	28	*24*
Djibouti (Côte Française des Somalis)	7	9	12	*5*
Gabon	5	21	29	*24*
Guinea	5	3	12	*7*
Madagascar	14	22	31	*17*
Mali (Sudan Français)	2	3	6	*4*
Mauritania	2	1	5	*3*
Niger	1	1	3	*2*
Senegal	6	7	16	*10*
Togo	6	17	26	*20*
French Africa average	**5,6**	**9,4**	**19,0**	**13,4**
Angola	1	1	8	*7*
Guinea Bissau	1	5	15	*14*
Mozambique	5	12	24	*19*
São Tomé and Príncipe	14	16	20	*6*
Portuguese Africa average	**5,3**	**8,5**	**16,9**	**11,6**
Equatorial Guinea (Spanish)	15	20	43	*28,4*

Congo, D.R. (Belgian)	23	33	36	*13,0*
Rwanda-Burundi (Belgian)	7	11	24	*16,8*
Ethiopia & Eritrea (independent)	1	2	4	*3,2*
Liberia (independent)	6	11	19	*12,6*
Namibia (South Africa)	15	22	28	*13,0*
Average of others	**11,2**	**16,5**	**25,7**	**14,5**

Sources: For the enrolment rates in 1938 we refer to the source description of appendix table 2. For 1950 and 1960 the enrolment data are from UNESCO, *Statistical Yearbook* 1964, table 9 and *Statistical Yearbook* 1979-80, table 3.2 respectively. The 1960 figures have been converted from enrolment rates of the actual school age population into enrolment rates of the age group 5-14, multiplying the original figure with *n*/10, *n* being the number of actual school age years.
Notes: For Djibouti, Namibia and São Tomé and Príncipe we used linear interpolation to estimate the lacking observations for 1960.

Appendix table 2: Gross primary school enrolment rates in British Africa, 1830-2000

		age group	1830	1850	1870	1880	1890	1900	1910	1920	1929	1938	1950	1950	1960	1970	1980	1990	2000
Gambia	Col. & Prot.	(5-14)										3	5	5					
Gambia		(8-13)												8	12	25	53	64	
Sierra Leone	Colony	(5-14)	22	60	77	57	64	38											
Sierra Leone	Col. & Prot.	(5-14)						2	3	3	3	5	7	7					
Sierra Leone		(5-11)												10	23	34	52	50	
Gold Coast	Colony	(5-14)			2	3	5												
Gold Coast	Col. & Prot.	(5-14)					3	3	6	8	7	8	18	19	38				
Ghana		(6-11)												32	63	62	79	75	
Nigeria	Col. & South Pr.	(5-14)					0	0	3*										
Nigeria	All areas	(5-14)							1*	2	6	8	13	16					
Nigeria		(6-12)												23	36	44	109	91	
Mauritius	Colony	(5-14)	3	6*	10	14*	17	20	22	27	32	38	48	51					
Mauritius		(5-10)												85	98	108	108	109	
Uganda	Protectorate	(5-14)						2*	3	10	26	27	23	18					
Uganda		(6-12)												30	49	61	50	74	
Nyasaland	Protectorate	(5-14)						9*	21	25	25	35	40	39					
Malawi		(5-12)												49	41	40	63	68	
Kenya	Col. & Prot.	(5-14)						0*	0	1*	8	12	24	26					
Kenya		(5-11)												37	47	64	115		
Tanganyika	Territory	(5-14)										5	10	10					
Tanzania		(7-13)												14	25	33	93	70	
Rhodesia	BSAC territory	(5-14)						1	4										
N. Rhodesia	Protectorate	(5-14)								19*	28	23	28*	35					
Zambia		(7-13)												50	48	87	90	99	
S. Rhodesia	Dominion	(5-14)							4	14	23	21	37	44					
Zimbabwe		(7-13)												63	60	70	85	116	
Bechuanaland	Protectorate	(5-14)						4*	4	7	10	16	17	22					
Botswana		(6-12)												31	42	65	92	117	

