Does School Education Reduce the Likelihood of Societal Conflict in Africa?

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Abstract

This paper empirically tests the hypothesis that education, as measured by the average schooling years in the population aged 15 and above, reduces the likelihood of societal conflicts in Africa. It focuses on a sample of 31 African countries during 1960-2000 and uses both panel ordered probit and multinomial logistic estimation models. Using an aggregated measure of all *intra-state* major episodes of political violence obtained from the Political Instability Task Force (PITF) as proxy for conflict, and controlling for the extent of political participation, income inequality, labour market conditions, neighborhood effects, different income levels, natural resource revenues, youth bulge, inflation, ethno-linguistic and religious fractionalisation and urbanisation; the results suggests that education effectively reduces the likelihood of intra-state conflicts in Africa. This finding is robust to alternative model specifications and to alternative time frames of analysis. The evidence also suggests that, sound macroeconomic policies, by way of rapid per capita GDP growth, better export performance and lower inflation are means of effectively reducing the likelihood of conflicts while neighborhood effects are a significant driver of internal conflicts in African states. Therefore, in the battle to reduce the frequency of intra-state conflicts, African governments should complement investments in education with sound macroeconomic policies while seeking mutually beneficial solutions to all major internal conflicts, with a view to minimising their spill-over effects.

Keywords: School Education, Intra-state Conflict, Economic Development, Africa.

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1 Introduction

African, and in particular, sub-Saharan Africa's economic growth performance over the past few decades has disappointedly lagged behind that of other regions that were at similar or even lower levels of economic progress in the 1960s. Concurrently with the slow growth observed across most of Africa, has been the increasing prevalence of several forms of violent conflict on the continent and recent empirical evidence suggests a strong correlation between socio-political conflicts and negative growth.[1] Considering the large number of on-going conflicts in Africa today, their devastating consequences and enormous costs, it becomes imperative to ask not just how the damage can be repaired, but more importantly, how future conflicts can be adverted or minimised.

The fact that increasing redistributive policies, notably through investments in school education[2] have not delivered on their promises of reducing violent forms of conflict particularly in Africa raises further questions as to the two faces of education[3] in conflict. The conventional belief in the civilizing power of education, as upheld in the UNESCO Commission for Education for the 21st Century suggests that:

> "education (...) is one of the most important means of advancing the development of the human race in an enhanced manner and with greater harmony. With its help, poverty, exclusion, ignorance, repression and wars may be reduced"

The World Bank has also unequivocally stressed its faith in the key significance of education and lifelong learning in reinforcing social cohesion:

> "by improving people's ability to function as members of their communities, education and training increase social cohesion, reduce crime and improve income distribution", World Bank (2002).

However, as the evidence suggests, this century-old myth that education plays a fundamental role in promoting inter-personal cooperation and understanding, in reinforcing social cohesion, in dismantling social inequality and morally improving people, is fast becoming one of the most influential fallacies and self-delusions in education, Klaus (2004).

[1] For instance, Aryeetey & Fosu (2002:3) find that episodes of negative growth in Ghana tended generally to coincide with periods of socio-political turmoil characterised by changes in government, and policy changes or reversals.

[2] According to the United Nations Educational, Scientific and Cultural Organisation (UNESCO), most SSA countries literally achieved universal primary education at the beginning of the twenty-first century.

[3] I acknowledge a semantic debt to Bush & Saltarelli (2000).

In a highly controversial paper, Bush & Saltarelli (2000:33) argue that *"in many conflicts around the world, education is part of the problem, not the solution"*. Citing a range of factors from the uneven distribution of education and educational opportunities, the role of education as a weapon in cultural repression, the denial of education as a weapon of war, the manipulation of history for political purposes, the manipulation of textbooks, ethnically segregated education to ensure inequality and prejudices to the incitation of hatred for other ethnic groups through the conveying of images which assert the superiority of the dominant culture or another group's inferiority; Bush & Saltarelli (2000) affirm the destructive effects of education which exacerbate ethno-political conflicts.

Aguilar & Richmond (1998), on the other hand, citing the Rwandan genocide in 1994, question the education received by the protagonists and the main perpetrators of the massacre:

> "The role of well-educated persons in the conception, planning and execution of the genocide requires explanation; any attempt at explanation must consider how it was possible that their education did not render genocide unthinkable. The active involvement of children and young people in carrying out acts of violence, sometimes against their teachers and fellow pupils, raises further questions about the kind of education they had received"

The educational scientist, Davies Lynn (2004:3) has also alluded to the involvement of well-educated persons in some of the worst atrocities of modern times, referring to the generally outstanding education biographies of the assassins of the September 11th terrorist attacks and the key personalities within Al Qaeda movement.

Even more embarrassing has been the fact that recent empirical evidence seems to suggest a negative statistically significant relationship between growth in educational outcomes and economic growth[4] in sub-Saharan Africa, thus raising the question as to whether educational outcomes and conflict are not related in a manner that might be detrimental to economic growth in Africa.

[4]Several empirical studies, notably, Pritchett (2001); Benhabib & Spiegel (1994), Spiegel (1994), and Lau et. al. (1991) in Pritchett (2001) have found a negative impact of schooling growth on economic growth. Pritchett (2001), for instance, finds a strong negative and statistically significant coefficient on schooling growth in the growth regressions and his results are robust to the choice of sample, estimation technique, the presence of outliers and to alternative measures of education. As Pritchett (2001:20) argues, SSA, contrary to intuition, did accumulate a great deal of educational capital over the first three decades following 1960. However, this increased education does not appear to have paid off in aggregate growth due to rent-seeking and talent diversion caused by excessive and ineffective government interventions in the economy.

