

# Colonial Traces of Fractionalization: The Possibilities of Africa Moving Beyond the Walls to a Sustained Growth

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## Abstract

While fractionalization had long been debated as one of the devastating economic factors on the African continent, there is much to believe that some important factors are responsible not only for its increasing growth and adverse effects, but also its perpetuation over the continent. This paper asserts that, colonial rule, among others, is to blame for the difficulties involved in dealing with the seemingly invincible effects of linguistic fractionalization and makes a recommendation that could help assuage the situation. The results are robust to alternative specifications including OLS, a simultaneous equation model and a spatial econometric model.

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**Index terms**— fractionalization, institutions, trade, colonial rule, homogeneity, spatial dependence.

Introduction though many factors have been found to account for the underdevelopment of African countries, fractionalization has been gaining increasing attention in the development literature. For example, many researchers have explored the relationship between institutions, ethno-linguistic fractionalization and growth. This includes the indirect effects of colonial institutions on the ability of Africans to trade peacefully. Colonial institutions in Africa are found to have exacerbated fractionalization, which led to the poor growth of African countries. Alternatively, others find that good institutions mitigate fractionalization and this leads to economic growth. Some other findings are that ethno-linguistic fractionalization negatively impacts economic growth and policies in Africa, and this is responsible for poor growth in Africa (Leeson, 2005; Easterly, 2001; Easterly and Levine, 1997).

The relationship between linguistic diversity, political stability and democracy has also been investigated widely and researchers find that linguistic diversity has positive impact on political instability. It is also discovered that democracy eliminates the negative impact of ethno-linguistic fractionalization on growth. There is also an established positive relationship between ethnic homogeneity and trust, which reinforces the positive relationship between trust and economic growth (Collier, 1999; Knack and Keefer, 1997). Cunniff and Fay (1993) also explore the relationship between long-run growth and ethno-linguistic fractionalization.

There is also a plethora of literature on the relationship between colonization and growth. European colonization, for example, has a negative impact on growth. Colonial heritage, measured as the identity of the Metropolitan ruler and the degree of Economic Penetration (GNP/GDP), is one of the reasons for low average growth rate of GDP per capita and the observed heterogeneities in Africa.

This explains differences in investment output ratio, education attainment and the index of ethno-linguistic fractionalization. Other researchers have also established a negative relationship between the number of years of colonial rule and growth. Also, by exploring the effect of ethnic, linguistic and religious fractionalization on the quality of growth, other studies find that linguistic and ethnic (racial) fractionalization are strongly negatively related to growth, but religious fractionalization is not (Bertocchi and Canova, 2002; Grier, 1999; Alesina, Devleeschauwer, Kurlat, Easterly and Wacziarg, 2003). Some other works in the area of economics of language include the explanation of the evolution of languages, the investigation of the economic and demographic determinants of destination language proficiency among immigrants and the connection between trade and languages. These researchers show that trade requires language. (Rubinstein, 1998; Chiswick, 2008; Smith, 1776).

Most of these researches focus on fractionalization as an exogenous variable. In this paper, I empirically investigate the determinants of fractionalization and argue that it can be reduced. For example, while the

47 main focus of Easterly and Levine (1997) and Leeson (2005) is that regardless of heterogeneity countries can  
48 realize gains from trade, this paper asserts that trade can reduce fractionalization society. In other words, if  
49 and as diverse individuals trade, the walls of linguistic fractionalization and ethno-linguistic fractionalization can  
50 eventually be lowered significantly if not utterly destroyed as a result of their interaction. The paper posits that  
51 if incidents and events such as colonial policies that sever the interaction of diverse individuals had not occurred,  
52 trade among African countries would have developed at a faster pace. This increased trade would then lead to  
53 declining fractionalization, paving the way for a faster growth in Africa.

54 Thus, though many papers have investigated fractionalization and its effects on growth and development  
55 few, if any, researchers have empirically endogenized fractionalization specifically in an African context. This  
56 paper fills the gap by providing an empirical analysis of linguistic using OLS, Seemingly Unrelated Regression  
57 (SUR) and Spatial Autoregressive model (SAR). The results suggest that, among other factors, the measures of  
58 fractionalization (the number of years of colonial rule, colonial history and colonial heritage) do affect the persistence of  
59 fractionalization in Africa. The paper also finds that linguistic fractionalization is spatially dependent (contagious)  
60 suggesting that the best ways to address fractionalization include steps that will reduce linguistic fractionalization.