Sources: The post-1950 series are from UNESCO, *Statistical Yearbook* 1964 (table 9); *Statistical Yearbook* 1979-80 (table 3.2); UNESCO, *Statistical Yearbook* 1990 (table 3.2) and UNESCO, *Statistical Yearbook* 1999 (table II.8). Sources used for constructing the decadal series of primary school enrolment rates prior to 1950 (including the 1938 estimates of appendix table 1) are listed below. Note that many titles of the mentioned statistical reports have changed over time, but this is only mentioned if it may cause confusion about the actual sources consulted. Population data were also taken from these sources and if deemed necessary corrected with the time series from Maddison, *Historical Statistics*: http://www.ggdc.net/maddison/ (version of March 2009).
Notes: * Nigeria 1914, Mauritius 1860 and 1883, Uganda 1905 and 1945, Nyasaland 1903, Kenya 1902, Northern Rhodesia 1924 and 1948, Bechuanaland 1905. Explanations for the bigger gaps between our figures and UNESCO's: the Uganda gap is probably caused by UNESCO excluding the rapidly diminishing but still substantial number of ungraded village schools. For Zambia, Zimbabwe and Bechuanaland the gap is probably caused by different estimates of total population, as we made upward adjustments of early population census data in view of long run demographic trends, unincorporated in the early issues of the UNESCO yearbook.

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Bechuanaland: *Blue Book of the Bechuanaland Protectorate* (1904-05, 1912-13, 1920-21 & 1928-29); *Official Yearbook of the Union and of Basutoland, Bechuanaland Protectorate and Swaziland* (1938 & 1952-53).
Gambia: *Blue Book for the Colony of The Gambia* (1938).
Gold Coast: *Blue Book for the Gold Coast Colony* (1870, 1881, 1891, 1901, 1912, 1920, 1928-29 & 1938); *Gold Coast Digest of Statistics* (1954/55 & 1955/56).
Kenya: *Blue Book of the British East Africa Protectorate* (1903, 1906-07, 1910-11 & 1915-16); changed into *Blue Book for the Colony and Protectorate of Kenya* (1926, 1929, 1938); *Colony and Protectorate of Kenya Statistical Abstract* (1958).
Mauritius: *Blue Book for the Colony of Mauritius* (1830, 1850, 1870, 1883, 1890, 1900, 1910, 1920, 1929 & 1938); *Colony of Mauritius Yearbook of Statistics* (1959).
Nigeria: *Blue Book for the Colony and Protectorate of Nigeria* (1914, 1920, 1929 & 1938); *Federation of Nigeria Annual Abstract of Statistics* (1961).
Northern Rhodesia: *Blue Book of Northern Rhodesia* (1924, 1929, 1938 &1948); *Official Year Book of the Colony of Southern Rhodesia* (1930).
Nyasaland: *Blue Book of Nyasaland Protectorate* (1905-06, 1910-11, 1920, 1929 & 1938). B.R. Mitchell (2007) *International Historical Statistics. Africa, Asia and Oceania 1750-2005*, 5th edition, Table I 1.
Sierra Leone: *Blue Book of Sierra Leone* (1830, 1870, 1880, 1890, 1900, 1910, 1920, 1929 & 1938); *Länderberichte Afrikanische Entwicklungsländer: Elfenbeinküste, Obervolta, Sierra Leone*, Volume 5 (1962).
(British) Somaliland: *Blue Book of the Somaliland Protectorate* (1910, 1925, 1938).
Southern Rhodesia: *Official Year Book of the Colony of Southern Rhodesia* (1930, 1938 & 1952).
Sudan: B.R. Mitchell (2007) *International Historical Statistics. Africa, Asia and Oceania 1750-2005*, 5th edition, Table I 1.
Swaziland: *Official Yearbook of the Union and of Basutoland, Bechuanaland Protectorate and Swaziland* (1938).
Tanganyika: *Blue Book of the Tanganyika Territory* (1921, 1929, & 1938); *The East African Quarterly Economic and Statistical Bulletin* (1956 & 1961).
Uganda: *Blue Book of the Uganda Protectorate* (1905-06, 1910-11, 1920, 1929 &1938); Uganda Protectorate Statistical Abstract (1956).

French Africa

French West Africa (Côte d'Ivoire, Dahomey, Guinea, Mali (Soudan Français), Mauritania, Niger, Senegal, Upper Volta and French Togo): *Annuaire Statistique de l'Afrique Occidentale Française et du Territoire du Togo place sous le mandate de la France*, Volume 3 (1936-1937-1938) and Volume 5 (1950-1954); *Annuaire Statistique de l'Union Française*, Volume 1 (1949-1954).
French Equatorial Africa (Chad, Gabon, Moyen-Congo, Oubangi-Chari (CAR)): *Annuaire Statistique de l'Afrique Equatoriale Française*, Volume 1 (1936-1950); *Annuaire Statistique de l'Union Française*, Volume 1 (1949-1954).
French Cameroon, Madagascar and French Somaliland (Djibouti): *Annuaire Statistique de l'Union Française Outre-Mer*, Volume 1 (1939-1946), Chapter D (Enseignement); *Annuaire Statistique de l'Union Française*, Volume 1 (1949-1954).

