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The Economic Costs of Civil Wars*

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Abstract: This article assess empirical studies of the economic costs of internal armed conflicts. The reviewed works are divided into accounting and modelling methods. Cost is seen as the difference between the counterfactual production without conflict and the actual production. The average economic cost of internal armed conflict is a 3.7% yearly reduction of GDP. There are large differences between the estimates, even for the same country. One of the reasons for pursuing such studies is to give improved basis for more cost-effective post-conflict reconstruction. This is better achieved with an accounting method where different sectors of the economy can be differentiated.

Keywords: economic costs of war, conflict, civil war

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1. Why measure costs of conflicts?

There are five main reasons for assessing the costs of war. First, because conflict is a major source of poverty and underdevelopment. Second, since policies for reducing the economic costs of conflicts can only be devised if we know how economies operate during conflict. Third, because understanding of economic behaviour and motivation during conflict is essential for forming policies to end or reduce war. (Stewart & FitzGerald 2000, p. 3) Fourth, better estimates of costs are needed to estimate the economic values of conflict prevention. (Humphreys 2003, p. 21). Fifth, because an assessment of costs will give knowledge for more cost-effective post-conflict reconstruction.

This paper reviews empirical studies of the economic costs of internal armed conflicts to see if the methods used are good enough to provide useful results for the purposes stated above. It does so by first presenting the main methods used so far and then comparing their results.

There are many different sorts of costs associated with conflict. "Surprisingly one of the least studied aspects concerns the economic consequences of war" write Fischer & Brauer (2003, p. 229) in a research agenda that also includes nineteen other important questions for peace economics.

An attempt at analyzing the cost-effectiveness for outside powers of conflict prevention has been made by a number of researchers in Brown & Rosecrance 1999. Their conclusion is quite clear: "in every case we studied ... conflict prevention actually cost or would have cost the international community much less than the conflicts themselves." (p. 221) This comparison of costs is not enough since decisions on intervention are not taken only by weighing economic costs against each other.

The economic burdens for prevention and the economic costs for conflict might be differently shared. This is even more pertinent if we look at the costs inside a country. Those who will pay the price for armed conflict are not necessarily the decision makers who start the violence. Most people lose but some groups in society can benefit from war, such as arms dealers and black market operators and others.

We can study the economic costs of armed conflict to compare them with the costs for conflict prevention in order to choose the best solution after a cost benefit analysis. It is however

a major obstacle for a rational decision if other groups in society than those who gain the benefits pay the costs. We face a risk for sub-optimization where decision makers chose according to the costs and benefits they see falling on themselves and not based on the costs and benefits falling on the whole society. A broader perspective taking into account all costs and benefits in the whole society should be made if a social cost-benefit analysis is made.

An even broader perspective is taken by Collier & Hoeffler 2004. They try to estimate economic costs and benefits for several means of reducing conflict. Their approach is interesting and debatable (Addison, 2004, Intriligator 2004).

Even if there is no difference between those who will pay for conflict and those who will pay for prevention one cannot assume that all actors are rational economical beings that will always chose economically. National pride, ideology, mistrust and incomplete information might make some people prefer uneconomical choices. War is not easily explained only by rational choices.

My hope is that more knowledge about the huge and long-lasting economic costs of armed conflict will at least increase the possibility that more decisions are made in a way that avoid violence.

Many peace agreements that have been concluded have paid too little attention to economic dimensions and consequences of the conflict and have therefore diminished the chance for a lasting peace. "Experience in the area of peace implementation in the 1990s suggests that economic factors have far more to do with the failure, or severe retardation of the peace process, than they do with the success of such initiatives." (Woodward 2003, p. 4) To facilitate the peace process it is thus important to assess the economic dimensions and the economic cost of conflict is a central dimension If the costs of conflict are better known this could improve.

All empirical studies made show that internal armed conflicts have far-reaching and long-lasting economic consequences. More detailed estimates of these effects can improve our understanding of them and make it easier to handle them in a post-conflict situation. Knowledge about which sectors of the economy that are most affected and how will give better tools for post-conflict reconstruction.

The estimates made so far have widely different results, which makes it important to explain the differences. A major reason is that all methods, partly because of the lack of data, are significantly affected by the assumptions that must

be made to produce the estimates. Which methods that is applied and which assumptions that are used will thus have a significant influence on the results. Another reason is that data from countries in conflict is hard to get even if they exist and often is incomplete and unreliable.

One reason for measuring the economic costs of internal conflict is to present facts in order to influence decision makers to intensify their efforts to end the conflict. A study commissioned by civil society organisations in Uganda was made because the commissioning organisations suspected that the costs to the region were substantial and also were affecting the Ugandan economy as a whole. If this was proven to be correct “this might influence policy makers and donors to put more resources into the search for sustainable end to the conflict” (Dorsey & Opeitum 2002, p. 1).

2. Selection of studies

This review studies empirical works on the economic effects of internal armed conflicts, also called civil wars. Economic costs are here taken rather narrow, meaning costs expressed in monetary terms and in the studies mostly presented as percentages of GDP.