61 The rest of this paper is organized as follows: in the following section the study examines the possibility of  
62 linguistic fractionalization decline in Africa, followed by what exactly transpired during colonial rule. It then  
63 continues with specification of the methodology, presentation of my results, robustness checks, and discussion of  
64 the possibility of linguistic fractionalization decline in Africa today.

## 65 1 II. The Possibility of Fractionalization

66 Decline in Pre-Colonial Africa African countries are among the world's most ethnically diverse countries.  
67 According to Easterly and Levine (2001), African countries are among fourteen of the world's fifteen most  
68 ethnically heterogeneous societies, with Uganda being the world's number one. Other societies in the world have  
69 gone through a phase of fractionalization comparable to Africa but, unlike the rest of the world, fractionalization  
70 in Africa seems to have come to stay.

71 However, before colonization, though fractionalized, Africa was one big society with no official significant  
72 differences. In order to commute from one area to the other, people did not need any documents or permission  
73 as long as they had the means of transportation and travelled through other settlements peacefully. Though  
74 sometimes special gifts and offerings were given to the chiefs and fetish priests of other societies through which  
75 one travelled or undertook business transactions, movement as well as assimilation into other societies and cultures  
76 was very common. Outsiders wanting to join a particular community gave special gifts to the Earth's Priests  
77 and agreed to respect the community's rituals (as a signal of credibility) and, thus, were given the possibility of  
78 trading with the existing group members. (Leeson, 2005). This is accentuated by the fact that some languages  
79 and cultures are common to a lot of ethnic groups across African countries today. For example, there are tribes  
80 in many African countries who speak same languages as some tribes in other African countries today. In other  
81 words, this shows that interaction of different societies through trade (free trade) was highly possible even in the  
82 face of fractionalization. Domestic, long distance and international trade developed in Africa with the resultant  
83 social interaction between different ethnic groups prior to European's arrival on the continent ??Cohen, 1969:  
84 6). There were also commercial interactions in pre-colonial Africa to the extent of creating homogeneity between  
85 different diverse people ??Thornton, 1995: 194). Thus, without any interruption, there was the possibility that  
86 the walls of fractionalization might be lowered to their minimal levels if not utterly destroyed.

87 One way ethno-linguistic fractionalization could have declined in the absence of colonial rule is that, with time,  
88 some languages and cultures could become dominant over others in each society or a lingua franca could have  
89 evolved. In every society, each group is identified with a certain kind of occupation. Typical examples are farmers,  
90 (including shepherds who travel widely in search of pasture), and traders. The latter are very influential as they  
91 move from one place to the other and must interact with the indigenous people in order to transact business  
92 with them. Consequently, they tend to spread their language and culture from place to place. For example,  
93 commercial interactions help explain the great cultural similarities between many different peoples south of the  
94 equatorial forest ??Vansina, 1968: 325). It is imperative to point out that most countries that have adopted one  
95 language today have gone through an evolution. This process of evolution from linguistic fractionalization as  
96 evident in other countries' experiences could have taken place in Africa too, but this was interrupted or slowed  
97 down, largely, as a result of colonization.

## 98 2 b) Cost and Benefits of Learning a New Language in

99 Pre-colonial Africa Language skill is human capital, since it satisfies the three requirements of a human capital  
100 namely productivity, costliness and embodiment in a person (Chiswick, 2008). The first two of these attributes  
101 imply that there is a benefit and cost associated with learning, adopting or developing a language that will serve  
102 the common good of a fractionalized society as Africa. If the cost is higher than the benefit, then the society or  
103 individuals who make up the society will stick to their different languages, instead.

