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The quantitative impact of armed conflict on education in the Democratic Republic of the Congo: counting the human and financial costs

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Front cover photograph: William Fernando Martinez.

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Acronyms and abbreviations

ADF Allied Democratic Forces

BRD Battle-related death

DHS Demographic and Health Survey

DRC Democratic Republic of the Congo

EPDC Education Policy and Data Center

GAR Gross attendance rate

GCPEA Global Coalition to Protect Education from Attack

GDP Gross domestic product

GER Gross enrolment ratio

GNI Gross National Income

IDMC Internal Displacement Monitoring Centre

IDP Internally displaced person

ISCED International Standard Classification of Education

MICS Multiple Indicator Cluster Survey

NAR Net attendance rate

NER Net enrolment rate

OOSC Out-of-school children

PEIC Protect Education in Insecurity and Conflict

PPP Purchasing power parity

ROI Return on investment

SSA Sub-Saharan Africa

UCDP Uppsala Conflict Data Program

UIS UNESCO Institute for Statistics

UNESCO United Nations Organization for Education, Science and Culture

1 Introduction

This case study accompanies the report *The quantitative impact of armed conflict on education: counting the human and financial costs* commissioned by Protecting Education in Insecurity and Conflict (PEIC), part of the Education Above All Foundation. It is one of three country case studies conducted for this research. The other case study countries are Nigeria and Pakistan.

That report outlines how conflict affects education, noting ten main channels through which conflict can impact on access to education and learning:

- School closure due to targeted attacks, collateral damage and military use of school buildings
- Death and injury to teachers and students
- Fear of sending children to school, and teachers' fear of attending due to targeted attacks, threats of attacks or general insecurity reducing freedom of movement
- Recruitment of teachers and students by armed forces (state and non-state)
- Forced population displacement leading to interrupted education
- Public health impacts of conflict which reduce access and learning
- Increased demand for household labour
- Reduction in returns to education
- Reduced educational expenditure (public and private) due to overall reduction in resources and shifting priorities
- Reduced public capacity to deliver education

This case study investigates the extent to which conflict has impacted on education in the Democratic Republic of the Congo (DRC). Using a variety of data sources, it considers the evidence of the impact of conflict on education via the various channels listed above, and attempts to quantify the impact in terms of numbers of out-of-school children (OOSC) and the financial implications of the damage done to the education system. It should be noted that the conflict situation in DRC is highly dynamic and that any statistic relating to the number of OOSC can only give a snapshot at one particular point in time. Similarly the financial costs of the impact depend on the timing and length of the period of conflict being considered. A further challenge in DRC is that data quality is often limited and there are considerable gaps between data collection points. For these reasons the figures given in this paper are very rough estimates, exploring the approximate range in which the 'actual' number, often a highly transitory statistic, might lie.

The report firstly sets the context by outlining the conflict history. Section 3 explores the effect of conflict on numbers of OOSC. The fourth section explores the direct costs to the education sector, broader impacts to the sector and costs borne in the longer term as a result of schooling missed due to conflict. The conclusion considers the relative scale of the different channels of impact, both in terms of cost and enrolment.

2 Conflict history

DRC gained independence from Belgium in 1960, with Patrice Lumumba its first Prime Minister. Katanga and South Kasai provinces immediately engaged in secessionist struggles. Both were unsuccessful but they nonetheless brought instability that the Chief of the Congo Army, Joseph Mobutu, was able to exploit to come to power in 1965. He would remain Congo's leader until 1997.

In 1994, Tutsis fleeing the Rwandan genocide took refuge in eastern DRC (then Zaire). Later that year, as the new Tutsi government established itself in Rwanda, two million Hutus crossed the border seeking refuge, with a majority returning to Rwanda in late 1996.

The First Congo War began in 1996 as, increasingly concerned about cross-border raids by Hutu militia based in the refugee camps, the Rwandan and Ugandan governments began providing arms to Congolese Tutsi militia based in eastern DRC. Utilising support from these foreign forces, Laurent Kabila led an armed rebellion against the Zaire government which eventually marched on Kinshasa and defeated Mobutu in 1997.

In 1998, fearing annexation of the mineral-rich eastern provinces, Kabila ordered Rwandan and Ugandan forces to leave the country. Conflict for control of the area then ensued, with government forces on one side and a number of militias, supported by Rwanda, Uganda and Burundi, on the other; both sides exploiting ethnic tensions between Tutsis and Hutus to their gain.

With rebel forces advancing on Kinshasa, Kabila managed to enlist the support of Angola, Zimbabwe and Namibia and beat back the offensive. Chad, Libya and Sudan were also to join the war on the side of the government, making a total of nine African countries fighting on DRC soil. The ensuing war, which lasted until 2003, is therefore often referred to as the Great War of Africa (or simply the Second Congo War).

Kabila was assassinated in 2001 and was succeeded by his son Joseph Kabila, who called for multilateral peace talks. Conflict officially ended in July 2003 with a transitional government, in which Kabila shared power with former rebels, taking power until Congo's first multi-party elections in 2006.

Militia have continued to operate in parts of DRC, however, with fighting often linked to ethnic tensions and mining resources. The most serious fighting has been in the eastern provinces of North and South Kivu, where foreign governments continue to support a complex mix of Hutu and Tutsi militia and government forces. There has also been post-war conflict in Orientale and Katanga provinces.

The International Rescue Committee (IRC, 2007) estimates that between 1998 and 2007 there were some 5.4m excess deaths in DRC, largely as a result of malnutrition and preventable disease. They estimate that around one-tenth of these deaths were violent, i.e. battle deaths. Partly as a result of the conflict and ensuing state fragility, DRC holds the joint lowest ranking on the Human Development Index (UNDP, 2012).

Children have been particular victims of the war. Over half of the estimated 5.4m deaths linked to the conflict were of children (IRC, 2007), and UNICEF ranked DRC as the country with the highest number of children used as soldiers, sexual slaves and labourers (Bell, 2006).

3 The human costs of conflict to education: out-of-school children in DRC

3.1 Data sources on OOSC

Obtaining accurate data is a challenge in DRC. The last year for which there are official administrative statistics is 1999. Household surveys are therefore our main source of evidence. A Multiple Indicator Cluster Survey (MICS) was carried out in 2000 and 2010 and the Demographic and Health Survey (DHS) in 2007, but the most valuable evidence comes from a 2012 household survey specifically focused on OOSC carried out for the Global Initiative on Out-of-School Children (OOSCI, 2013).

3.2 School system and data issues

DRC operates a six-year primary, six-year secondary system with an official entry age of 6. The UNESCO Institute for Statistics (UIS) and the majority of other sources therefore report OOSC for 6–11 year olds.

3.3 Numbers of OOSC

Table 1 outlines the headline figures from the most recent administrative data available (1999) and the three household surveys which have reported on OOSC since. It must be noted that administrative data and survey data are not directly comparable. Neither are the three surveys directly comparable: they each employ a different methodology, are conducted by different organisations, and in a changing landscape of conflict. However, they represent the only means of comparing OOSC in DRC across time.

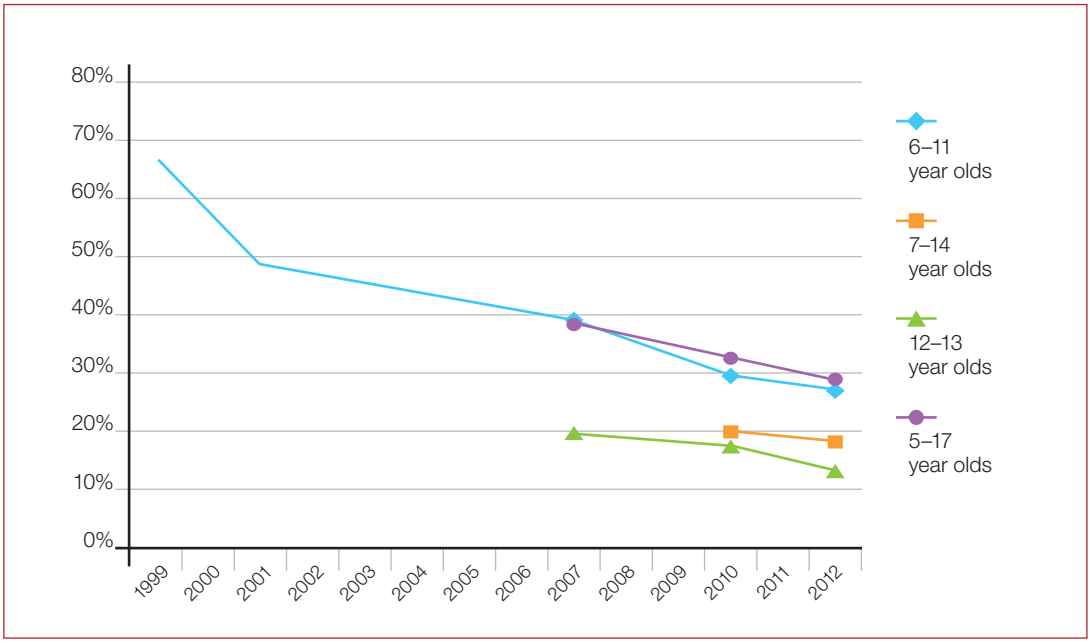
Looking at official primary-age children (ages 6–11), we can see a downward trend in OOSC rates, from 67% during the height of the Congolese wars in 1999 to 27% in the most recent survey in 2012. The two surveys which report on 7–14 year olds (MICS, 2010 and OOSCI, 2013) also show a downward trend. Figure 1 represents these trends graphically.

It should be noted that the out-of-school rate is particularly high among 6 year olds. This is the official school entry age; what the statistics show us is that, in practice, many families enrol their children when they are older. In most cases these younger children will enter primary school, albeit as late entrants. For the older age bracket of 7 to 14 year olds the number of OOSC is actually lower, despite it being a bigger band. Using this older age bracket, which reflects the age of primary school children in practice, may give a better representation of the number of children missing out on primary education than statistics based on official school ages.