Most studies are careful to point out that their estimates are conservative and if better data were available the total cost would certainly be higher. Many important aspects of society with direct effects on economic life are affected by armed conflict but many of them are hard to measure because of the common lack of reliable data in war-torn countries. Some facets of economic activities such as the importance of trust, social capital and belief in the future are also very difficult to measure, especially in conflicts.

There are many other consequences of conflict that have far-reaching effects on the economic development of countries. With good reasons civil wars have been characterised as “development in reverse” (Collier et al. 2003. p. 13ff). Added to the measurable and un-measurable economic costs there are severe social, political and cultural effects that all can hinder economic development.

The most visible is the deterioration of health for most people in the country, which has a direct effect on production. This effect is to some degree included in some of the studies here in so far as they use economic models based on earlier periods, other countries, or regional averages to estimate potential production under peaceful conditions. The detrimental health effects of

conflicts last very long after the conflict has ended and have therefore a profound effect on the productivity of the labour force for a long time. (Ghobarah et al. 2003, 2004a, 2004b)

International conflicts are not included here even though some of the conflicts can have some foreign intervention. There is however reason to believe that inter-state conflicts have some different economic dimensions. International wars can have more positive effects than internal armed conflicts since better utilisation of capacity and technological progress can stimulate the economy in a way that is not prevalent in internal conflicts. (Stewart, Huang & Wang, note, p. 67)

Recent research (Koubi 2005) on both international and internal conflicts report that the average economic growth in countries that has fought a war is slower than for those that did not. Perhaps somewhat surprisingly war severity and duration gave positive subsequent economic growth after the war (p. 69). That could be explained by the “Phoenix factor” (Organski & Kugler 1977) and Mancur Olsons (1982) theory of entrenched interests. Old technology and disrupted fossilized political structures are shaken by upheavals and war. Kang & Meernik (2005) find that “generally war exercise negative economic effects” (p. 88) and find those more important than the “war renewal” effects.

Today most armed conflicts are civil wars (also called intrastate conflicts). They accounted for 77% of armed conflicts 1989-2003. International conflicts (also called interstate conflicts) were only 6% and the remaining 17% were internationalized intrastate conflicts (intrastate conflicts with foreign intervention). (Harbom 2004, p.13)

In this review fourteen studies are included. All are civil wars. They were published between 1987 and 2003 and were all that were found trying to make a comprehensive estimate in monetary terms. The major part, nine studies, concentrate on one country only. Of those, five look at Sri Lanka. The remaining studies examine several countries, from four up to seventy-eight.

The research done is of a cumulative nature that is perhaps best seen in the studies on Sri Lanka that improve in clarification of methods and assumptions over time. The availability of data seems to be one of the factors why Sri Lanka is so thoroughly investigated compared to other countries.

3. Typology of methods

The methods for measuring the economic costs of conflict can be divided into two major groups.

They are here labelled the *accounting method* and the *modelling method*. The accounting method counts the direct and indirect costs of conflict based on economic theory and earlier empirical work. Typically authors list empirical estimates of how large these costs are and sum them up. The indirect costs are sometimes based on simple or complex economic models. The modelling methods do not try to add up observed costs but rather to establish how the economy could have developed in the absence of conflict. Of the fourteen studies reviewed here five are classified as accounting and nine as modelling.

3.1 Accounting methods

Methods that here are called accounting methods have one major advantage over modelling methods. They are based on a bookkeeping approach and therefore give an impression of factuality that all sorts of models and estimates based on assumptions lack. They are not basically counterfactual as all estimates built on models can be said (or accused) to be.

But they might miss a major part of the costs if not some sort of model thinking is applied. Especially opportunity costs such as decreased tourist streams and non-realised foreign direct investment cannot be estimated without some sort of assumptions, which always can be debated and questioned.

3.1.1 Direct costs

Direct costs are those that can be observed and counted, at least in principle. As all data on countries in conflict usually are hard to collect and more or less unreliable if found this might be difficult in practice.

Destroyed infrastructure, factories, machinery and farmland have some sort of price tag and can be summed up. Another cost that is easily grasped and relatively easy to measure is the increased military expenditure.

One way of calculating the cost of destroyed capital is to calculate the net present value of the lost production that is the result of the destruction. To do that you need to decide which internal rate of return you chose. Different rates will yield large differences for returns, especially if long time periods are involved. Some researchers have presented several scenarios based on different rates of return to facilitate comparisons how the estimates were done.

All capital is not necessarily productive, some investments might be the result of bad policy choices. But most capital is productive and

the destruction or loss of it will diminish total production.

Land mines are for some countries a grave obstacle, which cause both accidents and underutilisation of existing productive capacity, especially in agriculture. They are costly to remove but were cheap to manufacture.

3.1.2 Indirect costs

A major problem with all estimates is that they are not entirely built on actual, observable costs. The direct costs are sometimes hard to measure and often difficult to find data for but they are easy to understand. The indirect costs are much more controversial since they cannot be directly seen but are estimated. These estimations can always be questioned and they always build on some assumptions that are debatable.

Most of them undoubtedly exist for countries in conflict but how large they are is open to discussion. Even if they constitute a major part of costs (which they do in some estimates) it might be hard to convince sceptics that they really exist and should be taken into account. Political deliberations are perhaps more easily influenced by budgetary items and lists of destroyed property and injured and dead people.