1.1 Problem Statement

Until recently, the conventional wisdom has been that education is a powerful weapon for peace by reducing the likelihood of violent societal conflict, enhancing social cohesion, reducing inequalities, improving mutual understanding and the respect for diversity. However, in spite of several decades of massive investments in education by governments all over the world, widespread forms of violent conflicts have persisted, which questions the "civilizing" role of education in conflict.

A number of studies, notably, Bush & Saltarelli (2000), Smith & Vaux (2003), Vriens (2003), Davies (2010, 2004), Sommers (2002), Boyden & Ryder (1996), Huntington (1968), Apter (1955), Foster (1965), McWilliam & Kwamena-Poh (1978), Lange (2003), Obura (2002), Bourguignon & Verdier (2005), and Fedderke & Kuluratne (2008), amongst others, have attempted theoretical justifications as to why education could be an important source, as well as, a mitigator of societal conflict.

The five channels widely acknowledged in the literature as the fundamental mechanisms through which education potentially compromises social peace are (1) rising political aspirations of the recipients of education (see notably, Foster (1965), McWilliam & Kwamena-Poh (1978), Bourguignon & Verdier (2005) and Fedderke & Kularatne (2008)); (2) rising socio-economic inequalities and individualism or intolerance (see notably, Davies (2004) and Vriens (2003)); (3) extreme ethnic diversity[5] (see notably, Bush & Saltarelli (2000) and Smith & Vaux (2003)); (4) mis-match between education and jobs (see notably, Boyden & Ryder (1996), Apter (1955), and Lange (2003)) and (5) the inherently violent nature of certain type of educational curricula (see notably, Davies (2004), and Sommers (2002)).

A rather extreme view of the link between education and conflict holds that conflicts are an off-shoot of every modernisation process in society. According to this view, societies exposed to modernisation processes are ultimately in a permanent state of conflict with themselves, (see notably, Huntington (1968), and Senghaas (1998)). Huntington (1968:5), for instance, argues that:

> "Social and economic change... extends political consciousness, multiply political demands, broaden political participation... These changes undermine traditional sources of political authority and traditional political institutions... The result are political instability and disorder... ".

[5] According to these two authors, education is a key medium through which ethnicity may be mobilized to incite conflicts.

Senghaas (1998), also argues that education is capable of unleashing and multiplying conflicts:

> "Development (...) is inevitably conflictual, destabilizing and subversive because it challenges the established power structures that prevent individuals and groups from reaching their full potential"

Whilst significant attempts have so far been made at understanding the dynamics leading to violent conflict (or the drivers), and quite a number of other attempts have examined the theoretical arguments linking conflict to education,[6] none of the previous studies, to the best of my knowledge, have expressly tested the effects of schooling education on conflict, at least not in the context of Africa.

1.2 Objectives of the Study

The foremost objective of this study thus, is to investigate the impact of schooling education on the likelihood of conflicts in Africa. An empirical exploration of the nature of the relationship between schooling education and conflict is of the upmost importance today, not only in Africa, but also for the world at large, given the multiplicity of violent conflicts, often instigated by highly educated individuals. Thus, the findings of the study carry important implications for policy, especially as a growing consensus in the development literature sees investment in human capital as primordial, not only to speeding growth and poverty alleviation but also to conflict mitigation.

The study focuses on a sample of 31 African countries during 1960-2000 and uses both panel ordered probit and multinomial logistic estimation models. Using an aggregated measure of all *intra-state* major episodes of political violence obtained from the Political Instability Task Force (PITF) as proxy for conflict, and controlling for the extent of political participation, income inequality, labour market conditions, neighborhood effects, different income levels, natural resource revenues, youth bulge, inflation, ethno-linguistic and religious fractionalisation and urbanisation; the results suggests that education effectively reduces the likelihood of intra-state conflicts in Africa. This finding is robust to alternative model specifications and to alternative time frames of analysis. The evidence also suggests that, sound macroeconomic policies, by way of rapid per capita GDP growth, better export performance and lower inflation are means of effectively reducing

[6] A few others more have investigated the repercussions of conflict on educational outcomes in conflict regions. See for instance, Sany (2010), and Keleher (2006).

the likelihood of conflicts while neighborhood effects are a significant driver of internal conflicts in African states. Therefore, in the battle to reduce the frequency of intra-state conflicts, African governments should complement investments in education with sound macroeconomic policies while seeking mutually beneficial solutions to all major internal conflicts, with a view to minimising their spill-over effects.

However, some of the limitations of the study are worth mentioning here. Due to data constraints, the study limits itself to the period between 1960-2000 and only countries for which conflict data is available for that time period were included in the study. While failing to incorporate recent conflict episodes, there is also the possibility of a sample selection bias creeping into the results. Further, as stated above, this is a study of the association between schooling education and the *likelihood* of *intra-state* (domestic or internal) conflict in Africa - the study thus abstracts from the intensity of conflicts. Finally, the study does not explore the likely transmission mechanisms between education and conflict.

The rest of the paper is organised as follows: - section two provides a brief review of the existing literature while section three outlines the methodology of the study. Section four discusses the results and some robustness checks while section five concludes.

