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The Economic Cost of the War in Sri Lanka



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Abstract

There is growing interest in recent years in the economic dimensions of civil wars and other violent social conflicts. This paper discusses some of the conceptual and methodological problems associated with assessing the economic costs of such conflicts, and presents an evaluation of the costs of the (still ongoing) conflict in Sri Lanka. On conservative assumptions, the war may have cost the equivalent of twice Sri Lanka's 1996 GDP.

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1. Introduction

Civil wars, often related to ethnic conflicts, have become increasingly common in recent years. They impose enormous and long lasting human, social and economic costs, and have repercussions well beyond the immediate theatre of combat. The aggravation of ethnic frictions to the point of armed conflict can doom many multi-ethnic societies to periods of prolonged economic, political and social crises, and set back economic progress for decades. The eruption or continuation of these conflicts is obviously a product of a multitude of factors, and each conflict has its own unique roots. Nevertheless, economic factors, including major policy changes, do have the potential to contribute to a sharpening of ethnic tensions, particularly if they lead to (actual or perceived) changes in distribution of social wealth and opportunities.[1] The potential costs of social instability that may follow policy changes must be explicitly taken into account when assessing the net benefits of policy changes.

However, estimating the full costs of such conflicts is a very difficult, if not impossible, task. The human and social costs of death, disability, dispossession and the psychological trauma associated with violence and terror are not really quantifiable. On the other hand, at least in principle, the 'purely economic costs' are amenable to quantitative measurement: in "assessing the costs of war to an economy, one would ideally calculate the destruction of production factors to determine the country's potential output without war and then compare this information with the actual output" (Colletta, 1996:39). Empirical studies of even the purely economic costs of wars are however rare because, "making these ideal computations is difficult, time consuming...." (ibid, p. 39). Nevertheless, the economic aspects of civil wars are now receiving increasing attention (see, for example, Collier and Hoeffler, 1998). [2]

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[1] Clearly, economic factors, including the consequences of major policy changes, do have the potential to contribute to a sharpening of ethnic tensions, particularly if they lead to (actual or perceived) changes in distribution of social wealth and opportunities. Gunasinghe (1988) and others have suggested that the distributional effects of the post-1977 policy package contributed to deepening ethnic divisions in Sri Lanka, and there have been suggestions that the implementation of structural adjustment programmes facilitated the re-emergence of ethnic tensions in the Balkans.

[2] The estimation of economic costs of wars between countries has a fairly long history, and was the subject of considerable discussion earlier this century, focussing on whether the costs of a war would outweigh its benefits even to the victors. This issue was widely discussed, for example, during the discussions on the reparations payments imposed on Germany after the First World War to indemnify the victorious allied powers for losses suffered as a consequence of the war. Leaving aside the morality, politics, or even the pure economic sense of imposing reparations and indemnities on the defeated countries, the approaches to the quantification of the losses, however, were very crude and one-sided and, from a methodological viewpoint, of little use in providing guidelines for implementing

The primary aim of this paper is to assess the economic costs of the long drawn out and still ongoing ethnic conflict in Sri Lanka. However, in doing so, the paper also presents a critical review of the analytical approaches adopted in previous studies and clarifies some important conceptual and methodological issues. The paper is organised as follows. Section 2 presents a brief background on the Sri Lankan war. Section 3 discusses issues pertaining to the methodology of estimating the cost of the war and this is followed by a critique of the previous studies on the subject in Section 4. Section 5 provides our methodological framework and the estimated cost of the war. Section 6 provides the overall cost of the war with some concluding remarks.

2. Background and Consequences of the War

Sri Lanka is a small, multi-ethnic, low income country located at the Southern tip of the Indian sub-continent; in 1997 it had a population of 18.5 million, and per capita income of US$ 804. Despite its low income, it has long enjoyed a reputation for high levels of social indicators, comparable to those of much richer countries and well above those of its sub-continental neighbours.[3] The Sri Lankan Tamil minority (speaking an Indo-Dravidian language, largely Hindu by religion, and comprising 12.6 per cent of the population), has alleged discrimination in the post-colonial period by the Sinhalese majority (speaking a language belonging to the Indo-Aryan family, by religion largely Buddhist, and comprising 73.9 per cent of the population).[4] Simmering ethnic tensions that intensified after Sinhala was declared the only official language in 1956, (with resonable use of Tamil), led to sporadic eruptions of violent ethnic conflicts. Until the late 1970s the country enjoyed a reputation for having a functioning democracy, regular changes of government, and as a haven of peace and stability in a region of violence and conflict. This picture was however never entirely accurate. In 1971, a rural Sinhalese youth based movement, the Janatha Vimukthi Peramuna (the Peoples' Liberation Front - JVP) - with a confused mixture of left populist radicalism and Sinhalese nationalism - organised an armed uprising that was violently crushed by the government with

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rigorous studies of the total costs of a conflict. (See Angell, 1910, and Jones, 1915 for opposing views, and Bunselmeyer (1975) for a discussion of the evolution of the debate on reparations during and after the war).

[3] See, for example, Dreze and Sen (1996).

[4] These numbers are estimates for 1989 (Statistical Abstract, 1996). There is also an Indian Tamil community in Sri Lanka amounting to 5.6 per cent of the population,

thousands of casualties. But the dominant picture of peace and stability changed quite dramatically in the mid-1980s; indeed, in the light of the ongoing violence, some have gone so far as to call Sri Lanka the 'killing fields of Asia'.

Central to this change has been a bloody ethnic conflict that has been raging since 1983, when anti-Tamil violence in the South of the country, including in the capital, Colombo, led to a mass exodus of Tamils, and persuaded significant sections of the Tamils to lend their support for an armed struggle for a separate Tamil state (comprising the Northern and Eastern provinces of the country) led by the Liberation Tigers of Tamil Eelam (LTTE). While the Northern and Eastern regions have been the main theatre of the war, there has been sporadic violence elsewhere, including in Colombo, that has resulted in considerable human casualties and damage to property. Three phases of the war are often distinguished: *Phase 1* - 1983-1988 [Eelam War one], *Phase 2* - during 1990-1994 [Eelam War two], and *Phase 3* – since 1995 [Eelam War three]. Having started as a guerilla war, by 1998 it had intensified to a guerrilla-cum-semi-conventional type of conflict with the LTTE continuing to control large areas in the North and the East, though they lost control of their previous key base in the Jaffna peninsula at the Northern tip of Sri Lanka in 1995. In addition to this secessionist war, during 1988-89 the country experienced considerable political violence elsewhere; an insurrection led by the radical Sinhalese-based group, the JVP, was crushed by the armed forces with thousands of deaths during 1989/90. [5]

In Sri Lanka, the consequences of this long period of violent conflict are felt in every sphere of social and economic life. There is a widespread sense of insecurity and vulnerability among the population, a feeling of despair and hopelessness among youth, and an erosion of political, legal and social rights. In terms of tangible economic costs, battle field losses of both personnel and equipment, civilian victims, widespread destruction of capital assets and property, damages to infrastructure, loss of cultivable land: all these and others are clearly substantial, though actual figures are in dispute. In addition a large civilian population has been 'relocated' away from their homes, in some cases several times, and there exists a major refugee problem, that has spilled over into the international arena.

[5] This insurrection was also not unrelated to the secessionist war, as it fed on a nationalistic reaction among the Sinhalese to an Indian intervention in the ethnic conflict.

The conflict has brought about a sharp escalation of defence expenditures (Table 1), and a concomitant expansion of the armed forces. Traditionally Sri Lanka had a very low defence budget: until the early 1970s it was well below half per cent of GDP, and was still only just above one per cent even in the early 1980s. By 1985 it rose steeply to 3.5 per cent of GDP, and was estimated at 6.0 per cent of GDP in 1996. This increase took place at a time when average defence expenditure in the developing countries as a whole was falling sharply - coming down from 7.1 per cent of GDP to just over 3 per cent between 1985-95 (UNDP, 1997:189). The total strength of the armed forces was approximately 58,660 in 1986. In 1996, the total strength of the armed forces was estimated at 235,000 (Army - 129,000, Air Force - 17,000, Navy - 21,000, and Police – 68,000; Kelegama, 1999). Estimates of the military strength of the LTTE are not widely available. In 1986, the LTTE had only 3,000 members. Although after the early 1990s this number increased, the LTTE mainly resorts to a strategy of deriving strength through indoctrination and high level of training rather than from numbers and fire power (Gunaratana, 1998).