Nevertheless the indirect costs are quite large and are of crucial importance for estimating future production capacity and thereby the future wealth of a country. We will look at indirect costs with foreign dimensions first and then at costs with primarily national and household dimensions.

Capital flight is a well-documented problem for many LDCs and especially for those in conflict (Collier & Gunning 1995, Collier, Hoeffler & Pattillo 1999). Before a typical civil war a country held 8.6% of private wealth abroad but at the end of the war this had risen to 19.7% (Hoeffler & Reynal-Querol 2003, p. 6). This is a serious problem since capital flight is detrimental for capital formation, which is of crucial importance for economic growth. It is also negative because it shows that confidence in future economic growth is low. This applies for both domestic and foreign capital flight and both can be very hard to repair when investment patterns in other countries have been established.

The emigration of educated and skilled workforce is also a major problem. For most LDCs brain drain is a serious obstacle even in peacetime. If manpower educated in the country leave the country the cost for their education will be an unproductive sunk cost for the country that paid it.

Tourists are an important income-generating group for some countries. Sri Lanka had a fast growing tourist industry when the armed violence started. This was fatal for the industry but how should one estimate the losses made? One could assume that the expansion could have continued at the same rate as before or one could look at similar tourist destinations and use the same increase as they had.

The damage to production capacity coupled with uncertainty of future production lead to serious drawbacks in exports. Less export mean less foreign currency inflow and less possibilities for import. Some imports are still deemed to be necessary and imports of weapons tend to increase. Larger foreign debt is probably the result even if military aid might increase.

Development aid is most often stopped because of uncertainty and security reasons. Humanitarian assistance diminishes even though some new such assistance might come but only during the later part of conflict or after.

What and how much could have been produced if conflict had not occurred? The risk for manpower and facilities hinders production even

where it is possible to produce. In conflict areas taxation and looting from both government and rebels make production risky. If possible, capital leave the country and investment decrease. Since investment is so important for enhancing the productive capacity this will have long-term detrimental effects.

Investment in human capital in the form of expenditure on health and education also suffers and make people in their role as production factors less productive both in the short and long term. The often low age of many soldiers and rebels makes this especially grave since this can produce severe social problems after the conflict when many young men only know how to use weapons and are used to control power and money.

In this risky environment many entrepreneurs chose to engage in economic pursuits that yield fast and large returns. This is further aggravating the already bleak prospects for a conflict economy.

The table below lists the direct and indirect costs discussed above. The information there is already presented in the text above but in the table it is summarised in a tabular form.

Table 1. Accounting method for estimating direct and indirect economic consequences of internal armed conflict

<i>economic level</i>	<i>direct costs</i>	<i>indirect costs</i>
<i>external relations</i>	foreign debt	capital flight of domestic capital capital flight of foreign capital discouragement of new foreign investments emigration of skilled workforce reduction of incoming tourists less exports less imports less development aid less humanitarian aid military aid +/-
<i>national economy level</i>	physical destruction of production capacity, infrastructure, factories, machinery physical destruction of transport vehicles and routes agricultural production capacity physical destruction of land death and injuries on workforce higher military expenditure refugee care land mines	non-production because of threat situation taxation by rebel and government troops less investment less developed human resources as less health expenditure, less education expenditure missed education opportunities for combatants less production of transport and physically limited intensive production more production for short term profits, less long term
<i>household level</i>	death, injuries and illness extra legal income +	food scarcity inflation emigration, forced migration

3.2. Modelling methods

3.2.1 Extrapolation

In extrapolation earlier economic trends are extrapolated. This can be done in different ways, with more or less account taken of changes in the world economy outside the country in conflict. If tourism everywhere is severely decreased because of terrorism and its consequences this can be handled by not simply extrapolating earlier trends but by introducing a reduction in the estimate based on the experience of other similar countries. One way of doing this is to take the average for other countries in the region.

3.2.2 Economic models

Counterfactual production – actual production = loss of production. This is the basic idea behind most of the modelling that have been made to estimate the economic costs of conflict. The interesting and difficult part is how to establish the counterfactual production. Many of the models used study the increase in military expenditure and compute the impact of military expenditure on investments. The computed change in investment is then used to estimate counterfactual economic production.

Another way to model is to estimate growth from regression based on time series of earlier development. This can be augmented with techniques that take the economic development in neighbouring or similar countries into account. An even more sophisticated way is to construct a synthetic (or fictional) model of a country with characteristics that capture the essential traits in the economy. These different ways are discussed more below.

Military expenditure → investment → growth

The basic idea in these models is that increased military expenditure (mlex) reduces investment, which in turn decrease economic growth. That higher military expenditure reduces investment has empirically been established and is one of the few robust conclusions from research on the economic consequences of military expenditure (Smith 1977, Lindgren 1984, Chan 1985, Knight et al. 1996, Galvin 2003).

The smaller amount of investment will then reduce growth since investment is one of the key factors for producing economic growth. As Rodrik (2003 p. 4) describes it “The total output of an economy is a function of its resource endowments (labor, physical capital, human

capital) and the productivity with which these endowments are deployed to produce a flow of goods and services (GDP).”