2 Brief Literature Review

Two main opposing schools of thought on the association between conflict and education can be identified in the literature, namely: - the social stability and political aspirations schools. The social stability school, whose main proponent is Acemoglu & Robinson (2001), holds that resource transfers or redistribution from so-called 'elites' to the disadvantaged represent an attempt to purchase social stability which is a necessary condition for sustainable economic growth. According to this view, educating the poor is a way of raising their opportunity cost of conflict, suggesting that human capital transfers and conflict are inversely related. A central feature of the Acemoglu & Robinson (2001) model (henceforth, A & R Model) is the degree of income inequality which is positively correlated with political instability. The A & R Model also predicts that redistribution to the poor will be highest at more moderate levels of inequality, and lowest at higher or lower levels of inequality. According to the A & R framework, the rising episodes of conflicts in Africa post-independence would be attributable to rising levels of inequality and declining costs of repression. However, a closer look at the evidence suggests the contrary. Indeed,

the broad social science literature agrees that most forms of horizontal inequalities have been minimised by successive African governments since independence, see for instance, Arnim et al (2007) and Langer (2007), implying paradoxically, that conflicts should have reduced on the continent.

On the other hand, the aspirations school of thought, whose proponents are mainly recruited from the social science literature, notably, Huntington (1968), Apter (1955), Foster (1965), McWilliam & Kwamena-Poh (1978), Bourguignon & Verdier (2005) and recently, Fedderke & Kularatne (2008); holds that human capital empowerment of the disadvantaged in society raises their political aspirations to power, hence effectively lowering, not raising, the opportunity costs of conflict of the disadvantaged as postulated by the social stability proponents.

Apter (1955), Foster (1965), and McWilliam & Kwamena-Poh (1978), all argue that the genesis of post-war nationalism which often resulted in wars of independence against the colonisers is to be traced back to the unanticipated consequence of educational transfers from the colonisers to the indigenous elites of the former colonies. Bourguignon & Verdier (2005) explore the political economy of education and development using trade liberalisation and integration of international factor markets as motivations for the transfer of human capital by the elite to the disadvantaged of society. In this framework, the political elite will transfer human capital to the disadvantaged on grounds of raising the latter's productivity, but this comes at the expense of the latter gaining access to political power. The weakness of the Bourguignon & Verdier framework in characterising conflict situations is that political rights are not usually realised immediately following human capital transfers to the disadvantaged. It would seem plausible to believe that human capital transfers instead raises the consciousness of the disadvantaged about political rights, rather than consolidating such rights. Furthermore, it can be argued that the persistent delay in granting those rights might be the fuel that sustains political instability and unrest in a country.

Building on the Bourguignon & Verdier (2005) framework, Fedderke & Kularatne (2008) outline a model, based on the two contrasting case studies of South Africa and Sri Lanka, which supports the thesis of a necessary trade-off between the productivity gains for society and rising political aspirations of the poor associated with human capital transfers to them by the elite, thus confirming the hypothesis of concavity of human capital transfers in conflict.

Besides these two contrasting schools of thought, a number of theoretical as well as

empirical studies have examined circumstances under which economic motivations (or better still, grievances) might led to violent political actions. In a model characterising the conflict that led to the withdrawal of metropolitan powers from empires, Grossman & Iyigun[7](1997), consider the effect of population increase on the allocation of time by the indigenous population between productive and subversive activities - suggesting that the rapid increase in population during the colonial period increased the potential private returns to subversive activity until the colonies became a net burden on the metropolitan governments. Cramer (2005), on the other hand, argues that in conditions of economic deprivation and especially when agents greatly discount the future, the opportunity cost of conflict is relatively lower. Bates (1981:30) echoes a view already buttressed by Huntington (1968), that it was the combination of worldwide inflation and the resistance of colonial firms and governments to claims for off-setting wage increases that sparked widespread protests amongst urban consumers, thus giving impetus to nationalist activism that led to the political transition in the Gold Coast in 1957.[8] Bates (1983) model of conflict, building on Bates & Lofchie (1980), analyses the link between distortion in the rural traditional economic system, due to attempts at introducing an urban-based exchange economy in colonial Africa, and rising anti-colonialist sentiments that lead to the end of colonial rule.

In Hirshleifer's (1995) model of anarchy, the persistence of conflict is justified by the fact that neither of the belligerent parties has a superior fighting technology and the model essentially predicts two scenarios under which conflict rises - as agents devise more decisive fighting technologies and as the number of contestants in the conflict rises. Hirshleifer's model can serve to characterise some forms of conflict that have occurred in Africa considering that, more knowledge acquired from schooling means a better technology of fighting and an ever-increasing number of unemployed youths implies an increased number of potential belligerents. However, the shortcomings of Hirshleifer's model are that, the model does not explain why agents may opt to redistribute resources to their enemies and secondly, why transition is hardly a case of complete victory of one of the belligerent groups but instead, a continuity of conflict in other forms.

Unlike the Hirshleifer model, the Galor & Moav (2004) model predicts that class conflict would be eliminated as a result of the transfer of human capital from the elite

[7]Building on Grossman & Iyigun (1995).

[8]However, Foster (1965:118) notes a high correlation between urbanisation and education in the Gold Coast during the colonial era, suggesting that the roots of nationalism are to be found instead in educational transfers from the coloniser.

to the poor, because of the complimentarity between physical and human capital. In the Bates et al (2007) model, violence, if efficiently organised enhances social welfare and productivity in both state and stateless societies. This model, basically an extension of Hirshleifer's model, determines conditions under which a state can become predatory or developmental.

