Measuring the Costs of Conflict

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Abstract

Civil wars are now the most common form of major armed conflict and in this paper we examine the economic and human cost of civil war during 1960-99. The adverse consequences of the war are suffered not by the combatants but by ordinary civilians who have typically no say in either whether the conflict is initiated or whether it is settled. Using a global data set we show that a civil war of five years reduces the average annual growth rate by more than two percent. After the fighting stops a peace dividend is by no means automatic, the economic recovery very much depends on whether the country is able to implement considerable policy reform. Our survey of the human costs of conflict shows that even long after the war stops people are killed or maimed, mainly due to the destruction of public health infrastructure and population displacements. The post-war number of fatalities and casualties occurring is about as high as the numbers incurred during the war. We also consider whether these terrible costs could be seen as a high but necessary price to pay for future improvements. Many rebel movements want to change their countries' political systems for the better. However, using data on economic policy, democracy and political freedom we find that civil wars change countries for the worse. On average countries have lower policy scores than prior to the war. Thus, although it may be possible to find some modern civil war that can be seen as paving the way for social progress, it is likely to be the exception. On average, civil wars during the past forty years have not brought about positive social change but left a terrible legacy of high economic and social costs. They have been development in reverse.

1. Introduction[1]

Civil wars are now the most common form of major armed conflict. In 2001 all of the 15 conflicts listed by the Stockholm International Peace Research Institute (Sipri, 2002) were civil wars. These wars are typically an economic and humanitarian disaster for the affected country. For those who care about development, civil war is therefore a major problem. In this paper we examine these economic and human costs of civil war. We show that the main adverse consequences of civil war are suffered not by the combatants but by civilians, and that many of these consequences accrue long after the war is over.

During a civil war a society diverts some of its resources from productive activities to violence. As a result, the society loses twice over. The diverted resources are lost to productive activity, analogous to the loss from what economists call 'rent-seeking'. Increased military spending distorts the government budget, because resources are diverted from government provision of other public goods, such as infrastructure investment, health care and education. Whereas 'rent-seeking' activities are simply unproductive, the increase in violence is harmful. One part of society is producing, while another part is destroying.

Most of the costs of civil war accrue from these destructive activities. Established rights are displaced by the power of the gun. Men with guns, from both rebel and government forces, can steal, rape and murder with impunity. Behind this veil of havoc, the localized collapse of order extends impunity to criminal and other anti-social behavior. The primary response to the fear of theft, rape and murder is flight. People try to shift their assets to safety, and they themselves flee. This flight in turn creates massive problems, especially for health, as people are pushed into areas where they lack immunity to disease. They then carry these diseases with them, infecting host populations[2].

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[1] We would like to thank Paul Collier for helpful discussion and guidance.
[2] For a detailed discussion see Montalvo and Reynal-Querol, 2002.

As a part of the war strategy the country's infrastructure is destroyed, public health infrastructure and the civilian population are directly targeted. For example electricity grids are destroyed resulting in the stoppage of water and sewage pumping, causing many public health problems. The most direct human effects of civil war are fatalities and displaced population. However, the main problem and consequence of civil war, is not the number of deaths or injured people during shooting and bombing, but the increasingly severe public health consequences after war ends.

This paper is organized in five parts. In the second section we survey the immediate economic and human cost of war. Section 3 looks beyond these costs and we explore the long term effects of war. In the fourth section we present some empirical analysis on the effect of civil war on the two main variables most widely used by the literature to analyze the costs of civil war: economic growth and mortality rates. We find that a five years civil war reduces the average annual growth rate by more than two percent and leaves a legacy of increased infant mortality by about two percent *per annum*. The last section concludes.

2. The Economic and Human Cost during Civil War

2.1 Economic costs

During a civil war a society diverts some of its resources from productive activities to destruction. This causes a double loss – the loss from what the resources were previously contributing, and the loss from the damage that they now inflict.

The first loss can to an extent be quantified – during civil war governments increase their military expenditure and this directly reduces economic growth. During peacetime the average developing country (defined as a country with less than $3000 per capita GDP in 1995) spends about 2.8 percent of GDP on the military. During civil war on average this increases to 5.0 percent[3]. This is likely to cause a decrease in other public expenditures such as infrastructure and health. The decrease in the supply of such public goods has

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[3] Calculations made by using data from Collier and Hoeffler, 2002b.

consequences for incomes and social indicators – here we focus on the effects on income. Before taking into account any of the destructive effects of military activity, we can put some estimate on its consequences for crowding out productive expenditures. Knight et al (1996) quantified the costs to growth of military spending during peacetime. Their simulations suggest that the additional 2.2 percent of GDP spent on the military, sustained over the seven years that is the length of the typical conflict, would lead to a permanent loss of around two percent of GDP. Of course the increase in government military spending is only part of the diversion of resources into violence – the resources controlled by rebel groups are also a diversion from productive activities.