Many of the empirical works discussed in this paper base the estimate of how this link from investment to increased production functions on some version of the Harrod-Domar growth model which states that the rate of growth is a direct function of savings and an inverse function of the capital-output ratio or

$$growth = \frac{savings}{capital \square output \square ratio}$$

$$or \quad g = \frac{s}{k}$$

In economic theory savings and investment are identical *ex post*, so if investments increase growth will also increase according to the capital-output ratio. The national context in a country have often an empirical figure for how much more output that will result for one increased unit of capital, the incremental capital-output ratio (ICOR) (Todaro & Smith 2003, p. 113 ff).

How this chain of mechanisms is estimated can be based on regression analysis of the impact of military expenditure on investment. The increased mlex which is usually quite substantial in armed conflicts is then used as input in an equation based on the regression. The resulting estimated investment is the investment that could have taken place in the absence of conflict and thereof following higher mlex.

The estimated investment is then combined with an empirically based figure for ICOR for the country and this computation then result in an estimate of how large production would have been in peace. To give a clear picture of the magnitude the actual production in conflict is deducted from the estimated production for peace and the difference is then the cost of conflict. It is often presented as a percentage of actual production (percent of actual GDP in conflict).

Models from regression

One way of making an estimate of the cost is to make a regression. This can be done on the economy before conflict and then the results are used to estimate what could have happened. The regression can also be based on what took place in other countries in the region. One can also base an estimate on the ranking within the region of the conflict economy before conflict. Regression can also be based on time series and different statistical methods can be used.

A specific way if using regression is to develop a synthetic region. A synthetic region is a

construct, which incorporates essential characteristics of the economy in conflict. These characteristics are taken from other countries or parts of countries and together they determine how the synthetic region could have developed economically in peace.

3.2.3 Lost Foreign Direct Investment

Studies that estimate the economic costs of lost foreign direct investments that did not take place because of the armed conflict find those costs to be very large. The underlying assumption for such estimates is the idea that FDI is beneficial for the economic growth of a country. Most economists support this. Borensztein, Gregorio & Lee 1998 find that “FDI has a positive overall effect on economic growth” (p. 123) and that the effect “is dependent on the level of human capital ... in the host country” (p. 134). Zhang 2001 concludes that “it is clear that FDI may potentially be a growth-enhancing factor to host economies, but its actual impact on host economic growth depends on many factors, particularly host-country characteristics.” (p. 184) The flow of FDI increased during the 1990s and “despite the enormous increase in the FDI flows, the nexus between FDI and the host country’s economic growth seems generally positive for the 1990s” (Ram & Zhang 2002, p. 212). Building on those results it seems reasonable to assume that lost FDI because of internal armed conflict will lead to slower economic growth.

Arunatilake (2001) found this cost to be more than 40% of the total costs. How this cost is estimated is thus of crucial importance for the estimate of total costs.

To arrive at an estimate you can follow different routes. If it were reasonable to assume that the investments would have been basically the same as before the conflict you can estimate them with extrapolation or regression. But if investment patterns in the rest of the world changed for other reasons it seems best to let those changes also be reflected in your estimate. To do this one needs to compare the foreign investments with foreign investments in other countries in regard to industrial sectors and countries of origin.

Business decisions concerning foreign direct investment are taken in a context where the time frame is of utmost importance. Long-term predictability is highly regarded and all sorts of uncertainties have to be balanced by higher expected profits.

Time periods with different external or domestic characteristics should be identified and be

the basis for estimates. As an example the total period 1984-96 for Sri Lanka was by Arunatilake et al. divided into three periods with the period 1984-1991 assumed to have received the same FDI as the average for 1979-82 (1.23% of GDP) and for 1993-96 at the level for 1993 (2.5% of GDP) and the transition year 1992 the average of those two levels (1.87% of GDP).

Most FDI decisions are taken with the situation in the whole country as the determining factor. If the whole or only a part of a country is affected by conflict will in most cases not matter since the conflict per se will be a large disincentive for FDI. Only in few cases where remote or clearly demarcated regions have conflicts with low probability for spreading this will to some degree keep the unaffected areas attractive. On a more general level economic growth, predictable behaviour, trustworthiness and commitment from government institutions, infrastructural development of cities, and lower tax rates are important factors for attracting FDI (Hsiao & Chen 2003, p. 893). As for all business activities known and stable rules and frameworks are important for investment decisions.

The share of local production factors in production is important since many FDI result in production with a high degree of imports. This share varies between countries and sectors and is rather high. In the case of Sri Lanka it has been stated that the foreign exchange leak from exports made by export-oriented firms is as high as 85% of export values. Thus only 15% of the value of export accrued to domestic production factors where local labour earned 10%, local raw materials 3% and payments to local services 3% (Athukorala 1995 as cited in Arunatilake et al. p. 1494).

If no FDI comes the domestic resources otherwise used in production by FDI can be used for alternative purposes. These are probably less growth inducing than FDI would have been. In Arunatilake they are assumed to be half as good in this respect as FDI would have been.