Portuguese Africa
Angola, Guinea Bissau, Mozambique and São Tomé & Príncipe: *Anuário Estatístico do Ultramar 1950-51*.

Others
Equatorial Guinea (Spanish), Congo (Belgian), Rwanda-Burundi (Belgian), Ethiopia, including Eritrea (independent), Liberia (independent) and Namibia (South West Africa): B.R. Mitchell (2007) *International Historical Statistics. Africa, Asia and Oceania 1750-2005*, 5th edition, Table I 1; A. Benavot and P. Riddle (1988). "The expansion of primary education, 1870-1940: trends and issues" *Sociology of Education* 61(3): 191-210.

Appendix table 3: Sources and definitions of regression variables

Independent variables	
Primary school enrolment rate 1938	New data, presented in appendix table 2, detailed list of sources below this table.
Primary school enrolment rate 1950	Primary school enrolment rates age 5-14 (UNESCO, *Statistical Yearbook* 1964, Table 9).
Primary school enrolment rate 1960	Primary school enrolment rates age 5-14 (UNESCO, *Statistical Yearbook* 1978-79, Table 3.2). Rates converted from actual school age to age group 5-14, see for details appendix table 1.
Explanatory variables	
British rule	Dummy variable set at 1 if Britain was the colonial power during most of the period 1900-1960
Malaria ecology	Index number reflecting the ecological conditions supporting those malaria mosquito vectors which determine the distribution and intensity of the disease (Gallup and Sachs 2001).
Navigable river	Dummy variable set at 1 if the major population centres are located in the vicintiy of a navigable river (from the ocean onwards)
Population density 1938 (ln)	Natural logarithm of population density in 1938. Surface and population data taken from colonial statistical abstracts (see below), checked and if necessary adjusted on the basis of extrapolated population series (Maddison 2009).
Coastline/area (ln)	Natural logarithm of total coastline lenght divided by territorial surface (Nunn 2008).
Native resistance	Index number (1 to 5) reflecting the duration and intensity of native resistance against European occupation. Further details are given in the main text. Appendix table 4 presents the index figures and sources.
Precolonial influence Islam	Index number set at 1 if total area of the colony was under Islamic influence before 1885. Figure set at 0.5 if more than 10% of the area or population was under Islamic influence. Set at 0 if Islamic influence was negligible. Appendix table 4 presents the figures and sources.
Precolonial state centralization	Index number reflecting the extent of pre-colonial political centralization. Computed as the share of the Non-European population living under centralized state institutions. For Mauritius and Sao Tome, both uninhabited before colonization, we imputed the highest possible value (1) as they have always been centrally ruled (Gennaioli and Rainer 2007).
Peasant cash crop adoption	Dummy variable set at 1 if native peasants adopted and further developed the cultivation techniques of cotton, tobacco or cocoa prior to World War I. Based on time-series of crop production before WWI (Mitchell 2007).

Appendix table 4: Indices of degree of native resistance and pre-colonial influence of Islam

	Native resistance	Islamic influence		Native resistance	Islamic influence
Botswana (Bechuanaland)	2	0	Benin (Dahomey)	3	0.5
Gambia	3	1	Burkina Faso (Haute Volta)	4	1
Ghana (Gold Coast)	3	0.5	Cameroon (French Cameroun)	3	0.5
Kenya	3	0.5	Centr. Afr. Rep. (Oubanghi-Chari)	5	0.5
Lesotho (Basutoland)	1	0	Chad	5	1
Malawi (Nyasaland)	3	0	Congo. Rep. (Moyen-Congo)	3	0
Mauritius	1	0	Côte d'Ivoire	3	0.5
Nigeria	3	0.5	Gabon	3	0
Sierra Leone	3	0.5	Guinea	3	1
Somalia (British Somaliland)	5	1	Madagascar	3	0
Sudan	5	1	Mali (Sudan Français)	3	1
Swaziland	1	0	Mauritania	3	1
Tanzania (Tanganyikia)	4	0.5	Niger	5	1
Uganda	2	0.5	Senegal	3	1
Zambia (Northern Rhodesia)	2	0	Togo	2	0.5
Zimbabwe (South. Rhodesia)	3	0	Djibouti (Côte Française d. Som.)	2	1
British Africa average	**2.7**	**0.38**	**French Africa average**	**3.3**	**0.66**
			Equatorial Guinea (Spanish)	2	0
			Congo. D.R. (Belgian)	4	0.5
Angola	5	0	Rwanda-Burundi (Belgian)	5	0.5
Guinea Bissau	5	1	Ethiopia & Eritrea (independent)	5	0.5
Mozambique	5	0.5	Liberia (independent)	5	0.5
São Tomé and Príncipe	1	0	Namibia (South Africa)	4	0
Portuguese Africa average	**4.0**	**0.38**	**Average of others**	**4.2**	**0.25**