104 One of the costs of learning a dominant language or developing a common language in pre-colonial Africa is  
105 time; it takes time for one to learn a new language, especially so for the old. It could also take time for parents  
106 and relatives to teach the young this new language, but in pre-colonial Africa where interaction among diverse

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107 individuals was free the process could be much faster than it was under colonial rule. Exposure to the dominant  
108 language is another determinant of the cost of learning a new language. This exposure was much greater in the  
109 absence of colonial barriers and colonial immigration restriction policies. Similarly social distance, another cost of  
110 learning a new language, was smaller in pre-colonial Africa. For example, Leeson (2005) argues that pre-colonial  
111 agents used signals such as property usage, religious practices and the individual's relationship to authority to  
112 minimize the social distance between sender and receiver to send their credibility to outsiders they wanted to  
113 trade with.

114 Another factor that determines the cost of learning a new language is distance between one's mother language  
115 and the new (dominant) language. Though Africa has many languages, one thing these languages mostly have  
116 in common is their syllabus. You can almost write every language using a set of alphabets. There are many  
117 languages that have certain words in common as well. This means that it will be easy for a speaker of one African  
118 language to learn to speak another or most African languages.

119 There are also benefits associated with learning a new language. One of such benefits is productivity; language  
120 is productive in consumption activities. This implies that it will enable people find quality goods and services  
121 at lower prices. Trading in Africa, including today's, requires one's ability to negotiate prices, so the more  
122 proficient you are in a trade language the higher your chances of success. Not only would learning a dominant  
123 language in pre-colonial Africa enable people do well in the market, it would also make them find good jobs  
124 in the labor market. Learning a new language enables agents to execute their jobs efficiently. Other social  
125 benefits include one's ability to network and make a wide range of friends outside his linguistic enclave and the  
126 enhancement of civic involvement by gaining full political and economic rights of the new (dominant) spoken  
127 language community (Chiswick, 2008). In precolonial Africa, learning the larger society's language could be seen  
128 as a signal of credibility and could result in gaining access to full benefits of the larger society.

### 129 **3 III. The Worsening of Fractionalization During Colonial Rule**

130 Colonial rule seems to play a role that stymie the decline of linguistic fractionalization in Africa. Leeson (2005)  
131 explores the indirect effects of colonial institutions on the ability of Africans to trade peacefully. One of the  
132 findings includes how artificial colonial institutions such as forced allegiance to an authority disabled the signal  
133 that individuals look to when evaluating the credibility of outsiders to trade with, which resulted in the creation  
134 of smaller sub-groups among broader ones to eliminate the risk of interacting with those who were remotely  
135 unknown. Thus, this colonial distortion of trade further reduced social and commercial interaction that would  
136 expose individuals to and cause them to learn a dominant (trade) language.

137 Second, colonial rule inhibited free movement of individuals in Africa and this was no environment for cultural  
138 or linguistic convergence. As opposed to precolonial Africa where people could come and go as they pleased, so  
139 that it was possible for people to be members of multiple communities and hence exchange with a wide range of  
140 individuals, colonial land policy created noise in this signal used to convey credibility by legally requiring colonial  
141 agents to stay attached to their ruler-allocated areas of land. Such a colonial policy also restricted migration,  
142 as was the case of Basutoland in 1903 when colonial law forbade the provision of land to non-Basotho people  
143 (Leeson, 2005). Limited mobility under colonial rule was therefore one of the factors that reduced the need to  
144 adopt or learn the most widely spoken language(s) as the cost of doing so became more than the benefit, if any.

145 Another way colonization exacerbated linguistic fractionalization in Africa is that colonial masters separated  
146 African countries into territories that may never be reconciled to each other. The separation has far reaching  
147 ramifications of maintaining ethno-linguistic borders especially across countries. As mentioned above, walls of  
148 colonization have divided different African societies that had common languages and cultures. Societies that once  
149 saw each other as one though far apart, because of language and culture, now see each other as aliens. Even if the  
150 walls of ethnolinguistic fractionalization gradually break down in each colony (now country) it may never break  
151 down across countries, unless stringent measures are taken. This is because these colonies now see one another  
152 as different entities. For example, the people from the Volta region of Ghana speak the same language and have  
153 same culture as about half the population of Togo, a neighboring country, but are now considered aliens in Togo  
154 because of colonial walls. The same is true for tribes of many neighboring countries in Africa.