Table 1: Defence Expenditure: 1982-1996 (Selected Years)

	1982	1983	1985	1988	1990	1993	1994	1995	1996
Defence expenditure as a percentage of total government expenditure	3.1	4.4	10.2	14.3	14.6	14.7	15.2	18.1	21.6
Defence Budget as a percentage of GDP	1.1	1.4	3.5	4.8	4.5	4.2	4.4	5.4	6.0

Sources: Central Bank of Sri Lanka, *Review of the Economy and Annual Report*, various issues.

The conflict erupted only five years after the implementation of a far reaching economic reform program which made a decisive break with nearly two decades of inward orientation and increasing state intervention in economic activities. The 1977 reforms which created a new 'liberal' policy environment, and the pro-Western credentials of the government, made Sri Lanka attractive to both Western donors and large multinational companies. Aid flows into Sri Lanka became a veritable flood, making the country, in per capita terms, the world's leading aid recipient. The

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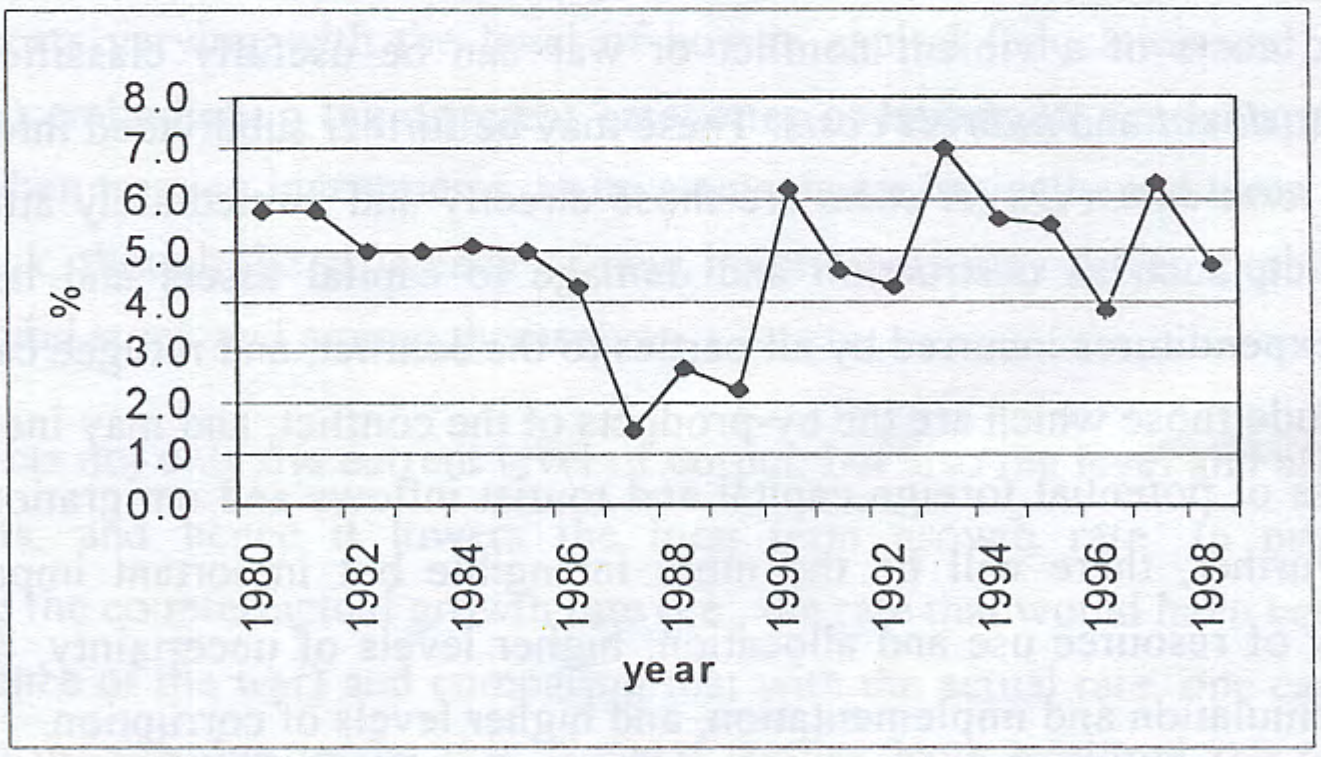
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international media dubbed Sri Lanka "the new investment center of Asia".[6] Tourism picked up and tourist arrivals exceeded 400,000 in 1982. Export growth accelerated with the garment sector in the vanguard. For the first time since Independence Sri Lanka's average growth rate for a five-year period exceeded 6 per cent during 1977-1982. In contrast, the next five years' (1983-89) average growth rate was only 3.7 per cent (Figure 1). The liberalization process stalled, political conflict deepened, an insurrection erupted in the South, and the country veered towards a major economic crisis in 1989.

Figure 1: Annual GDP Growth Rate (%): 1980-1998



Sources: Central Bank of Sri Lanka, *Annual Report* , various issues.

Note: Figure for 1998 is provisional.

The economic crisis and the crushing of the Southern rebellion, and a cessation of hostilities between the LTTE and the government announced in the first quarter of 1990, were followed by a 'second wave of economic policy liberalization' in early-1990. A growth rate of 6.2 per cent was recorded in 1990, partly attributable to the catching up process after the economic dislocations of the previous few years. Though the cessation of hostilities was short-lived, and Eelam War Two started in mid-1990, Sri Lanka benefited from a rapid increase in foreign capital inflows. Satisfactory growth was registered in 1991 and 1992, and growth accelerated to 6.9 per cent in 1993.[7] Political conflicts and elections in the South in 1994 generated political instability which affected economic activity. The eruption of Eelam War

[6] *Far Eastern Economic Review*, 23 October 1978.

[7] 1993 was a year of large foreign direct and portfolio investment flows to South Asia in general and, in particular, to Sri Lanka.

Three in 1995 - after abortive peace talks - led to a broadening of the war which has continued since then with no signs of an end to the conflict. 1998 saw some of the bloodiest battles of the war, and the evidence so far in 1999 indicates a continuation of the 1998 trends.

It is difficult to assess the direct impact of the war on economic growth, given the many factors that impact on the growth performance of a small trading nation like Sri Lanka. Nevertheless it is generally agreed that the conflict is responsible for a deceleration of economic growth.[8]

3. Estimating the Economic Costs of War: Some Methodological Issues

Economic costs of a violent conflict or war can be usefully classified into two categories: *direct* and *indirect costs*. These may be further subdivided into *short term* and *long term costs*. *Direct costs* are those directly and immediately attributable to the conflict, such as destruction and damage to capital assets and labour, extra military expenditures incurred by all parties to the conflict, and refugee care. *Indirect costs* include those which are the by-products of the conflict, and may include capital flight, loss of potential foreign capital and tourist inflows and emigration of skilled labour. Further, there will be the more intangible but important impacts on the efficiency of resource use and allocation: higher levels of uncertainty, poor quality policy formulation and implementation, and higher levels of corruption.

Some of these, such as the destruction of capital assets, obviously have both short term and long term impacts; damage to a capital asset results in the loss of capital services not only in the short term but over the entire duration of its projected life time. Other costs, such as refugee care, is generally considered to be primarily short term in nature, while the cost of lost investment which affects the growth rate is primarily long term. But even in the case of refugee care, it must be noted that there can be long term costs. In addition (and partly because of) the psychological stresses and trauma, education and other forms of productive human capital acquisition (such as learning by doing) are disrupted with the result that the average skill level of the work force falls, with longer term effects on output.[9] On the other hand, it is possible that some skills that are acquired in conflict situations, such as skills gained by

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[8] However, O'Sullivan (1997) has argued that the war " has not led to a breakdown of growth".

[9] The generation of black freedom fighters of South Africa who now find themselves with little human capital in the post-apartheid society is a case in point.

military personnel or by those employed in new industries that owe their existence to the conflict, may subsequently raise productivity of non-military industries.

In computing direct losses due to destruction or damage to 'capital' assets (including infrastructure, cultivable or otherwise productive land, and other durable assets), the cost of damage or destruction to capital should be treated, in principle, as the sum of the discounted net present value of the stream of capital services that would have been generated by them. Thus, to take an example, the cost of a power plant that is destroyed is the loss of power over its lifetime. If that plant can be and is replaced, then this cost is not incurred and the relevant social cost then is the replacement cost. Labour force reductions due to death, disability or emigration impose similar costs, with the costs varying with the level of human capital (education and other skill levels, etc.) embodied in the different categories of labour. A similar approach can be taken when treating investments, as investments are basically additions to existing capital stock, though the efficiency of new investments may differ, both relative to the old capital stock and among themselves.