Sources: For constructing the index of the **degree of native resistance** we have consulted a number of specialist historical studies on African responses and resistance to European domination. For Angola and Mozambique we relied on Duffy (1959) and Isaacman and Vansina (1985); for Lesotho, Swaziland and Botswana, Chanaiwa (1985); for Namibia and Tanzania, Packenham (1992); for Madagascar, Esoavelomandroso (1985); for Zambia and Zimbabwe, Hanna (1960); For Congo (Leopoldville) and Ruanda-Urundi, Isaacman and Vansina (1985); for Uganda, Mwanzi (1985); for Kenya, Sorrenson (1968); for Senegal, Mali, Côte d'Ivoire, Benin, Burkina Faso, Guinea and Mauritania, Coquery-Vidrovitch (1992); for Gabon, Central African Rep., Congo rep. and Chad Thompson and Adloff (1960); for Togo and Cameroun, Gann and Duignan (1977); for Gambia, Guinea-Bissau, Sierra Leone, Ghana and Nigeria, Crowder (1978) and M'Baye Gueye and Boahen (1985); for Somalia and Sudan, Ibrahim (1985); for Djibouti, Thompson and Adloff (1968). No specific sources consulted for Liberia (no colonial control), Ethiopia (no colonial control), Mauritius and São Tomé and Príncipe (both originated as European colonies). For the index of **pre-colonial Islamic influence** we consulted Holt et al. (1978) 'Africa and the Muslim West' in: Holt, P.M., Lambton, A. K. S and Lewis, B. (eds.) *The Cambridge History of Islam*, Cambridge University Press: Cambridge UK, in combination with the map of 19th century Muslim areas in Africa published in Robinson, F. (1982) *Atlas of the Islamic World since 1500*, Phaidon Press: Oxford, p. 155.