Yet another framework for understanding conflict that has been discussed in the literature is found in the work of Collier *et al* (2006). Their empirical study reveals that societal conflict is driven by the following factors – the level of per capita income, the presence of natural resources, population size, the degree of fractionalization, the fact that a country has been a French colony, youth bulges, and the proportion of the country that is mountainous.

3 Methodology

This section describes the empirical model, the estimator, the estimation strategy and also presents the variables and datasets used in the study.

3.1 Empirical Model

The question that this paper seeks to address is whether increasing school education, as measured by the average years of schooling in the population aged 15 and above, reduces the likelihood of societal conflicts in Africa?

To answer this question, the regression model is specified as follows:

$$CIVTOT_{it} = \alpha AYS_{it} + \beta X_{it} + \mu_i + \varepsilon_{it} \tag{1}$$

where

- $CIVTOT_{it}$ is an aggregate measure[9] of the frequency of all *intra-state* major episodes of political violence during 1960-2000.

- AYS_{it} is the principal explanatory variable - the average years of schooling in the population aged 15 and above during 1960-2000.

- X_{it} is the matrix of country-year control variables that are standard in the conflict literature, notably, the extent of political participation, a measure of income inequality, income levels, an indicator of labour market conditions, urbanisation, the share of natural

[9]This aggregate measure makes no distinction between "civil" and "ethnic" conflict, as long as both are intra-state.

resources export in GDP, the proportion of young men aged between 15-24 in the total population (youth bulge), ethno-linguistic and religious fractionalisation, neighborhood effects, and inflation.

- α is a vector of slope coefficients that are common to all countries.

- μ_i is a vector of individual country effects reflecting unobservable country heterogeneity and

- ε_{it} is a vector of error terms.

3.2 Choice of Estimator

The analysis on the empirical model specified in equation (1) above is performed using a core dataset of thirty-one (31) African countries during 1960-2000. The dependent variable (CIVTOT), captures the occurrence or not of intra-state conflict in a country in a particular year. Thus, CIVTOT=1 implies there was an episode of intra-state conflict in the country in that particular year and otherwise, CIVTOT=0. The ideal estimator for estimating this type of models in which the dependent variable is binary and discontinuous, is the random-effects logistic or probit model. The multinomial logistic model, which gives similar estimates to the random-effects logistic model is most preferable because it best handles the problem of distribution of the error term, while paying less attention to ordering or threshold values.

The data on conflict (or Major Episodes of Political Violence - MEPV) is obtained from the Political Instability Task Force (PITF) which assigns eleven (11) intensity levels or magnitudes ranging from 0 (no conflict) through 1 (lowest intensity) to 10 (highest intensity). Magnitude scores, as coded by the PITF, reflect multiple factors including state capabilities, interactive intensity (means and goals), area and scope of death and destruction, population displacement, and episode duration. Magnitude scores are considered to be consistently assigned (i.e. comparable) across episode types and for all states directly involved.

However, in this paper, only two definitions or codes are assigned to the conflict variable (CIVTOT), that is, the occurrence of intra-state conflict in a country in a particular year (CIVTOT=1) or not (CIVTOT=0). Where no data is available, conflict is recorded as a blank space. Following Wooldridge (2002), the underlying conflict process can be modelled as:

$$Y_{it}^{*} = X_{it}\beta + \eta_i + \varepsilon_{it} = Z_{it} + \varepsilon_{it}, \qquad \varepsilon_{it} \diagup X_i \tilde{} \ \Lambda\left(0,1\right), \ t = 1, ..., T \tag{2}$$

where X_{it} captures the explanatory variables indicated above, ε_{it} are independent and identically distributed random variables, η_i is the individual country effects and β is the fixed or common parameters identical to all countries. The observed indicator variable Y_{it} is determined from Y_{it}^*, the latent variable using the following mechanism:

$$Y_{it} = \left\{ \begin{array}{ll} 0 & if \quad Y_{it}^* < \alpha_1 \\ 1 & if \quad Y_{it}^* > \alpha_1 \end{array} \right\} \tag{3}$$

In this ordered specification, Y^* has a single threshold point, hence, the observed variable Y depends on whether or not the threshold point has been crossed.

3.3 Estimation Strategy

In the first instance, annual data for all variables included in the model is utilised in running a baseline random-effects probit model on equation (1) specified above and in subsequently running a multinomial logistic model for the same specification. The marginal probabilities of observing a particular conflict outcome for the multinomial logistic model are then computed. As test for robustness of the results, the same estimation strategy is followed but this time using five-year period averages of all variables in the model.

However, a number of econometric problems are associated with the estimation of equation (1) above. These relate to possible endogeneity, multicollinearity of variables, and heteroskedasticity of residuals.

To handle the likely problem of endogeneity arising from the fact that (1) some of the explanatory variables might be correlated with the un-observed country effects, (2) there might be persistence in the dependent variable and (3) some omitted variables might concurrently affect the dependent variable as well as some of the explanatory variables, and following the evidence suggested by Arellano & Carrasco (2003) on dealing with endogeneity in discrete-choice panel data models, I instrument the possible endogenous variables by their first lagged values. In addition to taking the first lagged values of all potentially endogenous variables, I attempt to differentiate the impact of different economic environments on educational outcomes by including a dummy for the income level or development of a country. Also, in order to handle the issue of persistence in the dependent variable, I estimate a dynamic model wherein the lagged value of the dependent variable is included as one of the explanatory variables.