To arrive at a total cost for lost foreign investment we should then compute the compounded present value of the production that would have taken place if FDIs had been present in such quantities as they would in absence of conflict. How large the total sum is will be largely dependent on which internal rate of returns that is used. The differences are clearly shown in the following table.

Table 2. Lost earnings due to lost FDI in Sri Lanka with different rates of return 1984-1996

Interest rates Cost in Rs. and % of total cost	Interest rate 0%		Interest rate 5%		Interest rate 10%	
	Rs. millions	Percentage of total cost	Rs. millions	Percentage of total cost	Rs. millions	Percentage of total cost
Lost earnings, lost FDI	423 446	43%	495 252	42%	588 897	41%

Adapted from Arunatilake et al. 2001, Table 3, p. 1496

3.2.4 Lost tourism

For some countries tourism is an important industry. In 1996 receipts from international tourism equalled about 1.5% of world GDP and was the third largest economic activity in the world after oil and motor vehicles. (Sinclair 1998:4). Tourism can make several important positive contributions to economic development. It can provide hard currency to diminish foreign exchange gaps and also to finance imports of capital goods. It can increase full-time and part-time jobs. It can increase gross national product and personal incomes and also augment the tax revenues for the government. To get all these positive effects tourism has to be expanded and this also involve considerable costs. Infrastructure in the form of roads, airports, water and sanitation is often required in a way specific for tourism and hence of limited general use. Skilled labour is often demanded and exerts a pressure for investment in human capital. Foreign tourists may spend their money in a way that alter domestic consumption patterns and might also be inflationary (Sinclair 1998:2ff).

Non-economic effects of tourism might be very large and the political, social and cultural effects are often immense. Sometimes they have far-reaching economic consequences on domestic migration patterns and consumption habits.

For those countries where tourism is important it is in the same way as for FDI crucial to assess whether trends before the outbreak of conflict could have been expected to continue or if changes would have occurred regardless of conflict. If no large changes would have been probable some sort of regression building on earlier trends can give an estimate.

There are very few studies on the effects of conflicts on tourism. One recent (Neumayer 2004) concludes that “[s]ubstantial increases in political violence lower tourist arrivals in the long run by about one-quarter in our global sample” (p. 277). Tourism might return to earlier levels fast after a conflict (Hall 1994 as cited in Neumayer 2004, p. 278)

All resources that could have been generated by tourism would not have stayed in the country. The import leakage was in Sri Lanka assessed to be 30%. Alternative income generating activities was assumed to be 20% of lost income. The remaining 70% and 80% would thus leave 56% of gross loss in tourism as the factual cost.

Compounded to present value this still leaves substantial costs for a country with many potential tourists.

4. Empirical estimates

4.1 Studies of one country

In this paper 14 studies are reviewed. Of those studies 9 deals with only one country and of those 5 are dealing with Sri Lanka. This seems a bit surprising but might be explained by the fact that there have been more efforts at collecting pertinent data for economic reconstruction after conflict in Sri Lanka than in other countries. Lack of data is one of the major problems with producing estimates of the economic cost of conflicts. The other three countries are Nicaragua (2 studies), and Uganda.

4.2 Studies of several countries

Studies of the costs for several countries have all used some sort of economic modelling for estimating the costs. Two of them have used the average growth of other countries in the same geographical region without conflict as a base for predicting what the growth of countries with conflicts would have been without these conflicts.

In addition to the 11 studies in table 4 below there are also studies investigating these questions on a more general level without giving estimates for specific countries. An early attempt at this was Collier 1999 who estimated that countries in civil war reduced their annual growth rate with 2.2% (p. 9). He studied 92 countries where 19 had civil wars and the period was 1960-89. A similar estimate is given by Hoeffler & Reynal-Querol 2003 who found that the average growth rate per annum would be reduced by 2.4%

(p. 19). They studied 211 countries where 78 were in conflict during the period 1960-99.

4.3 Overview

The table below is showing major aspects of the 11 reviewed studies with estimates for specific countries and the two with no specific estimate for individual countries. One study that looks at a part of one country (the Basque country) is also included, Abadie & Gardeazabal 2003. That gives us altogether 14 studies in table 3. Which countries that are studied, during what period, what the total estimated cost is (the difference between the counterfactual production without conflict and the actual production with conflict expressed as a percentage of GDP), which methods that are used,

and how the main methods can be classified according to the typology presented earlier. All the studies have some element of economic modelling in them since a pure accounting method would cover only a small part of costs. Some models have to be used to get a more realistic result.

Of the 14 studies in table 3 only 5 are here classified as mainly accounting. That is probably due to the fact that more accounting oriented methods require better empirical data and thus are more difficult to use since data availability is a major problem. Four of the five accounting studies focus on Sri Lanka and the fifth on Uganda (which also has unusually good economic data for a conflict country).

