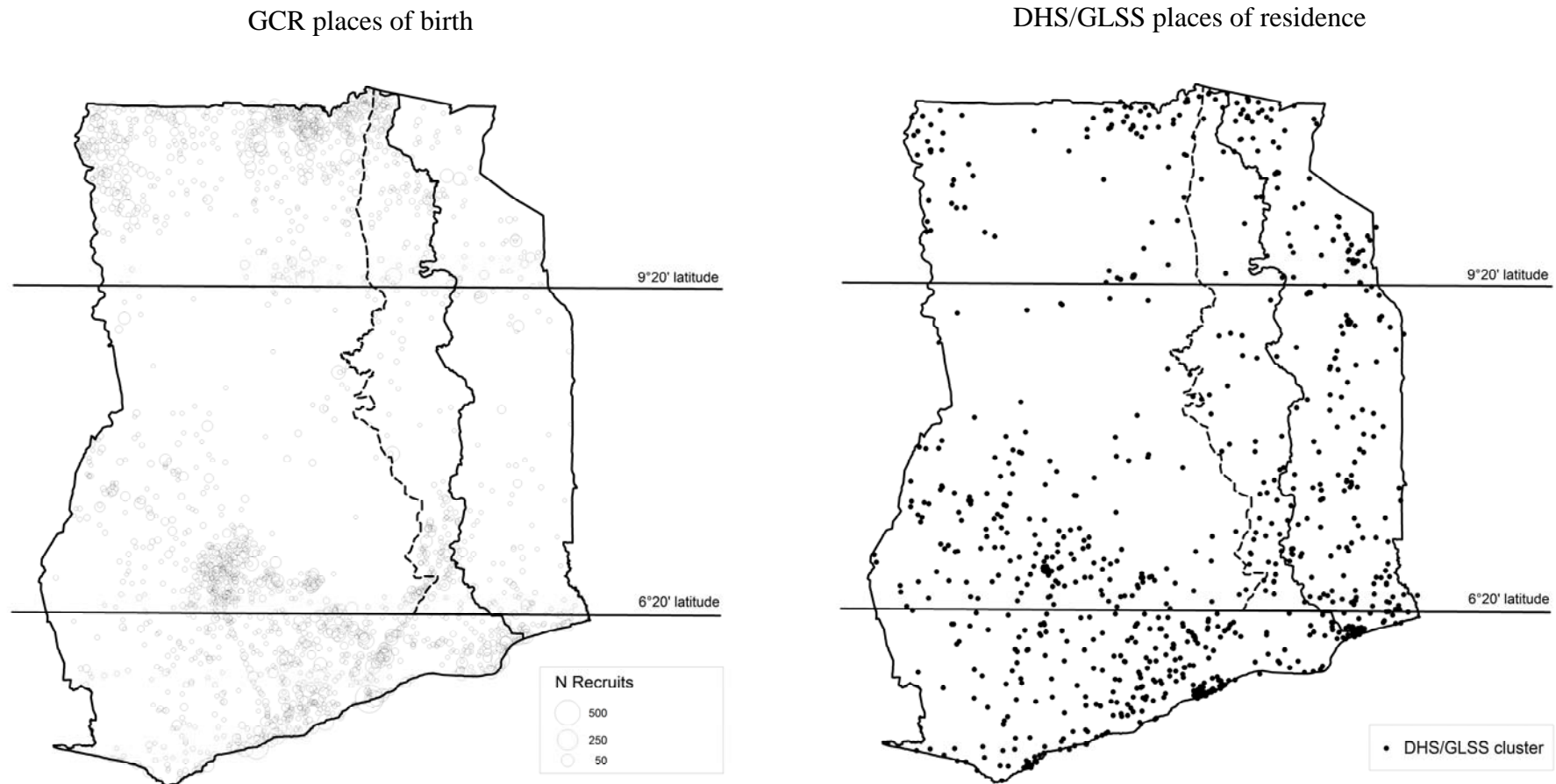


Web Appendix of Denis Cogneau and Alexander Moradi "Borders That Divide: Education and Religion in Ghana and Togo Since Colonial Times".

Figure WA.1: Place of birth / residence in the data used



Note: In the GCR data a dot represents the place of birth of at least one recruit. In the DHS data dot shows the place of residence and is a primary sample unit (PSU, or survey cluster).