Table 1: OOSC estimates

		Primary school age (6–11)	Lower secondary age (12–13)	7–14 year olds	5–17 year olds
Administrative data 1999	Number	5,598,022			
	Rate	67%			
MICS 2000	Number				
	Rate	49%			
DHS 2007	Number				
	Rate	39%	19.70%		38.50%
MICS 2010	Number			2,872,623	
	Rate	29%	17.50%	20%	32.50%
OOSCI 2012	Number	3,509,251	513,168	2,973,616	7,375,875
	Rate	27%	13%	18%	29%
	Rate for girls	28%	17%	24%	32%
	Rate for boys	26%	10%	17%	27%

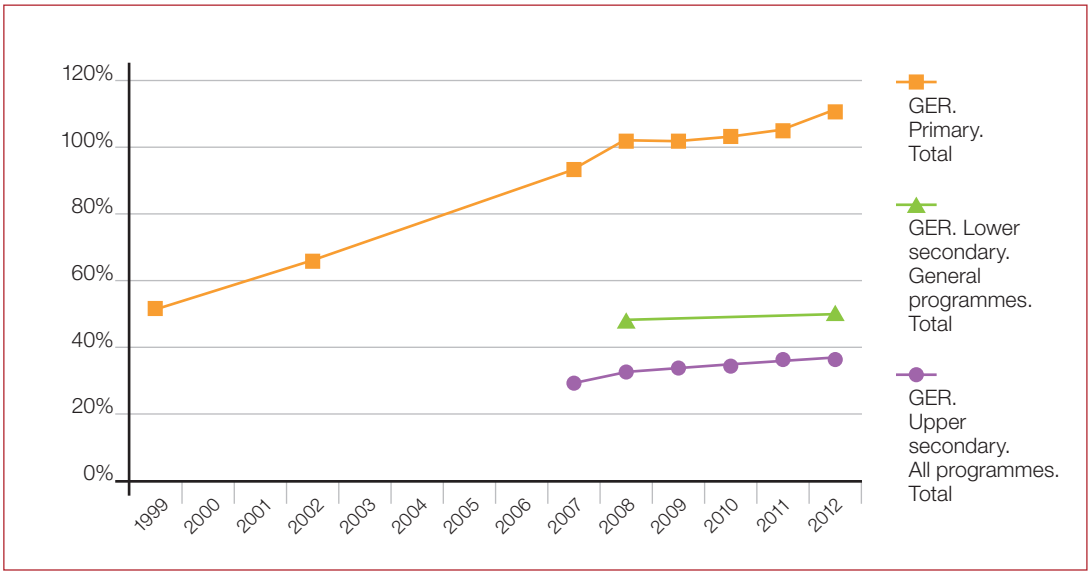
Figure 1: OOSC in DRC



Source: MICS 2000 and 2010; DHS 2007; OOSCI 2012

We must note that there are issues in comparing results from different surveys. However, examining administrative data on Gross Enrolment Ratios (GER) we note a complementary positive trend in enrolment, providing supporting evidence to the survey results.

Figure 2: GER trends

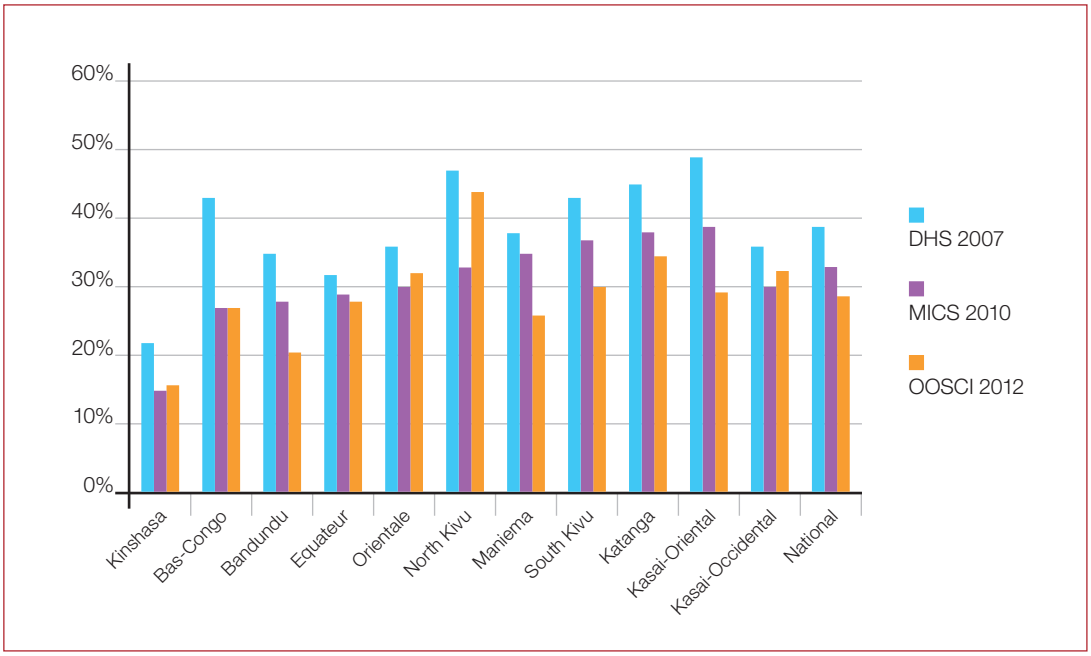


Source: World Bank Databank

3.4 Characteristics and distribution of OOSC

OOSC are more prevalent in rural areas (33% for 5–17 year olds) compared to urban areas (20% for 5–17 year olds); in absolute terms, this translates to around 5.7m OOSC in rural areas compared with 1.7m in urban areas (OOSCI, 2013, p.34). There is also significant provincial variation, with North Kivu having the highest OOSC rate (44% for 5–17 year olds) and Kinshasa the lowest (16% for 5–17 year olds) (OOSCI, 2013, p.34). Examining provincial trends (Figure 3), we see that OOSC rates for 5–17 year olds apparently fell in all provinces from 2007 to 2010, but rose between 2010 and 2012 in four provinces, most significantly in North Kivu.

Figure 3: Provincial variation in OOSC over time, 5–17 year olds



3.4.1 Gender dimension

In DRC, boys significantly outnumber girls in the population. According to the UIS statistics for the primary school age population, boys outnumber girls by almost 11 to 10. Due to the sex imbalance in the population, comparison of the absolute numbers of out-of-school boys and girls does not give a good representation of the extent of the gender inequality in school access. For this, it is more informative to compare the rates of OOSC. Comparing rates of school attendance in the three most recent surveys, we find that the Gender Parity Index has improved from 0.94 in both 2007 and 2010 to 0.97 in 2012. Qualitative evidence suggests that this is due to the awareness-raising campaigns and the relative peace and economic recovery that have followed the conflict in the 2000s (OOSCI, 2013). However, gender clearly still plays a role in parents' decisions to educate their children, with domestic chores and pregnancy being major reasons for non-enrolment and drop-out for girls (OOSCI, 2013). The gender gap widens during adolescence, so while gender inequality in access to education is only minor for primary school aged children, the inequality increases for children over 12 years old; a 17 year old girl in DRC is almost twice as likely to be out of school as a boy of the same age (see Figure 4).

Figure 4: OOSC rates by age and sex

Source: EPDC (undated) based on MICS 2010

3.4.2 Reasons for OOSC

OOSCI (2013) presents the results of multivariate regressional analysis to determine which factors are most closely correlated with children being out of school. The three most powerful predictors were, in order:

1. Household income

2. Distance to primary school

3. Household head's educational level

OOSCI (2013, p.145) also asked survey respondents what the primary reasons for not enrolling at school or dropping out were. The top three reasons given for not enrolling were:

1. Money (70% of respondents)

2. No school nearby (21%)

3. Too young for school (19%)

The top three reasons for dropping out were:

1. Money (71% of respondents)

2. Family constraints (17%)

3. No school/teacher (12%)

The fact that the OOSC phenomenon is more prevalent in provinces with high mining production and in those hit by recurrent conflict (see Figure 3 above) leads us also to speculate that conflict, economic pressures and the interaction of the two are further major causes of OOSC. We explore the impact of conflict on OOSC below.

3.5 The impact of conflict on access to education

As outlined above, there has been considerable conflict in DRC for two decades. A UN report from 2003 outlines the impact this has had on education.

> *"The education system has suffered from the devastating effects of the war as well as from bad governance over the past decades. The national budget spent on education has dropped to 0.3%. It is estimated that only 30% of children attend and finish primary school and just 12% actually finish secondary education. Some children are unable to attend school either for economic reasons or the lack of any educational services and infrastructures in their region, or they have been obliged to quit school due to the war (displacement, insecurity problems, etc). This puts the future of the country in a precarious situation."*
> (UN, 16 January 2003, p.44, cited in IDMC, 2004)

OOSCI (2013) surveyed households in DRC on reasons for non-enrolment and drop-out for 6–17 year olds, with one option being "fear of crime and conflict". Whilst this was not the main reason in any province, it was significant in the two worst-affected provinces, North and South Kivu, with "fear of crime and conflict" being the primary reason for drop-out for 16% in South Kivu and 8% in North Kivu compared to 4% nationally, and the primary reason for non-enrolment for 10% in South Kivu and 15% in North Kivu compared to 5% nationally. This translates to a total of approximately **180,000 primary school aged children currently out of school because of fear of violence**.

However, this tells us only about the 'fear' channel of impact; conflict can also exacerbate many other barriers to enrolment. The three main reasons for drop-out were "money", "family constraints" and "no school/teacher". Looking at the channels listed in the introduction, we can see that conflict has the potential to interact with all three of these. For example, military use of school buildings is a feature of the conflict in eastern DRC, with militias often looting furniture for firewood (Dryden-Peterson, 2009); so we can surmise that "no school/teacher" is actually capturing this impact in some cases. Conflict also impacts on economic opportunity and household labour allocations, i.e. "money" and "family constraints" (see Section 3). According to a Save the Children survey on barriers to education in Nord-Kivu,

> *"Children and parents acknowledge that conflict is the basis for the poverty they experience and the resulting economic problems that prevent access to education."* (Dryden-Peterson, 2009, p.13)

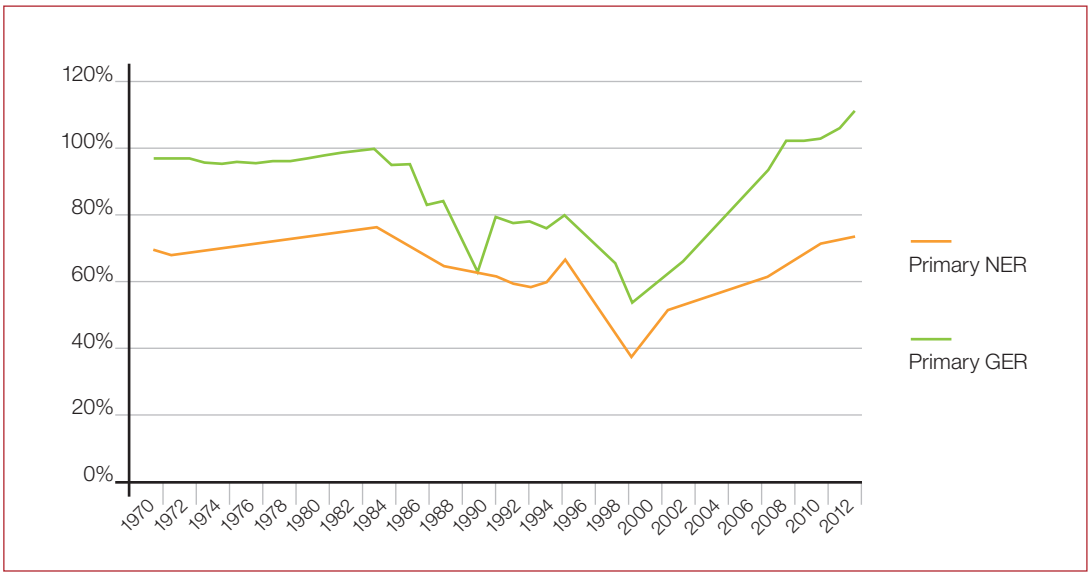
IRC (2007) tells us that conflict in DRC has had a major impact on public health. They estimate that between August 1998 and April 2007 there were 5.4m excess deaths, largely from malnutrition and disease. Although controversial, their findings give an idea of the scale of the devastation wrought by conflict in DRC. They estimate that children account for 47% of these deaths, suggesting an impact on OOSC numbers. A high death rate is indicative of poor health in general, so we would expect high levels of drop-out and non-attendance through this channel. Furthermore, death of family members increases demand for labour amongst those remaining.