Table 3. Empirical Studies of the Economic Costs of Internal Armed Conflict, 14 studies

<i>Author</i>	<i>Country</i>	<i>Conflict period</i>	<i>Cost of conflict</i>	<i>Methods</i>	<i>Main type of methods</i>
Fitzgerald 1987	Nicaragua	1980-84	77% of GDP 1984*	Compared with earlier gov. projections	Modelling
Richardson & Samarasinghe 1991	Sri Lanka	1983-88	68% of GDP 1988 (p. 213)	Direct and indirect costs built on assumptions	Accounting
Grobar & Gnanaselvam 1993	Sri Lanka	1983-91	20% of GDP 1988 (p. 404)	Increased milex -> reduced investment -> reduced growth physical and human destruction not included	Accounting
Stewart & Humphreys 1997	El Salvador Guatemala Nicaragua Ethiopia Uganda Somalia Sudan Liberia Mozambique 9 countries	1965-90 1965-90 1965-90 1965-90 1965-90 1965-90 1965-90 1965-88 1980-90	38.1% of GDP 1965 9.9 % of GDP 1965 113.4 % of GDP 1965 28.8 % of GDP 1965 58.6 % of GDP 1965 7.8 % of GDP 1965 +7.2 % of GDP 1965 35.1 % of GDP 1965 31.8 % of GDP 1965	Comparing with estimated growth based on average growth in region for countries not at war	Modelling
DiAddario, Sabrina. 1997	Nicaragua Nicaragua	1980-87 1980-87	17.3, 18.2, 19.6, 25.7% of GDP 1980-85	Based on model for assessing external financing	Modelling
Harris 1997, 1999	Sri Lanka	1983-92	88% of GDP 1982 (p. 287, 23)	Increase of gov. milex -> less growth based on Harrod-Domar	Modelling
Collier 1999	19 countries	1960-89	2.2% of growth rate/year and war overhang after	Regression	Modelling
Kelegama 1999	Sri Lanka	1983-94	131% of GDP 1995 (p. 79)	Increased milex -> reduced investment -> reduced growth + damaged infrastructure	Accounting
Stewart, Huang & Wang 2000	Angola Burundi Ethiopia Liberia Mozambique Sierra Leone Somalia Sudan Uganda El Salvador Guatemala Nicaragua 12 countries	1974-95 1987-95 1973-95 1984-95 1980-95 1990-95 1987-95 1983-95 1970-90 1978-95 1965-95 1977-93	1.48% of GDP 1995 +0.006% of GDP 1995 3.95% of GDP 1995 1.56% of GDP 1995 2.83% of GDP 1995 1.47% of GDP 1995 0.29% of GDP 1995 1.72% of GDP 1995 0.5% of GDP 1995 5.67% of GDP 1995 +0.006% of GDP 1995 13.5% of GDP 1995 (p. 96)	Comparing with estimated growth based on average growth in region for countries not at war	Modelling
Arunatilake, Jayasuriya, & Kelegama 2001	Sri Lanka	1984-96	140%, 168%, 205% of GDP 1996 (different interest rates 0-5-10%)	Increase of gov. milex -> less growth based on Harrod-Domar + extrapolated lost FDI, all compounded	Accounting
Lopez 2001	El Salvador Nicaragua Guatemala Panama 4 countries	1979-91 1978-79,81-88 1966-96 1989	1100% of GDP 2000 900% of GDP 2000 425% of GDP 2000 85% of GDP 2000	Regression based on time series	Modelling
Dorsey & Opeitum 2002	Uganda	1995-2002	57% of GDP 2002	Direct and opportunity costs	Accounting
Abadie & Gardeazabal 2003	Basque Country	1975-97	10 percentage points decline relative synthetic region (p. 7)	Estimates from synthetic region with essential characteristics	Modelling
Hoeffler & Reynal-Querol 2003	78 countries	1960-99	2.4% of yearly growth rate	Regression	Modelling

* computed from table 8, p. 208.

5. Comparing the results

In order to compare the estimates for the economic costs of conflict that have large differences a simple computation has been done. Most of studies have given an estimate of total costs in terms of percentage of GDP for the country in conflict. The cost is the difference between the counterfactual production without conflict the actual production during conflict. Most often comparing the total costs of conflict for the whole conflict period with the GDP for the starting or ending year. This total cost of conflict has here been divided by the number of conflict years and thereby we get a yearly percent reduction of GDP for countries in conflict. This is done in the table below for the eleven studies where this can be done in a comparable way (Collier 1999, Abadie & Gardeazabal 2003 and Hoeffler & Reynal-Querol 2003 are not included).

This computation is a rather crude measurement but is a clear improvement for comparative purposes instead of the total percentage of GDP for a given year that is most often given by the studies as a result. Since what appears to be rather small differences in economic growth will have large effects even after relatively short periods it is important to include the length of the conflict. The length of conflict is computed from the conflict years as given in the studies. The shortest conflict is only 1 year (Panama) and the longest is 31 years (Guatemala). In order to

compare the estimated costs it is therefore reasonable to divide the cost estimate for the whole conflict period with the number of years of the conflict.

There are very large differences between the estimates ranging from a very small increase up to about 90% decrease per year. What can explain the variation?

To see how important the method for measuring is, the studies have been divided into two groupings, Accounting and Modelling methods, respectively (table 3). Two studies, DiAddario 1997 and Lopez 2001 have substantially higher estimates of the economic costs of conflict than the other and averages for the two groupings have been computed also with these two studies excluded. As can be seen in the table below the average cost is not very different, 10.0% and 12.24%, according to method with all studies included. When the two studies with highest costs are excluded we find a larger difference with averages of 10.0% and 2.1% where the accounting methods have the higher value.