To deal with heteroscedasticity of residuals, I use robust standard errors. Regarding

the distribution of the error term, the standard approach in the literature is to specify additional models that do not emphasise ordering or threshold values (as robustness checks), such as the multinomial logit and binary logit models. Therefore, as robustness, I estimate a multinomial logit model to handle the issue of heteroscedasticity. To check for possible multicollinearity on explanatory variables, I examine the matrix of correlation coefficients.

3.4 Variables and Data

The dependent variable in all specifications, CIVTOT, is an aggregated measure of all *intra-state* major episodes of political violence, whether they be civil or ethnic violence, obtained from the Political Instability Task Force (PITF) dataset.[10] The intuition for using an aggregated measure is precisely because of the difficulty in distinguishing episodes of civil violence from those of ethnic violence. According to the PITF dataset, conflict is deemed to occur when an organised group challenges the government, with or without fatalities. It defines eleven (11) conflict intensity levels or magnitudes ranging from 0 (no conflict) through 1 (lowest intensity) to 10 (highest intensity). Magnitude scores, as coded by the PITF, reflect multiple factors including state capabilities, interactive intensity (means and goals), area and scope of death and destruction, population displacement, and episode duration. Magnitude scores are considered to be consistently assigned (i.e. comparable) across episode types and for all states directly involved.

However, the present study abstracts from the intensity of conflicts in each particular year and only focuses on the occurrence or not of an episode of *intra-state* conflict in a country in a particular year. Thus, when using annualised data, CIVTOT is a dummy variable taking the value 1 in event of the occurrence of intra-state conflict in a country in a particular year and the value 0 otherwise. Where no data is available, the space is left blank.

When using five-year period averages, CIVTOT instead captures the frequency of intra-state conflicts during each five-year period. The frequency of conflicts in each five-year period during 1960-2000 is obtained as the proportion of years in each observed five-year period during which an episode of intra-state conflict occurred. Thus, CIVTOT would take on any of the following possible values:

[10] A few studies, notably, Bleaney & Dimico (2010) have also utilised the PITF dataset and in particular, they also ignored the distinction between civil and ethnic conflict.

$$CIVTOT = \left\{ \begin{array}{c} 0 \; if \; there \; was \; conflict \; in \; none \; of \; the \; years \; during \; the \; 5 \; year \; period \\ 0.2 \; if \; there \; was \; conflict \; in \; only \; one \; of \; the \; years \; during \; the \; 5 \; year \; period \\ 0.4 \; if \; there \; was \; conflict \; in \; only \; two \; of \; the \; years \; during \; the \; 5 \; year \; period \\ 0.6 \; if \; there \; was \; conflict \; in \; only \; three \; of \; the \; years \; during \; the \; 5 \; year \; period \\ 0.8 \; if \; there \; was \; conflict \; in \; only \; four \; of \; the \; years \; during \; the \; 5 \; year \; period \\ 1 \; if \; there \; was \; conflict \; in \; all \; five \; of \; the \; years \; during \; the \; 5 \; year \; period \end{array} \right\}$$

In sum, CIVTOT takes on six possible values $\{0, 0.2, 0.4, 0.6, 0.8, 1\}$ representing different conflict frequencies during each five-year period interval over the 1960-2000 timespan.

The principal explantory variable is the average years of schooling in the population aged 15 and above (AYS) obtained from Barro & Lee educational attainments datasets. Informed by the conflict literature, the study uses annualised (or correspondingly, five-year period averages) of a set of twelve (12) control variables spanning through the time period 1960-2000. These include:

- *Export share in GDP (EXP)* to capture the likely influence of primary commodity revenues on the risks of conflict in a country. This data is obtained from the World Bank. The study uses the export share in GDP to capture the presence of natural resources due to the lack of disaggregated data on natural resource exports for almost all countries in the sample. On another count, since a significant share of export revenues in most African countries comes from natural resources, the export share in GDP would seem a suitable proxy for this channel. The literature identifies three channels through which primary commodity revenues might raise the risks of conflict: - through the financing of rebel predation during conflicts[11], through the incentives to capture rents (greed) both during and after the conflict, and through grievances by the general population arising from possible neglect by governments of resource-rich countries. The empirical evidence by Collier *et al* (2006) suggests a quadratic relationship between natural resources and conflict - with the sign of primary commodity exports (PCE) being positive and significant, while the sign on PCE squared is negative and significant.

- *Ethno-linguistic and Religious Fractionalisation (ETHNOREL)* to control for the impact of ethno-linguistic and religious cleavages on the propensity of conflicts. Collier & Hoeffler (1998 & 2004), and Fearon & Laitin (2003) suggests no evidence that ethnicity

[11] Examples of such include the diamond-financed rebellions in Sierra Leone and Angola, Collier *et al* (2006).

diversity makes conflicts more likely to start, although Collier *et al* (2006) found a positive significant relationship between ethno-linguistic & religious fractionalisation and conflicts. Smith (2005:376) argues that identity-based differences are important for understanding conflict, more because they may be mobilised to escalate conflict, rather than them being fundamental causes. The expected sign on this variable is thus indeterminate.

- *Youth bulge (YBULGE):* is used to control for the propensity of conflict arising from a significant presence of "rascals", that is, young men between the ages of 15-24, in the total population. The data is obtained from Collier *et al* (2006) whose empirical results suggest a positive significant relationship between youth bulge and the propensity of conflict. This is explained by the fact that a great availability of potential recruits as rebel soldiers makes it easier and cheaper to start a rebellion.