A war affects not only the current level of output, but also the level and efficiency of investments, and hence it lowers the long term growth rate. In principle, by calculating the counterfactual growth rate (i.e., the rate that would have been attained in the absence of the war) and comparing that with the actual rate, one can calculate the loss in growth due to the war. Several studies have explored the relationship between military expenditures and economic growth, following Benoit's (1973) multicountry study which concluded that in developing countries military spending was positively related to growth.[10] Most of these studies found that the relationship was negative, consistent with the view that government investment is crowded out by higher military expenditures. But this crowding out effect is not always the only, or even the main, reason why increased military spending may dampen growth. The response of private investment may be crucial: increases in military spending are not always associated with outbreaks of war, but they may signal the existence of underlying tensions that contain the potential for violent conflict. Thus increases in military spending may be correlated with a poor investment climate which reduces private investment, including foreign investment flows that might otherwise have come. The degree to which reductions in investment have any significant direct effects on growth depends critically not only on the level but also on the efficiency

[10] See, for example, Chan (1986), Deger (1986), Faini, Annez and Taylor (1984), Knight, Loayza and Villanueva (1996), and Lim (1983).

of those investments; it is possible that the conflict situation itself may alter the productivity of investments if the conditions needed for efficient economic activities deteriorate (e.g., delayed transportation of goods due to security checks).

Some of the economic costs that are related to political and social changes brought about by conflicts can be less tangible, and extremely difficult to measure, but may be large in magnitude. Thus a protracted conflict constrains the political ability of governments to pursue economically optimal policies, and may force the abandonment of well designed development strategies and policy reforms.[11] For example, trade reforms identified as potentially beneficial may be abandoned because they may alienate a particular producer group whose political support is considered vital to the war effort. A common evil associated with such conflicts is that the scope for corruption increases dramatically. Not only are military procurements notoriously corruption prone, news censorship and other measures taken to restrict information flows in the name of maintaining state security are often convenient vehicles for covering corrupt practices in many other areas as well. Such corruption not only redistributes income, but also has efficiency implications, by distorting incentives, by increasing transactions costs, and generally leading to misallocation of resources.

4. Previous Studies of the Cost of the War in Sri Lanka

Having outlined this broad methodological approach, we now proceed to critically examine available studies of the Sri Lankan war that attempt to quantify the economic costs. These are: (a) the Richardson and Samarasinghe (RS) (1991) study, (b) the Grobar and Gnanaselvam (GG) (1993) study, and a more recent study by Marga (1998) for the National Peace Council (MARGA). These also happen to be among the very few empirical analyses available of the economic costs of a

[11] See Azar (1987; 1990), cited in Richardson and Samarasinghe (1991).

protracted war. The RS study is the first attempt to systematically enumerate the various components of economic costs and to quantify them. They classify total costs into three categories: *primary, secondary* and *tertiary costs*. Primary costs are defined as 'losses due to destruction of physical infrastructure, costs of caring for the domestic refugees, extraordinary costs of forces engaged in conflict and losses due to injury and death'. Secondary costs are 'the longer term, less direct consequences' such as foregone production, tourism, damages to education and social welfare systems, lost foreign investment and aid, and capital flight. Tertiary costs are 'medium and long term economic impacts resulting from the sense of instability and uncertainty that violent conflict creates', such as adverse impacts on the economic development strategy and international economic integration. They estimated that total costs of the conflict between 1983-88 as being equal to 4.2 billion US dollars or 68 per cent of Sri Lanka's 1988 GDP.

The Grobar and Gnanaselvam (GG) study focuses on the impact of the conflict on growth. They estimated a regression equation which related investment to military spending, national income and capital inflows. The estimated equation indicated a strong negative relationship between military expenditure and investment. They went on to use this relationship to then estimate the degree to which growth rate was lowered, and calculated the cost of the associated loss in output as 22 per cent of 1988 GDP.

The MARGA study was aimed at quantitatively estimating all the economic costs of the war between 1983-96, while also pointing out some aspects of its human and socio-political costs. It attempted to estimate the economic loss due to war as, "the sum of all the resources that would have been available for an alternative path of consumption, growth and investment had they been either not been spent on the war or not been lost as a result of the reduction of output and opportunities foregone" (p. 21).

In our view, there are several weaknesses with all these analyses.[12] Some of these are attributable to data limitations beyond the control of the authors, but others are of a more general methodological nature. Some of these are discussed below as they illustrate the kinds of problems encountered in any similar empirical study. First

[12] This critical review is not meant in any way to denigrate the contributions of these studies. Our study would not have been possible without these pioneering contributions, and builds on them.

considered are the estimates of the cost due to reduced growth. RS estimated this in quite simplistic fashion by assuming a counterfactual growth scenario - termed a moderate growth scenario - which, however, was well above Sri Lanka's historical growth rate over the past decade (or past several decades).[13] The MARGA study considers that a sustained growth rate of 7 per cent per year could have been achieved during the 1983-96 period - though the basis for this figure is not made quite clear. It may be noted that this is a historically unprecedented growth rate, and appears to be very much a 'super optimistic' scenario. The RS study, while overestimating the losses due to foregone growth, ignores the future losses due to current cuts in investment, except in so far as they were reflected in the difference between their counterfactual growth rate and the actual growth rate: the (discounted) present value of future reductions in output due to cuts in investment in 1988, for example, is not included in their total costs. [14]

The GG estimates are based on a more structured analysis of the reduction in output due to lower investment caused by military expenditure. They adopt a two step procedure. First they estimate the following regression and conclude that a significant negative relationship exists between overall investment and defence expenditure:

$$I_t = 10.15 + 0.13y_t - 1.44G_{mt} \quad 0.39K_t + 2.31D_{t-2}$$
$$(9.33) \quad (5.56) \quad (4.13) \qquad (6.41) \qquad (2.51)$$
$$R^2 = 0.94$$

where I is investment as a per cent of GDP, y is real per capita income, G_{mt} is military expenditure as a per cent of GDP, K is capital inflows and D is a dummy for periods when the United National Party (UNP) was in power.[15]

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[13] The moderate growth rate was supposed to be based on an average of 6 per cent with adjustments for good and bad harvests; but this assumed counterfactual growth rate seems to have been based on the average for the 1978-82 period. But this period of unprecedentedly rapid growth was not just a response to policy changes in 1977/78 but to a large extent driven by a huge foreign aid financed public sector investment programme. But even then, the average GDP growth for 1980-82 was only 5.5 per cent per year.

[14] Because the biases in the study go both ways, it is difficult to know whether their claim that the estimate of total costs is conservative is true or not. In any case, if that statement is true, it would be so for reasons other than what they have adduced, viz. that 'some costs (for example private and unbudgeted costs of security) have not been taken into account' (p. 209).

[15] The rationale for using a dummy for the UNP periods is given as the lower emphasis it had traditionally placed on social spending.

This equation was estimated for the period 1960-1988, and the authors reported that autocorrelation was detected and the Cochrane-Orcutt method was used to correct for autocorrelation. On the basis of this estimated equation, they concluded that a one per cent increase in the ratio of defence expenditure (as a percentage of GDP) will reduce the corresponding investment ratio by 1.4 per cent. Using an incremental capital output ratio (ICOR) of 2.5 - close to the average for the previous decade - the output losses for the 1983-88 period were calculated to be 22 per cent of 1988 GDP.[16]

There are several problems with this methodology. It relies heavily on a simple Harrod-Domar growth model to calculate the counterfactual growth. No account is taken of possible changes in investment efficiency, or the composition of investment. Both public and private investment are treated as being identical in their productivity; no attempt is made to evaluate the extent to which government military expenditures had differential crowding out effects on these two components of total investment. Also, note that the losses from reduced investment are long lasting, as the returns from investments flow over the entire life time of the investments. The reduction in GDP during the period under consideration is only a part of the overall losses, whose (present) value should be calculated by discounting the entire foregone income stream by an appropriate discount rate. Further, even leaving aside issues about the model specification, the estimation procedure is clearly unsatisfactory because it is well known that the use of the Cochrane-Orcutt method when autocorrelation is detected is quite inappropriate. Observed autocorrelation suggests that there is a strong possibility that these time series may be non-stationary, and that relationships indicated by the regression results may be quite spurious.[17]

Both RS and MARGA studies also attempt to estimate the losses other than those due to reduced investment. In doing so, however, they often make a methodological error in adding the (replacement) value of capital, infrastructure and other durable assets damaged by the war, with the output losses that are (at least partly) a consequence of these damages. For example, RS adds together the so-called primary costs (destruction of housing, productive capacity and infrastructure, etc.), and the

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[16] This was based on the Harrod-Domar formula, $\Delta Y/Y = (I/Y)^* (1/ICOR)$, where ΔY = change in GDP.