The average economic cost of internal armed conflict is thus 3.7% of GDP. This might sound low but considering that the average length of the conflicts included were 16.8 years it means that the loss for the whole period is more than half of GDP for one year (61.7%). A substantial cost for any economy and especially for a developing country.

Table 4. Yearly reduction of GDP for countries in conflict, 11 studies

<i>Author</i>	<i>Country</i>	<i>Conflict years</i>	<i>Number of conflict years</i>	<i>Cost of conflict, difference between production without and with conflict</i>	<i>Yearly % reduction of GDP for countries in conflict</i>	<i>Main type of methods</i>
Fitzgerald 1987	Nicaragua	1980-84	5	77% of GDP 1980	15.4	Modelling
Richardson & Samarasinghe 1991	Sri Lanka	1983-88	6	68% of GDP 1988	11.3	Accounting
Grobar & Gnanaselvam 1993	Sri Lanka	1983-91	9	20% of GDP 1988	2.2	Accounting
Stewart & Humphreys 1997	El Salvador	1965-90	26	38.1% of GDP 1965	1.5	Modelling
□	Guatemala	1965-90	26	9.9 % of GDP 1965	0.4	□
□	Nicaragua	1965-90	26	113.4 % of GDP 1965	4.4	□
□	Ethiopia	1965-90	26	28.8 % of GDP 1965	1.1	□
□	Uganda	1965-90	26	58.6 % of GDP 1965	1.1	□
□	Somalia	1965-90	26	7.8 % of GDP 1965	0.3	□
□	Sudan	1965-90	26	+7.2 % of GDP 1965	+0.3	□
□	Liberia	1965-88	24	35.1 % of GDP 1965	1.5	□
□	Mozambique	1980-90	11	31.8 % of GDP 1965	2.9	□
DiAddario 1997	Nicaragua	1980-87	8	17.3, (18.2, 19.6, 25.7)% of GDP 1980-85	17.3	Modelling
DiAddario 1997	Nicaragua	1980-87	8	(17.3, 18.2, 19.6) 25.7% of GDP 1980-85	25.7	□
Harris 1997, 1999	Sri Lanka	1983-92	10	88% of GDP 1982	8.8	Modelling
Kelegama 1999	Sri Lanka	1983-94	12	131% of GDP 1995	10.9	Modelling
Stewart, Huang & Wang 2000	Angola	1974-95	22	1.48% of GDP 1995	0.1	Modelling
□	Burundi	1987-95	9	+0.006% of GDP 1995	0.0	□
□	Ethiopia	1973-95	23	3.95% of GDP 1995	0.2	□
□	Liberia	1984-95	12	1.56% of GDP 1995	0.3	□
□	Mozambique	1980-95	16	2.83% of GDP 1995	0.2	□
□	Sierra Leone	1990-95	6	1.47% of GDP 1995	0.2	□
□	Somalia	1987-95	9	0.29% of GDP 1995	0.0	□
□	Sudan	1983-95	13	1.72% of GDP 1995	0.1	□
□	Uganda	1970-90	21	0.5% of GDP 1995	0.0	□
□	El Salvador	1978-95	18	5.67% of GDP 1995	0.3	□
□	Guatemala	1965-95	31	+0.006% of GDP 1995	0.0	□
□	Nicaragua	1979-91	17	13.5% of GDP 1995	0.8	□
Arunatilake, Jayasuriya & Kelegama 2001	Sri Lanka	1984-96	13	140% of GDP 1996	10.8	Accounting
	Sri Lanka	1984-96	13	168% of GDP 1996	12.9	□
	Sri Lanka	1984-96	13	205% of GDP 1996	15.8	□
Lopez 2001	El Salvador	1979-91	13	1100% of GDP 2000	84.6	Modelling
□	Nicaragua	1978-79, 1981-88	10	900% of GDP 2000	90.0	□
□	Guatemala	1961-96	31	425% of GDP 2000	13.7	□
□	Panama	1989	1	85% of GDP 2000	85.0	□
Dorsey & Opeitum 2002	Uganda	1995-2002	8	57% of GDP 2002	7.1	Accounting

Table 5. Difference in yearly percent reduction of GDP according to methods of estimation, 11 and 9 studies

		All studies	Accounting methods	Modeling methods
With all studies 11 studies, 36 estimates	Average	11.9	10.0	12.2
	Median	1.5	11.1	1.0
	Max	90.0	15.8	90.0
	Min	+0.3	2.2	+0.3
Without DiAddario, Lopez 9 studies, 30 estimates	Average	3.7	10.0	2.1
	Median	1.0	11.1	0.3
	Max	15.8	15.8	15.4
	Min	+0.3	2.2	+0.3

The major advantage of the accounting method, which is highlighted scrutinizing the two outlying studies, is that is very difficult to pinpoint exactly what factor is resulting in the exceptional result. In the accounting methods the included costs can be separated and thus more easily scrutinized to see if they are reasonable compared to other relevant data.