However, the main economic losses from civil war arise not from the waste constituted by diverting resources from production, but from the damage that the diverted resources do when they are used for violence. The most obvious cost arises from the direct destruction of infrastructure. During the war physical infrastructure is targeted as part of the military strategy. The main targets are the enemy's communication and support lines, such as telecommunications, airports, ports, roads and bridges. In addition to this strategic destruction of key infrastructure, rebels and government soldiers loot and destroy housing, schools and health facilities. An example is Mozambique, where about forty percent of immobile capital in the agricultural, communications and administrative sector was destroyed. The pre-war transport system had been a large foreign income earner as goods were transported from and to the neighboring states of Malawi, Zimbabwe, Swaziland and South Africa. A total of 208 out of 222 units of rolling stock were lost or badly damaged between 1982 and 1989 (Brück, 2001). Similarly, during the war in Liberia in the mid-1990s all major infrastructures were damaged and looted. Monrovia, the largest port, suffered major damage during the first few months of the war, most of the electricity-generating capacity of the Liberian Electricity Corporation was destroyed, and looting removed much of the distribution and transmission systems[4]. Infrastructure is an important determinant of economic growth, and so destruction of infrastructure on such a scale is bound to reduce incomes.

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[4] For a detailed discussion see Hoeffler (1998).

However, probably a more substantial cost arises from the fear that violence inevitably generates. Frightened people flee from their homes - we discuss this human exodus below. They also lose the few assets they possess. For example, in a survey of households in Uganda, Stewart and Matovu (2001) found that two thirds of respondents had lost all their assets. Their houses were bombed or unroofed, their household belongings such as bicycles and furniture looted and their cattle were stolen by the soldiers. In Mozambique less than a fifth of the recorded 1980 cattle stock remained by 1992. Cattle were lost due to direct rebel activity (to feed their troops and to spread terror) and due to indirect effects of warfare (lack of feed and veterinary attention during the war).[5] Faced with the prospect of such losses, people try to protect their assets by shifting wealth abroad. The effect of civil war on the flight of financial capital has recently been estimated by Collier, Hoeffler and Pattillo (2002). Prior to conflict the typical civil war country held 8.6 percent of its private wealth abroad. By the end of the civil war this had risen to an astonishing 19.7 percent, so that more than a tenth of the private capital stock had been shifted abroad. Even this probably underestimates the extent of overall capital flight: for example, cattle may be moved into neighboring countries and sold.

The disruption of civil war shortens time horizons and the displacement severs family and community links. Both weaken the constraints upon opportunistic and criminal behavior. For example, during the Russian civil war of 1920 the town of Nikolaev was for two days in limbo between 'white' and 'red' occupation. In these two days local crooks chopped down all the trees lining the main avenue and stole the wood. During the Rwandan genocide of 1994, the risk of being murdered was higher for those with assets (Platteau and Andre, 1998). Colletta and Cullen (2000) analyze the relationship of violent conflict and the transformation of social capital using four cases studies: Cambodia, Rwanda, Guatemala and Somalia. In response to heightened opportunism and uncertainty people invest less, and retreat into those subsistence activities that are less vulnerable. For example, in Uganda during the long period of social chaos the share of the subsistence sector increased from 20 percent of GDP to 36 percent (Collier and Reinikka, 2001:20).

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[5] Brück (2001).

The overall effect of civil war on the economy has been estimated both through econometrics and case studies. An econometric study by Collier (1999) found that during civil war countries tended to grow by around 2.2 percentage points more slowly that during peace. Hence, after a typical civil war of seven years duration[6], incomes would be around 15 percent lower than had the war not happened, implying around a 30 percent increase in the incidence of absolute poverty. The cumulative loss of income during the war would be equal to around 60 percent of a year's GDP. Note that this is much larger that the loss directly due to the waste of resources in extra government military spending, suggesting that most of the costs of war are due to the adverse effects of violence rather than simply to the waste of resources. Stewart, Huang and Wang (2001) survey data from about 18 war countries. For 14 countries the average growth rates of GNP per capita could be calculated: the average annual growth rate was negative, at -3.3 percent. The growth rates ranged from 2.7 percent in Mozambique throughout the war to –13.4 percent in Iraq. Further, they found that a wide range of macro-economic indicators worsened during the conflict. 15 out of 16 war countries experienced a fall of per capita income, 13 out of 17 countries experienced a drop in food production, all surveyed war economies increased their external debt as a percentage of GDP and trade patterns changed: in 12 out of 18 countries export growth declined.