155 Moreover, colonization led to the proliferation of different institutions in Africa that made it difficult to  
156 reduce fractionalization. Colonial created institutions severed the communication mechanism between socially  
157 heterogeneous individuals in Africa by reducing the signals (pre-colonial institutions) that enabled communication  
158 and interaction as this increased the cost of commercial interaction. Legal systems of each colonial master were  
159 different and this made it difficult for Africa to adopt an institutional framework that supported continent-wide  
160 development initiatives such as free trade areas. These legal frameworks that distorted the already established  
161 ones before them helped prolong fractionalization in Africa. In addition, the division of colonies into regions and  
162 districts by some colonial rulers has huge ramifications. This was an attempt to facilitate colonial rule but now  
163 permanently left these internal groups at conflict with each other over lands, resources and domains. Colonial  
164 policy led to a break-down of the ability of African people to interact freely and, instead, led to a sharp increase  
165 in property disputes among Africans (Leeson, 2005).

166 One would think that the introduction of the language of the colonist should mitigate linguistic fractionalization  
167 but what happened was the exact opposite. Unlike societies such as Latin America where colonial masters  
168 introduce Spanish to the whole society, the colonial master's language was intended for only a few selected

169 Africans, who helped in the facilitation of communication of the colonial masters with the rest of the African  
 170 societies. If a larger population of each country were taught the colonial master's language, it could help promote  
 171 homogeneity. Today, the colonial master's language is a luxurious commodity in Africa, and it is largely the rich  
 172 consume it. In most cases, one could only learn this language (official language) through formal education, which  
 173 is costly. Studies show that 90 percent of the population in most African countries does not speak the official  
 174 language at home (Easterly and Levine, 1997). In other words, these official languages tend to add to linguistic  
 175 diversity in Africa rather than help create homogeneity.

176 Coupled with above, the same master did not colonize all African countries, and that means ranging from  
 177 English to Spanish, more languages were added to the several languages spoken in Africa rather than replace  
 178 them (a situation that would have reduced fractionalization in Africa). If a greater proportion, if not all, of the  
 179 population of Africa countries were able to speak its colonial master's language the outcome would have been  
 180 close to desirable.

181 Post-colonial attempts to use the colonial master's language to reduce linguistic fractionalization in Africa  
 182 did not succeed. Most African countries made it mandatory for every school going person to learn the official  
 183 language (colonial master's language) of their neighboring African country. Due to these colonial walls that have  
 184 now become official barriers, even if one learns the neighboring country's language he could do little with it  
 185 (because hardly does anyone speak that language in the domestic country) and hence tend to forget it a few  
 186 years after leaving school. If there were no official barriers and people could travel freely to neighboring countries  
 187 to trade or undertake other commercial activities, continuous use of the neighbor's language could cause them  
 188 to be proficient not only in their own official language, but also in the language of their neighboring countries.  
 189 Canada is an example of the possibility of speaking a second official language in the absence of official barriers.

## 190 4 IV.

### 191 5 Methodology a) Data

192 This study estimates the impact of colonial rule (number of years of colonial rule) on fractionalization in Africa.  
 193 The data comprises a cross-section of 49 African countries from 1980-2000. The list of countries is found in  
 194 Appendix 2. Data on linguistic fractionalization is computed by Alesina, Devleeschauwer, Kurlat, Easterly and  
 195 Wacziarg (2003). This variable is based on the shares of languages spoken as mother tongues. The reason for the  
 196 choice of this variable is that it is entirely based on language and hence different from the effect of any racial or  
 197 ethnic features.

198 Even though both linguistic fractionalization and ethnic fractionalization were used by Alesina, Devleeschauwer,  
 199 Kurlat, Easterly and Wacziarg (2003), in most of their main regressions linguistic fractionalization does have  
 200 a bigger effect (and higher level of significance) on growth than ethnic fractionalization. I thus employ only  
 201 linguistic fractionalization in my regressions.

