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Religious Diversity and Economic Development in Sub-Saharan Africa: So Far So Good

OASIS KODILA-TEDIKA¹ AND JULIUS AGBOR AGBOR²

ABSTRACT

This paper investigates the effects of religion on a broad set of development outcomes in sub-Saharan Africa. We regroup these outcomes into three broad categories, namely, development process outcomes (growth, investment, conflict, and government quality), institutional outcomes (property rights and the rule of law) and social development outcomes (social and gender protection). Using two new measures of religion – religious fractionalization (RELFRACT) and religious polarization (RELPOL), alongside the traditional measure of religious diversity, our results suggest that broadly speaking, religion or religious diversity has no statistically significant impact on the institutional and social aspects of development in sub-Saharan Africa. However, our findings do suggest that religion has important effects on the development process through its effects on investment. The analysis suggests that African policy-makers need to pay attention to the changing religious dynamics and increasing religious polarization of African societies.

KEY WORDS: Economic development, Africa, Religious Polarization; Conflict; Religious diversity

JEL: O, O1, O24, O5, O11; Z12; O55

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INTRODUCTION

We can broadly view institutions as comprising of established rules, norms and strategies which influence the kind of social interactions that occur in a particular society (Crawford and Ostrom, 1995; Ostrom, 2005; Hodgson, 2006). Institutions encourage particular types of behaviours while at the same time discouraging other types (Hogson, 2006). Research has demonstrated that the quality of institutions influences the rate of economic growth and the level of economic development in a society (North, 1989; Kimenyi and Mbaku, 2003; Rodrick et al., 2004).

Since Adam Smith, the impact of religion on the socio-economic and political development of nations has received considerable attention in the economic development literature. In his "Theory of Moral Sentiments"³, Smith outlined the important role of religion in public life (notably, as a complement in the exercise of public authority and in reducing information asymmetries) while in his famous book "An Inquiry into the Nature and Causes of the Wealth of Nations", Smith raised the problem of religious diversity. He argued that religious diversity increases religious competition which in turn improves the quality of supply of religious goods⁴.

Several contemporary authors have dwelled on different aspects of the religion – development nexus. For instance, Tavares & Wacziarg (2001) consider the relationship between religion and democracy⁵; Lewer & Vand den Berg (2007) and Helble (2007) focus on religion and trade; Sacerdote & Glaeser (2008) focus on religion and education; Barro & McCleary (2003), Allesina et al (2003), Barro (1997), Sala-I-Martin (1997), Montalvoa & Reynal-Querol (2003) consider religion and growth (or development); while Iannaccone (1998) and McCleary & Barro (2006) investigate religion and other behaviors.

It is now widely accepted that the spread of religion could be a double-edged sword. On the one hand, it could facilitate economic development through the concomitant process of evangelism, religious liberty, mass education, mass printing, and support to civil society organizations, which in turn contribute to the

3 For an exhaustive account of Smith's arguments see Anderson (1988).

4Recent authors, notably, Barro & McCleary (2003) have expounded on this axiom.

5 Woodberry (2012) focuses on one aspect of religion – missionary protestant christianism - to argue that religion helps entrench stable democracies around the world, by promoting mass education, mass printing, newspapers and voluntary organizations. Similar contributions have been made by Nunn (2010) and Anderson (2004).

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entrenchment of democratic institutions and the rule of law. On the other hand, religious intransigence or polarization could undermine development by sidelining the importance of secular (western) education⁶ and also by promoting a culture of violence and terrorism.

Over the past two centuries, Sub-Saharan Africa's (henceforth, SSA) religious landscape has undergone profound changes from a monolithic African traditional religious⁷ society to an increasingly polarized religious society. In 1900, 75 percent of Africans professed their faith in African traditional religions, whilst the Christian and Muslim populations put together constituted less than a quarter of the total population, according to historical estimates from the World Religion Database. However, by 2010, this trend has significantly reversed in favor of the Christian and Muslim populations which now occupy about 86 percent of the total SSA population implying that less than 15 percent of Africans continue to profess their faith in African traditional religions⁸. There are notable differences even within the non-traditional African religious group. The Christian population seemed to have witnessed the most dramatic growth since 1950, from a share of the population of about 25 percent to nearly 60 percent in 2010, see Figure 1 below. In international comparative perspective, SSA is now home to about one-in-five of all the Christians in the world (21 percent) and more than one-in-seven of the world's Muslims (15 percent), World Religion Database.