So how do we estimate the total impact of conflict on OOSC numbers? One avenue is to compare 2007 enrolment rates in conflict-affected provinces and non-conflict-affected provinces. EPDC (2010) identify four conflict-affected provinces – Katanga, North Kivu, Orientale, South Kivu – and seven non-conflict-affected provinces – Bandundu, Bas-Congo, Equateur, Kasai-Occidental, Kasai-Oriental, Kinshasa, Maniema – and note that Net Enrolment Rates (NER) for the conflict-affected provinces are 43% compared to 57% in the non-conflict-affected provinces. We might therefore posit that the underlying national rate of OOSC is 43%, and that there are 14% excess OOSC in conflict-affected provinces as a result of conflict. This is a very crude analysis, however, as the unit of analysis, a province, is too large to identify local effects of conflict, and there are many other reasons why OOSC might be higher in conflict-affected provinces other than conflict (there may be factors, such as poverty and weak governance, which are impacting upon both the likelihood of conflict and the risk of drop-out/non-enrolment – correlation does not imply causality). Furthermore, if we repeat the analysis with the more recent OOSCI (2013) data we find that the excess OOSC for 6–11 year olds for these provinces is just 7%. Breaking down by province we find that, of the four conflict-affected provinces, only two are significantly over the national OOSC rate: North Kivu at 40% and Katanga at 34%, compared to the national rate of 26%. For the other two, South Kivu and Orientale, OOSC rates are 2% below and 3% above the national rate, respectively.

3.6 Estimating the full impact of conflict: enrolment trends over time

Looking at GER and NER over the period 1970–2012, we see that both the 1980s and 1990s saw big drops in access to education, only recently regained. Both indicators peak in 1984, GER close to 100% and NER at 76%; GER rebounds in 1990–1991, stabilises just below 80% then drops significantly again from 1995 to 1999; similarly, NER falls until 1993, rebounds slightly in 1993–1995, then falls again to just 36% in 1999; both then recover throughout the 2000s so that now they are at similar levels to 1984 (GER slightly higher, NER slightly lower).

Figure 5: Enrolment trends, 1970–2012

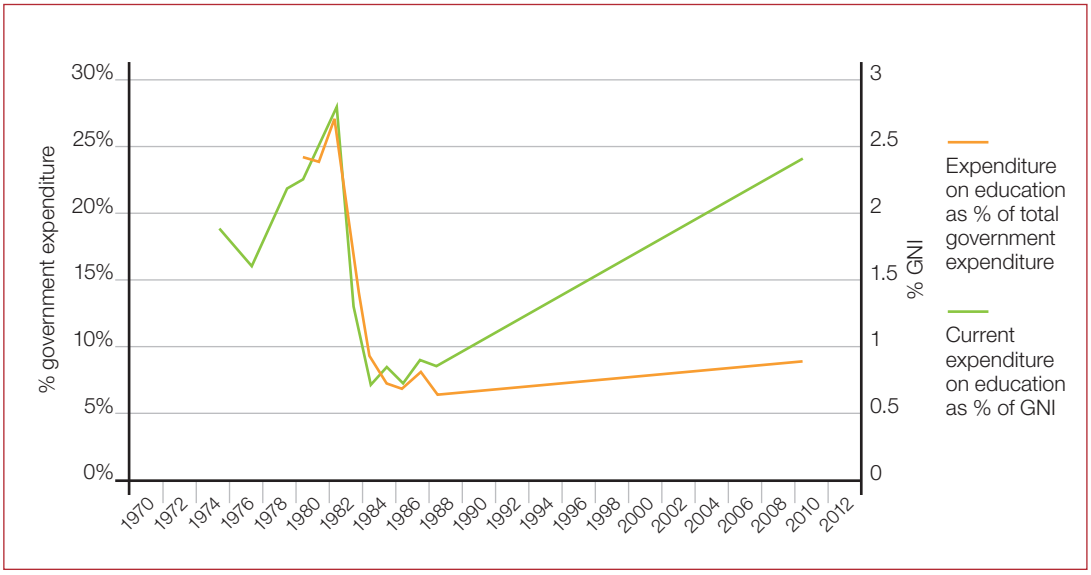


Source: World Bank Databank, MICS 2000, DHS 2007, MICS 2010, OOSCI 2012

Although conflict data are only available from 1990, we can rule conflict out as a cause of the 1984 enrolment collapse as there were no major conflicts at the time. Looking instead at educational expenditure, we see an almost complete collapse in 1982–1985 from 2.8% to 0.72% of Gross National Income (GNI) and from 27% to 6.9% of total government spending. That it falls in relation to both GNI and government spending during a time of economic stability (Gross Domestic Product (GDP) rose by 7.5% over the period) tells us that this was the result of a policy decision rather than a collapse in general government spending. It seems likely therefore that cuts in education spending starting in 1982 had a direct impact on enrolment two years later.

There are no data on educational expenditure for 1989–2009; as a percentage of total government spending, 2010 levels are at late-1980s levels whereas as a percentage of GNI, educational expenditure has increased to early-1980s levels (i.e. government spending as a proportion of GNI has increased).

Figure 6: Educational expenditure, 1970–2010

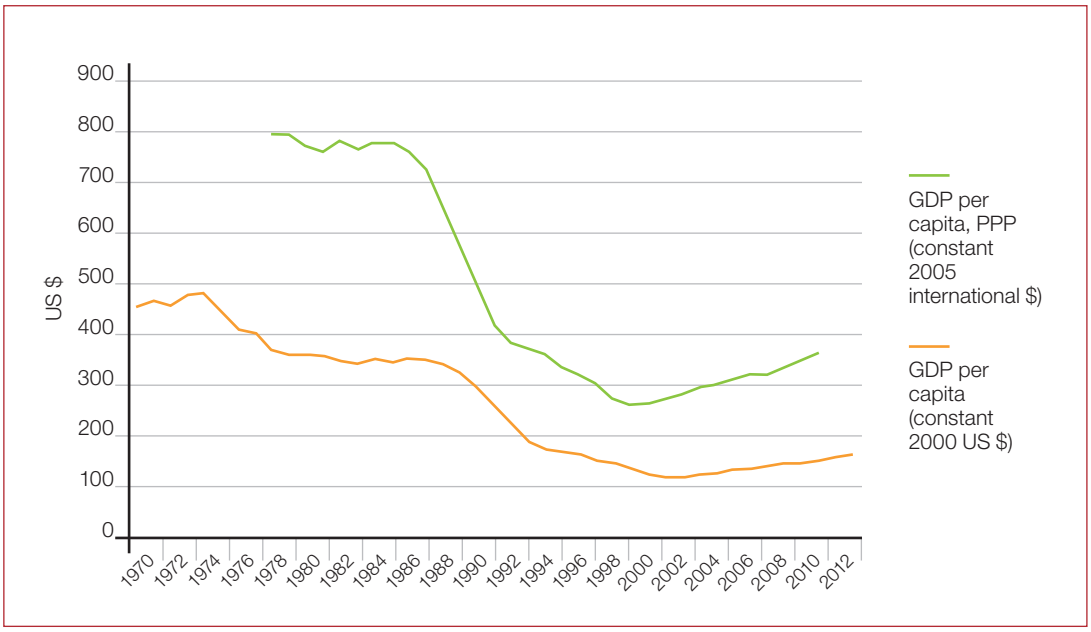


Source: World Bank Databank

With the lack of data for 1989–2009, we cannot examine whether further educational expenditure fluctuations were the cause of the enrolment fluctuations we see during the 1990s. We therefore turn to economic indicators. Looking at GDP per capita and GDP per capita purchasing power parity (PPP),[1] we again see a general downward trend during the 1980s and 1990s. In US$, GDP per capita starts falling in 1974, levels out during the 1980s, and falls again from the late 1980s before bottoming out in 2001–2002 and then rising slightly. In PPP$, the fall does not begin until 1985, continuing until 1999 then rising slightly during the 2000s. This does not follow enrolment trends during the period, although we can conjecture that the collapse in GDP per capita in the 1970s may have been one of the reasons for the diversion of resources away from education in the 1980s.

[1] The PPP measure adjusts prices to reflect local purchasing power.

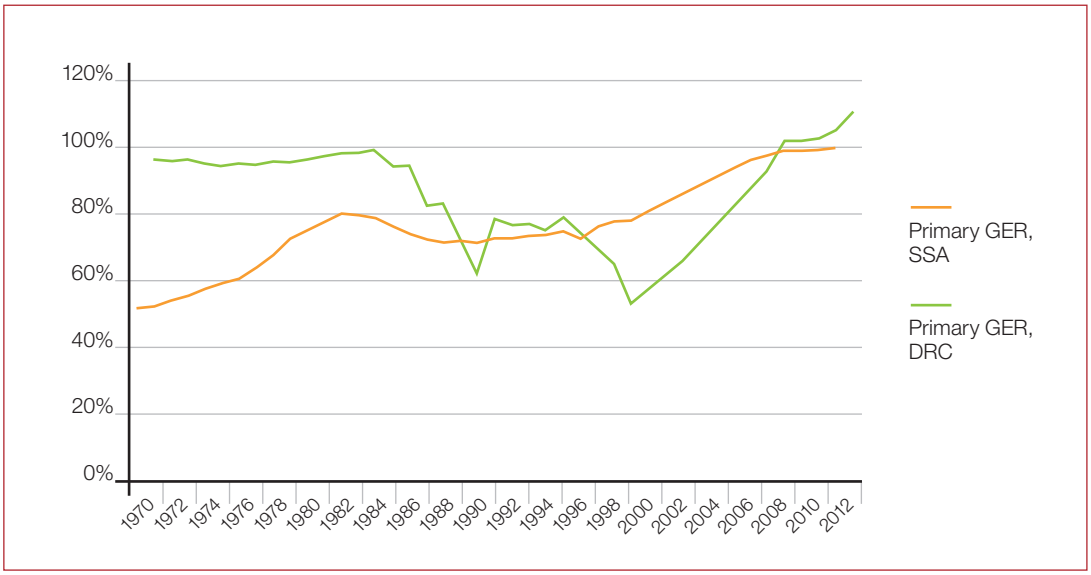
Figure 7: GDP per capita, 1970–2012



Source: World Bank Databank

Comparing GER for DRC with that of the Sub-Saharan African (SSA) average, we note that enrolment in DRC started out from a much higher base in the 1970s than was the SSA average. We also note that SSA as a whole suffered an enrolment decline in the 1980s, albeit less dramatic than that of DRC. From 1990 to 1996, similar enrolment trends prevail before DRC falls dramatically, not recovering until 2007–2008. That it is now higher suggests a 'catching up period' with overage children attending primary school.