Natural and constructed geography at the Ghana-Togo border

Table WA.1 looks at the differences in natural and constructed geography between the comparison areas, i.e. at the geographical characteristics of the places of birth of GCR recruits (lying within the 100 kilometers bandwidth across the TVT/Togo border and between the 6.3 and 11.3 parallels); here again, we distinguish the Northern (9.3-11.3 latitude) and Southern (6.3-9.3 latitude) sub-samples. We use the GCR sample as in our analysis of literacy, Christian religion or height stature. Even if the GCR is not a representative sample of populations, this analysis differs from a pure look at geographical maps as it takes into account the spatial distribution of people. It allows detecting whether geographical discontinuities could confound our double-difference estimates.

Three “natural geography” variables are considered: latitude, altitude, and an index of the “ruggedness” of terrain, taken from Nathan Nunn and Diego Puga.¹ The three other “constructed geography” variables are: (i) the distance to the closest “large city”, defined as counting more than 30,000 inhabitants in 1990; (ii) the distance to the Togo railway lines that started to be built under German rule and were continued under French rule; (iii) the quantity of cocoa produced in a 5 kilometers radius around the place of birth, as of 1927. For each geographical variable in column, the top panel simply reports the average difference in level between the cohorts born before 1914 on each side, in the North and in the South. The middle panel then reports the DiD estimates. The bottom panel reports DiD-T (trend breaks) estimates.

Column (1) shows that no significant differences in latitude can be detected, whether in level or across time. Column (2) shows that southern pre-1914 Togo recruits are born in places that are on average more elevated by 52 meters than birth places of TVT recruits. This latter difference is reversed for post-1914 cohorts, with a significant DiD estimate (-77 meters) meaning that the variation in altitude could be a confounder, in case it has an impact on any of our three outcomes. However no significant double-differences in trends are identified, meaning that altitude should not confound the more refined DiD-T estimates. Column (3) on ruggedness basically brings the same conclusions as for altitude, except that there is no initial difference between pre-1914 places of birth: the DiD estimate signals that southern post-1914 Togo recruits are from less rugged (and less elevated) places, but no double-difference in trends (DiD-T) is detected. For DiD estimates at least, these variations in elevation and in ruggedness could be a concern as Nunn and Puga (2011) have argued that in the African context a more rugged terrain preserved people from slave trade raids.² Then post-1914 recruits from TVT would originate from communities who were less affected by the slave trade, and could have ended up with better institutions, “trust” and/or human capital endowments. We checked that this variation in elevation or slope does not apply to the Ewe ethnic group, whose homeland lies in the less mountainous most southern area, and only to mountain people located between the Volta lake and the TVT/Togo border. When restricting our estimation to Ewe recruits, as we do in col.(1) of Table 5, we no longer find any significant DiD in altitude or ruggedness. According to Nunn's figures, the intensity of the slave trade was maximal for the Ewes, the Konkombas in the North coming second.

¹ We also tried the alternative “slope” measurement, however it is very much correlated with “ruggedness” so that using it instead makes little difference.

² Nathan Nunn & Diego Puga, 2012. “Ruggedness: The Blessing of Bad Geography in Africa,” *The Review of Economics and Statistics*, 94(1), 20-36.

Last, in Table WA.2 below we provide estimates that control for altitude and ruggedness, both in the DiD and the DiD-T specifications (col. 3). We find that those controls bring no change, or if anything rather a slight increase in the estimate of the literacy divergence.

Table WA.1: Differences in natural and constructed geography

	Latitude (degrees)	Altitude (meters)	Rugged- ness ^d (meters)	Dist. large cities ^e 1990 (km)	Dist. Togo railway ^f (km)	Cocoa 5 km radius ^g 1927 (tons)
	(1)	(2)	(3)	(4)	(5)	(6)
<hr/> Simple difference in level ^a (pre-1914 cohorts)						
North	+0.00 (0.23)	-5.5 (26.3)	+2.8 (5.5)	+58.3*** (11.6)	-17.6 (23.4)	0 (-)
South	+0.13 (0.50)	+52.4 (48.6)	+2.4 (20.7)	+10.0* (5.9)	-4.1 (34.3)	-130*** (45)
<hr/> Double difference pre and post-1914 ^b (DID)						
North	-0.16 (0.13)	-28.2* (17.0)	-1.7 (4.8)	-11.7 (7.9)	-17.4 (15.0)	0 (-)
South	+0.06 (0.29)	-76.7** (35.7)	-36.8** (18.0)	-9.1 (6.1)	-1.8 (22.2)	+1.8 (45.4)
<hr/> Double-difference in trends ^c (DiD-T)						
North	-0.018 (0.018)	-2.39 (2.03)	-0.39 (0.58)	-1.18 (0.91)	-1.87 (2.12)	0 (-)
South	-0.051 (0.055)	-3.92 (7.90)	-1.36 (3.08)	-2.76*** (0.93)	-1.67 (2.9)	+14.5* (7.8)
N	428	428	428	428	428	428

Source and coverage: Gold Coast Regiment data. Recruits enlisted 1908-1955, born 1890-1930. Except noted below: Place of birth in former Togoland area, 50 km or less from the border between TVT and Togo, and 6.3 to 9.3 degrees.