202 The population, GNP and GDP data are taken from the World Bank's databases. One of the measures of  
 203 colonial rule, colonial penetration (also referred to as "drain") is the ratio of a country's GNP to GDP in 1960 as  
 204 in Bertocchi and Canova (2002). The lower the value of GNP the higher the level of colonial penetration and the  
 205 lower the ratio. They use this as a measure of colonial drain following the drain of wealth thesis. According to  
 206 them this measure captures how Metropolitan countries further extracted colonial surplus by reducing indigenous  
 207 capital accumulation through repatriation of profits, pensions, interest on loans and salaries. They argue that the  
 208 impact of colonization may survive past political independence but those colonies kept paying the consequences  
 209 of their history even after independence was achieved.

210 Institutional measures are taken from the International Country Risk Guide (ICRG). Data on colonial rule is  
 211 taken from the World Fact Book. The length of colonization was compiled based on Barro (1991), which provides  
 212 data including dates of independence. A detailed description of the data, together with summary measures is  
 213 given in Appendix 1.

### 214 6 b) Model

215 Both OLS and a spatial econometric model, SAR (Spatial Autoregressive Model) are employed in the main  
 216 regressions. A simultaneous equation model is also employed for robustness analysis. SAR specifies a country's  
 217 linguistic fractionalization as a function of the weighted value of the linguistic fractionalization of its geographic  
 218 neighbors. The models are specified below. OLS:  $Elf = \beta_0 + \beta_1 Colrule + \beta_2 Institutions + \beta_3 Colpen + \beta_4 GDP$   
 219  $+ \beta_5 Poltstability + \beta_6 Borderdummy + \epsilon$  (1)  $Trade = \beta_0 + \beta_1 Colrule + \beta_2 Institutions + \beta_3 Colpen + \beta_4 GDP$   
 220  $+ \beta_5 Poltstability + \beta_6 Borderdummy + \epsilon$  (2) where,  $Elf$  represents linguistic fractionalization,  $Trade$  is the volume  
 221 of bilateral trade between each country and all other countries in the study,  $Colrule$  is the number of years a  
 222 country has been colonized,  $Institutions$  is an index of the quality of a country's institutions,  $Britishdummy$ ,  
 223  $Frenchdummy$ , and  $Belgiumdummy$  are colonial history dummies for African countries colonized by Britain,  
 224 France and Belgium respectively  $Borderdummy$  is a dummy created for countries whose post colonial borders  
 225 existed before colonial rule, and  $\epsilon$  and  $\epsilon$  are  $N \times 1$  matrixes of iid random errors. Colonial rule is expected to have  
 226 positive impact on linguistic fractionalization and negative impact on trade. Equation (1) is only employed for  
 227 robustness analysis. SAR:  $Elf = \beta_0 + \beta_1 WElf + \beta_2 Colrule + \beta_3 Institutions + \beta_4 Colpen + \beta_5 Poltstability + \beta_6 Borderdummy + \epsilon$  (3)

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228 where  $X$  is a vector of controls variables specified above,  $Y$  is an  $N \times 1$  vector of measures of the dependent  
229 variables;  $\rho$  is the spatial autoregressive and spatial error coefficients (which represents geographic contagion in  
230 the dependent variable), and  $\epsilon$  is an  $N \times 1$  matrix of iid random errors.  $W$  is an  $N \times N$  weight matrix for geographic  
231 neighbors.

232 For the geographic weight matrix a country gives a weight of one to every country it shares a border with  
233 (whether vertically, horizontally or at vertex contacts) and zero otherwise. The geographic weight matrix is row  
234 standardized. For example, if country  $A$  has 4 neighbors, then each of these countries is assigned a weight of  $1/4$   
235 by country  $A$ .  $W_{ij} = 1$  if country  $i$  and  $j$  are neighbors,  $W_{ij} = 0$  otherwise.

236  $W_{ij} = 1$  if country  $i$  and  $j$  are neighbors,  $W_{ij} = 0$   
237 otherwise.

238 This makes the weights given by each country to all others sum up to 1. This is represented in matrix notations  
239 above.

240  $V$ .

## 241 7 Results

### 242 8 a) Main Findings

243 The results suggest that the number of years of colonial rule in an African country affects a country's level of  
244 linguistic fractionalization.