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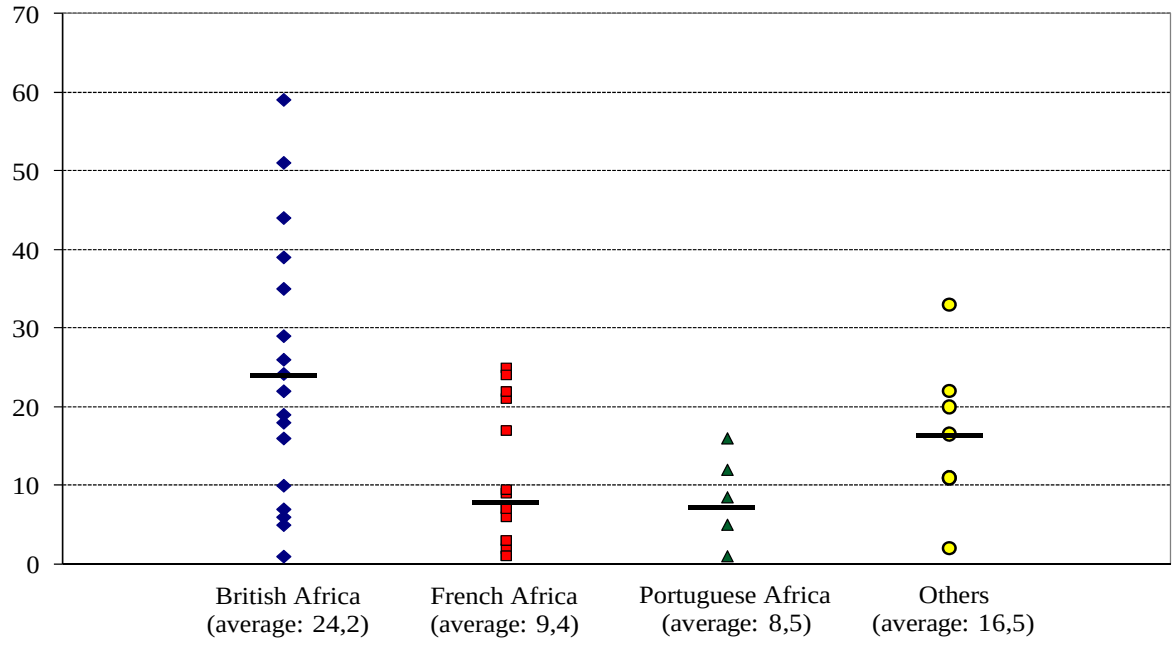
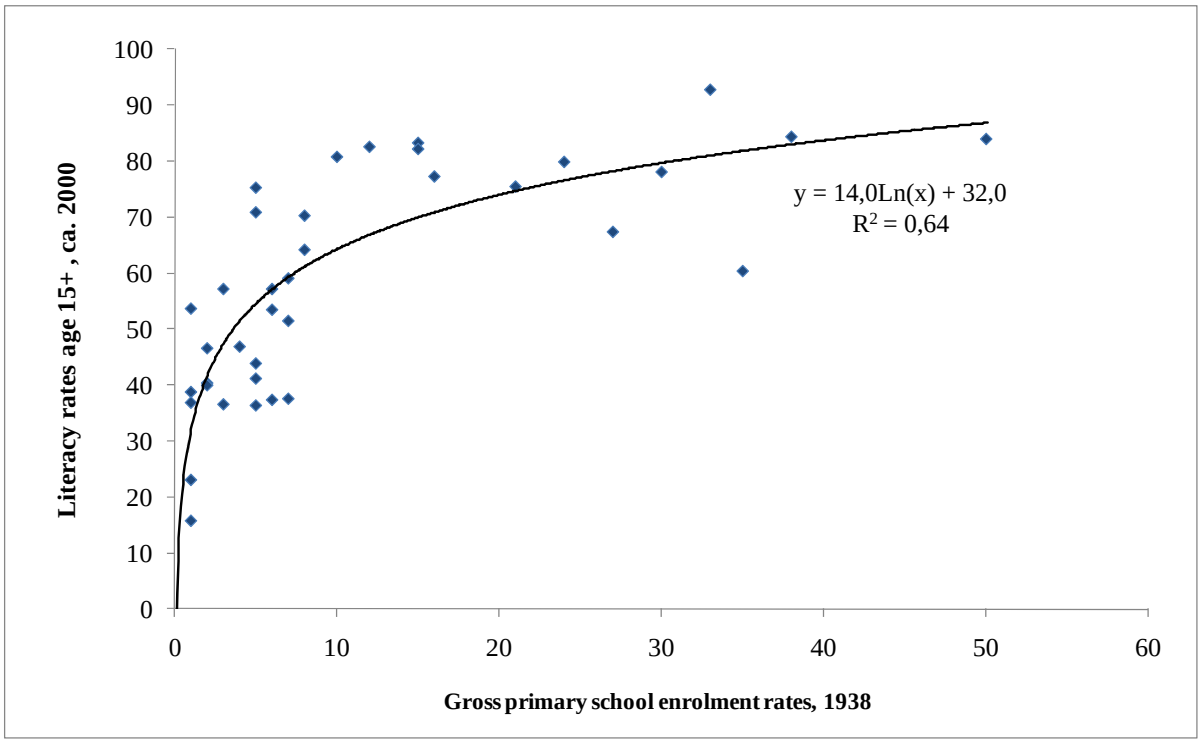
Figure 1: Gross primary school enrolment rates in colonial Africa subdivided by metropolitan power, ca. 1950