Figure 8: GER in DRC and SSA, 1970–2012

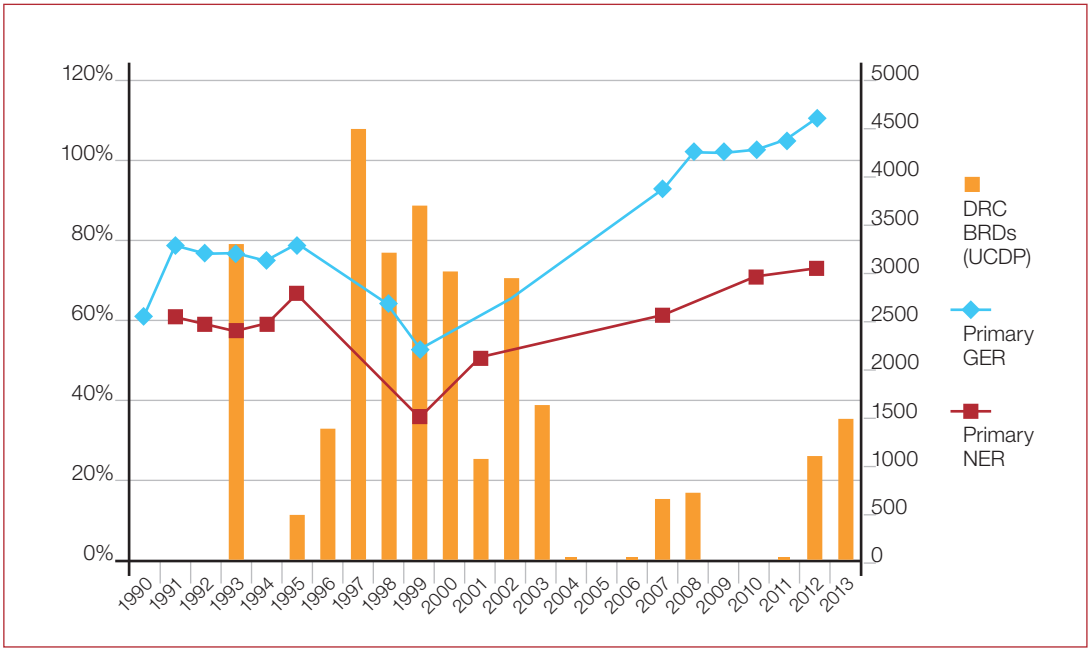


Source: World Bank Databank

To explain this divergence in 1990s enrolment, we might turn to conflict as a potential cause. Figure 9 compares conflict data[2] with recent trends in enrolment, revealing the Congo War 1996–2003 as a plausible cause of primary enrolment decline. GER fell from a peak of 74% in 1995 to a low of 53% in 1999 before recovering during the 2000s. Similarly, NER fell from a peak of 67% in 1995 to a low of 36% in 1999 before recovering during the 2000s. At the same time, battle-related deaths (BRDs) went from zero in 1995 to a peak of 4,341 in 1997 and back to zero in 2002. Although we do not have data points for 1996 and 1997, it would seem plausible that the collapse in enrolment coincides with the onset of hostilities (as projected in Figure 9 on the following page). Furthermore, GER did not reach pre-war levels until sometime between 2002 and 2007 (and NER not until sometime between 2007 and 2010), when conflict intensity was much less. Although this does not imply causality, it does provide some corroborative evidence that conflict has had an impact on enrolment.

[2] A note on conflict data: we take the UCDP encyclopedia and database as our source: **www.ucdp.uu.se/database**. Battle-related deaths (BRDs) include validated military and civilian deaths incurred as a direct result of 'normal' warfare involving armed forces of warring parties. This includes traditional battlefield fighting, guerrilla activities and all kinds of bombardments of military units, cities and villages etc. See **http://www.pcr.uu.se/research/ucdp/definitions/**. IRC (2007) estimate that around 10% of the 5.4 million excess deaths in DRC 1998-2007 were violent, i.e. around 550,000.

Figure 9: Conflict and enrolment



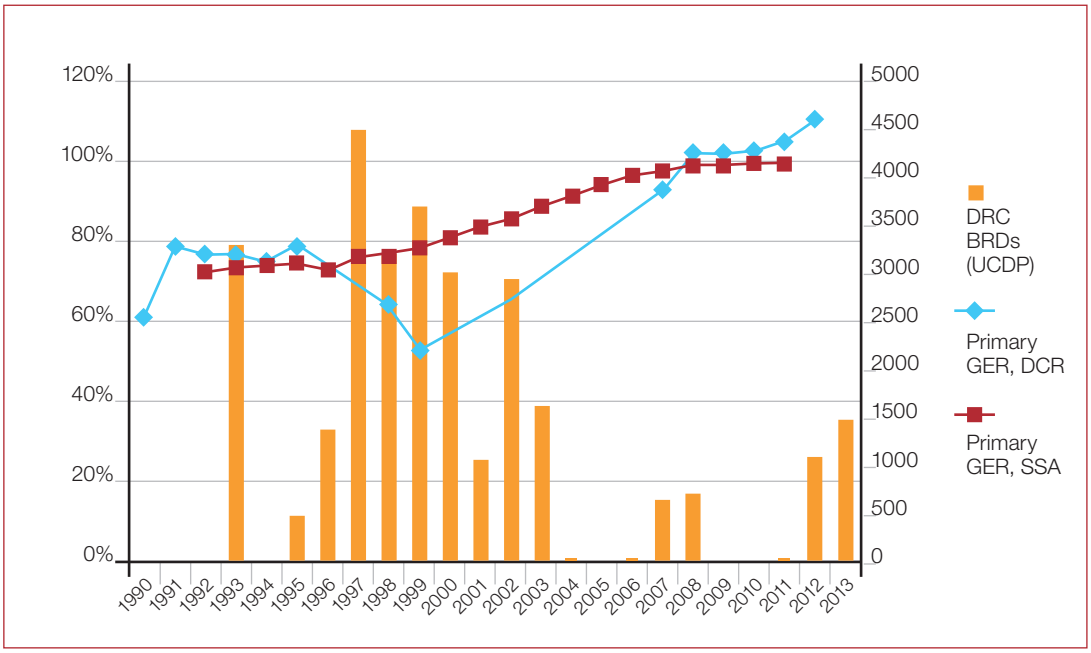
Source: UCDP 2014, UIS, MICS 2000, DHS 2007, MICS 2010, OOSCI 2012

There also seems to be an impact on primary GER from the Kivu conflict from 2007 to the present: although GER has not fallen during this period, there has been a distinct slowing in the rate of increase from 2007 to 2011. An alternative explanation for this correlation is that GER slowed down once it passed 100%. The slowing rate is also noticeable in NER, but this could simply be a result of diminishing marginal gains as NER gets closer to 100% (the slowing down in GER and NER is also noticeable in other Sub-Saharan African countries – see Figure 8).

By comparing DRC's primary GER with that of other countries in SSA, we can get an idea of the magnitude of this impact (Figure 10). Until 1996, GER was slightly above the average for developing countries in SSA. It then drops below the SSA average, probably sometime in 1996 and does not catch up again until 2008.[3] We can therefore speculate that the area between the red and blue lines in Figure 10 represents the number of children who were denied access to education because of the Congo War and its aftermath, i.e. that should the war not have occurred, we might have expected a steady rise in GER from 1996 to around 2007/2008 when GER reached 100 per cent in both DRC and SSA.

[3] That it is now higher than the SSA average, at 111%, indicates a catching up period with substantial numbers of overage children (NER is 73%, meaning that currently over one-third of children in primary school are overage, i.e. 12 years or older).

Figure 10: Comparing enrolment ratios of DRC and SSA average



Sources: UCDP, UIS, World Bank

By taking the difference of GER rates for DRC and SSA from 1996 to 2008 and multiplying by school-age population estimates for the period, we can arrive at estimates of the number of OOSC due to conflict in each year. At the trough of the curve **in 1999, we estimate that there were 2 million children out of school because of conflict.**[4] **The average for the period 1997–2007 is 1.3m, making a total of 14m student years.**[5]

Since there seems to be some catching up of education by overage children, to arrive at the net figure of lost student years due to conflict, we should subtract the area between DRC GER and SSA GER since 2008.[6] This area represents around 1.4m student years, meaning that our revised estimate for the impact of the Congo War and its aftermath is 13m student years.

Looking at the OOSC rate for DRC since 1990 provides another perspective. The OOSC rate was around 40% in the early 1990s before falling to 33% in 1995. There are no data points for 1996–1998, but it seems that the OOSC rate began rising with the onset of conflict, since it reaches 64% in 1999. It has then fallen fairly consistently to its present level of 27%.