2.2 Human Costs

The most direct human costs of civil war are fatalities and population displacements. The composition of these victims is radically different in the modern civil war from the wars of the early twentieth century: the impact has shifted from military personnel to civilians. At the beginning of the 20th century about 90 percent of the victims were soldiers. By the 1990s nearly 90 percent of the casualties resulting from armed conflict were civilian (Cairns, 1997).

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[6] Collier, Hoeffler and Söderbom (2001) find that the average civil war lasts seven years.

To an extent the rise in civilian casualties is a consequence of new military practices. Rebel recruitment strategies are now commonly coercive and so people flee to avoid recruitment. For example, here is the response to a recent rebel attack in rural Nepal. 'About 35,000 people (out of a population of 75,000) have left the district, mainly young men moving to India to avoid being forcibly recruited by the Maoists.'[7] Furthermore, the military sometimes deliberately target civilians to create forced migration. Azam and Hoeffler (2002) analyze the different motives of targeting civilians in internal wars. On the one hand soldiers may terrorize civilians because they need the loot to augment their resources. An alternative hypothesis suggests that terrorizing the civilian population plays a direct military role. Using cross-country data from Sub-Saharan Africa they find support for the latter hypothesis. Civilians are targeted mainly because the displacement of large fractions of the civilian population reduces the fighting efficiency of the enemy, as they cannot hide as easily and obtain support.

Forced migration broadly consists of two groups: refugees and Internally Displaced Persons (IDPs). The United Nations High Commission for Refugees (UNHCR) provides data on 'people of concern', i.e. the number of people who received assistance from the organization. Approximately 86 percent of people of concern are refugees and IDPs. In 2001 the UNHCR assisted about 12 million refugees and about 5.3 million IDPs worldwide. According to the UNHCR a refugee is a person who 'owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership in a particular social group, or political opinion, is outside the country of his nationality, and is unable to or, owing to such fear, is unwilling to avail himself of the protection of that country' (1951 United Nations Convention). The total number of refugees worldwide peaked in 1992 (see Figure 1).

Internally displaced (IDPs) are persons who are displaced within their country. Since the majority of wars during the past decades have been internal to a country rather than interstate wars, the numbers of IDPs have increased over time. They are now the second largest group of concern to the UNHCR. Although the data on IDPs collected by the

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[7] The Observer, 2nd February 2003, p 23.

UNHCR is sketchy, Figure 1 shows that the pattern is similar to the one displayed by the refugee data.

Figure 1: People of Concern to the UNHCR, 1962-2002
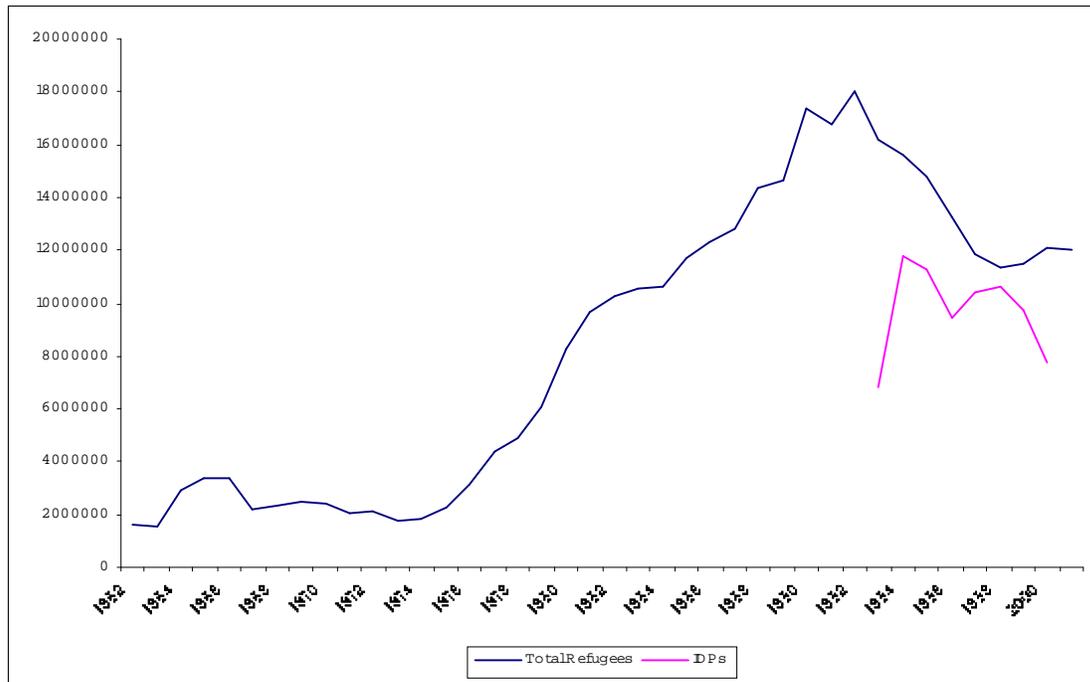
3. The Long-term Effects of Civil War