[17] See Mizon (1995).

value of foregone output and production; MARGA adds together the estimated cost of damages to physical facilities in the irrigation and fisheries sectors, and the value of lost production in agriculture and fisheries. This amounts to double counting because the (replacement) value of the physical asset is really an estimate of the present value of its services over its life time; net losses in production attributable to damaged physical facilities and infrastructure are already reflected in their (replacement) value.

These studies also routinely ignore the concept of value added in production, and do not draw any distinction between the *gross* value of lost production and its *net* value. This ignores the fact that production requires expenditure of resources; actual losses due to cessation of production are losses net of the value of resources that would have been used in production.[18] Hence the estimated losses of foregone output overestimate its *net* economic cost.

A similar error occurs in the treatment of losses due to lower levels of foreign investment. The loss of a dollar of foreign investment is treated as a net loss of a dollar to the country. In reality, the value of a dollar of foreign investment is (discounted present) value of added output generated by that investment, net of the profits that accrue to the foreigners and the value of the domestic resources that are used in production.[19] Foreign investment is treated as a gift to the country, rather than as the sale of capital services. Again, the losses are overestimated. Further, in general, annual losses appear to have been simply added up, though they occur in different time periods.

We now turn to our own analysis, where we attempt to overcome some of these limitations of earlier studies. Table A1 in the Appendix provides a comparison of the results of this study with that of the other studies discussed above.

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[18] For example, rice production, in addition to irrigation water and tractor services also requires labour, fertiliser and other material inputs. When no production takes place, those other inputs have been 'saved'. In the case of labour, in a war situation, lack of alternative uses would have greatly reduced the value of such a 'saving', but the point is more directly relevant to the case of material inputs such as fertiliser.

[19] This is not to deny that foreign investment can add to domestic employment and growth, but to emphasise the point that foreign investment is in principle, a loan of the 'services' of foreign capital to the host country; foreigners retain ownership over their capital and extract a payment from the host country for lending their services.

5. Estimating the Costs of the War: Methods and Results

5.1 Direct Costs

Direct costs include military costs borne by the government and the LTTE and costs of damage to physical and social infrastructure. Of course, even if there was no war, the government would have incurred some level of 'normal' military expenditure. Average military expenditure in the two years (1982 and 1983) before the outbreak of war was 1.28 per cent of GDP, and it is assumed that this would have been the 'normal' level in the absence of the war. [20] This value increased substantially after the outbreak of war in 1983. War-related military expenditure is the amount of extra military expenditure that the government spent above this figure (1.28 per cent of GDP). From 1984 to 1996 (at 5 per cent interest rate) the compounded present value of government military expenditure was Rs. 287,543 million. (Unless otherwise stated, all figures are given in 1996 Rupees.) This is equivalent to 41.3 per cent of Sri Lanka's 1996 GDP (see Table 3).[21]

For obvious reasons, figures for military expenditure borne by the LTTE are not available. Judging by the damages caused by the LTTE forces, and anecdotal evidence on arms purchases, LTTE expenditures on arms and ammunition must be quite substantial. Marga (1998) hypothesises that the value of military expenditure for the LTTE is 20 per cent of the amount spent by the government. Some of these resources have been raised through taxes and levies imposed on individuals living in the North and the East, with some being raised from overseas sources. The direct cost to the Sri Lankan economy due to LTTE military expenditure is the value of local funds spent on the war that could have been otherwise spent on consumption or investment. We make a conservative assumption that the military expenditure incurred by the LTTE (at the cost of local consumption and investment) is 10 per cent of the military expenditure incurred by the government. In millions of 1996 Rupees, this value (compounded to 1996) is equivalent to 28,754 (i.e., 4.1 per cent of 1996 GDP).

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[20] The level of expenditure was considerably lower than this in the previous decades.

[21] The magnitude of the costs depends on (and increases with) the assumed discount (compound) rate; we believe that a real discount rate of 10 per cent would be appropriate for Sri Lanka; results reported in the text are given for the (very conservative) 5 per cent rate, but figures are presented for three different interest rates (r= 0 per cent, 5 per cent and 10 per cent) in the tables.

In addition to the military expenditure incurred by the government and the LTTE, direct costs of the war include costs of providing for refugees,[22] costs of damages to capital assets[23] and land. Precise data on the costs of these damages are not available. From time to time the Government of Sri Lanka (GOSL) and various other donors have launched reconstruction and rehabilitation programmes to bring back 'normalcy' to affected areas. These programmes aim to provide shelter and relief to displaced persons and families, resettle (and where needed relocate) these individuals, reconstruct damaged public infrastructure, provide grants and loans to individuals to repair and reconstruct damaged economic enterprises, and conduct vocational training programmes for displaced, disabled and destitute individuals.

Since there is no data available on the actual cost of damages to physical and social infrastructure, the expenditure incurred by the Sri Lankan government in providing reconstruction/rehabilitation services to affected areas is used as a proxy for the costs of damages. Implementation of relief programmes is likely to be influenced by the military situation in affected areas; therefore, the actual value of damages to infrastructure is likely to be higher than the expenditure incurred by these programmes. For example, the ERRP programme launched after the end of Eelam War One in 1988, had to be abandoned in some areas and restricted in others with the escalation of hostilities in 1990. Yearly values of expenditure spent on these programmes are not available. There are only rough estimates of the costs of lost and damaged infrastructure due to the war. It does not appear that the cost figures were adjusted for inflation before totaling over years, or that the costs of earlier years were appropriately compounded. The value computed in this way is most likely an underestimate of the true cost of relief programmes.

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[22] "The ethnic conflict of the last 12 years has resulted in loss of life and has caused injuries to and the disappearance and displacement of persons, as well as destruction of the social and economic infrastructure. Of the 530,000 families displaced, 130,000 are yet to be registered and are living in Welfare Centres or with relatives/friends. At the end of 1994, over 40,000 families were living in Welfare Centres. 400,000 families have now been resettled but without much follow-up action for their well-being and sustenance. About 12,000 families are refugees in India, while several thousands have fled to other countries. Although the actual figure may be higher, officially about 30,000 have lost their lives" (ERRP, 1995).

[23] "In 1987, the report of the national task force on damages to public and private property during the period 1983-1987 reported that 56,000 houses were completely destroyed and another 34,000 damaged. The damage to commercial and government property, roads and bridges, irrigation systems, plant and machinery and movable property of both private individuals, firms and government agencies was extensive" (Marga, 1998).

According to our calculations, from 1987-1996 the Government of Sri Lanka spent (in 1996 prices) close to Rs. 21 billion on providing dry rations, food and compensation to the displaced civilians. This amounts to roughly 3 per cent of Sri Lanka's GDP in 1996. The cost of damage to infrastructure in the North and the East (in 1996 prices) is close to Rs.90 billion,[24] and the cost of damage to property in the Greater Colombo region is Rs.4.5 billion.[25] Together, the total cost of lost infrastructure amounted to 13.5 per cent of Sri Lanka's 1996 GDP.

Thus the cumulative direct costs are equivalent to 61.9 per cent of 1996 GDP.

5.2 Indirect Costs

There are several components of indirect costs, and some of these are discussed below.

5.2.1 Lost income due to foregone investment

If a counterfactual investment-growth scenario can be estimated, then the losses due to foregone investment can be easily calculated by comparing the counterfactual with the actual. But in the case of Sri Lanka's war, it was found that this was not a straightforward task. There were several reasons for this, but a major factor was that the onset of the war coincided with important changes in the external (global) environment, which meant that the value of trends and relationships estimated from past data was likely to be considerably diminished. First, a major change took place in the international investment scene as the early 1980s saw the beginning of a surge in foreign direct investment into developing Asian countries, to be followed later by a portfolio investment surge as well. Sri Lanka, with its pro-market policy reforms of 1977/78 seemed to be well positioned to attract such investment, but lost out as the onset of the war severely damaged its profile among international investors. Secondly, the global upsurge in international tourism was also just starting in the early 1980s; again Sri Lanka, after a promising beginning, lost out. In both cases, comparisons with the experience of similar countries, rather than the past trends in Sri Lanka itself, are relevant for constructing a counterfactual; but of necessity, this