The length of the conflict could be expected to be important. Changes in domestic and foreign investment and tourist patterns can be expected to be more firmly established after longer time. The same could be said about emigration of educated manpower.

Different sorts of conflicts would have different impacts. Secessionist movements in small areas of a large country would have different effects than large uprisings with great popular support.

The intensity of conflict could also be expected to influence the economic consequences. It seems that the length of the conflict has a large influence on the effects after the end of hostilities

where there is a larger war overhang for shorter wars. Changes in economic behaviour, especially in portfolio management and education choices, need some time to influence the economy but will not change back very fast after a short war. (Collier 1999, Hoeffler & Reynal-Querol 2003)

If the same conflict were studied all these expected differences above would be kept constant. But still we find large discrepancies between the most investigated conflict, the one in Sri Lanka. Figures range from 2.2 to 15.8, all percent of GDP per year. Some of these variations are explained by clearly stated scenarios with different internal rates of return. A major part of the deviation can be found in the assumptions of how the indirect costs for lost foreign direct investment and lost tourism should be treated.

The figures for Nicaragua are also widely diverse with the lowest at 0.8 and the highest 90 % of GDP per year. The methods used are very different but they all build on economic modelling. This can explain some of the variation but leaves many question marks for further investigation.

Table 6. Differing estimates for the same country

Country	Author	Conflict years	Number of years	Economic cost	Cost per year in %
Sri Lanka	Richardson & Samarasinghe 1991	1983-88	6	68% of GDP 1988	11.3
Sri Lanka	Grobar & Gnanaselvam 1993	1983-91	9	20% of GDP 1988	2.2
Sri Lanka	Harris 1997, 1999	1983-92	10	88% of GDP 1982	8.8
Sri Lanka	Kelegama 1999	1983-94	12	131% of GDP 1995	10.9
Sri Lanka	Arunatilake, Jayasuriya & Kelegama 2001	1984-96	13	140% of GDP 1996	10.8
Sri Lanka	Arunatilake, Jayasuriya & Kelegama 2001	1984-96	13	168% of GDP 1996	12.9
Sri Lanka	Arunatilake, Jayasuriya & Kelegama 2001	1984-96	13	205% of GDP 1996	15.8
Nicaragua	Fitzgerald 1987	1980-84	5	77% of GDP 1980	15.4
Nicaragua	Stewart & Humphreys 1997	1965-90	26	113.4 % of GDP 1965	4.4
Nicaragua	DiAddario 1997	1980-87	8	17.3, 18.2, 19.6, 25.7% of GDP 1980-85	17.3 25.7
Nicaragua	Stewart, Huang & Wang 2000	1977-93	17	13.5% of GDP 1995	0.8
Nicaragua	Lopez 2001	1978-79, 1981-88	10	900% of GDP 2000	90.0

6. Conclusions

All the empirical estimates discussed in this paper have an element of assumption in them. This is unavoidable since there is no way to use strictly bookkeeping methods and get a reasonable total. The estimates given here are in general considered by the authors to be on the conservative side and thereby underestimating the true cost.

When comparing eleven studies that include 36 country specific estimates the average economic cost of internal armed conflict was 3.7% of GDP. The conflicts in these analysis had an average length of 16.8 years. The average total cost for these years was thus 61.7% of GDP for one year.

All estimates where a large part of the total cost consists of indirect assumed costs share the common weakness that most non-economists will look upon them with suspicion. The estimates building on economic models are probably even less convincing for politicians and other decision makers.

Forecasts of economic growth are not significantly better based than estimates of economic costs of conflict. Still they are widely cited and used as a basis for economic policy. Estimated costs of conflict should also be used even if they are not fully accurate since they might help decision makers finding more peaceful ways of solving conflicts. We know for sure that there are many other costs associated with conflicts than the economic costs.

Estimates of the economic cost of conflict in a country can be combined with case studies where more specific aspects of the economy in a country in conflict can be treated. Investigations on the consequences for health and education are pertinent. Many of these things have also been done for a number of countries. More research on how the economic costs can be measured is still useful and needed.

Many forms of regression analysis basically build on the assumption that the future in some way will be shaped by the same forces that formed the period upon which the regression is based. If then the context is structurally changed it might be misleading the base an estimate on a context that is no longer existing. This problem is diminished if these structural changes are taken into account.

A very general model that is based on the whole economy in an earlier period might not very well reflect the economics of a country in conflict where the surrounding world has changed significantly. It seems better to try to incorporate

such changes even if some crude assumptions have to be made.

The comparison between the different methods for estimating the economic costs of conflict did show that modelling methods tended to give almost the same estimates than accounting methods if all studies were included. If the two outlying studies were not included the accounting methods gave higher estimates. The conclusion is that the problem of credible results gives a clear advantage to the accounting methods since it is hard to judge the validity of a model consisting of econometric equations. This is especially significant for non-economists and since decisions on conflicts seldom are taken by economists this is crucial.

To facilitate post-conflict reconstruction a more accounting method of assessing the economic costs of conflict is more appropriate since it will give more guidance for that task.

Even if economic costs are not considered there are many human and moral arguments for peaceful conflict resolution. The estimates of the economic costs of conflict can show us that conflict resolution without violence in many cases also is a very good economic investment.

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