To the extent that civil war has a political rationale it is to achieve change for the better. A rebel leader might honorably accept the terrible costs incurred during war as a high but necessary price to pay for future improvements. We now turn to the legacy left by war. In fact, far from being the catalyst for beneficial change, civil war typically leaves a persisting legacy of poverty and misery.

3.1 The Economic and Political Legacy

Several of the adverse economic effects of civil war are highly persistent.

Recall that during civil war military expenditure rises as a percentage of GDP from 2.8 percent to 5.0 percent. However, once the war has ended, military expenditure does not return to its former level. The average country during the first decade post-conflict spends 4.5 percent of GDP on the military. The modest reduction in military spending from its wartime level is often presented as a 'peace dividend'. However, a more accurate way of viewing post-conflict military spending is to see it as a major hidden cost of conflict – hidden, because abnormally inflated military spending persists long after the conflict. Cumulatively over the first decade of peace some 17 percent of a year's GDP is lost in increased military spending. This is far from being the only post-conflict cost of war, but alone it is substantial: *during* the typical conflict the total income loss cumulates to around 60 percent of a year's GDP.

A second cost during conflict is capital flight. Recall that during war capital flight increases from 8.6 percent of private wealth to 19.7 percent. By the end of the first decade of post-conflict peace capital flight has *risen further* to 26.1 percent[8]. Far from their being a peace dividend here, there is a *war overhang* effect. A possible reason for this is that asset portfolios can only be adjusted very gradually so that even by the end of a war the typical portfolio may be not have fully adjusted to the political uncertainty created by the war. As we will see, once a country has had a civil war it is much more likely to have further conflict, so that although peace is an improvement, risk levels do not return to their pre-conflict level. Thus, even once peace has returned, people may still wish to move more of their assets abroad. Capital repatriation requires more than just peace. The same is true, only much more powerfully, for human flight. Civil war gives a big impetus to emigration, but some of these emigrants – especially those in developed countries, will provide an incentive to other family members to join them post-conflict, i.e. encouraging further emigration.

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[8] Calculations are based on the data used by Collier, Hoeffler and Pattillo (2002).

A third persistent adverse legacy is the loss of social capital: civil war can have the effect of switching behavior from an equilibrium in which there is an expectation of honesty, to one in which there is an expectation of corruption. Once a reputation for honesty has been lost, the incentive for honest behavior in the future is much weakened. Clearly, civil war is not the only way in which a society can become corrupted; the point is simply that the costs inflicted by the loss of honesty and trust are likely to persist long after the conflict is over.

For civil war to have some redeeming features, the most hopeful areas would be policies, political institutions, and human rights. The impact of civil war on each of these can, to an extent, be measured. With respect to policy we use a measure adopted by the World Bank – the Country Policy and Institutional Assessment (CPIA). The CPIA is an assessment on a five-point scale of economic policy in four areas – macro, structural, social, and public sector management. While what constitutes 'good' policies can be controversial; there is a wider consensus on the recognition of bad policies, and unfortunately, civil war countries tend to be at this end of the spectrum. Those low-income countries that are neither at war nor in the first decade of post-war peace have on average a CPIA score of 2.75. Post-conflict countries, averaged over the first decade of peace, have a CPIA score of only 2.52. Although the numbers are close together, they actually reflect quite a substantial difference in policies. All four policy areas are worse in post-conflict societies – the macro-economy is less stable, structural policies such as trade and infrastructure are less conducive to growth, social policies are less inclusive, and the public sector is less well-managed. Civil war is thus not normally a catalyst for policy improvement but rather for policy deterioration.