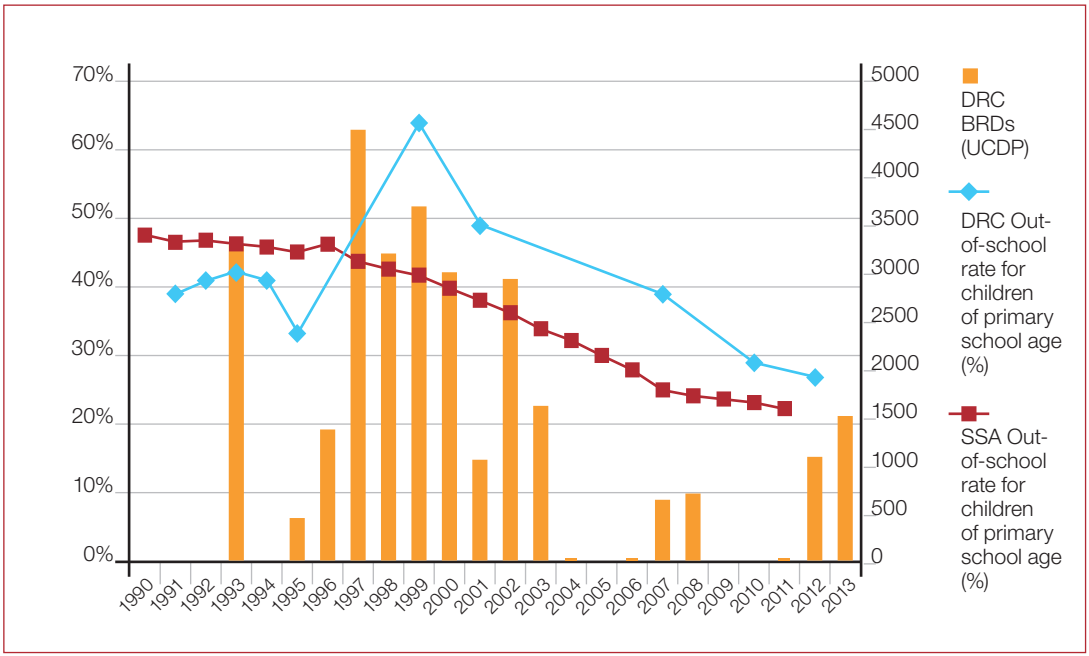
Comparing to the SSA average, we note that the DRC OOSC rate was below the average pre-conflict, significantly higher during the conflict, and is now converging to a similar rate. Following a similar methodology to that above, we can use the graph in Figure 11 to obtain a different estimate for the number of OOSC due to conflict[7] (again assuming that conflict was the source of this divergence). These data provide us with estimates of **1.7m OOSC at the peak in 1999** and

[4] Difference between DRC and SSA GER for 1999 was 26 percentage points. Multiplying this by school-age population, 7.7m (UIS, 2014b) gives 2m.
[5] Same methodology as outlined in previous footnote. NB: we did not include figures for 1996 and 2008 as DRC GER was higher than the SSA average.
[6] i.e. the difference in GER multiplied by school-age population for 2008-2011. SSA GER data are only available to 2011.
[7] The difference is that now we are only looking at children of school age denied access. When we used GER above we also captured the overage children who would have attended school in the absence of conflict.

an **average of 1m OOSC each year from 1997 to 2011** due to conflict, meaning a **total loss of student years for school-age children of 15m**.

Using this method to calculate current levels of OOSC, we arrive at an estimate of **5% of 6–11 year olds out of school due to the aftermath of the Congo War and current conflicts, representing 660,000 children**.[8]

Figure 11: Comparing DRC and SSA OOSC



Source: UCDP, UIS

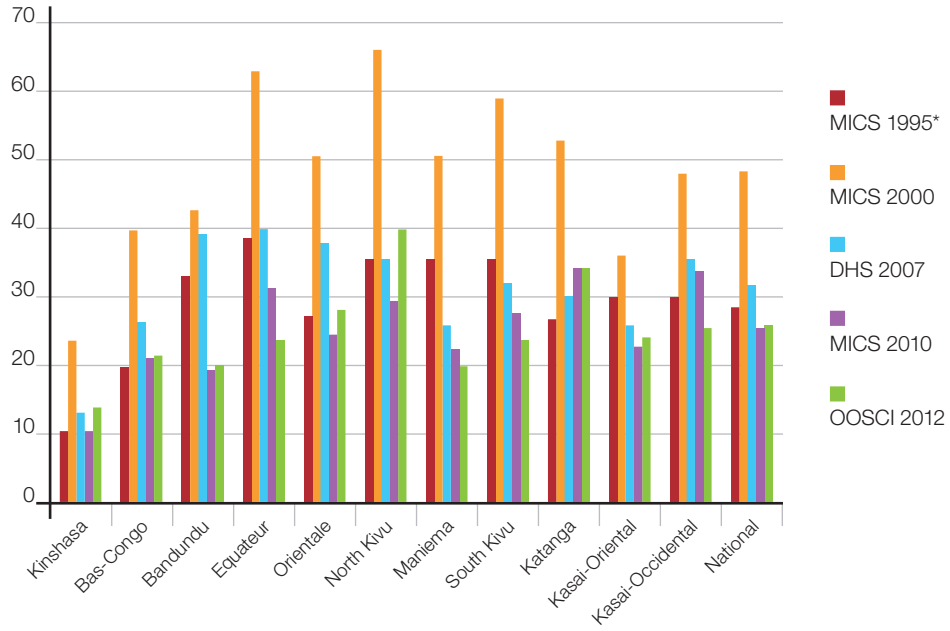
Analysing by region can shed further light. Data on primary-aged OOSC are available for 2000 (MICS), 2007 (DHS), 2010 (MICS) and 2012 (OOSC). Since these all post-date the most intense period of war, it is difficult to ascertain the impact of conflict from these data points.

The MICS 1995 presents regional data for the 6–14 year olds OOSC rate but not 6–11 year olds. We know from both the MICS 2010 and OOSC 2012 studies that the OOSC rate for 7–14 year olds is substantially lower than that for 6–11 year olds, by around one-third for both. This is largely a result of high OOSC rates for 6 year olds and slightly lower OOSC rates for 12–14 year olds than 6–11 year olds in the region (see Figure 4 above), both due to late entry. This being the case, we can expect *ceteris paribus* the OOSC rate to be lower for 6–14 year olds, but less than one-third lower.

Bearing this in mind, we must interpret the big rises in OOSC from 1995 to 2000 presented in Figure 12 with caution. For eight of the eleven regions, the OOSC rate increases by more than 50% (in Kinshasa it increases by 130%). Only in Kasai-Oriental is it substantially lower than the one-third benchmark referenced above. We can therefore state that regional OOSC data provide some corroboratory evidence that the Congo War 1996–2003 increased OOSC in virtually every province.

[8] School-age population in DRC 2012 is estimated at 13m.

Figure 12: Regional variation in OOSC over time



*MICS 1995 data is for 6–14 year olds, other data for 6–11 year olds.

From 2000 to 2007, OOSC rates fell in every province of DRC and only in Katanga did OOSC rates rise from 2007 to 2010. The situation from 2010 to 2012 is more complicated. In four provinces (Equateur, Maniema, South Kivu, Kasai-Occidental) OOSC rates fell. In the seven remaining provinces (Kinshasa, Bas-Congo, Bandundu, Orientale, North Kivu, Katanga, Kasai-Oriental) OOSC rates increased. Nationally, rates were steady (changing from 25.6% to 25.8%).

UCDP record no BRDs for the period 2009–2011,[9] meaning that these rises in regional OOSC are unlikely to be attributed to current conflict intensity (indeed, rates fell in South Kivu, which is currently one of the worst affected by conflict). It is possible that they are the result of the legacy of conflict and continuing military activity, but without more evidence further analysis is impossible.

EPDC (2010) compare Gross Attendance Rates (GARs) from the 2000 MICS and the 2007 DHS for conflict-affected provinces and non-conflict-affected provinces. The four conflict-affected provinces identified by EPDC have been in conflict since 1996. They all have a low starting point in 2000, but without data from previous years it is impossible to tell whether this is a result of conflict or other factors. Instead, what the 2000 and 2007 data show us is that there has been a convergence between these provinces and non-conflict-affected provinces towards 100% GAR. Indeed, the two worst-affected provinces – North and South Kivu – are the two provinces which show the greatest increase in enrolment rates.

[9] UCDP battle deaths data only include validated deaths so are likely to underestimate actual battle deaths.

UIS (2010) uses the 2007 DHS data to track how education levels have varied over time in different provinces and to explore the impact of conflict on education. The study identifies North and South Kivu, Katanga, Orientale, Kasai-Oriental, Maniema and Equateur as the provinces most affected by conflict in the last 50 years. The study then maps three education indicators – proportion of population with no formal schooling, average years of schooling and literacy rates – for the cohorts who were of school-going age[10] against a conflict timeline, differentiating between those from conflict-affected provinces and non-conflict-affected provinces.

For the average number of years of schooling, conflict-affected cohorts start from a lower base but there is a general trend for all to improve to around 1990, then fall slightly. There is some evidence of divergence during conflict and post-conflict periods and some convergence in more peaceful times (e.g. 1980s to early 1990s). The other indicators (literacy rates and proportion of the population with no schooling) show similar trends.

Analysing by gender, it becomes apparent that the gap in average years of schooling between conflict-affected cohorts in 1950 is entirely for males; females from conflict- and non-conflict-affected provinces had similarly low levels of schooling. For females from conflict-affected provinces there is stagnation during the (peaceful) 1950s followed by a rise during the (non-peaceful) 1960s, albeit at a slower rate than in non-conflict-affected provinces. They then both rise at similar rates until the great wars of the 1990s/2000s when non-conflict-affected cohorts stagnate and conflict-affected-cohorts decline.

Whilst this analysis is useful, it does not provide the evidence of the impact of conflict that the authors claim. For one thing, this 'eye-balling' of the data is highly subjective and does not lead to many firm conclusions – there is some convergence between conflict-affected and non-conflict-affected provinces during conflicts (e.g. female years of schooling during the Katanga conflict) and some divergence during peacetime (e.g. female years of schooling in the mid-1970s). Because of this lack of a clear correlation between conflict and education, it is difficult to talk about causation: one could imagine various competing explanations for variation in educational outcomes over time (e.g. poverty, governance, rural/urban balance).

3.7 Displacement

At the end of 2012, about 2.7 million people in DRC were living in displacement, with over 1 million displaced in 2012 alone (IDMC, 2013). Since the majority of displaced children in DRC have no access to education (IDMC, 2010), it is another channel through which conflict has considerable impact on OOSC rates.

> *"Displaced children in particular have little or no chance to continue with their education. Of the two million displaced people, approximately 400,000 are thought to be children of primary school age. These children have no access to any form of basic education, prejudicing their opportunities later in life, and increasing their risk of enlistment into armed forces in search of a better situation."* (Oxfam, August 2001, p.29–30, cited in IDMC, 2004)

Whilst the statement *"no access to any form of basic education"* seems overly pessimistic, the estimate of 400,000 displaced primary school age children is useful. Since 2012 estimates for total displaced are 35% higher than in 2004, we can estimate that 2012 levels of 6–11 year olds living in displacement are around 540,000. Globally, around 30% of primary school age children in refugee camps are out of school (UNESCO, 2011, p.16). Using this as our lower bound, we estimate that **between 160,000 and 540,000 6–11 year olds were out of school due to displacement in 2012**.

[10] They present point estimates for 15 year olds and a trend line for the average of 13–17 year olds.

This refers to internally displaced Congolese and is therefore a subset of the total OOSC for DRC.

3.8 Summary

The interaction between conflict, the economy, government spending and enrolment is complex and difficult to evaluate with descriptive data alone. This is especially true in DRC where the data collection infrastructure has all but disappeared. The analysis presented above on OOSC and conflict intensity is probably over-simplistic and ignores the impact from government expenditure and the economy. Having said this, there are clear channels through which conflict impacts on education, evidence for which is documented in various surveys carried out in DRC in the past ten years (e.g. IRC, 2007; Dryden-Peterson, 2009; OOSCI, 2013).