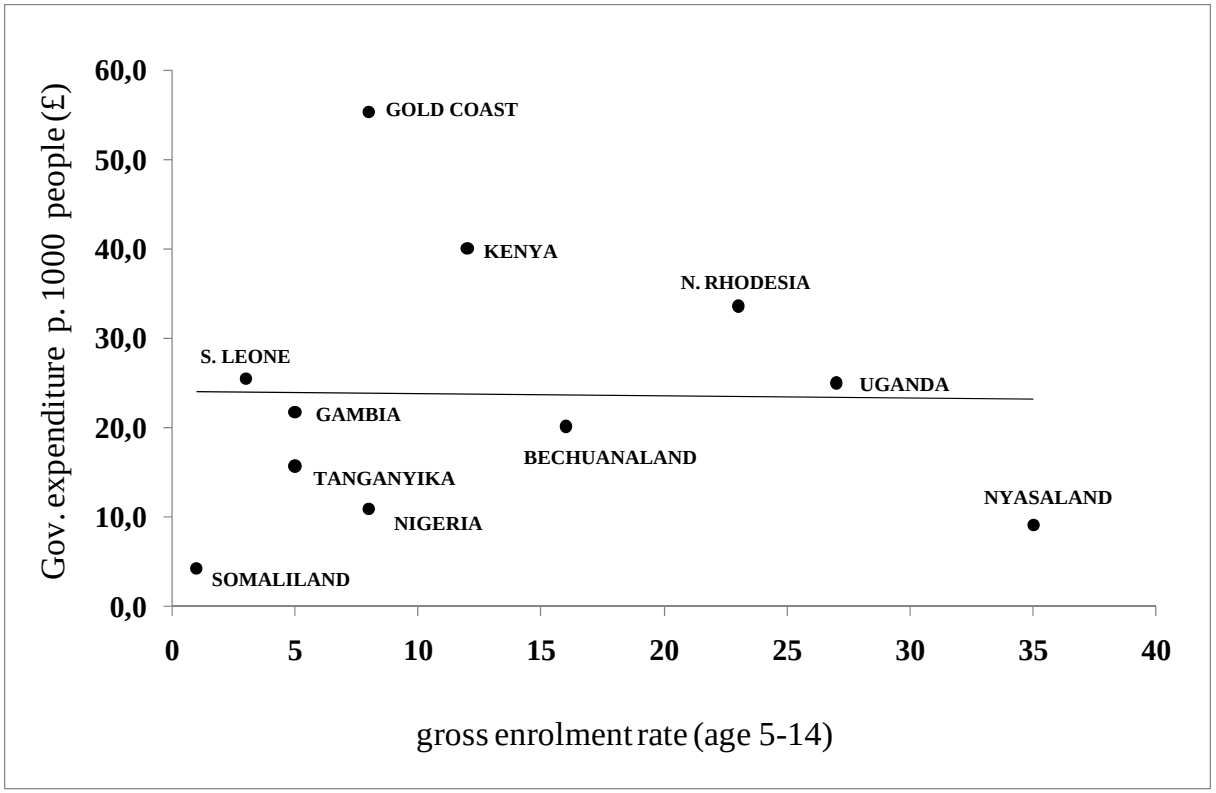
Sources: see appendix table 1.

Figure 2: Scatter plot of primary school enrolment rates in 1938 and literacy rates (age 15+) in 2000 in sub-Saharan Africa



Sources: 1938 enrolment data see source description of appendix table 2. Literacy rates from UNESCO, *Institute for Statistics*, Data Centre: http://stats.uis.unesco.org/

Figure 3: Scatter plot of gross enrolment rates (age 5-14) versus government expenditure per capita (current £), British Africa, 1938.



Sources: see source description of appendix table 2.
Notes: The scatter plot and regression line excludes Mauritius (does not fit the y-axis) and Lesotho, Sudan, Swaziland and Southern Rhodesia for lack of expenditure data.

Table 1: The share of mission schools in total enrolment in British Africa, ca. 1900 and 1938

	No. enrolled in mission schools		Share in total primary enrolment (%)	
	ca. 1900	**ca. 1938**	**ca. 1900**	**ca. 1938**
Gambia				
Sierra Leone	10.697*	20.372	99,6	92,8
Gold Coast	11.158	62.228	87,2	83,0
Nigeria, Southern	59.002*	266.342	91,1	97
Mauritius	9.635	24.607	50,6	61,6
Uganda	11.954*	267.837	100	98,9
Nyasaland	61.091*	206.202	100	99,9
Kenya	2.432	129.101	100	92,2
Tanganyika		66.753		85,6
N. Rhodesia	*2.400**	122.312	100	99,2
S. Rhodesia		ns		ns
Bechuanaland	2.236	14.239	100	98,4
Totals & weighted averages	**170.638**	**1.179.993**	**93,3**	**95,5**

Sources: Blue Books of the respective colonies. For Bechuanaland *South African Yearbook*.
Notes: *Sierra Leone 1890, Southern Nigeria 1914, Uganda 1905, Nyasaland 1905. The figure for Northern and Southern Rhodesia in 1900 is a guesstimate referring to the combined territories of Rhodesia under the rule of the British South Africa Company. For Tanganyika (German East Africa until 1919) there is no information available around 1900. For Southern Rhodesia the 1938 statistics do not make a distinction between mission schools, government schools and other schools, such as Indian schools, but data for 1950 suggest that missionary education constituted between 95 and 99% of total enrolment.