With respect the extent to which political institutions are democratic, we use the standard political science index – 'Polity IV'[9]. This is a ten-point scale; as with the CPIA the bottom end of the range is probably more clear-cut than the top. The typical low-income country that is neither at war nor in post-war peace has a score of 2.11. Countries in the

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[9] For a description see Jaggers and Gurr (1995).

first decade of post-war peace average a score of only 1.49. Hence, again on average civil war leads to a deterioration rather than an improvement in political institutions. A related measure is an index of political freedoms compiled by Freedom House[10]. This is a seven-point scale in which, unlike the other indices, a low score is better than a high score. The comparable numbers are 4.79 and 5.66. Hence, again civil war leaves a legacy of reduced freedom rather than increased freedom.

The political legacy of civil war is in fact far worse than implied by these indicators. Once a country has had a civil war it is far more at risk of further war. Collier and Hoeffler (2002a) estimate that this risk is approximately three times higher than the conflict risk faced by the average country. This is partly because war leaves the society divided and embittered, and partly because war creates interests that favor continued violence and criminality. As a result, the economic landscape post-conflict may be dominated by people's fears of a relapse into further conflict.

The overall economic and political legacy from civil war is thus sufficiently adverse that we would not necessarily expect rapid recovery. Collier (1999) finds some evidence for a *war-overhang* effect, whereby after short wars the economy continues to have exceptionally low growth. This is consistent with the capital flight story above – a short war may give insufficient time for people to shift their assets abroad, so that they continue with capital flight even after the war is over. It turns out that the pace of post-conflict recovery is highly dependent upon national policy choices and the scale and nature of international support. Recovery is not an automatic process of bouncing-back. Even in successful recoveries the process is slow: take for example, Uganda, where recovery was unusually rapid. Even by the late 1990s ten years after the end of the civil war, per capita income had barely regained its level of the early 1970s, and the retreat into subsistence had barely been reversed. At the household level, when interviewed, although most respondents had been able to replace some of their assets, sixty percent indicated that they were still worse off in comparison to the pre-war period.

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[10] http://www.freedomhouse.org/ratings

3.2 The Social Legacy

Mortality rates only capture one dimension of the human consequences of conflict; however they are a useful summary measure of the crisis and its impact. Mortality estimates can be highly inaccurate, but they are often better and more easily captured than other health indicators, which may be subject to different definitions and cultural interpretations (Keely et al 2000). There is other human damage as a consequence of conflict such as morbidity and psychological effects, but mortality rates have been one of the most easily and accurately measured indicators in emergency settings.

Guha-Sapir and van Panhuis (2002) collected intensive case-study data on mortality rates following civil conflicts. They find that the impact on adult mortality is generally even worse than that on infant mortality. Among the cases they analyzed, 60 percent of the cases refer to refugees, 20 percent to internally displaced people and 20 percent to residents of the country. Mortality rates were higher after conflict than before. While it might be imagined that the rise in adult mortality is because of the greater exposure of adults to the risk of combat death, few of these adult deaths are directly combat-related. We can compare these increases in mortality with the estimates of death as a direct result of combat. The death of combatants is only a very minor component of the overall rise in mortality. These numbers confirm that civil wars kill far more civilians even after the conflict is over than the number of combatants that die during the conflict.

Table 1 shows the mortality rates among children under five years old post-conflict and in the pre-conflict baseline. The numbers show the highly mortality rates mainly due to infectious diseases in refugee camps after war.

Table 1: Mortality Rates among Children

Population sample and year	Disease	Mortality Rates	
		Conflict	Baseline
Internally displaced in Somalia 1992	Measles	36.5	10.1
	Diarrhoeal disease	39.0	20.0
Kurdish refugees in Iraq, 1991	Diarrhoeal disease	74.0	22.9
Sudanese refuges in Northern Uganda, 1994	Meningitis	0.2	0.60
Rwandan refugees in Zaire, 1994	Diarrhoeal disease	87.0	20.0
Buthanese refugees in Nepal, 1992-1993	Respiratory Infectious	41.4	26.2
	Diarrhoeal disease	22.9	22.9
Residents in Eastern Dem.Rep of the Congo, 2000	Malaria	26.0	15.5
	Diarrhoeal Disease	11.0	20.0

Data presented by CRED (The Centre for Research on the Epidemiology of Disasters) at the Workshop "Filling Knowledge Gaps: A Research Agenda on the Impact of Armed Conflict on Children" July 2-4th, 2001 Florence.