245 Table 1 results show that without controlling for institutions the number of years of colonial rule is positive but  
246 insignificant. However, once I control for institutions both the number of years of colonial rule and institutions  
247 become significant. Similarly, other measures of colonial rule are also positive and significant in Table 1. Colonial  
248 Penetration is positive and significant in all regression while French Colonial Dummy is also significant but only  
249 when institutions are controlled for.

250 Table 2 reports the results for the SAR model. The main aim of this regression is to find out if there is a spatial  
251 dependence in the dependent variables; that is if countries that have low levels of linguistic fractionalization tend  
252 to be neighbors and vice versa. The results indicate that linguistic fractionalization is contagious. This is evident,  
253 as the coefficient, ( $\rho$ ), is significant. A possible reason explanation is that languages can be created, adopted,  
254 spread or dominated.

255 Controlling for spatial dependence also makes all the independent variables, except British and French colonial  
256 dummies, insignificant. This can be explained by the fact that all the independent variables are spatially  
257 correlated. All of them are measures of colonial rule. Thus the geographic weight matrix therefore captures and  
258 removes this spatial correlation making these variables insignificant. British colonial dummy is now significant  
259 and French colonial dummy is still positive and significant, still indicating the effects of British and French  
260 colonization on linguistic fractionalization.

### 261 9 b) Robustness Checks: Adding New Variables and

262 Comparing Alternative Models (SUR and OLS) While the above gives an indication that the length of colonial  
263 rule and colonization in general does have an effect on the fractionalization measure, the paper attempts to check  
264 the robustness of the results by including other independent variables, and a dependent variable (trade), to see  
265 if the results will change significantly. To do this, a simultaneous equation specification is also employed in  
266 addition to the OLS regression. The use of such a specification can improve standard errors as well. A seemingly  
267 unrelated regression (SUR) models are specified below based on equation (??) and (??). First, I estimate the  
268 impact of colonial rule on trade. Table ?? shows that there is a negative impact of colonial rule on bilateral  
269 trade between African countries (as seen in the OLS regression) and the results are significant at 5%-10% levels.  
270 However no other independent variable is significant in the OLS regression. Table ?? presents the results for  
271 SUR regression based on equation (??) and (??) above. The SUR result for linguistic fractionalization is still  
272 significant, but the trade result is no longer significant. In addition, the linguistic fractionalization regression  
273 gives a negative and significant coefficient of institutions. Thus there is a negative relationship between linguistic  
274 fractionalization and institutions. However, the results suggest that whereas colonial may have an effect on trade,  
275 institutions do not have an effect on trade.

276 VI. Is there a Possibility of Linguistic or Ethno-Linguistic Homogeneity in Post-Colonial Africa?

277 Though one cannot say for certain whether ethno-linguistic fractions can reduce enough in Africa, looking at  
278 what is going on other continents suggests that there is a possibility. Economic integration or political integration  
279 or both can help. For example, English is becoming a "lingua franca" in Europe following the reduction of legal  
280 barriers that now facilitates the movement of people and the removal of non-tariff and tariff barriers that facilitates  
281 trade (the free mobility of goods) across EU countries (Chiswick, 2008).

282 If this EU paragon could be applied in Africa, free trade and free mobility of economic agents could call for,  
283 if not result in, a lingua franca. This new language, which can be a widely spoken African language or one of  
284 the widely spoken languages introduced by colonial masters, would reduce linguistic fractionalization. When a  
285 big society speaks the same language, ethnic fractionalization will also dwindle, because it will become more and  
286 more difficult to tell ones ethnicity when everyone's name is in the same language. Governments can help fund the  
287 teaching of this language and make individuals view the speaking of such a language as a sign of demonstrating

288 patriotism or nationalism. Creating the awareness of the effect of homogeneity on economic growth of Africa can  
289 help Africans embrace such policies. In other words there are benefits as well as costs associated with achieving  
290 linguistic and ethno-linguistic homogeneity now as, if not more than, it was in pre-colonial Africa.

### 291 10 VII.

### 292 11 Conclusion

293 The findings of this paper show that while colonization worsened both linguistic fractionalization in Africa, its  
294 effect on effect is only significant by controlling for institutions. This is supported by the results of this paper,  
295 which show that the number of years a country was colonized, colonial penetration and colonial history do have  
296 a positive impact on linguistic fractionalization in Africa. It also shows that while both French colonial rule and  
297 British colonial rule exacerbated linguistic fractionalization, others did not. This may be due, for example, to  
298 colonial policies such as divide-and-rule practiced by Britain.