Notes: Cohort sizes reweighed assuming a 2% annual demographic growth over 1890-1930, see Table 2 and text.

A positive coefficient means French Togo higher than British TVT.

a: $\delta_2^{pre} - \delta_1^{pre}$, see text.

b: Double diff. between Fr. Togo and Br. Togoland, $(\delta_2^{post} - \delta_2^{pre}) - (\delta_1^{post} - \delta_1^{pre})$, see Table 2.

c: Coefficient $(\beta_2^{post} - \beta_2^{pre}) - (\beta_1^{post} - \beta_1^{pre})$, in units per year, see text and Table 3.

d: Terrain ruggedness index for 30-arc-seconds grid. From <http://diegopuga.org/data/rugged/#grid>.

e: Cities: Distance and squared distance to the closest city, taking cities with more than 30,000 inhabitants in 1990 (source: Africapolis database, <http://www.e-geopolis.eu>): Atakpame, Ho, Kpalime, Lomé, Sokode, and Yendi.

f: Railway: Distance and squared distance to Togo railway lines: For born before 1903, railway line as of 1913; if born after 1924, lines as of 1934; if born between 1903-24, interpolated.

g: Cocoa: Output and squared output of cocoa beans in 1927, 5 km radius around place of birth (only Gold Coast, French Togo not available).

Clustered standard errors, by place of birth (in parentheses). ***: $p < .01$; **: $p < .05$; *: $p < .10$.

We then turn to constructed geography. Column (4) suggests that pre-1914 Togo recruits were born further away from the small towns that turned into large cities (over 30,000 inhabitants) during the post-colonial period (Atakpame, Ho, Kpalime, Lomé, Sokode, and Yendi), especially in the North. In the South, the places of birth of recruits from Togo born before 1914 are on average 10 kilometers further from these future cities. For cohorts born after 1914, this difference more or less cancels out, so that the DiD estimate is negative (-9.1 km) although not significant; yet the DiD-T estimate is also negative and highly significant, reflecting a gain of 2.8 kilometers per year. As distance to urban centers is negatively correlated with literacy, evangelization or health, this kind of variation should generate a downward bias, i.e. attenuate the divergence we observe between TVT and Togo recruits.

Column (5) shows that distance to the Togo railway lines should not be a great concern: recruits from Togo are not significantly born closer to the railway, so that we can't think that literate and skilled individuals on the French side have been more often diverted away from the GCR, thanks to the alternative labor opportunities opened by the railway.

Column (6) finally considers the potential impact of cocoa production that expanded from Gold Coast to British TVT around Ho and Kpandu in the 1920s, before to reach the French side at the end of the 1930s; of course, only southern forest areas are suitable for cocoa. A large share of the TVT cocoa beans were crossing the border to be transported to Lomé by railway; besides, people from the French side could also cross the border to work in TVT plantations on a seasonal basis. We only have data for cocoa production in TVT as of 1927, so that proximity to cocoa plantations is underestimated for Togo recruits. Unsurprisingly, TVT recruits are found to be born in places that are closer to the major cocoa plantations: while an average of 137 tons of cocoa is produced (in 1927) within 5 kilometers of their place of birth, the same figure is only 7 tons (=137-130) for French Togo recruits. However, the DiD-T estimate shows that the latest recruits from TVT tended to be recruited from places which were relatively further away from cocoa plantations, when compared to their French counterparts. Two issues are involved here. First, recruits who were at school age in the 1920s-1940s, i.e. recruits born after 1924, could have benefited from the income effect induced by the rise of cocoa production. Hence, part of the educational advantage of post-1914 TVT recruits could stem from the development of cocoa in this area. However, according to the DiD-T, this advantage should decrease over time. Second, cocoa could also have modified the labor market in the TVT area, by diverting more farmers or unskilled laborers out of the GCR recruitment. To check for this, we considered the occupation at entry in the GCR, and estimated the DiD and DiD-T model with "unskilled occupation" as the dependent variable. No significant variation is found, meaning that there is no sign that farming or unskilled occupations were more and more absorbed out of the GCR, in the cocoa sector or in other segments of the labor market.