Table 2: Summary of estimates of children out of school due to conflict

	Age range	Number	% of OOSC	Methodology and source
OOSC due to fear of violence	6–11	180,000	5%	OOSCI 2012 household survey (responses to question 'why out of school?')
OOSC due to conflict 1999 (1)	6–11	2m	41%	Difference in GER in DRC and SSA (prior to Congo War levels had been similar)
OOSC due to conflict average 1997–2007 (1)	6–11	1.3m	32%	Difference in GER in DRC and SSA (prior to Congo War levels had been similar)
OOSC due to conflict 1999 (2)	6–11	1.7m	35%	Difference in OOSC rates in DRC and SSA (prior to Congo War levels had been similar)
OOSC due to conflict average 1997–2007 (2)	6–11	1m	27%	Difference in OOSC rates in DRC and SSA (prior to Congo War levels had been similar)
OOSC due to conflict, 2012	6–11	660,000	19%	Difference in OOSC DRC and SSA (prior to Congo War levels had been similar)
OOSC due to displacement, 2012 (lower bound)	6–11	160,000	5%	Estimating numbers of displaced 6–11 year olds, assuming 30% have no access to education
OOSC due to displacement, 2012 (upper bound)	6–11	540,000	15%	Estimating numbers of displaced 6–11 year olds, assuming 100% have no access to education

At the peak of the conflict in 1999 there may have been as many as 2 million children out of school due to the conflict, representing 41% of the OOSC population and 26% of the school age population. Estimates for current (2012) OOSC due to conflict depend on the methodology. Our lower bound estimate, numbers on OOSC due to fear of violence plus displacement, is 340,000, representing 10% of the total OOSC population. Assuming that all displaced children are out of school results in an upper bound estimate of 720,000 or 20% of the total OOSC population.

4 The financial costs of conflict to education in DRC

As noted in Section 1, conflict impacts on education in ways that have a direct cost to the sector, as well as more indirectly through reducing demand and/or supply of education.

Direct attacks and collateral damage create clear costs for the sector in terms of rebuilding and replacing personnel, and it is relatively straightforward to generate some rough estimates of the impact of these attacks on the education system wherever they are reported. But the impact that conflict has on access to learning also represents a cost to society, both in itself and through its impact on wider societal and economic goals. These impacts are much harder to monetise, but there is a growing body of literature on the quantitative impact of conflict on education to draw upon.

Taking descriptions of attacks to education from *Education under Attack 2014* (GCPEA, 2014) as a starting point, we examine the monetary cost of direct attacks and collateral damage to education for 2009–2012. We then attempt to quantify other impacts on education that do not create a direct financial burden, such as the impact on access and learning. We then take these quantitative estimates of the impact on education and attempt to quantify the long-term costs of conflict to the economy as a result of reduced levels of education.

Explanation of our approach is provided below, and in more detail in the accompanying report, *The quantitative impact of armed conflict on education: counting the human and financial costs* (Jones and Naylor, 2014).

4.1 Direct monetary cost of conflict to education, 2009–2012

4.1.1 Targeted attacks on education

GCPEA (2014) documents around 800 attacks on schools in DRC for the period 2009–2012 with the vast majority of these occurring in 2012. Some representative quotes are presented below.

> *"From October 2008 to December 2009, the UN reported 51 attacks on schools by armed forces and armed groups. In 2010, at least 14 schools were attacked, while in 2011 the UN recorded 53 incidents against schools and health centres."* (GCPEA, 2014, p.132)

> *"In 2012, the reported number of attacks increased significantly, due mainly to fighting between FARDC [Forces Armées de la République Démocratique du Congo] and M23 forces and the activities of other armed groups who took advantage of the security vacuum created by the army's focus on the M23. At least 561 incidents of looting and damage, affecting 548 primary schools and 13 secondary schools in North and South Kivu, were reported by local protection monitors – although the percentage damaged during targeted attacks or military use was not specifically indicated, and not all cases could be confirmed."* (GCPEA, 2014, p.132)

> *"During attacks on two schools in Haut-Uélé district in January 2012, 10 classrooms were set on fire by alleged LRA [Lord's Resistance Army] elements."* (GCPEA, 2014, p.132)

> *"As of late September [2013], the UN had documented at least 49 attacks on schools and health facilities by armed groups."* (GCPEA, 2014, p.133)

Table 3: Targeted attacks on education in DRC, 2009–2012

Dates	Schools damaged/ destroyed	Impact on students/ teachers	Notes
2009	41 attacks on schools (GCPEA (2014) documents some attacks in 2008 – estimate reduced based on assumption equal number of attacks in each month)		
2009–2012		Students recruited to armed forces; schools closed due to this threat	
June 2009		1 girl raped	Congolese army colonel, South Kivu (allegedly)
2010	At least 14 schools attacked		
2011	27 attacks on schools (GCPEA (2014) documents attacks on schools and health centres – assumed half are schools)		
January 2011	"Several" buildings looted or burned	3 university students killed	Clashes with police at University of Kinshasa
October 2011		7 education workers killed	"Ethnically-driven attack" by Mai Mai Yakutumba fighters, South Kivu
2012	At least 561 incidents of looting and damage to schools (548 primary and 13 secondary)		Mostly due to fighting between Forces Armées de la République Démocratique du Congo (FARDC) and M23
2012	64 schools occupied		Due to fighting between Mai Mai and FARDC, Katanga

2012	42 schools occupied by armed groups; desks and chairs used for firewood	1,100 children prevented from attending school	Congolese Army, North Kivu, South Kivu
January 2012	2 schools attacked		"Alleged LRA [Lord's Resistance Army] elements", Haut-Uélé district
April 2012		"At least" 32 boys recruited to armed forces	M23, Mapendano secondary school
April–May 2012		"At least" 48 boys recruited to armed forces	M23, Masisi, North Kivu
November 2012		4 primary school students killed, 9 others injured	Shots fired by security forces in Kantine during a student march
Estimate total impact	**Over 724 schools damaged**	**7 education personnel killed; 7 students killed, 9 injured, 1 raped and over 80 forcibly recruited to armed forces**	

In total, there were over 724 attacks on schools during the reporting period. Rather than deliberate destruction, however, most of these attacks were occupations and lootings by armed groups. Given the uncertainty of this figure we round to **800 schools damaged**.

Classroom construction costs, of course, vary greatly by location and materials used. The estimate used by the government in its 2012 Interim Plan for Education assumes a standard construction cost for a primary school of $50,000 (MoE, 2012, p.104).[11] If we assume that the cost of repairing a damaged school is equal to half the construction cost, we estimate a **total repairs bill of $20m**.

As well as repairs costs, attacks and occupation also result in the **destruction of school furniture and teaching materials**.[12] If we assume that for these 800 schools, there will also be a cost to replace damaged or looted equipment and materials, we estimate a further cost of $4m based on a unit cost of $5,000 per school (MoE, 2012, p.104). If we add this to the repairs costs, we arrive at a total cost from targeted attacks on buildings of $24m.

In addition, attacks on schools and occupation of buildings can mean disruption to school schedules for weeks, months or even years. The risk of child recruitment to armed forces has also closed schools in DRC during the reporting period.[13] As well as denying access to education for students, school closure also represents extra expenditure if teachers continue to be paid during the period of

[11] For a secondary school, the unit cost is only available per classroom and for science blocks, so we have used the primary school figure in our calculations.
[12] It seems to be common practice for occupiers to use furniture for firewood, e.g. see Dryden-Peterson (2007).
[13] *"In April 2009, schools in the northern Masisi-Walikale border zone were temporarily closed in response to threats of recruitment by Mai Mai forces."* (GCPEA, 2014, p.133).

closure. Unfortunately, there is little evidence in GCPEA (2014) on the length of school closure associated with these attacks. We can imagine that it would take significant time to rebuild and repair buildings, though some classes may have been resumed outdoors. Assuming that for each of these attacks the schools were closed for 100 days, and the average school consisted of 200 students,[14] we estimate **16m lost student year**. The pupil-teacher ratio is 35:1 for primary school (World Bank, 2014), resulting in an estimate of **460,000 lost teacher days**. If an average teacher's salary is $70/month[15] and there are 200 teaching days per year, **the cost in lost teaching time is $1.9m**.

There is no evidence of the deliberate targeting of teachers from 2009–2012, but seven "education workers" were killed in an ethnically-driven attack on their way to lead a teacher training programme (GCPEA, 2014, p.132). These are treated as teachers and we estimate the cost of replacing them.

There is a two-year pedagogy stream following secondary education (UIS, 2014a). DFID (2014) estimate that public expenditure on secondary education per student is approximately $15 per year. However, it is estimated that in DRC 90% of education costs are covered by parents and communities (de Herdt and Poncelet, 2010), meaning that the real cost per year is around $150. Multiplying by two years gives us a lower bound estimate of the cost of teacher training of $300. The cost of replacing these seven teachers is therefore estimated at $2,100.

Table 4: Summary of the direct costs of conflict on education, 2009–2012

Cost	Quantity	Unit cost	Cost estimate
Cost of repairing damaged infrastructure	800 schools	$25,000	$20,000,000
Cost of replacing damaged and looted equipment	800 schools	$5,000	$4,000,000
Cost of replacing lost teaching force	7 education workers killed	$300	$2,100
Cost due to lost teaching time	460,000 lost teaching days	$4.2/day	$1,932,000
Total cost			**$25,934,100**

GCPEA (2014) also provides some accounts of attacks on education in 2013. This reporting does not follow the same methodology as that of 2009–2012, so we present the data separately.

[14] Based on the assumption that each school consists of six sections of over 30 students.
[15] Interim Plan for Education 2012, p.104 (MoE, 2012): salary of a primary school teacher.

Table 5: Targeted attacks on education in DRC, 2013

Dates	Schools damaged/ destroyed	Impact on students/ teachers	Notes
February – March 2013	3 damaged (UN report for schools and health centres; assumed half were schools)		
March 2013	18 destroyed		Katanga
June 2013	"At least" 1 school damaged		Allied Democratic Forces (ADF), Beni territory, North Kivu
July 2013	11 damaged		ADF, Beni territory, North Kivu
July 2013	5 schools occupied		FARDC
September 2013	1 school burned down	"Dozens" of children and 3 teachers kidnapped	North Kivu
Estimate total impact	**19 schools destroyed and at least 20 schools damaged**	**"Dozens" of children and 3 teachers kidnapped**	

Following the same methodology as above,[16] we calculate the cost to the education sector as presented in Table 6.

[16] Additional assumption: kidnapped workers also need to be replaced.