In the light of this historical evidence, two important questions merit the consideration of scholars. First, the likely impact that these changing religious dynamics could have on SSA development trajectory and second, how the increasing religious polarization of African societies is expected to impact on development outcomes. Our study aims at answering both of these questions⁹.

Figure 1: Evolution of the Sub-Saharan African Religious Landscape

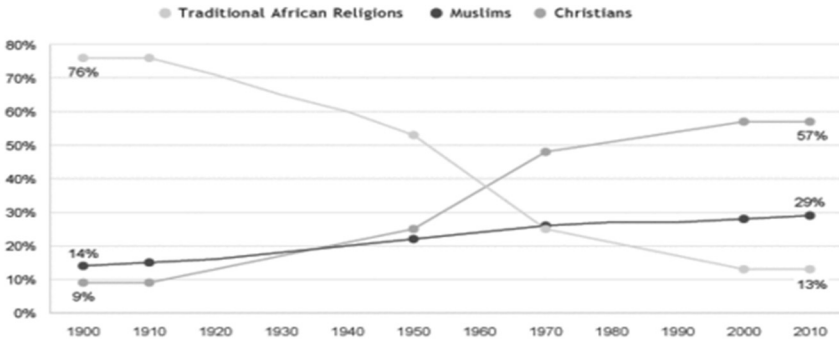
6 The Boko Haram Islamic religious sect in northern Nigeria is known to publicly advocate against western education.

7 African traditional religions are the diverse sets of traditional belief systems rooted in the ancestral traditions and cultures of African people. Its origins could be traced far back into pre-colonial Africa.

8 In spite of the observed dramatic decline in the share of African traditional religions, the influence of the latter on the Christian and Muslim religions can not be discounted completely, as some African Christians, especially those in indigenous African Christian Churches continue to mix their native African religious conceptions and ideologies with Christianity. In this sense, it could be argued that the observed dramatic decline in African traditional religions is over-stated.

9 To keep the analysis simple, we would in this paper ignore the likely influence of the worldwide growing heterogeneity within the Christian religious family, which was traditionally composed mainly of Catholics and Protestants but is now widely dispersed into Catholics, Protestants, Pentecostals, Charismatics and Mormons.

Growth of Islam & Christianity in Sub-Saharan Africa Since 1900



Source: World Religion Database. Historical data draw on government records, historical atlases and reports of religious organizations at the time. Later figures draw on U.N. population estimates, surveys and censuses.

Pew Forum on Religion & Public Life, April 2010

Two important contributions to the literature are to be derived from this study. First, the originality of our study derives from the use of two new explanatory variables, not used before by previous researchers, to proxy for religion: religious fractionalization (or diversity) and religious polarization. Second, unlike previous studies that have focussed mainly on an aspect of development (either democracy, trade, education or growth), our study intends to be more broader and comprehensive in the dimensions of development considered. Furthermore, by limiting the scope of the study to SSA, we abstract from the problem of heterogeneity which plagues previous studies.

The results of this study can be briefly summarized as follows: 1/ broadly speaking, religion or religious diversity has no statistically significant impact on the institutional and social aspects of development in SSA. However, our findings do suggest that religion has important effects on the development process through its effects on investment. In particular, our parameter estimates suggest that both religious polarization (RELPOL) and religious fractionalization (RELFRA) have economically and statistically significant effects on investment in SSA, although their effects are opposite in nature: while religious fractionalization significantly reduces investment, religious polarization potentially increases investment. 2/ at a disaggregated level, our empirical study does not suggest the superiority of any one single religion, although Christian faiths tend to show positive (but statistically insignificant) association with development outcomes. The rest of the paper is

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organized as follows: Section 2 presents the data while section 3 presents and discusses the statistical results. Section 4 concludes the paper.

DATA

Our dependent variable is development and we consider both the socio-economic and institutional dimensions of development. The economic dimensions of development are captured by economic growth (proxied by the natural logarithm of real per capita GDP); investment (proxied by the investment share in real GDP); and the quality of government (proxied by the share of government expenditure in real GDP). Data for these variables are obtained from the Penn World Table 6.2. The social dimensions of development are captured by an index of social protection (obtained from the Mo Ibrahim Foundation) which is a multi-dimensional index capturing several aspects of social development.

We capture the institutional dimensions of development by including measures for property rights obtained from the Heritage Foundation, measures of the rule of law obtained from the Worldwide Governance Indicators (2009) and measures of conflicts. In line with the tradition in the literature, notably, Bertocchi & Guerzoni (2012), we proxy conflict by the number of years a country witnessed armed conflicts (data obtained from the UCDP/PRIO Armed Conflict Dataset) and the number of revolutions (data obtained from Banks (2001) dataset).