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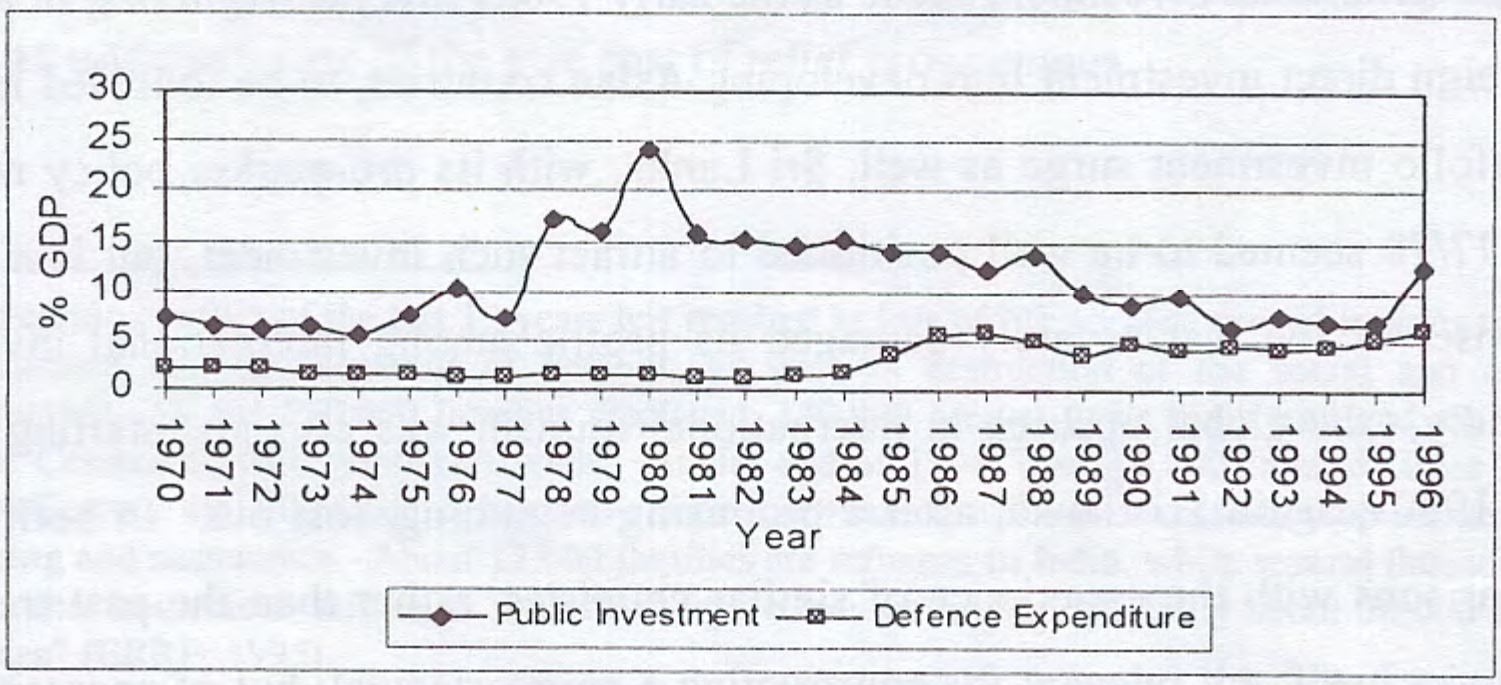
[24] This includes the costs of public infrastructure up to 1995, and costs of damages to houses up to 1996. Unfortunately, estimates of damages to public infrastructure in 1996 are not available.

[25] See Marga (1998).

involves considerable subjective judgement. But we opted for the latter course, adopting a somewhat *ad hoc* approach to developing the needed counterfactuals, rather than using the standard econometric approaches alone.

The full economic cost of higher military expenditure is more than the amount spent on war-related activity; it must include the growth foregone due to crowding out of investment, both by domestic and foreign investors and by its impact on the efficiency of investments. In Sri Lanka, due to the aforementioned changes in both domestic and external circumstances, average investment levels tended to be often higher in the post-war period than in the pre-war period. If the other changes were ignored, this by itself would provide a very misleading indication of the actual impact of the war on investment and growth in the economy. On the other hand, the allocation of a larger share of government resources to war-related expenditures was a striking feature of the post-1983 period. The government, in principle, could finance higher military expenditure at the cost of public investment and/or public consumption, and higher military expenditures may also indirectly lead to the reduction of some private investment. In fact, as shown in Figure 2 the level of public investment declined sharply after the outbreak of war in 1983. In order to understand the effect of increased military expenditure on investment we estimated a public investment function for the period 1960 to 1996.

Figure 2: Trends in Public Investment and Defence Expenditure: 1970 - 1996



Sources: Central Bank of Sri Lanka, *Annual Report*, various issues.

Given the questions raised about the efficiency of investments, particularly some of the public sector investments, and because it was hypothesised that higher military expenditures would tend to crowd out public investments to a greater extent, it was

felt important to distinguish between private and public investment in our analysis. However, Sri Lankan investment data are not disaggregated between public and private investment after 1982, as the 'private' investment figures for the post-1982 period also include investments of public corporations. To overcome this problem, government investment (GINV) is proxied by "total capital expenditure and lending" from the "functional classification of expenditure".[26] Data series used in this study are obtained (or compiled) from various *Central Bank Annual Reports* and other reports produced by the Central Bank.

In our model, government investment is assumed to be a function of government military expenditure (GM), and foreign capital (K). GM is voted government expenditure (both recurrent and capital) by the Defence Ministry and K is the total (sum of direct, other private and government) long-term capital inflows. As seen in Figure 2, the investment pattern in the post-1977 era is quite different from those in the pre-1977 period. This is most likely due to the policy and institutional reforms that took place after the government changed in 1977. A dummy variable (D77), which is one for the years 1960 to 1977, is included to control for these policy effects. The effect of a protracted conflict situation is likely to be different from the effect of initial upsurges in conflict. Initial upsurges in conflict are likely to have a larger impact, both on military expenditure and investment, but in the absence of further outbreaks of conflict growth in military expenditure are likely to stabilise and investments tend to recover as agents get used to the conflict. We included a dummy (DWAR) to indicate the years in which there were major upsurges in the conflict; this dummy had the value of one for the years 1983, 1990 and 1995.

GINV, GM, and K are measured as ratios of GDP. The following model was estimated using annual data for the period 1960-96:

GINV = f(GM, K, D77, DWAR)

The time-series properties of the data were examined using the augmented Dicky-Fuller (ADF) test, which showed the presence of non-stationary variables. In order to retain the long-run relationships while minimising the possibility of estimating spurious relationships, the model was estimated using the unrestricted error

[26] This does not include expenditure on repayment of loans.

correction modeling (UECM) procedure. Results of the estimation are given below, with t-statistics in parentheses.[27]

$\Delta GINV =$

$$\underset{(4.45)^{***}}{18.18} \underset{(0.52)}{-0.39DGM} \underset{(3.35)^{***}}{-1.69GM_{t-1}} \underset{(1.09)}{-0.42\Delta K} \underset{(1.54)}{-0.54K_{t-1}} \underset{(4.63)^{***}}{-0.72GINV_{t-1}} \underset{(3.91)^{***}}{-9.43\,D77} \underset{(1.52)}{-2.50DWAR}$$

$R^2 = 0.50$

As can be seen, government military expenditure has a negative and significant effect on government investment in the long-run, implying that military expenditure crowds out government investment. The D77 variable is statistically significant and negative, implying that the post-1977 policy reforms positively affected government investment. The variable on capital inflows (K) is not statistically significant; note however that this refers to all foreign capital inflows, rather than foreign funds that were made directly available to the government itself. Somewhat surprisingly, these estimations indicate that other things remaining equal, a one per cent increase in government military expenditure (as a ratio of GDP) reduces government investment (as a ratio of GDP) by more than one per cent (2.4 per cent). This is consistent with the view that government investments have been reduced by more than is needed to finance military expenditures alone. Governments wanting to reduce total government expenditures, particularly given the pressure from the World Bank and IMF, may have used military expenditure increases as a politically expedient rationale for achieving overall (larger) cuts in government investments. [28]

In order to assess how this crowding out affects economic growth, it was necessary to know how government investment affects GDP growth. Regression models estimated with several different specifications showed no statistically significant relationship between government investment and economic growth (see Appendix 2). This implies that though military expenditure reduced government investment, it had little or no direct effect on economic growth. One explanation for this somewhat unexpected result is that, at least until recently, reductions in government investment

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[27] Variables starting with Δ are first differenced. For example, $\Delta GINV = GINV_t - GINV_{t-1}$. Significance at 10 per cent, 5 per cent and 1 per cent levels are indicated by *, **, ***, respectively.