Table 6: Summary of the direct costs of conflict to education, 2013

Cost	Quantity	Unit cost	Cost estimate
Cost of repairing destroyed infrastructure	19 schools	$50,000	$950,000
Cost of repairing damaged infrastructure	20 schools	$25,000	$500,000
Cost of replacing damaged and looted equipment	39 schools	$5,000	$195,000
Cost of replacing lost teaching force	3 teachers kidnapped	$300	$900
Cost due to lost teaching time	11,142 lost teaching days	$4.2/day	$46,800
Total cost			**$1,692,700**

4.1.2 Collateral damage to education

The above estimates refer only to targeted attacks on education verified by GCPEA. It seems likely that actually many more teachers died as a result of conflict during this period in DRC. Although estimates for the GCPEA (2014) reporting period, 2009–2013, were not accessed, during previous conflicts civilian casualties have been high. IRC (2007) estimate that between August 1998 and April 2007 there were 5.4m excess deaths in DRC, largely from malnutrition and disease. From UIS data for 2012 we estimate that there are currently approximately 630,000 teachers in DRC, or about 1% of the population.[17] We can therefore speculate that of these 5.4m excess deaths, around 54,000 of them were teachers. In addition to the great personal loss suffered by their families, this also represents a massive burden to the education sector. A lower bound of the cost of losing these teachers is the cost of training their replacements. Applying the teacher training cost of $300 leads us to a **lower bound estimate of the cost of replacing 54,000 teachers of $16.2m**.[18]

For the period 2009–2012, the Armed Conflict Location & Event Data Project[19] (ACLED) recorded 11,000 deaths due to conflict. This translates into an estimated 110 teacher deaths, at a minimum replacement cost of $33,000. This is a much more significant cost than the seven education personnel deaths reported in GCPEA (2014) for this period.

[17] DRC has a population of approximately 66m (UIS databank).
[18] IRC's estimate of 5.4m excess deaths has been challenged in some quarters; however, the order of magnitude of the estimate has not.
[19] http://www.acleddata.com/data/version-4-data-1997-2013/

4.2 Broader impacts of conflict on education

4.2.1 Impact on access and learning

As well as the direct costs to education, conflict also impacts on access to education and learning. In the introduction, we outlined the main channels through which conflict impacts on access to education.

Whilst we will consider the impact of some of these channels individually, in intense and/or long conflicts, the combination of all these factors – and their interaction with other barriers to education such as poverty and weak governance – can have a significant impact on educational achievement for a whole generation. If this is the case, it could represent a cost to education far greater than the direct costs of rebuilding schools and training teachers.

Regarding the **killing and injuring of students**, there are reports of eight deaths and seven students injured between 2009 and 2013 (GCPEA, 2014, p.132–133). However, a UN report on children and conflict reports the death of 154 children and injury of 113 due to conflict in 2012 alone (UNGASC, 2013, p.15). The true number may be higher, due to under-reporting.

There are estimated to be around 2.7m **displaced people** in DRC, with around 540,000 of these of primary school age. Above, we estimated that **between 162,000 and 540,000 6–11 year olds are out of school due to displacement** (see Section 3.7).

Recruitment of children to armed forces has been a feature of conflict in DRC. At the height of the war there are estimated to have been around 30,000 child soldiers (Bell, 2006). Between 2004 and 2006, "tens of thousands" of children were released from armed forces to return home (CSI, 2012, p.111). However, agreements on the cessation of the use of child soldiers have not been honoured.

> *"Today hundreds of children are believed to be still serving in the Forces Armées de la République Démocratique du Congo (FARDC), and the Republican Guard (Garde Républicaine) and incidents of recruitment of children by state armed forces continue to be reported."* (CSI, 2012, p.111).

In 2011, there were 272 documented cases of child recruitment to armed forces (UNGASC, 2012, p.7) and 578 in 2012 (UNGASC, 2013, p.14). There were also 1,497 documented accounts of children escaping from armed forces (UNGASC, 2013, p.16).

As noted above, the result of the **physical attacks on education** 2009–2012 documented by GCPEA (2014) might have led to around 460,000 lost teaching days. As well as the direct cost of spending on teacher salaries, these attacks also mean around **16m lost student days**.

Section 3 considered the number of OOSC in DRC that can be attributed to conflict. The OOSCI (2013) survey estimates that **150,000 children are out of school because of fear of violence** alone. Other methods of calculating the impact of conflict on OOSC such as analysing enrolment trajectories are also explored. The upper bound estimate is **1.5 million children currently out of school due to conflict**.

We also considered historical numbers of OOSC that might be attributed to conflict, arriving at an estimate of **14m lost student years**, or around 2.8bn lost student days for the period 1996 to the present time (assuming 200 teaching days per year).

This tells us little, however, about the impact of conflict on ultimate educational attainment. Present levels of primary GER in DRC are in excess of 100% indicating substantial numbers of overage children, many of whom might be catching up on education having been denied access during the Congo War and its aftermath. In order to ascertain the ultimate impact of conflict on education, we must examine indicators such as years of schooling and literacy levels.

UIS (2010) compares trends in literacy rates and average years of schooling for conflict-affected and non-conflict-affected regions in DRC. This is discussed in greater detail in Section 3. For the purposes of costing, it suffices to say that whilst the UIS analysis provides some evidence that conflict has permanently impacted on educational outcomes, it cannot be used to estimate the magnitude of this impact.

Another approach is to look at statistical analyses carried out in other conflict-affected countries. There is a growing body of literature which aims to isolate the impact of conflict on education, for example by exploiting district-level variation in conflict exposure. A number of these studies are described in the accompanying main report (see Jones and Naylor, 2014). Although such analysis has been carried out for a variety of conflict situations, estimates of the net impact of conflict on years of schooling have tended towards a 0.5 year reduction.

Although it is difficult to generalise from one conflict context to another, the fact that there is this grouping around a 0.5 year reduction in average schooling leads us to speculate that in areas of DRC where the conflict is at similar levels of intensity to those studied (e.g. Colombia, Côte d'Ivoire, Rwanda), the impact on school attainment is of a similar magnitude. We could argue that this is the case for the current conflict in North and South Kivu, for example. These regions account for 20% of DRC's school-age population (OOSCI, 2013, p.121) so we can speculate that the impact of the current conflicts in DRC is to reduce national educational attainment by an average of 0.1 school years.

Even if access can be maintained during conflict, there may still be significant impacts on learning. Conflict can lead to poor learning environments, reduced distribution of learning materials and psychological trauma that affect children's learning (Save the Children, 2013). These impacts are very difficult to quantify in a country such as DRC, but again, we might hypothesise that they represent a significant cost to education.

4.2.2 Impact on educational expenditure

As well as impacting on access and learning directly, we might expect that conflict also impacts on the financing and governance of education, which again can impact on access to education and learning.

Educational expenditure in DRC is low, estimated at just 2.5% of GDP,[20] decidedly below the world average of 4.8%.[21] In terms of a proportion of government spending, it is just 8.9% of the budget, amongst the lowest in Africa.[22]

We might hypothesise that this relatively low level is partly a result of pressure that conflict places for increased military expenditure. However, we find that military expenditure in DRC is 1.7% of GDP (SIPRI, 2014), below the world average of 2.7%. It is also below the average of developing countries during peacetime of 2.8% GDP as calculated by Collier et al. (2003) and significantly below the average of developing countries during civil war of 5% GDP.

[20] http://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS accessed August 2014.
[21] UIS Online Database, accessed January 2014.
[22] http://data.worldbank.org/indicator/SE.XPD.TOTL.GB.ZS/countries

Drawing on analysis of the fiscal impact of conflict in 22 countries, Gupta et al. (2002) find that conflict does lead to greater military expenditure, but that this is largely funded by borrowing rather than cuts in basic services such as education.

Lai and Thyne (2007) also find evidence that conflict depresses educational expenditure. They find that being in a state of civil war reduces educational expenditure by 3.1–3.6% per year but again, they do not find evidence that this is a result of increased military expenditure. For DRC, this would represent a **$21m to $25m (0.08 to 0.09% of GDP) drop in educational spending per year**.

Lai and Thyne (2007) also use this dataset to test the impact on educational expenditure of the severity of conflict, finding that an increase in 1,000 BRDs per year leads to a reduction in educational expenditure of about 2–2.7%. According to the UCDP battle-deaths database (UCDP, 2014), in 2012 there were 1,088 BRDs, meaning that we can estimate **the negative impact on educational expenditure to be between $4m and $5m (0.01 to 0.02% of GDP) per year**.[23] Combining these two approaches gives us a full range of a **$4m to $25m (0.01 to 0.09% of GDP) drop in educational spending per year**.

4.2.3 Impact on teaching force and administration

As well as having a direct impact on the teaching force, targeted attacks also impact on an individual's **decisions to join or remain within the profession**. It is not possible to put a figure on the cost of this impact, but difficulties in recruiting and retaining teachers clearly jeopardise educational quality and place a burden on administration. Furthermore, there is evidence that a far greater impact than on recruitment is to be found on teacher training and professional development, further jeopardising educational quality (Buckland, 2005).

In DRC, one-third of teachers are not on the government payroll; instead, these teachers are paid for by school fees and community contributions (World Bank, 2008). In Kasai-Oriental and North Kivu, this figure rises to 40%. This can lead to the exclusion of poor students. Indeed, in a 2012 survey on OOSC, money was cited by 70% as the reason for non-enrolment and drop-out (OOSCI, 2013).

[23] The authors use an absolute measure (BRD/year) to estimate impact of conflict on a relative measure (education expenditure as share of government budget). It is therefore an estimate of the impact of conflict intensity on an average-sized country.

Table 7: Summary of other impacts of conflict on education in DRC, 2009–2012

Impact			Monetary impact	
	Estimate	Notes	Estimate	Notes
Lost student days	16 million	Summary of GCPEA (2014) data with assumption of average school closure 100 days		
Students killed	8	Summary of GCPEA (2014) data		
Students injured	7	Summary of GCPEA (2014) data		
Students kidnapped	"Dozens"	Summary of GCPEA (2014) data		
Displaced students	Approx. 540,000			
Recruitment of students to armed forces	At least 850 cases of abduction during the reporting period but around 30,000 during height of conflict	Summary of GCPEA (2014) data		
Number of children out of school because of conflict	Between 150,000 and 1.5 million	See Section 3		
Impact of conflict on average years of schooling	0.1 years	Assuming 0.5 years' impact in North and South Kivu. See main text for details of evidence and calculations		

Impact on learning	Not quantifiable			
Impact on educational expenditure	0.6% – 3.6%	Lai and Thyne (2007)	$4 to $25 million	See main text for details of evidence and calculations
Impact on teaching force and administration	Not known			

4.3 Indirect cost of conflict through missed education

There is a recognised link between educational attainment and subsequent economic and social development (see main report for discussion). If conflict impacts on educational attainment, we could therefore expect economic and social repercussions. Although it is not a cost *to* education, it is a cost that comes *through* the impact of conflict on education.