Moving beyond mortality, a useful summary measures are DALEs (disability-adjusted life expectancy) compiled by the World Health Organization. The DALE measure takes into account both years of life lost to disease and injury and years of healthy life lost to long-term disability. Russett et al (2003) find that civil wars significantly reduce this aggregate measure of national health performance.

A related measure is WHO data on DALYs, (disability-adjusted life-years). Russett et al (2003) use information on the major 23 diseases for categories of the population distinguished by gender and 5 different age groups. They find important effects of civil war in increasing the post-conflict incidence of death and disability due to particular infectious diseases and conditions in the different population sub-groups. As an example, in 1999 WHO(2000: 168, 174) estimates that there were 8.44 million DALYs lost as a direct effect of all wars that were then ongoing. However, in the same year there were a further 8.01 million DALYs lost as a result of civil wars than had ended in the period 1991 to 1997. These past civil wars had increased the incidence of persistent infectious diseases that caused these additional DALYs. Thus, the legacy effect of civil wars on disability-adjusted life years was approximately as large as the effect during conflict (Russett et al 2003).

The most important cause of the indirect deaths of civil war are infectious diseases (Russett et al 2003). Of these, malaria is the most important. The evidence suggest that all the age groups under 60 are affected by malaria. For example, in Rwanda as of 1999 the effect of the rise in malaria as a result of the war has been estimated to have reduced

healthy life by 15 years per 100 people. This is the indirect cost of civil war through one of 23 major infectious diseases.

HIV infection rates also increase due to civil war. Military recruits are typically young, sexually active men, often unmarried. Military personnel tend to have high rates of Sexually Transmitted Diseases (STDs) and HIV, estimates indicate that they are two to five times higher than those of the general population even during peacetime. When stationed away from home social controls to engage in sexual relationships are lower and the risk of HIV infection is likely to be higher. Prostitution around army bases also increases the spread of infection. In times of war the risk of contracting HIV or other STDs may seem low relative to the risk of death in combat. There are some figures for HIV prevalence in the military available (see Table 2) but there are no reliable figures for rebel forces. They are likely to be at least as high as for the regular armed forces. However, HIV is not only spread through consensual intercourse but also through gender based violence. Regular soldiers and rebels force women to give sexual favours in exchange for "protection". The incidence of rape increases often dramatically during war, refugees as well as displaced women and girls being particularly vulnerable. It is estimated that over 200,000 women refugees were raped during the Rwandan war (Carballo and Solby, 2001).

Table 2 : HIV in the Military

Country	HIV Prevalence
Sierra Leone (1998)	61 percent
Angola	40-60percent
DRC	40-60percent
Uganda (1995/96)	27.1percent
Cambodia (1996)	6.5 percent

Sources: World Bank (1997) and Elbe (2002)

The destruction of the social and physical infrastructure during wartime also contributes to the spread of the disease. The health system is less likely to detect the diseases associated with HIV/Aids infection or screen blood supplies. War also destroys the education system which makes the teaching of prevention more difficult. Aids also

contributes to political instability by leaving millions of children as orphans and by killing teachers, health workers and other civil servants. The relationship between conflict and HIV can therefore be seen as mutually reinforcing. In most war or post-conflict situations women do not have a choice regarding breastfeeding their babies, thus increasing the risk of infecting the next generation (Machel, 2000).

After the war many countries are thus left with a much higher prevalence of HIV infections than before the war. Reconstruction of the physical infrastructure is likely to take precedence over many social development targets and with very limited resources many states will be unable to fund educational health programs to prevent a further spread of HIV infection. The re-integration of ex-combatants into civil society also poses a particular health problem due to their comparatively high levels of HIV prevalence (Carballo and Solby, 2001).

Diseases have long been used as weapons of war. AIDS has also been used as an instrument of war. The widespread use of rape has been used by HIV infected soldiers as a systematic tool of warfare in conflicts in Liberia, Mozambique, Rwanda, and Sierra Leone. "There is documented testimony from female survivors of rape in Rwanda that the transmission of HIV was a deliberate act. According to some accounts, HIV-positive Hutu men would tell women they were raping that they would eventually suffer an agonizing death from AIDS. Some of the rapists allegedly said 'We are not killing you. We are giving you something worse. You will die a slow death' (Elbe, 2002).

The displacement of people caused by civil war has severe adverse effects on the reproductive health of women, men and adolescents. Fertility patterns and sexual activity remain at normal levels for refugees, but the living conditions of refugees and the displacement of people increase the incidence of sexually transmitted infectious diseases.