Our main explanatory variable is religion and like the dependent variable, there exist several dimensions of religion. The tradition in the literature, (see notably, Barro (1997), Sala-i-Martin (1997), La Porta et al. (1999), Tavares & Wacziarg (2001), Helble (2007) and Kodila-Tedika (2012)) is to consider the relative share of membership of each religious grouping in the total population as proxy for both religion and religious diversity. We follow the tradition by utilising the proportion of population ascribing to a particular religion as indicator of religious diversity and we utilize the dataset used in La Porta et al. (1999).

Worth while mentioning that some new proxies of religious diversity have been used in recent studies. Alesina et al. (2002) have proposed a new measure of religious fractionalization which they utilized in their study and found that religious fractionalization affects the quality of government but not necessarily long term growth. Montalvo & Reynal-Querol (2000), Reynal-Querol (2002b) and Montalvo & Reynal-Querol (2003) have also proposed new measures for polarization (POL) and religious diversity and suggest that religious polarization might well capture the extent of religious conflict better than religious diversity: "The index POL ranges from 0 to 1. Opposite to what happens with the

fragmentation index, polarization reaches a maximum when there are two religious groups of equal size. In this type of index, what matters is not only how many groups there are but also if they view other groups as a potential threat for their interests. For a given number of groups, the threat is higher the larger the size of another group relative to the size of the reference group. Therefore the polarization index can reflect potential religious conflict in a society better than the fragmentation index." (Montalvo and Reynal-Querol, 2003: 202-203).

It is worth noting that the index of religious diversity proposed by Montalvo & Reynal-Querol (2003) is very strongly correlated (at coefficient 0.83) with that proposed by Alesina et al. (2002). Montalvo & Reynal-Querol (2003) argue that their index of polarization is more suited in measuring the impact of religious diversity on economic growth. Small wonder its appeal to several recent studies notably, Montalvo & Reynal-Querol (2003), Montalvo & Reynal-Querol (2003, 2005a, 2005b). We employ these new measures of religious diversity and polarization in our robustness checks.

We also use a number of control variables, which some other studies have used as explanatory variables. This is especially true in the case of the trade variable (captured by the average share of exports and imports in real GDP). We also control for the fertility rate (natural logarithm of number of children per woman obtained from the World Bank's World Development Indicators 2010 on-line version), government effectiveness (obtained from Worldwide Governance Indicators (2009)), human capital (proxied by primary and secondary enrollment rates courtesy World Bank's World Development Indicators, 2010 on-line version) and inflation (using the consumer price index provided by the IMF).

EMPIRICAL RESULTS

Development process

In this section, we discuss the comparative empirical performance of indices of religious fractionalization and polarization on different dimensions of development. The purpose of this section is to analyze the effect of different dimensions of religious diversity on economic development and to compare the empirical performance of fractionalization indices relative to polarization. The estimation procedure for the direct channel (growth equation) and the indirect channels (investment, government consumption share in GDP and conflict) is the seemingly unrelated regression estimator (SURE) commonly used in recent empirical growth studies. There is at least one issue that could potentially affect the estimation of the standard deviation of the parameters.

Our specification in Table 1 follows that in Montalvo & Reynal-Querol (2005b). Table 1 shows the comparative effects of religious polarization (RELPOL) and religious fractionalization (RELFAC) on growth (per capita GDP), investment, the probability of civil wars (conflict) and government quality (GOV). In the growth regression, we include the following control variables in column 1 gross school enrollment rates, government expenditure, investment, number of revolutions, trade, inflation, rule of law, and fertility rates. While in the investment regression, we control for conflict, human capital, government expenditure, and inflation. In the conflict regression, we control for rule of law and fertility rates. In the quality of government regression, we control for rule of law and conflict.

The results in column 1 of Table 1 show that neither religious polarization (RELPOL) nor religious fractionalization (RELFAC) has a statistically significant direct effect on growth, conflict, the quality of government. The finding of an insignificant effect of religious fractionalization on growth is thus consistent with Alesina et al. (2003). However, our findings suggest that both RELPOL and RELFAC have economically and statistically significant effects on investment in SSA, although their effects are opposite in nature: while religious fractionalization significantly reduces investment, religious polarization potentially increases investment. The observation of a positive association between religious polarization and investment can be interpreted along the lines of Adam Smith's logic of religious competition driving the supply of religious goods, while the negative association of religious fractionalization with investment can be interpreted along the lines of Easterly & Levine's (1997) logic of ethnic diversity reducing the supply of public goods. It is worth noting that the finding of a positive

association between religious polarization and investment is in contradiction to the findings by Montalvo & Reynal-Querol (2005b) who find investment to decrease with religious polarization.