[28] Results were robust to other specifications that allowed for the possibility that private investment responds to changes in government military expenditures, rather than its absolute level.

were made in areas where the investment cuts had negligible output effects, at least in the short to medium term. [29]

The results of a model with GDP growth rate as the dependent variable and total investment as the sole independent variable showed that an increase of 1 per cent in the investment to GDP ratio results in increasing the GDP growth rate by 0.09 (regression results are given in the Appendix 2). With this result, two scenarios arise regarding the impact of military expenditures on growth. First, a 'high' scenario, where we ignore the regression results regarding the impact of government investment cuts and assume that cuts in private and public investment have the same effect on GDP, and estimate the value of lost output due to the war from further reductions of government investment. (The GS estimates are based on a similar 'high' scenario where they attribute all output losses/increases to losses/increases in investment, with no distinction between public and private investment.) Second, a 'low' scenario, where we base our estimates on the regression results and assume that cuts in government investment have had no dampening effect on growth.

First, on the basis of the first scenario, we estimated the effects of military expenditure on government investment from the last regression, and calculated the value of lost output due to military expenditure, adhering to the comparative static Harrod Domar framework as in the GS study. For each year since 1983 we calculated the incremental capital-output ratio (ICOR).[30] We then used this ICOR to estimate the counterfactual growth (and GDP) for each year since 1983, and used the difference between the implied and actual levels of GDP to estimate the lost output in each year.

The estimated lost output and reductions in GDP growth rates for the years 1984 to 1996 using the "high" and "low" scenarios are shown in Table 2. According to the "low" scenario, the compounded (assuming 5 per cent interest rate) present value of the cost to the economy from reduced public investment is Rs. 26,520 million.

5.2.2 Lost income from reduced tourist arrivals

The tourism sector in Sri Lanka has suffered greatly due to the war. Until 1982, tourist arrivals to the country were growing quite rapidly. However, after the

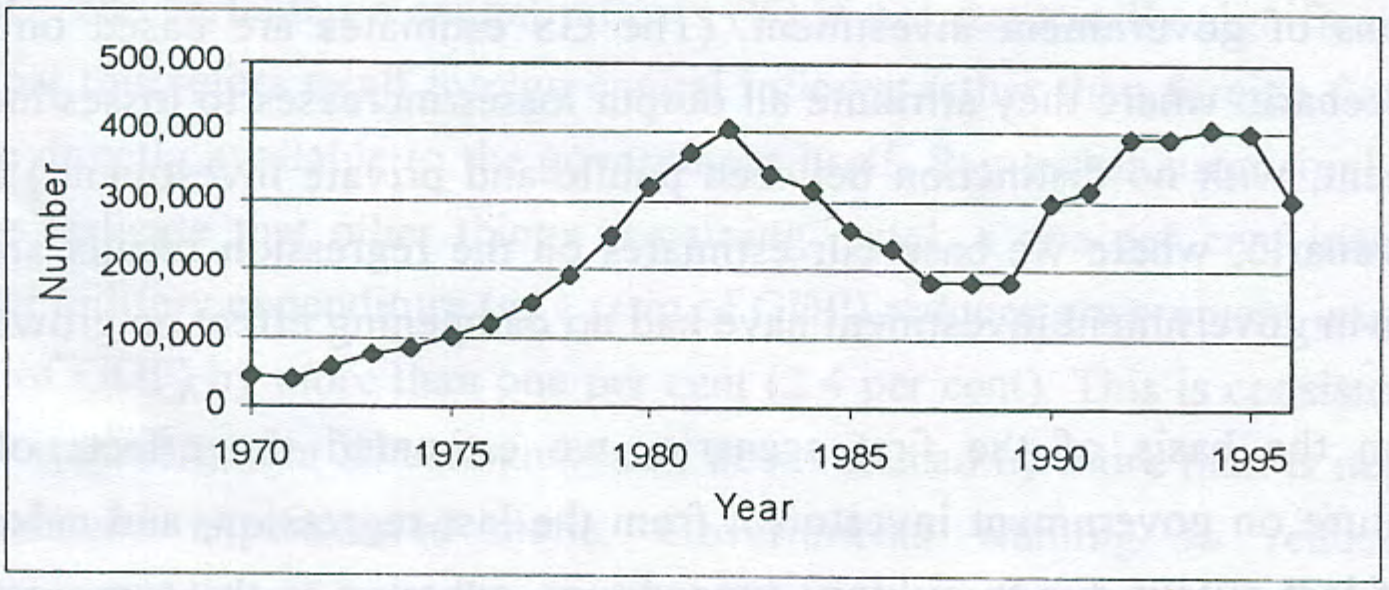
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[29] However, this does not mean that further reductions in government investment will have no effect on growth; if they were to affect important areas they are bound to affect economic growth.

[30] ICOR = (I/Y)/ Yg, where (I/Y) is investment as a ratio of GDP and Yg is the GDP growth rate.

outbreak of war in 1983 and the resulting troubled environment in the country, tourist arrivals to the country dwindled from a high of 407,000 visitors in 1982 to a low of 183,000 in 1988 (see Figure 3). Since then tourist arrivals have recovered to some extent due to favourable government propaganda and a relatively peaceful environment in the Southern part of the country. However, compared to other countries with similar attractions and facilities, the level of tourist arrivals to the country is much lower than what is likely to have been attained under normal circumstances.

Figure 3: Trends in Tourist Arrivals to the Country: 1970 - 1996



Source: Ceylon Tourist Board.

During the period 1975 to 1982, tourist arrivals increased at an average rate of 22 per cent per year. What would have been the level of tourist arrivals that would have taken place if the war did not erupt? It is unlikely that a very high rate of growth would have been maintained over time even under normal circumstances, and some slowing down is likely to have occurred. Taking this into account we postulated the level of tourist receipts the country would have received under peaceful conditions by fitting a regression equation to estimate the hypothetical trend in tourist receipts under normal circumstances.[31] The difference between the counterfactual and the actual is the amount of gross earnings that the country lost due to reduced tourist arrivals. However, the import leakage in the tourist sector is about 30 per cent (Table B.14, Tourism Master Plan Final Report, 1993). Hence only 70 per cent of the gross earnings can be considered to have been lost to domestic factors due to reduced tourist arrivals; the loss to the economy (rather than the tourist sector) due to the war would be lower.

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[31] See Appendix 3 for details of this calculation. According to our estimates tourist arrivals to the country would have increased approximately to one million tourists by 1996.

This is because some of the resources that would have been potentially used in the tourist sector would have found employment in other sectors when tourist arrivals declined.[32] In the absence of better data, it was assumed that about 20 per cent of the resources that would have been used in the tourist sector would have been employed in alternative income generating activities (or that these resources earned 20 per cent of what could have been earned in the tourism sector). On the basis of these assumptions, only 56 per cent (= 70 per cent * 80 per cent) of the gross loss in tourist receipts could be attributed as the net economic cost to the economy due to the war.

5.2.3 Lost earnings due to foregone foreign investment

There is a consensus that foreign investment has suffered because of the war. Again, there is the problem of estimating the counterfactual investment flows, and associated net losses to the economy. With the policy changes that took place after the elections in 1977, foreign direct investment in Sri Lanka saw a marked increase. In 1978 the Greater Colombo Economic Commission (GCEC) was set up to promote foreign investment in the country. The first investment promotion zone set up at Katunayake (in proximity to Colombo and the international airport) was such a success that two others (in Biyagama - close to Colombo [25 km] and Koggala [120 km] to the South of Colombo) soon followed. These policy-induced incentives, together with the favourable political climate in the country started to attract considerable foreign

[32] For example, some individuals who would have found work in tourist hotels would have instead worked elsewhere.