- *Urbanisation (URBAN):* To control for the effects of rising urbanisation on the propensity of conflict, the share of the urban population in the total population is included. Bates (1981) has shown that rising urbanisation is a chief source of conflict in Africa, as it produces a pool of unemployed people who easily become rebel recruits.[12] However, Collier and Hoeffler (2004) find a positive link between urbanisation and political stability, working through enhanced productivity and growth. As such, the sign on this variable is imprecise.

- *Inflation (INFL):* One of the frequent causes of urban uprising in Africa, as Bates (1981) argues, is rising inflation. During inflationary situations, the opportunity cost of conflict is lower. Hence, a positive sign is expected on the inflation variable.

- *Growth in per capita GDP (GROW):* There is a consensus in the literature that faster growth in per capita incomes reduces the risks of conflict by tightening the labour market, thus making it more difficult for rebel militia organisations to recruit. GROW is utilised in the models as a proxy for labour market conditions. During periods of fast growth (assumed to be above the *normal* growth rate of the economy), it is expected that unemployment would be lower, and hence the lesser the frequency of unemployment-related conflicts. There is therefore an expectation of a negative sign on this variable.

- *Level of per capita GDP (PCGDP):* This variable aims to capture the effects of the per capita income level of a country on the frequency of conflicts. According to the evidence by Krueger & Maleckova (2003:121), individuals tend to engage in property crimes if they have lower wages or less education[13] but the occurrence of violent crimes,

[12] Auvinen (1997) and Annett (2001) also find a negative relationship between urbanisation and stability.
[13] See for instance, Ehrlich (1973), Freeman (1996), & Piehl (1998).

including murders, is typically found to be unrelated to economic opportunities.[14] Also, rational choice models of conflict (notably, terrorism) fail to give an unambiguous answer to the question of whether higher income and more education reduces participation in violent conflict. Krueger & Maleckova (2003) conclude that "any connection between poverty, education and terrorism is indirect, complicated and probably quite weak". As such, the expected sign on this variable is ambiguous.

- *Income inequality (GINI):* to capture the effects of income inequality on the likelihood of conflict escalating. The political economy literature recognises the existence of vertical inequalities, notably, high and sustained differences in income and wealth between the rich and the poor, as a potential source of societal conflict, whence the need for redistributive policies as a way of purchasing social peace. The expectation thus, is that a higher gini coefficient increases the likelihood of conflicts.

- *Extent of Political Participation (DEMOC):* This variable, obtained from the Africa Research Program dataset, captures the extent to which non-elites are able to access institutional structures of political expression. Several authors, notably, Duffield (2001), have postulated that the prevalence of conflict today is related more to issues of political transformation and globalisation than to persistent poverty. The lack of political space might raise frustrations amongst segments of the population leading to violent socio-political unrest, as observed recently in the Arab world. The expectation thus, is for a positive sign on the variable.

- *Neighborhood Effects (SPILL):* It is arguable that internal conflicts occurring in one country can be the source of conflicts in neighboring countries. To capture these neighborhood effects, a variable coded named SPILL, is constructed to take into account whether or not there was an episode of intra-state conflict in any of the immediate surrounding neighboring countries (or correspondingly, the number of years in each five-year period, whereby there was conflict in any of the immediate surrounding neighboring countries).[15] If indeed spillover effects do matter, then the expectation is for a positive sign on this variable.

- *Differences in Economic Environments (DEV_DUMMY):* is a dummy variable that takes on the value 1 for countries with an overall per capita income level during 1960-2000 above the mean for all countries in the sample (i.e. above US$509) and the value 0 otherwise. The ten countries for which DEV_DUMMY = 1 include Algeria, Botswana, Swazi-

[14] See for instance, Piehl (1998) & Ruhm (2000).

[15] By immediate neighboring countries, the study refers to those countries that share a border with the country under investigation.

Table 1: Variable List and Sources

VARIABLE	**SOURCE**
Average Years of Schooling in Population aged 15 + (AYS)	Barro & Lee
Intra-state Episodes of Conflict (CIVTOT)	Author's Construction from PITF Dataset
Export share in GDP (EXP)	World Bank
Proportion of young men aged 15-24 in total population (YBULGE)	Collier *et al* (2006)
Extent of Political Participation (DEMOC)	Africa Research Program
Urbanisation (URBAN)	World Bank
Inflation (INFL)	World Bank
Ethno-linguistic & Religious Fractionalisation (ETHNOREL)	Collier *et al* (2006)
Economic Environment (DEV_DUMMY)	Author's Construction
Resource Dummy (RES_DUMMY)	Author's Construction
Per capita GDP Growth (GROW)	World Bank
Level of Per Capita GDP (PCGDP)	World Bank
Neighborhood Effects (SPILL)	Author's Construction
Extent of Income Inequality (GINI)	World Inequality Dataset

Table 2: Summary Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CIVTOT	236	0.203	0.355	0	1
GROW	235	4.355	7.462	-26.324	27.613
AYS	238	2.121	1.480	0.16	8.07
ETHNOREL	248	0.295	0.192	0	0.65
YBULGE	248	18.934	0.966	15.62	21.93
DEMOC	203	-1.372	10.013	-70.2	5
URBAN	248	26.013	16.160	2.08	76.2
INFL	175	54.313	485.410	0.077	6424.9
EXP	224	26.985	15.508	4.305	73.655
SPILL	248	1.838	1.744	0	7
PCGDP	235	501.09	646.28	41.51	3708.5
GINI	240	45.731	9.527	29.486	73.3