Finally, in col.(5) of Table WA.2 thereafter, we provide DiD and DiD-T estimates controlling for the three "constructed geography" variables: cities, railway and cocoa. Estimates are very little affected. Collinearity issues explains why we refrained from controlling for all our six geographical variables together; still, when doing so, the double-difference estimates for literacy in the South become even larger and remain very significant: respectively -29.2** (s.e.=12.8) for DiD, and a very high -10.64*** (s.e.=2.52) for DiD-T.

Table WA.2: Robustness to geography (southern areas)

	50km (1)	25km bw (2)	Latit., Altit. & Rugg. controls (3)	All South (4)	Cities, Railway & Cocoa (5)	Border RD ^f (6)	Placebo Border RD ^g (7)
Double difference pre and post-1914 (DiD)^a							
Literate (%)	-25*** (9.5)	-28*** (9.3)	-28.1*** (9.5)	-28.6** (9.3)	-24.3** (11.5)	-27.8* (15.1)	-18.9 (18.7)
Christian (%)	-23.2 (16.0)	-28.8 (19.9)	-28.0 (18.8)	-23.9 (17.0)	-29.6** (14.2)	-53.2* (29.6)	-8.2 (20.7)
Double-difference in trends (DiD-T)^b							
Literate (%)	-5.3*** (1.26)	-5.3*** (1.73)	-6.96*** (1.47)	-6.38*** (1.50)	-4.56** (1.83)	-7.17*** (2.62)	+3.29 (2.30)
Christian (%)	-3.13 (3.12)	-0.87 (3.07)	+3.99 (2.46)	+3.15 (2.33)	-4.53 (2.83)	+7.97 (5.01)	+1.49 (2.73)
<i>N</i>	428	255	428	577	428	428	628
Latit., altit. & ruggedness ^{c,g}	No	No	Yes	Yes	No	Yes	Yes
Cities, railway & cocoa ^{d,g}	No	No	No	No	Yes	No	No
Distance to border ^{e,f,g}	No	No	No	No	No	Yes	Yes

***: p<.01; **: p<.05 ; *: p<.10. Clustered standard errors, by place of birth (in parentheses).

Source and coverage: Gold Coast Regiment data. Recruits enlisted 1908-1955, born 1890-1930.

Except noted below: Place of birth in Togoland area, 50 km or less from the border between TVT and Togo, and 6.3 to 9.3 degrees latitude. Column (2): 25 km or less from TVT/Togo border. Col.(4): Includes Extreme South, i.e. below 6.3 latitude, and in particular the capital city of Togo, Lome. Col.(7): 50 km or less from British/German border (as of 1914), still 6.3 to 9.3 degrees of latitude.

Notes: Cohort sizes reweighed assuming a 2% annual demographic growth over 1890-1930.

a: Double diff. between Fr. Togo and Br. Togoland, $(\delta_2^{post} - \delta_2^{pre}) - (\delta_1^{post} - \delta_1^{pre})$, see Table 2.

b: Coefficient $(\beta_2^{post} - \beta_2^{pre}) - (\beta_1^{post} - \beta_1^{pre})$, in percentage points per year, see Table 3.

c: Dummies for each half degree of latitude, and for each 100 meters elevation above sea level (up to 300 meters), and dummies for quartiles of terrain ruggedness index (30-arc-seconds grid) from <http://diegopuga.org/data/rugged/#grid>.

d: Cities: Distance and squared distance to the closest city, taking cities with more than 30,000 inhabitants in 1990 (source: Africapolis database, <http://www.e-geopolis.eu>): Atakpame, Ho, Kpalime, Lomé, Sokode, and Yendi. Railway: Distance and squared distance to Togo railway lines: For born before 1903, railway line as of 1913; if born after 1924, lines as of 1934; if born between 1903-24, interpolated. Cocoa: Output and squared output of cocoa beans in 1927, 5 km radius around place of birth (only Gold Coast, French Togo not available).

e: Regression discontinuity design: distance to the British/French border, interacted with all the variables of the base model (area dummies, pre-post dummies or birth year trends and their mutual interaction).

f: Same as e, except British/German border as of 1914.

g: Each geographical variable is interacted with pre-post dummies (top panel), or pre-post birth year trends (bottom panel).