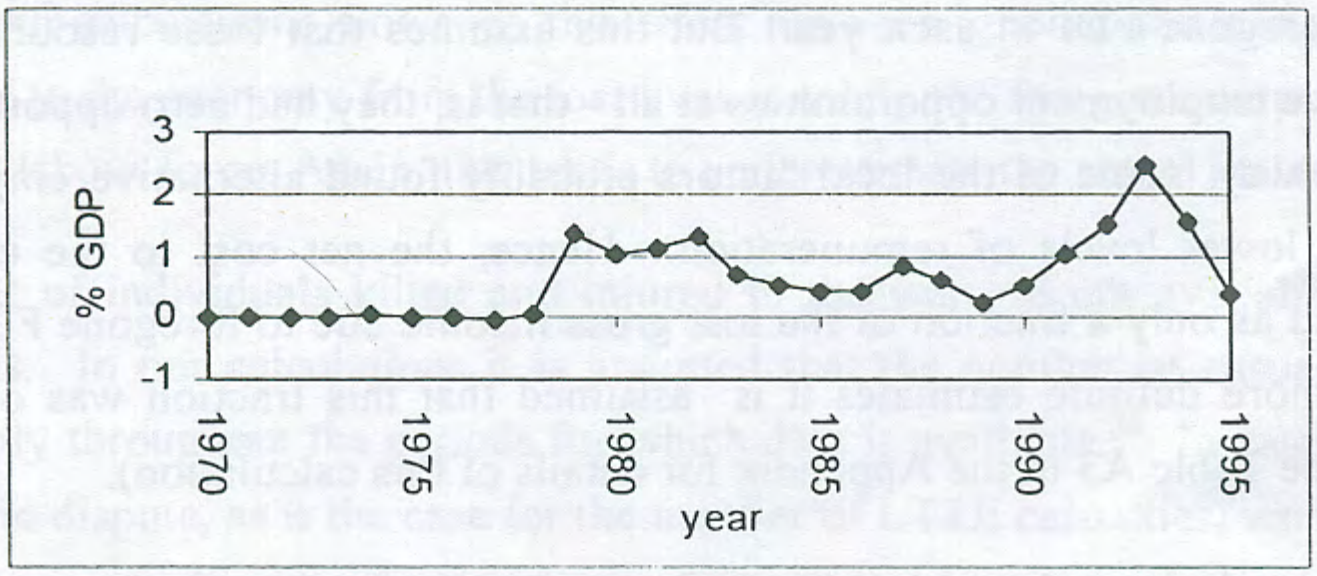
Table 2: Effect of Military Expenditure on GDP

Year	Govt. Military Expenditure (GM) (% GDP)	Effect of GM on Public Investment (per cent GDP)	Using Marginal Product of Investment on GDP			Using Average Product of Investment on GDP			
			Drop in GDP Growth Rate (per cent)	Estimated Lost GDP		ICOR	Drop in GDP Growth Rate (per cent)	Estimated Lost GDP	
				Rs. Mn (1996)	(Per cent GDP)			Rs. Mn (1996)	(per cent GDP)
1984	1.61	-0.79	0.07	283	0.07	5.11	0.15	615	0.15
1985	3.46	-5.21	0.47	1,956	0.45	4.81	1.08	4,527	1.03
1986	5.41	-9.90	0.89	3,913	0.86	5.53	1.79	7,913	1.73
1987	5.79	-10.81	0.97	4,476	0.97	16.05	0.67	3,125	0.68
1988	4.83	-8.51	0.77	3,579	0.75	8.44	1.01	4,697	0.99
1989	3.49	-5.30	0.48	2,282	0.47	9.65	0.55	2,633	0.54
1990	4.54	-7.81	0.70	3,431	0.67	3.60	2.17	10,607	2.06
1991	4.21	-7.01	0.63	3,279	0.61	4.96	1.41	7,448	1.38
1992	4.23	-7.07	0.64	3,457	0.61	5.67	1.25	6,824	1.21
1993	4.16	-6.90	0.62	3,518	0.58	3.68	1.88	10,687	1.78
1994	4.41	-7.50	0.67	4,086	0.64	4.80	1.56	9,565	1.50
1995	5.24	-9.49	0.85	5,464	0.81	4.72	2.01	12,974	1.94
1996	6.02	-11.37	1.02	6,915	0.99	6.45	1.76	12,045	1.73

Sources: Central Bank of Sri Lanka, *Annual Report*, various issues, calculated.

investment. But, this propitious investment climate soon deteriorated with the escalation of the ethnic conflict in 1983.[33] Further investor-incentives provided towards the end of 1990 and the relatively peaceful environment in the southern part of the country in the post-1989 period led to a temporary revival of investor interest in the country. However, this slumped after 1993, as political instability, the change in government and, bomb attacks on physical infrastructure in and around Colombo, projected a poor image of Sri Lanka among foreign investors.

Figure 4: Trends in Foreign Direct Investment: 1970 - 1996



Sources: Central Bank of Sri Lanka, *Annual Report*, various issues.

To get a (conservative) counterfactual estimate of investment flows, it is assumed that under normal conditions the foreign direct investment flow to the country from 1984 to 1991 would have remained at its average from 1979 to 1982 (i.e., 1.23 per cent of GDP), and it would have been at the 1993 level (2.5 per cent of GDP) from 1993 to 1996. In the transition period, 1992, it is assumed that the level of investment would probably have been 1.87 per cent of GDP (the average of 1.23 per cent and 2.5 per cent).

Most of the foreign direct investments (FDI) in this period were made in export-oriented processing firms – particularly in the garments and textiles sector. Since only limited data is available on the specific FDIs made during this period, it is assumed that all investments were made in the highly import-intensive garments and textiles sector. (According to Athukorala (1995) the foreign exchange leakage

[33] These other factors, such as policy instability and policy uncertainty and deteriorating macro environment could also have driven out potential investors (Athukorala, 1995). But in the absence of the war these conditions are not likely to have resulted in driving out potential foreign investment in a sustained way for any significant period of time. Hence we attribute the total decline in foreign direct investment to the war. Given our very conservative assumptions regarding the counterfactual investment flows, this is not likely to lead to a significant upward bias.

component in the export-oriented firms is as high as 85 per cent of the value of exports.)[34] Hence, it is assumed that only 15 per cent of the value of gross exports in the garments and textiles sector were earned by local factors (wages earned by local labour (10 per cent), local raw materials (3 per cent), and payments on services provided by local companies (3 per cent), and the income earned by local factors is calculated from a unit of FDI each year. Since an investment in one year generates a stream of income in the consequent years, the losses due to foregone investments should be accumulated over the expected lifetime of the investment when calculating the lost income.[35] Hence the accumulated value of lost investments was multiplied by income per unit of FDI to calculate the lost income due to foregone FDI in each year. But this assumes that these resources had no alternative employment opportunities at all - that is, they had zero opportunity cost. But in reality, some of the local factors probably found alternative employment - albeit at lower levels of remuneration. Hence, the net cost to the economy is calculated as only a fraction of the lost gross income due to foregone FDI. Due to lack of more definite estimates it is assumed that this fraction was only 50 per cent. (See Table A3 in the Appendix for details of this calculation).

5.2.4 Lost income due to lost human capital of dead or injured persons

Since the start of the war, the country has lost a large number of individuals, many in their most productive years. According to the Defence Ministry Statistics (as quoted in Goonetileke, 1998) the total number of members in the armed forces, including police personnel and individuals in the Special Task Force, killed since the outbreak of war in 1983 until 1st January 1997 was 10,014. In addition to this, some 13,545 armed forces personnel were reportedly wounded in action. The reported number of LTTE casualties during this period varies widely depending on the source. According to the Defence Ministry this number was 22,116, while the

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[34] Imported inputs constitute 70 per cent of the value of gross exports. Profit remittances, salaries of expatriates and payments of interest on foreign loans constitute a further 15 per cent of the value of gross exports.

[35] For example, employment generated in 1990 from a garment factory financed by FDI, will continue to provide employment in 1991 and thereafter for the duration of its life time. The country will lose the opportunity to generate employment for several years to come, due to lost FDI today. Hence, when calculating income due to foregone FDI one must take into account the incomes the country will have to forgo in the future due to reduced FDI now. In order to estimate the loss of future incomes, one must know the productive life of various industries financed by FDI. Since such data is not available it is assumed that a solution to the ethnic conflict will result in raising the level of FDIs to the level that would have prevailed under normal circumstances.

LTTE reports claim this number to have been 9,301. The number of civilian casualties during this period is estimated to be between 20,000 to 30,000 (Goonetileke, 1998). These figures are at the lower end of the casualty estimates.

The cost in terms of the mental agony suffered by widows, children, parents, relatives and friends due to the deaths and injuries of these individuals is impossible to quantify. Even if one leaves aside these enormous psychic costs, the pure economic costs of these lost lives is not minor. These include not only the direct loss to the economy due to the reduced labour force, but also because these deaths and injuries affect the productivity of others, such as their families and friends. In our calculations, however, this effect has been ignored and it is assumed that the cost to the economy from the lost lives is solely the foregone output due to the reduced labour force. Again, this tends to underestimate the actual losses.