Table 3: Matrix of Correlation Coefficients

	CIVTOT	GROW	AYS	DEMOC	URBAN	INFL	EXP	YBULGE	GINI	SPILL	PCGDP
CIVTOT	1.000										
GROW	-0.267	1.000									
AYS	-0.067	-0.089	1.000								
DEMOC	-0.324	0.307	0.030	1.000							
URBAN	-0.177	-0.123	0.504	0.102	1.000						
INFL	0.094	-0.132	0.031	-0.084	-0.003	1.000					
EXP	-0.355	0.159	0.436	0.262	0.355	-0.043	1.000				
YBULGE	0.122	-0.062	0.516	0.032	0.207	-0.037	0.111	1.000			
SPILL	0.435	-0.238	0.015	-0.204	-0.212	0.136	-0.204	0.137	-0.133	1.000	
GINI	0.033	-0.039	0.536	0.065	0.417	-0.041	0.242	0.279	1.000	-0.133	
PCGDP	-0.022	-0.021	0.689	0.069	0.658	-0.057	0.444	0.440	0.617	-0.142	1.000

Table 4: List of Countries included in Sample (Total: 31)

Algeria	Congo Rep	Sierra Leone	Burundi	Kenya
Benin	Mali	Sudan	Rwanda	Lesotho
Botswana	Mauritius	Swaziland	Mozambique	Togo
Gambia	Mauritania	Uganda	Ethiopia	
Ghana	Malawi	Zambia	Libya	
Cameroon	Niger	Zimbabwe	South Africa	
Central African Rep	Senegal	Zaire	Tunisia	

land, Mauritania, Mauritius, Zimbabwe, Cameroon, Libya, South Africa, and Tunisia. As mentioned in the introductory section, it is plausible that educational outcomes and by implication, the consequences of education on conflict, might vary with different economic environments, thus the need to control for this influence.

- *Resource Dummy (RES_DUMMY):* This dummy variable which takes on the value 1 for the presence of oil or mineral deposits in a country, seeks to capture the specific influence of the "resource curse" on the likelihood of conflict in a country. A positive statistically significant sign on this variable suggests that countries with oil or mineral deposits are more prone to conflicts than those without such resources.

Table 1 above summarises the variables included in the study, while Table 2 provides summary descriptive statistics. Table 3 presents the matrix of correlation coefficients while Table 4 provides the list of countries included in the sample.

4 Discussion of the Results

Table 5 presents the results from different specifications of the random-effects probit model and the multinomial logistic model on equation (1) above using different time frames of analysis - annualised data for Models 1 & 2 and five-year period averages for Models 3 & 4.

The results of the panel probit models using annualised data (Model 1) and five-year period averages (Model 3) both suggest that increasing years of schooling effectively reduces the likelihood of conflict in Africa. Estimating the multinomial logistic model[16] across different time frames of analysis, as robustness check in Models 2 & 4 also confirms this result - that education reduces the likelihood of conflict in Africa.

The results of the panel probit model in Model 1, show that the following variables enter with a positive statistically significant coefficient - Inflation (at 10%), neighborhood effects (1%), conflict in previous period (1%) and per capita income level (1%), which suggests that, the main drivers of conflict are rising inflation and neighborhood effects, while conflict generally tends to have a persistent effect in Africa. The finding that per capita income levels are positively correlated with the likelihood of conflict in Africa is quite interesting but only by considering the impact of income levels in different economic environments (DEV_DUMMY) can one really appreciate the full import of this result.

[16] Only the marginal probabilities of the conflict outcome CIVTOT = 1 are reported in Models 2 & 4 of Table 5, the marginal probabilities of CIVTOT = $\{0.2, 0.4, 0.6, \&0.8\}$ are not reported due to space constraints. The base outcome for all marginal probabilities is CIVTOT = 0.

Table 5: Main Results

DEPENDENT VARIABLE: FREQUENCY OF CONFLICTS (CIVTOT)				
	Annual Data		Five-Year Period Averages	
VARIABLES	(1)	(2)	(3)	(4)
	Probit Model	Multinomial Logit	Probit Model	Multinomial Logit
AYS(t-1)	-0.207**	-0.382**	-0.282**	-2.646**
	(0.164)	(0.181)	(0.140)	(1.077)
YBULGE	0.053	0.123	-0.016	0.374
	(0.095)	(0.185)	(0.117)	(0.967)
DEMOC(t-1)	-0.000	-0.000	-0.003	-0.023
	(0.004)	(0.007)	(0.010)	(0.085)
URBAN	-0.002	-0.008	-0.015	-0.051
	(0.008)	(0.016)	(0.013)	(0.072)
INFL(t-1)	0.001*	0.002**	0.007	0.035
	(0.000)	(0.001)	(0.006)	(0.027)
GROW(t-1)	-0.006	0.013	0.004	-0.133*
	(0.005)	(0.010)	(0.019)	(0.075)
PCGDP(t-1)	0.001***	0.001***	0.001***	0.014***
	(0.000)	(0.000)	(0.000)	(0.004)
ETHNOREL	0.533	0.971	-0.474	4.630
	(0.456)	(0.871)	(0.769)	(4.243)
GINI	0.006	0.015	-0.006	-0.155
	(0.009)	(0.017)	(0.018)	(0.101)
EXP(t-1)	-0.052**	-0.105**	0.033	0.681
	(0.021)	(0.041)	(0.048)	(0.448)
EXP^2(t-1)	0.000*	0.001*	-0.001	-0.022**
	(0.000)	(0.000)	(0.001)	(0.011)
SPILL	0.819**	2.045**	0.385***	1.278***
	(0.364)	(0.897)	(0.079)	(0.367)
DEV_DUMMY	-0.419	-0.906	-0.456	-14.834
	(0.354)	(0.653)	(0.398)	(9.325)
RES_DUMMY	0.131	0.307	0.447	2.695
	(0.288)	(0.637)	(0.440)	(1.796)
CIVTOT(t-1)	2.235***	3.895***	1.199***	2.015
	(0.164)	(0.316)	(0.426)	(2.188)
CONSTANT		-5.913		-10.879
		(3.754)		(17.411)
No. Obs.	695	695	130	130
Wald Chi^2(15)	286.06	200.70	78.93	
Prob > Chi^2	0.00	0.00	0.00	
Pseudo R^2	0.59	0.60	0.26	0.51