Guha-Sapir and Forcella (2001) in their study of the three refugee camps in Ethiopia noticed that although family planning services or contraceptives were available in some cases, these services were not effective due to a passive distribution system that depended

on explicit demand of them. She argues that a "lack of demand among refugees from civil conflict have frequently been explained by a " population replenishment" attitude". In the Bonga camp, although condoms were available, they was no evidence of their use. The total fertility rate in this camp was estimated at 233.6 per 1000 women in reproductive aged. Moreover, refugees in Bonga freely expressed their desire to replace lost population resulting from conflict and displacement.

Moreover, Russett et al (2003) find that here is also an apparent effect of civil war on the increasing rate of cervical cancer. There are two channels through which civil wars can affect the incidence of cervical cancer. First of all, after civil war social norms breakdown and this includes the norms against forced sexual relations. Secondly, it as been showed that infectious diseases plays an important role in the increase of cancer, and as it has already been mentioned civil war increases significantly the incidence of infectious diseases.

Psychological damage of civil war

Quantitative research on the effect of civil war on mortality is feasible because mortality is easy to measure. At the other end of the spectrum of measurability is the psychological damage done by civil war. Mental health services are typically highly inadequate in conflict and post-conflict situations and so the evidence is much more fragmentary. However, such evidence as is available suggests, unsurprisingly, that psychological effects are large and again highly persistent.

Survivors from civil wars have lost family members, friends, livelihood, familiarity and identity. And most of them are living in refugee camps. This experience of trauma suffered on a wide-scale have psychological consequences: 'intimate exposure to brutality and subsequent displacement and civil disorder leave individuals psychologically scarred and the intricate network of social interaction deeply torn'. The experience of trauma does not end when shooting or bombing stops, but continues after wars. Moreover, living in a refugee camp or transitory settlement can constitute a

"secondary wound". The majority of individuals will experience low-grade but long-lasting mental health problems (MacDonald, 2002).

Russett et al (2003) find an indirect effect of civil wars on suicides of woman of childbearing age. This probably reflects the trauma of rape.

Landmines

Finally, one legacy effect of civil war we want to discuss here are landmines. They are in effect a 'negative capital stock' that the society accumulates during conflict. They continue to kill and maim people long after the actual fighting has stopped. For 2001 the International Campaign to Ban Landmines (ICBL, 2002) recorded 7,987 landmine casualties in 70 countries, of which about 70 percent were civilians. However, since reporting is incomplete, ICBL estimate that the total number is more likely to be between 15,000 and 20,000. In comparison with previous years, when the number of casualties was estimated at around 26,000 per year, this is a considerable improvement. The decrease in the number of landmine victims is due to the worldwide ban of antipersonnel mines in 1997 which resulted in the destruction of stockpiles as well as a drastic decrease in the production and trade of landmines. In addition mine sweeping operations in a large number of countries have been very successful in detecting and destroying mines. However, as the example of Cambodia shows, landmines continue to severely disrupt normal daily activities and thus constitute a serious obstacle to economic and social recovery. Although the actual fighting stopped more than a decade ago in 1991 on average more than two people are injured or killed by landmines in Cambodia every day. The number of civilian casualties was about 95 percent; children were particularly at risk, 28 percent of the casualties were children.

4. Some Empirical Analysis on the Economic and Human Costs of Conflict

In this section we perform a very simple analysis of the effect of civil war on economic growth and infant mortality. Economic growth and infant mortality capture only one dimension of the economic and human cost of conflict, however they are a useful summary measures of the economic and human crisis and its impact.

To analyze the effect of civil war on economic growth we consider a sample of 211 countries and data from 1960 to 1999 organized in periods of five years. To analyze the direct effect of civil wars on growth we adopt the standard specification:

$$GROWTH_{it} = \alpha + \beta LNGDP0_{it} + \sum \gamma_j X_{jit} + \delta CW_{it} + u_{it}$$

where i is a country index and t is a time index. GROWTH is the growth rate of GDP per capita over the five year periods, 1960-64, 1965-69, …, 1995-99 and LNGDP0 is gross domestic product per capita in the initial year of each period, measured in 1960, 1965, …., 1995. The set of X's includes the ratio of real government consumption, to real GDP (GOV), the number of revolutions (REVOLT) or coups (COUP) per year, the proportion of assassinations per million population (ASSASS), the deviation of the inflation from the sample mean (PPDEV), the ratio of real domestic investment to GDP (INV), secondary school (SEC) and primary school enrolment rates (PRI). We add the percentage of time during which the country experienced a civil war to the basic growth regression. Data on civil wars comes from Collier and Hoeffler (2002a) all other variables were obtained from the Global Development Network Database[11].