Table 2: Central government expenditure per person enrolled in primary education, in current £ and constant £ of 1910

	1870	1880	1890	1900	1910	1920	1929	1938	1950
Current £									
Sierra Leone	0.02	0.01	0.11	0.49	0.78	2.03	2.97	1.88	5.39
Gold Coast	0.00	0.11	0.13	0.51	0.90	1.34	3.99	2.80	
Nigeria				0.89	0.76	0.58	0.71	0.58	
Mauritius	2.50	2.10*	1.89	1.69	1.89	3.43	3.62	2.68	
Uganda				0.00	0.05	0.06	0.23	0.38	1.83
Nyasaland				0.00	0.00	0.01	0.10	0.10	
Kenya				0.00	0.80		1.83	1.38	4.16
Tanganyika								1.25	3.64
N. Rhodesia						0.10	0.15	0.31	1.62
European educ.						22.19	33.88	30.21	36.22
African educ.						0	0.06	0.27	0.82
Bechuanaland				0.29*	0.53*	0.44	0.60	0.50*	2.17
Constant 1910£									
Sierra Leone	0.02	0.01	0.12	0.51	0.78	0.98	1.60	0.99	1.45
Gold Coast	0.01	0.11	0.14	0.53	0.90	0.64	2.15	1.47	
Nigeria				0.92	0.76	0.28	0.38	0.30	
Mauritius	2.69	2.22	2.05	1.76	1.89	1.65	1.95	1.41	
Uganda				0.00	0.05	0.03	0.13	0.20	0.49
Nyasaland				0.00	0.00	0.00	0.05	0.06	
Kenya				0.00	0.80		0.98	0.73	1.12
Tanganyika								0.66	0.98
N. Rhodesia						0.05	0.08	0.17	0.44
European educ.						10.68	18.23	15.92	9.73
African educ.						0.00	0.03	0.14	0.22
Bechuanaland				0.30	0.53	0.21	0.32	0.26	0.58

Sources: see for the countries included bottom of appendix table 2.

Table 3: Government expenses and student-teacher ratios in European and African schools, ca. 1938

		Government expenses per student (current £)		Average no. of students per teacher	
	year	European	African	European	African
Kenya	1938	18,87	0,42	15,1	38,6
Northern Rhodesia	1938	30,21	0,27		
Southern Rhodesia	1936			21,0	46,3
Tanzania	1938	12,38	1,02		
Nyasaland	1938	20,99	0,22	11,2	
Bechuanaland	1938	34,35	0,98	11,6	58,9

Sources: see for the countries included bottom of appendix table 2.

Table 4: Expected effect of dependent variables on primary school enrolment and actual correlation of dependent variables with British rule

	Expected effect on primary school enrolment 1938-1950	Actual correlation with British rule (dummy)
Malaria ecology (index)	-	-0.249
Navigable river (dummy)	+	0.166
Coastline/area (ln)	-	-0.181
Population density (1938, ln)	+	0.192
Native resistance (1885-1914, index)	-	-0.340
Islamic influence (pre-1914, index)	-	-0.083
State centralisation (pre-1885, index)	+	0.233
Cash crop exports (pre-1914, dummy)	+	0.264

Sources: see appendix table 2.