Table 1. Religion and Development

	Seemingly unrelated regression			OLS
	Per capita GDP			
	(1)	(2)	(3)	(4)
RELFrac	-1.48 (1.30)	-.13 (.39)		
RELPol	.87 (.92)		-.14 (.27)	
Catholics				.00 (.00)
Muslims				-.00 (.00)
Protestants				-.00 (.01)
Obs	40	41	40	47
Parms	12	11	11	8
RMSE	.38	.41	.39	.51
R-sq	0.81	0.80	0.80	0.76
	Investment			
RELFrac	-27.67*** (9.59)	-1.93 (3.29)		
RELPol	18.74*** (6.88)		-.14 (2.37)	
Catholics				.06 (.05)
Muslims				-.01 (.03)
Protestants				.027 (.06)
Obs	40	41	40	47
Parms	8	7	3	6
RMSE	3.24	3.61	3.56	5.31

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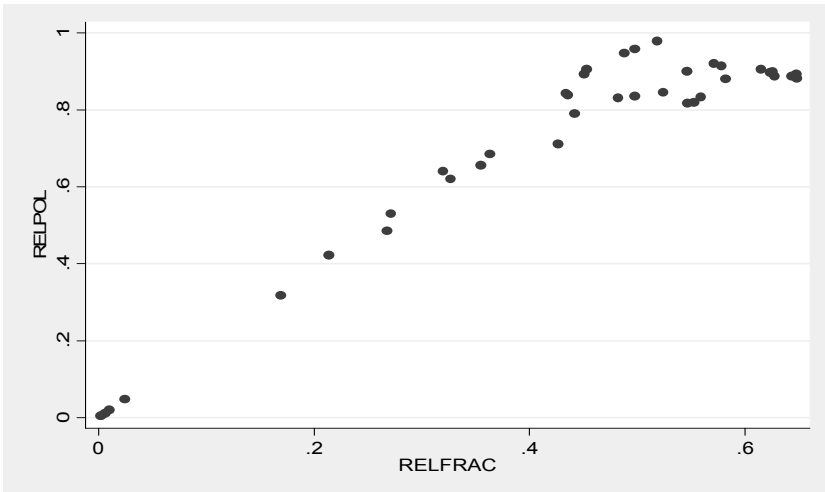
R-sq	0.42	0.33	0.29	0.19
Conflict				
RELFAC	1.30 (5.93)	1.14 (1.99)		
RELPOL	-.19 (4.14)		.68 (1.43)	
Catholics				.01 (.02)
Muslims				-.00 (.02)
Protestants				-.02 (.03)
Obs	40	41	40	47
Parms	4	3	3	5
RMSE	2.25	2.23	2.24	2.27
R-sq	0.21	0.23	0.22	0.25
GOV				
RELFAC	34.24 (29.99)	-3.66 (10.27)		
RELPOL	-28.79 (20.93)		-6.37 (7.34)	
Catholics				.15 (.13)
Muslims				.04 (.09)
Protestants				-.07 (.20)
Obs	40	41	40	47
Parms	4	3	3	5
RMSE	11.40	11.54	11.59	12.61
R-sq	0.07	0.03	0.03	0.13

All regressions include a constant term. Standard errors are in parentheses. * p=10%; ** p=5%; *** p=1%

As Montalvo & Reynal-Querol (2005b) have indicated, the results of column 1 are likely to be biased owing to the very high degree of correlation

between religious fractionalization and religious polarization (see Figure 1 below). In effect, the coefficient of Pearson of the two variables is 95.1.

Figure. 1 Correlation between RELPOL and RELFRA



To minimize the problem of multicollinearity, and following Montalvo & Reynal-Querol (2005b), we proceed to introducing religious fractionalization (RELFRA) and religious polarization (RELPOL) one at a time, in columns (2) and (3) respectively. We maintain the same estimation technique and other control variables as in column (1).

We observe that RELFRA maintains its previous sign in most of the regressions (excepting the government quality regression where its sign changes) and also loses its statistical significance in the investment regression. RELPOL also ceases to be statistically insignificant in the investment regression and changes sign in almost all the regressions suggesting the high sensitivity of these results to different controls.