299 Also the results suggest that linguistic fractionalization is more adversely affected by colonialism than trade and  
300 that while colonial institutions have negative effect on linguistic fractionalization, it does not have any significant  
301 effect on trade. The results also support the view of Leeson (2005) that bad institutions worsen fractionalization  
302 and that this is one of the reasons for the increasing fractionalization and poor growth in Africa. Apart from  
303 the division of the continent into colonies, different foreign languages and institutions introduced by colonial  
304 rulers made it difficult for Africa to reduce its level of fractionalization. Therefore, policy recommendations  
305 for mitigating or eradicating the effects of linguistic fractionalization in Africa may include the introduction or  
emergence of a lingua franca. <sup>1</sup>

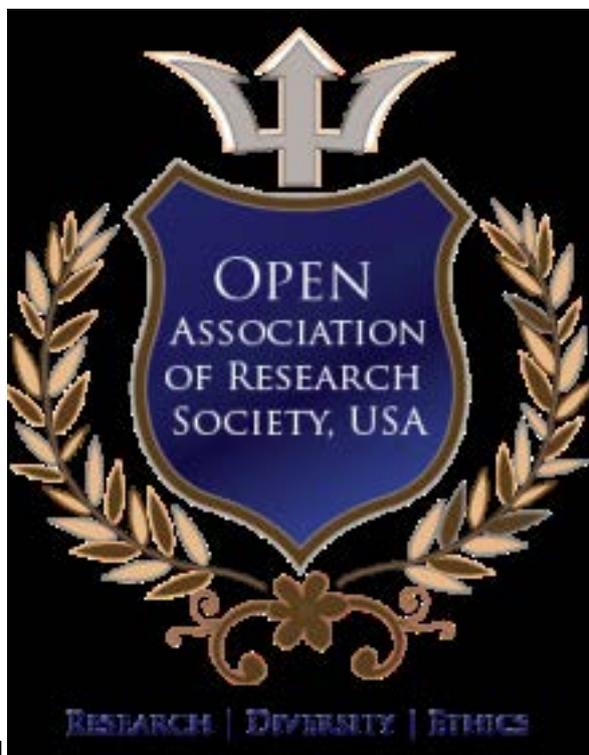


Figure 1: 1 )

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1

Independent Variables	I	II
Constant	2.910** *	1.626**
	(3.65)	(2.23)
Colonial Rule (no. of year)	0.003**	0.0002
	(2.14)	(0.25)
Institutions	-0.202 ***	
	(-2.63)	
Colonial Penetration	-0.025***	-0.013*
	(-3.21)	(-1.73)
British Colonial Dummy	0.642**	0.306
	(1.99)	(1.03)
French Colonial Dummy	0.554*	0.336
	(1.78)	(1.13)
Belgium Colonial Dummy	0.338	0.263
	(0.79)	(0.73)
Border dummy	0.030	-0.063
	(0.20)	(-0.40)
R-Squared	0.35	0.15

[Note: Notes: *t*-statistics in parentheses; asterisks indicate significance as follows: \*\*\*=1%, \*\*=5%, \*=10%. Variable description, descriptive statistics, and sources can be found in Appendix 1.]

Figure 2: Table 1 :

2

Independent Variables	I	II
Constant	0.246	0.246*
	(1.595)	(1.710)
Rho	0.317***	0.312***
	(2.49)	(2.424)
Colonial Rule (no. of year)	0.0005	0.0004
	(1.065)	(1.081)
Institutions	-0.002	
	(-0.039)	
Colonial Penetration	-0.0004	-0.0004
	(-0.400)	(-0.399)
British Colonial Dummy	0.210*	0.209*
	(1.62)	(1.671)
Belgium Colonial Dummy	-0.028	-0.028
	(-0.146)	(-0.144)
Border Dummy	0.027	0.027
	(0.270)	(0.270)
R-Squared	0.17	0.17
Observations	49	49

Figure 3: Table 2 :



- 
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