The most obvious and measurable of these links is that of private earnings. Individuals invest their time (and potentially money) in education partly because they believe that the lifetime earnings gain outweighs the private costs and foregone earnings whilst studying. The formulation of this decision-making process – lifetime earnings gain over foregone earnings and private costs – is called the private rate of return on investment in education (ROI).[24]

ROI estimates have been calculated since the 1960s, but the lack of reliable data means that robust estimates are not available for all countries. In a 2004 review of the literature, Psacharopoulos and Patrinos did not identify any reliable estimates of returns to education in DRC. For the Sub-Saharan Africa region, they estimate that private returns to education are 38% for primary, 25% for secondary and 28% for higher (Psacharopoulos and Patrinos, 2004, p.114).

These private return estimates do not take into account the total cost of education, i.e. the opportunity cost of foregone earnings plus the cost of providing the education, typically borne by the government, often with parental contributions. This inevitably reduces the returns to education. But there are also benefits to society in educating individuals. Unfortunately, attempts to quantify these externalities are few and far between, and we do not attempt to put a figure on the true social returns to education.

What this discussion shows us is that the impact of conflict through education (on the economy) will always be greater in magnitude than the impact of conflict on education. Education has positive returns, both for the individual and society, and any impact that conflict has on education will inevitably lead to an even greater impact on economic growth and societal goals.

Above, we outlined the direct costs that conflict in DRC has brought to the education sector. These represent a loss of investment in education that we would expect to see magnified in the long-term economic impact. If we assume 25% returns to education investment then the $26m direct cost calculated in section 4.1 for 2009–2012 would translate to a $32m impact on national income over the lifetime of the students affected.

[24] This calculation should give a figure above 100%. It is common practice to present ROI as the return above 100%, e.g. if the calculation yields a result of 130%, the ROI will be stated as 30%.

We also speculated that, as well as this loss of sunk investments, current educational budgets might have been reduced (Section 4.2.2). For the lower bound, a $4m reduction in educational investment would translate to around $5m impact on national income. This gives a net impact of $1m (since the reduced education spending represents a 'saving').[25] For the upper bound, a $25m reduction in education investment would translate to around $31m impact on national income, giving a net impact of $6m. The reduction on spending is annual, so for the four years of conflict covered in this study (2009–2012), the long-term opportunity cost would be four times the net annual cost, giving a long-term cost to the economy of around $4 million if we take the lower bound of the estimate range for losses through this channel.

But we also outlined how conflict's impact on education is much broader than the monetary impacts to the sector. Conflict results in a reduction in access which ultimately leads to permanent reductions in average educational attainment. In Section 4.2.1 we speculated that current conflicts might have the long-term impact of reducing national average years of schooling by 0.1 years. Based on discussions in Burnett et al. (2013) of the impact of missed schooling in DRC, we can speculate that this might lead to a 1.7% reduction in income per capita.[26] This translates to an impact on the economy of $467m.[27]

Burnett et al. (2013) also calculate the opportunity cost of the high levels of OOSC in DRC. Using wage premium estimates and estimating the proportion of OOSC who will never complete primary education, they estimate that the cost to DRC of OOSC is equivalent to 1.1% of GDP.[28] Adding cost implied as a result of also foregoing secondary education, they estimate the total impact at 1.9% of GDP.[29] We speculated above that around 10–20% of OOSC numbers in DRC can be attributed to conflict. This would put conflict's impact on GDP[30] through reduced schooling at around 0.2–0.4% of GDP, or around $53–107m.

The gender dimension of the impact of conflict in DRC means that some of the costs of poor educational achievement are exacerbated. The gains of improved maternal and child health and decreased fertility that come with basic education for girls are lost, and estimates of the impact on average years of schooling would lead to underestimates of these costs if not broken down by gender.

[25] NB: reduced education expenditure would also impact on national income levels through other channels. Here we present the impact only through the channel of reduced human capital investment.
[26] They calculate that a 2.5 years of schooling increase would increase income levels by 43%.
[27] We use 2012 GDP figures rather than the figures in Burnett et al. (2013) to ensure consistency of GDP figures throughout this report.
[28] They estimate that 12% of OOSC will never complete primary education, that the wage premium for primary education is 9%, and therefore that the cost to the economy is 1.1% of GDP.
[29] The wage premium to secondary is estimated at 22%, primary-secondary transition rate is 80%, meaning a GDP loss of 0.84% is to be added to the direct cost of foregone primary of 1.1%.
[30] Again, using 2012 GDP figures.

Table 8: Estimates of the long-term economic impact of current conflicts in DRC

	Estimates	Sources
Returns to education	25–38%	Psacharopoulos and Patrinos, 2004 (SSA average)
Opportunity cost of damaged infrastructure and personnel	$32m	Calculations from 4.1; assuming 25% ROI based on above
Opportunity cost of reduced educational expenditure	$4m	Calculations from 4.2; assuming 25% ROI based on above
Opportunity cost of reduced educational attainment	$467m (1.7% of GDP)	Burnett et al., 2013; World Bank, 2014
Opportunity cost of OOSC	$53–107m (0.2–0.4% of GDP)	Burnett et al., 2013; World Bank, 2014

4.4 Summary

We have tried to list the major channels through which conflict impacts on education, from the immediate impacts of a bombed school to the long-term impacts on the economy of reduced national education levels. These estimates have drawn on different data and theoretical sources, each with their own methodological issues.

When trying to account for physical damage, we are likely to face an underestimation bias as we take documented accounts as our starting point; amidst the danger and confusion that has reigned in certain parts of DRC during the reporting period of our principal source, *Education under Attack 2014,* it is likely that there have been further costs unidentified. Although we have tried to account for these, we have only done so where there is hard evidence to back up our claims.

We took a very different approach when it came to the indirect costs of conflict, as there simply is no hard evidence. Our estimates are by necessity highly speculative, intended to give an idea of the possible order of magnitude, and to demonstrate that the impact of conflict on society through the channel of education is greater than the damage to bricks, mortar and budget lines. Damage to buildings, equipment and materials, and the loss of teaching staff brings harm to the long-term progress of the sector. Access to education is denied for thousands of children, permanently impacting on national educational attainment. Since education typically exhibits positive returns, these effects are magnified in the long term on the economy. And the social benefits of education are also foregone, having a long-term impact on maternal and child health, for example.

Where possible we have drawn on a variety of theoretical approaches in order to provide validation or alternative estimates. Our findings are summarised in the table on the following page.

Table 9: Summary of cost of conflict on and through education

Impact	Estimate
Direct cost to the education sector of targeted attacks on education, 2009–2012	$26m
Impact on educational expenditure	$4–25m per year (0.6–3.6%)
Opportunity cost of lost and reduced expenditure (long-term impact of the previous two impacts, taking lower bound estimates)	$36m
Opportunity cost of OOSC	$53–107m (0.2–0.4% of GDP)
Opportunity cost of reduced educational attainment	$467m (1.7% of GDP)

Of course, all these calculations are highly speculative and cannot embody the complex interaction of various factors such as education, conflict, poverty, inequality and religious difference. It may well be that DRC's low levels of education are more a cause of conflict than conflict is a cause of low levels of education, but the more likely truth is that they interact with each other in ways that make it impossible to put a figure on the cost. What we have attempted here is to demonstrate the potential order of magnitude of the cost that conflict might have on education, and the impact that this then has on economic and social development.

5 Conclusion

This study set out to investigate the impact that conflict has on education in DRC, and to account for this quantitatively by looking firstly at the number of OOSC and secondly by monetising the damage done to the national education system, in terms of both material damage and human resource costs. In order to do this the study has looked at both the macro, econometric data and the detailed country evidence that considers the local context and dynamic nature of conflict. It has considered both the immediate, direct costs and the longer-term, more indirect costs that can only be determined by looking at changing enrolment and conflict trends over periods of time.

The most visible channel through which conflict impacts on education in DRC is targeted attacks on education, resulting in damage to and closure of schools, death, injury and kidnapping of teachers and pupils, the latter often to fight as child soldiers. But schools, teachers and students are also victims of collateral damage, suffering as the result of indiscriminate violence, bombing and destruction. There are numerous other indirect channels through which conflict impacts on education, including forced displacement, impacts on household and national economies, and negative impacts on public health. For the period 1996–2007, it is estimated that 5.4 million people lost their lives through the sum of these channels. Part of the massive impact that this has on society will be felt by the education system, through lost teachers and students, as well as through the education system, through a reduction in human capital accumulation.

Trying to untangle the interaction between school enrolment, conflict, the economy, and government spending is complex and difficult to evaluate with descriptive data alone. The analysis of enrolment trends and current levels of OOSC presented in Section 3 is probably over-simplistic but, given the data challenges in DRC, it represents our best efforts to describe the impact the conflict is having on access to schooling. Considering the divergence of DRC and Sub-Saharan Africa enrolment rates during the conflict, we speculate that as many as 14 million student learning years were lost as a result of the conflict, with 2 million out of school in 1999 alone. That this represents just 41% of OOSC at the time shows that the challenge of getting children into school in DRC predates recent conflicts and will likely continue beyond them. Hard evidence on current levels of OOSC due to conflict was not accessed but we deduce that it is likely to be in the range of 10–20%. Whilst this may be considered an excessively broad range, a more precise estimate would be misleading given the assumptions required to generate these figures.

Targeted attacks on education during conflict create real costs to the sector. Schools have to be repaired or rebuilt, furniture and teaching materials restocked and lost personnel replaced. When schools are closed there may also be the cost of paying teachers who are not teaching. For the period 2009–2012, we estimate the sum of these costs for DRC to be $26m. In a country where the state barely covers 10% of total education costs, this will have a massive impact on the purses of government and communities alike, with lasting implications for the sector.

But these targeted attacks make up only a tiny proportion of teacher deaths in DRC. A figure of 5.4m excess deaths due to conflict is likely to mean over 50,000 teachers lost because of conflict. There is no data on damage to schools as villages are attacked, but we can speculate that it is also more significant than targeted attacks.

These impacts represent not only costs to the sector but also investment foregone since efforts to rebuild infrastructure and replace personnel will divert other investment. Since education generally exhibits positive returns on investment, this reduced investment will have an impact of greater magnitude in the long term through reduced national income. Not only that, reduced access to education also represents a foregone investment as children miss out on the opportunity to accumulate human capital. Section 3 sets out the scale of this impact on current levels of OOSC; but this is just a snapshot hinting at the long-term impact of conflict on educational access. In conflict-affected parts of DRC we expect that years of conflict impacting on education will have the effect of a long-term reduction in human capital accumulation, both by impacting on state investment in education and by restricting access to schooling. We estimate the long-term impact on the economy through reduced human capital accumulation may be as much as eighteen times the short-term cost to the sector of targeted attacks. The restriction of schooling for generations of children will of course have multiple other impacts on DRC society that we cannot quantify.

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