*** p<0.01, ** p<0.05, * p<0.1 Robust standard errors in parentheses. Base outcome is Pr(CIVTOT=0)

Accordingly, the sign on DEV_DUMMY is negative (and insignificant) throughout all four model specifications, suggesting that higher income countries are less prone to conflict than lower income countries. If anything, the joint interpretation of the coefficients on PCGDP and DEV_DUMMY implies that rising per capita income raises the likelihood of conflict only for the low income countries that are included in the sample.

The results in Model 1 also suggests that better export performance contributes in reducing the likelihood of conflict in Africa, which goes contrary to the findings of Collier *et al* (2006) who find concavity in the relationship between natural resource exports and conflict. Finally, although statistically insignificant, the following variables enter Model 1 with their correct signs - growth in per capita incomes, youth bulges, political participation, ethno-linguistic & religious fractionalisation, income inequality and resource dummy.

The results in Model 2 which employs the multinomial logistic estimation basically validates the previous results in Model 1.

Changing the time frame of analysis from annualised data to five-year period averages, and estimating the panel probit model (Model 3) and multinomial logistic model (Model 4) leaves the main findings of Models 1 & 2 unchanged, with the only exception that, growth of per capita income is now statistically significant while inflation and previous period conflicts are no longer statistically significant. Furthermore, as the results in Model 4 suggests, exports now seem to matter in reducing the likelihood of conflicts only at very high levels of exporting.

The results from this study concur with existing evidence in the literature in two main respects - Firstly, using five-year period averages (Models 3 & 4), the findings does suggest concavity in the relationship between exports (or betterstill, export revenues) and conflict, as upheld in Collier *et al* (2006). However, unlike in Collier *et al* (2006), the coefficient on $EXP(t-1)$ is statistically insignificant whereas that on $EXP^2(t-1)$ is statistically significant, suggesting that, only at higher levels of exporting does the likelihood of conflicts reduce. Nonetheless, the "resource curse" phenomenon can not be completely ruled out, given the consistently positive and economically important (though statistically insignificant) coefficient on the natural resource dummy (RES_DUMMY).

Finally, one of the most nuanced implications of the study is the evidence that rising per capita income for the low income countries increases the likelihood of conflicts, which suggests further that, poverty may not be the main driver of internal conflicts in African states. This view point is consistent with emerging rational choice models of conflicts

and Krueger & Maleckova (2003) who recently concluded that "any connection between poverty, education and terrorism is indirect, complicated and probably quite weak".

5 Conclusion

The main endeavour of this study has been to investigate whether increasing school education reduces the likelihood of societal conflicts in Africa. The study employed both annualised data and five-year period averages of all variables during 1960-2000 in a sample of 31 African countries and using a random-effects probit as well as the multinomial logistic estimator in a panel data framework. Using an aggregated measure of all *intra-state* major episodes of political violence obtained from the Political Instability Task Force (PITF) dataset as proxy for conflict, and the average schooling years in the population aged 15 and above, as proxy for school education, and controlling for the extent of political participation, income inequality, labour market conditions, ethno-linguistic & religious fractionalisation, neighborhood effects, per capita income levels, natural resource revenues, youth bulge, inflation, and urbanisation; the results suggests that education effectively reduces the likelihood of intra-state conflicts in Africa. This finding is robust to alternative model specifications and to alternative time frames of analysis.

The evidence also suggests that, sound macroeconomic policies, by way of rapid per capita GDP growth, better export performance and lower inflation are means of effectively reducing the likelihood of conflicts while neighborhood effects are a significant driver of internal conflicts in African states. Therefore, in the battle to reduce the frequency of intra-state conflicts, African governments should complement investments in education with sound macroeconomic policies while seeking mutually beneficial solutions to all major internal conflicts, with a view to minimising their spill-over effects.

A final word would be that, this study has attempted to throw some light into the vast, albeit emerging field of conflict and education but there is evidently so much that is left uncovered. Future work might consider extending the time frame of analysis to include more recent episodes of conflicts in Africa, investigating into the likely mechanisms of transmission between education and conflict, as well as, incorporating the intensity dimension of conflicts which was ignored in the present study. Finally, for a comprehensive understanding of the drivers of intra-state conflict, further research might consider moving away from the cross-country to the country-specific framework.

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