Table 3 shows the main results. We find that the effect of civil wars on economic growth depends on the duration of the conflict. A five year war reduces the average growth rate over five years by 12 percent. Thus, *per annum* the average growth rate would be reduced by about 2.4 percent, a result comparable to the one obtained by Collier (1999).

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[11] http://www.worldbank.org/research/growth

Table 3: The Impact of Civil War on Economic Growth

Dependent variable: growth rate of GDP per capita		
	(1)	(2)
LNGDP	-0.07	-0.06
	(-5.00)	(-5.48)
INV	0.57	0.58
	(4.42)	(5.82)
SEC	-0.00	-0.00
	(-0.84)	(-0.17)
PRI	-0.00	0.00
	(-0.21)	(0.14)
GOV	-0.48	-0.35
	(-3.94)	(-3.91)
REVOLT	-0.01	
	(-0.44)	
COUP	-0.05	
	(-0.53)	
ASSASS	-0.00	
	(-0.69)	
PPDEV	0.00	-0.00
	(0.21)	(-0.22)
Civil War	-0.12	-0.09
	(-2.82)	(-3.73)
R^2	0.2396	0.2209
Obs.	323	507

Notes: OLS regression with robust t-statistics in brackets. Regressions include an intercept and regional dummies for Sub-Saharan Africa, Latin America and the Caribbean and Asia.

To analyze the effect of civil war on infant mortality we adopt a specification derived from Waldman (1992), including our variables of civil war. The main explanatory variables are the number of physicians, the percentage of urban population, the primary school, and the birth rate and regional dummies. The data on infant mortality, physicians, urban population and birth rate comes from the World Development Indicators. The data on primary school enrolment rates was taken from the Global Development Network Database. As before we consider a sample of 211 countries and data from 1960 to 1999, organized in periods of five years. The dependent variable is the log of the mean infant mortality taken over each five year period. As in the growth regression we include as

explanatory variables the percentage of time spent at civil war during the period , and a dummy which takes value of one if the country was at civil war during previous period.

Table 4 shows the main results. Our econometric study investigates the effect of civil war on infant mortality. Unsurprisingly, the mortality effect depends upon the duration of the conflict. A five-year war increases infant mortality by 13percent. However, this effect is persistent – in the first five years of post-conflict peace the infant mortality rate remains 11 percent higher than in the baseline.

Table 4: The Impact of Civil War on Infant Mortality

Dependent variable: log of infant mortality		
	(1)	(2)
Primary education	-0.00	-0.00
	(-1.40)	(-1.24)
Physicians per 1000 population	-0.14	-0.14
	(-7.19)	(-7.04)
Urban population	-0.01	-0.01
	(-8.57)	(-8.57)
Birthrate	0.04	0.04
	(22.45)	(21.92)
Civil War	0.13	
	(2.24)	
Previous war		0.11
		(3.47)
R^2	0.87	0.87
Obs.	761	761

Notes: OLS regression with robust t-statistics in brackets. Regressions include an intercept and regional dummies for Sub-Saharan Africa, Latin America and the Caribbean and Asia.

5. Conclusion

In this paper we have focused only on the effects of civil war within the affected country, we have neither considered the regional nor the global costs of civil war. Our survey shows that most of the suffering inflicted by civil war accrues to non-combatants who typically have no say in either whether the conflict is initiated or in whether it is settled.

During the war there is a severe loss of income, and a large increase in mortality and morbidity. Even if a war is viewed as a costly investment in subsequent social progress, the costs during the conflict are typically so high that post-conflict progress would need to be dramatic for subsequent benefits to outweigh them. Yet the legacy effects of civil war are usually so adverse that they cannot reasonably be viewed as social progress. Many of the costs of the war continue to accrue long after it is over. For example, the country tends to get locked into persistently high levels of military expenditure; capital continues to flow out of the country at an unusually high rate; the incidence of infectious disease remains much higher. Even economic policies, political institutions and political freedom appear to deteriorate. Hence, most modern civil wars are not remotely like the nineteenth century American civil war that ended slavery. Of course, it is always possible to find some modern civil wars that can reasonably be seen as ushering in social progress, but these are surely the exceptions. On average, modern civil war has not been a useful force for social change, it has been development in reverse.

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