Table 5: Regression results

	Dependent variable: primary school enrolment rate											
	(1)			(2)			(3)			(4)		
	1938	1950	1960	1938	1950	1960	1938	1950	1960	1938	1950	1960
British rule	11.82***	13.26***	9.03*	6.24*	7.19*	3.93	2.91	3.18	-0.67	3.98	5.43	2.24
	3.37	*4.13*	*4.50*	*3.14*	*4.19*	*4.89*	*2.64*	*3.71*	*4.36*	*2.53*	*3.14*	*3.49*
Malaria ecology				-0.68***	-0.80***	-0.68**	-0.64***	-0.74***	-0.61**	-0.38**	-0.21	0.08
				-0.19	*0.25*	*0.30*	*0.15*	*0.22*	*0.25*	*0.18*	*0.22*	*0.25*
Navigable river				0.16	3.79	4.40	2.91	7.10	8.20	1.37	3.86	4.00
				4.46	*5.94*	*6.93*	*3.65*	*5.12*	*6.01*	*3.49*	*4.35*	*4.83*
Coastline/area (ln)				-1.33***	-1.17*	-0.69	-1.51***	-1.38**	-0.93	-1.29***	-0.92*	-0.34
				0.49	0.65	0.76	0.39	0.55	0.65	0.38	0.48	0.53
Population density (ln)				2.63**	2.26	2.25	1.62*	1.04	0.84	1.50*	0.79	0.52
				1.12	*1.50*	*1.74*	*0.93*	*1.31*	*1.54*	*0.89*	*1.09*	*1.22*
Native resistance							-4.49***	-5.41***	-6.20***	-3.74***	-3.84***	-4.17***
							1.00	1.40	1.64	0.99	1.23	1.37
Islamic influence										-8.00**	-16.19***	-21.29***
										3.37	4.19	4.66
State centralisation												
Cash crop exports												
Adjusted R-squared	0.22	0.21	0.07	0.53	0.42	0.24	0.65	0.52	0.36	0.69	0.67	0.60
N	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*

Table 5 (continued)

	Dependent variable: primary school enrolment rate						Dependent variable: literacy rate					
		(5)			(6)		(7)	(8)	(9)	(10)	(11)	(12)
	1938	1950	1960	1938	1950	1960	2008	2008	2008	2008	2008	2008
British rule	3.13	4.93	1.51	4.29*	6.30**	3.14	15.72**	13.72**	4.70	8.16*	3.69	
	2.61	*3.34*	*3.68*	*2.37*	*2.98*	*3.31*	*6.05*	*5.85*	*4.42*	*4.76*	*4.46*	
Malaria ecology	-0.42*	-0.27	-0.07	-0.42**	-0.14	0.15		-1.26***	-0.92**	-0.59	-0.70**	-0.78**
	0.21	*0.27*	*0.30*	*0.17*	*0.21*	*0.24*		*0.34*	*0.34*	*0.38*	*0.32*	*0.32*
Navigable river	0.35	3.90	5.14					-3.38		-6.85		
	3.68	*4.72*	*5.20*					*8.02*		*6.38*		
Coastline/area (ln)	-1.32***	-1.00*	-0.59	-1.26***	0.84*	-0.25		1.00		1.01		
	0.42	*0.53*	*0.57*	*0.37*	*0.46*	*0.51*		*0.89*		*0.73*		
Population density (ln)	1.46	0.90	0.90	1.50*	0.80	0.53		-2.17		-3.09*		
	0.92	*1.19*	*1.31*	*0.87*	*1.09*	*1.21*		*2.05*		*1.62*		
Native resistance	-3.77***	-3.92***	-4.37***	-3.66***	-3.61***	-3.93***			-2.55	-2.37	-2.47	
	1.00	*1.28*	*1.41*	*0.95*	*1.20*	*1.33*			*1.69*	*1.78*	*1.72*	
Islamic influence	-6.56*	-16.38***	-21.65***	-8.24**	-17.61***	-22.63***			-20.05***	-22.17***	-19.52***	-21.50***
	3.48	*4.64*	*4.92*	*3.27*	*4.11*	*4.56*			*6.33*	*6.32*	*6.45*	*6.50*
State centralisation	0.23	-1.82	-5.98						-11.32	-3.83		
	4.50	*5.77*	*6.35*						*7.34*	*8.01*		
Cash crop exports	3.80	1.60	1.28						12.85***	12.74***	12.24***	13.53***
	2.53	*3.25*	*3.58*						*4.44*	*4.42*	*4.51*	*4.46*
Adjusted R-squared	0.69	0.65	*0.59*	0.70	0.67	0.61	0.13	0.63	0.65	0.67	0.63	0.61
N	*42*	*42*	*42*	*42*	*42*	*42*	*40*	*40*	*40*	*40*	*40*	*40*

Sources: see appendix table 2.
Notes: Standard errors in rows below coefficients. * significant at 10%, ** significant at 5% and *** significant at 1%.