In column (4) we use a different estimation strategy (OLS) and the traditional measure of religious diversity (that is the proportion of population ascribing to a particular religion). We only maintain in column (4) estimation those control variables that were found statistically significant in column (1). In the growth regression, these include, the fertility rate, trade, investment, government expenditure and conflict. In the investment regression, these include, government expenditure and human capital. In the conflict regression, these include, the fertility rate, and rule of law. In the government quality regression, these include conflict and rule of law.

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We find that the two main Christian religious groups (catholicism and protestantism) are positively correlated with investment, while the muslim faith is negatively correlated with investment. Grier (2007) also finds protestantism to have a positive association with investment. Given the lack of statistical significance of most of the variables in column (4), we spare the reader of any discussion of these results but worth mentioning that, contrary to Kuran (1997), the hypothesis of the muslim religion negatively affecting development cannot be completely ruled out in sub-Saharan Africa.

Institutions

The empirical evidence on the religion – institutions nexus is inconclusive. On the one hand, there are those who claim that institutions are endogenous to religion, see notably, McCleary & Barro (2006) while there are those who claim it is exogenous, see notably, La Porta et al. (1999), Levine (2005, Ayyagari Demirgüç-Kunt & Maksimovic (2006). Recently, Berggren & Bjørnskov (2012) used a measure of religiosity in a cross-section of 112 countries to find a negative association between religion and institutional outcome variables. For consistency with the literature, we use similar institutional variables as in Berggren & Bjørnskov (2012).

We employ ordinary least squares estimation in the results presented in Table 2. To correct for likely heteroskedasticity, we present white-corrected standard errors. In spite of the great disparity in number of observations across models, the results of our cross-section analysis remain largely valid.

In Table 2 we estimate the effects of RELFRAC and RELPOL on the following two institutional aspects of development – property rights and rule of law. In both regressions (property rights and rule of law) we make use of the following four control variables namely, government expenditure, trade, real per capita GDP (in natural logs), and human capital (secondary enrollment rates).

None of the variables religious fractionalization (RELFRAC) nor religious polarization (RELPOL) has a statistically significant effect on both property rights and the rule of law, when both are estimated together in column (1) or when each is estimated independently of the other in columns (2) and (3). Even after employing the standard measure of religion in column (4), religion does not appear to have a statistically significant effect on either dimension of institutions considered.

Table 2. Religion and Institutions

Property Rights				
	(1)	(2)	(3)	(4)
RELFrac	44.73 (30.38)		-1.07 (9.88)	
RELPol	-35.82 (22.82)	-6.916 (7.62)		
Catholics				-0.01 (.12)
Muslims				.01 (.10)
Protestants				.00 (.16)
Obs	39	39	40	45
R-sq	0.42	0.37	0.42	0.37
Rule of Law				
RELFrac	1.20 (1.49)	.11 (.50)		
RELPol	-.82 (1.03)		-.05 (.37)	
Catholics				-.00 (.00)
Muslims				-.00 (.00)
Protestants				-.00 (.01)
Obs	40	41	41	47
R-sq	0.42	0.46	0.41	0.45

All regressions are estimated using White (1980) heteroskedasticity correction. All regressions include a constant term. Standard errors are in parentheses. Legend: * p=10%; ** p=5%; *** p=1%

Social Indicators of Development

We also use ordinary least squares estimation for the results presented in Table 3. As before, we correct for likely heteroskedasticity by presenting white-corrected standard errors.

Table 3 aims to estimate the effects of RELFRAC and RELPOL on the following two social dimensions of development – social protection and gender

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protection. In the social protection regression we make use of the following four control variables namely, government expenditure, government effectiveness, real per capita GDP (in natural logs), and human capital (secondary enrollment rates). In the gender protection regression we make use of the following four control variables namely, rule of law (to capture democracy), government effectiveness, real per capita GDP (in natural logs), and human capital (secondary enrollment rates).

Again, the results in Table 3 suggest neither religious fractionalization nor religious polarization has a statistically significant effect on social development indicators in sub-Saharan Africa, whether both variables are estimated together (column 1) or independently of the other (columns 2 & 3). Column (4) which uses the traditional measure of religion finds one interesting result: there is a positive and statistically significant effect of catholicism on gender protection, as opposed to the negative but statistically insignificant effect of muslim adherence.

Table 3. Religion and Social Development

Social Protection				
	(1)	(2)	(3)	(4)
RELFAC	-25.27 (20.98)		-1.29 (9.93)	
RELPOL	17.57 (15.32)	1.45 (6.87)		
Catholics				.07 (.06)
Muslim				.02 (.08)
Protestants				-.14 (.15)
Obs	41	41	42	47
Parms	6	6	6	7
R-sq	0.78	0.77	0.79	0.74
Gender Protection				
RELFAC	-35.91 (26.26)	-5.74 (7.26)		
RELPOL	21.67 (17.18)		-.05 (.37)	
Catholics				.13* (.07)
Muslims				-.00 (.06)
Protestants				.01 (.09)
Obs	41	42	41	47
Parms	6	6	6	7
R-sq	0.57	0.57	0.54	0.65

All regressions are estimated using White (1980) heteroskedasticity correction. All regressions include a constant term. Standard errors are in parentheses. Legend: * p=10%; ** p=5%; *** p=1%

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CONCLUSION

Our inquiry has been to investigate the effects of different dimensions of religion on a broad set of development outcomes. We regroup these outcomes into three broad categories, namely, development process outcomes (growth, investment, conflict, and government quality), institutional outcomes (property rights and the rule of law) and social development outcomes (social and gender protection). We utilized two new measures of religion – religious fractionalization (RELFRACT) and religious polarization (RELPOL), alongside the traditional measure (the share of population ascribing to a particular religion) as proxy for religion or religious diversity.

Our results suggest that broadly speaking, religion or religious diversity has no statistically significant impact on the institutional and social aspects of development in SSA. However, our findings do suggest that religion has important effects on the development process through its effects on investment. In particular, our parameter estimates suggest that both religious polarization (RELPOL) and religious fractionalization (RELFRACT) have economically and statistically significant effects on investment in SSA, although their effects are opposite in nature: while religious fractionalization significantly reduces investment, religious polarization potentially increases investment. The observation of a positive association between religious polarization and investment can be interpreted along the lines of Adam Smith's logic of religious competition driving the supply of religious goods, while the negative association of religious fractionalization with investment can be interpreted along the lines of Easterly & Levine's (1997) logic of ethnic diversity reducing the supply of public goods in Africa. We also find a positive and statistically significant effect of catholicism on gender protection, while we do not find any statistically significant relationship between the muslim religion and gender protection, even though we observe an inverse relationship. Given the ambivalence of this finding in light of the strong correlation between RELPOL and RELFRAC, an immediate line of further research is to try to unravel the exact nature of the relationship between these two variables and investment.

In light of our fundamental research question, African policy-makers need to pay attention to the changing religious dynamics and increasing religious polarization of African societies.

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Appendix A. Summary Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
edup	48	101.6458	27.49274	33	173
edus	48	40.075	24.34726	8	112
protection~e	48	49.14792	16.01687	0	90.3
cath80	48	27.175	27.16996	0	95.9
musl80	48	28.65625	33.69785	0	99.8
prot80	47	13.32553	14.95508	0	64.2
relpol	41	.7015111	.2974974	.0039959	.9792523
relfrac	42	.4267098	.1965609	.001998	.647864
rev	96	.2552703	.3748203	0	1.333333
governm	95	24.31116	13.38962	2.602222	85.58665
invest	95	9.059193	5.783989	2.328974	34.97275
trade	95	73.78535	38.67534	2.01522	181.1759
inflimf	93	86.2287	454.5387	1.263875	3945.127
fertilityr~g	96	1.644109	.2853525	.6773081	2.043434
kkgovernef~t	96	2.784375	.606536	1.41	4.23
kkrulelaw	96	2.764687	.685963	1.23	4.34
realpercap~g	94	7.334436	.8997084	5.616685	9.690198
droitdepro~n	46	31.52174	13.97894	5	70
genreibrah~m	48	50.36945	13.90579	18.9	74.5
confln	96	1.791667	2.591146	0	8

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Appendix B. Definition of the variables

edup		taux brut d'inscription au primaire
edus		taux brut d'inscription au secondaire
protection~e		protection sociale
cath80		
musl80		
prot80		
relpol		religious polarization
relfrac		religious fractionalization.
rev		Révolution
governm		Taille du gouvernement
invest		Investment
trade		Ouverture
inflimf		Inflation
fertilityr~g		taux de fertilité en log (Number of children
per woman (log))		
kkgovernef~t		Efficacité gouvernementale
kkrulelaw		Etat de droit
realpercap~g		Log du PIB per capita
droitdepro~n		droit de prropriété
genreibrah~m		genre
confln		conflit