The number of individuals killed and injured in the war are not available on an annual basis. In our calculations it is assumed that the number of casualties are spread evenly throughout the periods for which data is available.[36] In cases where figures are in dispute, as is the case for the number of LTTE casualties, we took the more conservative figures. In the case of the injured, some of the wounded probably returned to their previous occupations, and others may have found work in alternative occupations. Hence it is assumed that the country lost only the productive capacity of half of the wounded individuals. In the case of deaths, the country loses his/her potential contribution that would have been made over the entire productive lifetime. Hence the actual economic losses due to a death accumulates over a period, and should be estimated as the value of the stream of potential output that was lost. Ideally, in order to calculate lost potential output due to the deaths and the injuries, one needs to know the age distribution of these individuals and estimates of future earnings. Such data are not available. But it is known that most of the military casualties are likely to be young men. It is assumed that, on average, each dead person would have participated in the labour force for 25 more years. It is also assumed that the marginal product of labour for the dead and injured is roughly 90 per cent of the market wage rate for an unskilled male

[36] Numbers of individuals in armed forces killed and disabled in the war are available for the three presidential regimes (i.e., Jayawardene era, July 1983 to December 1988; Premadasa and Wijetunge era January 1989 to November 1994; Kumaratunga era November 1994 to June 1997). All other data are available only for the entire period from 1983 to 1st January 1997.

worker till 1996. [37] We then calculated the discounted present value of future losses assuming that their real wages would have remained constant after 1996 - again, this tends to underestimate actual losses. (See Table A4 in the Appendix for details of this calculation).

5.2.5 Output foregone due to displacement of people

According to the EERP (1995) report, at the end of 1994 there were 130,000 families yet to be resettled. 90,000 of these were living with family and friends, while the rest (40,000) were in welfare centres. In order to estimate the cost of foregone output due to displacement of individuals, ideally one must have data on the number of individuals who were not working due to displacement and the time and duration of their displacement. In the absence of such detailed data, it is assumed that on average about 90,000 families were staying with their families and 40,000 families were in welfare centres between 1986 to 1995.[38] We also made the conservative assumption that there is only one income earner in each family. We allowed for the possibility that some of the individuals who were staying with friends and family may have participated in productive economic activities, and assumed that half of these individuals were able to participate fully in the labour force. That is only 85,000 (= 40,000 + 0.5*90,000) persons in the 130,000 families were not productive because of displacement -- clearly a very conservative estimate. Then the same procedure as before was used to compute the value of lost output, which was estimated at roughly Rs. 30 billion.

In principle, a similar procedure can be applied to calculate the cost of the losses due to emigration of productive workers, thus capturing the losses due to the huge exodus of skilled professionals of Tamil as well as those of other ethnic origin who have left as a result of war-related factors. There are problems of making any

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[37] Since very few females work in the armed forces we opted to use the market wages for males. Because of unemployment, the marginal product of labour is likely to be less than the market wage; this was assumed to be 90 per cent of the market wages. It was further assumed that the wage rate for "digging pits" reflects the wage rate for unskilled labour. Of course it is known that casualties on both sides have included much more skilled persons whose potential contribution is grossly underestimated by this procedure.

[38] The displacement of individuals was highest in 1996 after the launching of the 'Operation Riviresa' in October 1995. After the start of this operation more than half the population of Jaffna had fled beyond Elephant Pass (Goonetileke, 1998). Since exact values of individual displacement in 1996 are not known we proxy the foregone output due to individual displacement and infrastructure damage by the foregone output in 1996.

accurate estimates in this case. Firstly, it is difficult to know the numbers migrated because of the war and the migration due to other reasons, and secondly, many of the emigrants have remitted considerable sums of money back to domestic residents. Therefore we do not make any estimate here, but merely note that this is certainly the source of non-trivial losses.

5.2.6 Output foregone in the Northern Province in 1996

Our calculations for indirect costs of the war due to lost incomes in the North and East go only up to 1995. To update these estimates to the end of 1996, we were compelled to undertake a more ad-hoc procedure, as the required data on the effects on various factors such as labour force reductions and damages to infrastructure were not available. However, it is well known that such damages were large. At the end of 1995, the GOSL launched 'Operation Riviresa', which resulted in a large exodus of the population from Jaffna, and severe damages to both private and public infrastructure. According to Marga (1998), roughly 64,000 houses were damaged and another 17,000 were destroyed during this offensive. Again, making a very conservative assumption that the average cost of replacing these houses is about Rs. 50,000, the cost of replacing damaged houses was estimated to be Rs. 4,050 million.[39] In addition to this, economic activity in the Northern province was severely curtailed as a result of displacement and damages to infrastructure. We assumed that foregone output in the North due to displacement in 1996 is roughly half of its 1995 GDP, that is, Rs. 9 billion.

6. Concluding Remarks

The total cost of the war is summarised in Table 3. According to these estimates, even using a conservative 5 per cent interest rate, the accumulated total cost of the war up to 1996 is at least Rs. 1,172 billion at 1996 prices (168.5 per cent of the 1996 GDP). In other words, the cost of Sri Lanka's ethnic conflict up to 1996 was over 1.7 times the 1996 output. If a 10 per cent interest rate is used, this rises to twice the 1996 GDP.

Note that our calculations do not include a number of other costs that are difficult to quantify, but are clearly substantial. Some of these include costs due to:

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[39] This cost is included under cost of lost infrastructure in Table 3.

- reduced health "stock" (low weight births, mental illnesses), and corresponding higher health costs, and reduced labour productivity,
- capital flight,
- the general break down in 'law and order' for the average citizen,
- emigration of skilled labour ('brain drain'),
- disruptions to the education system (access and equality, lost time, quality related to brain-drain of academics),
- reduced efficiency of investments,
- infrastructure bottlenecks created by security measures (e.g., cost of delays and extra expenditure due to traffic congestions caused by roadblocks and security checks).

If we were to make a rough estimate of these costs, together with the large scale casualties, damages to property and economic dislocation and the amount of direct military expenditures during 1997-1999 – which has shown an increasing trend, and has been running at over 5 per cent of GDP each year- it is reasonable to conclude that, under even the most conservative assumptions, the country has incurred a war cost amounting to about two years of annual GDP.[40] The longer the conflict continues, the further the cost will increase, with the burden falling most heavily on the poor and the young of the country.

[40] The costs of the war borne by foreigners are not included here. For example, a substantial part of the rehabilitation and reconstruction expenses in the North and North East have been funded by foreign sources. Of course, the rest of the world has also gained in some ways, particularly from the large influx of Sri Lankan professionals.

Table 3: Compounded Present Value (1996) of Estimated Cost of the War, 1984-1996 (Mn. of 1996 Rs.)[1]

	Interest rate r = 0.00	r = 0.05	r = 0.10
Direct Costs			
Direct government military expenditure	224,148	287,543	375,466
	32.2%	*41.3%*	*54.0%*
LTTE military expenditure	22,415	28,754	37,547
	3.2%	*4.1%*	*5.4%*
Government expenditure on relief services[2]	20,742	*20,742*	*20,742*
	3.0%	*3.0%*	*3.0%*
Cost of lost Infrastructure[2,3]	93,584	93,584	93,584
	13.5%	13.5%	13.5%
Indirect Costs			
Lost income due to foregone public investment	46,639	59,884	78,263
	6.70%	8.61%	11.25%
Lost income from reduced tourist arrivals	91,832	118,365	155,323
	13.2%	*17.0%*	*22.3%*
Lost earnings due to lost foreign investment	423,446	495,252	588,897
	60.9%	*71.2%*	84.7%
Lost income due to displacement (up to 1995)	29,784	38,219	49,417
	4.3%	*5.5%*	*7.1%*
Lost income due to lost human capital of dead or injured persons[4]	14,641	17,229	20,875
	2.1%	*2.5%*	*3.0%*
Output foregone in the Nothern Province in 1996[5]	9,031	9,031	9,031
	1.3%	*1.3%*	*1.3%*
Total	976,261	1,168,603	1,429,144
	140.3%	*168.0%*	*205.4%*

Notes:

1 Values as a % of 1996 GDP are given in italics.

2 Due to lack of yearly data, values given in the last two columns are not compounded.

3 This includes rehabilitation and reconstruction in the North and the East up to 1995 (85,034), infrastructure in the greater Colombo area up to 1996 (4,500), damages to houses in Jaffna in 1996 (4,050).

4. Income could also have been lost due to "brain-drain"; however, because of data problems this cost is not included in this calculation.

5. Cost of damages on top of damages to houses.

Appendix 1

Comparisons of estimates of economic costs of the war with existing studies from 1983-1988.

Table A1 provides the results that our study produced for estimated cost components of the war of previous studies on the subject. Because of differences in the estimation methods these results cannot be directly compared. This is highlighted only for academic interest.

Table A1: Comparisons of Estimates of Economic Costs of the War with Existing Studies from 1983-1988

Study	Estimated Cost Components	Cost as a Percentage of 1988 GDP
Grobar and Gnanselvan (1993)	Loss of output due to reduced investment	20%
Our Study	Loss of output due to reduced investment at (5% interest rate)	6.30%
Richardson and Samarasinghe (1991)	Comprehensive	68%
Our Study	Comprehensive (at 5% interest rate)	59%

Appendix 2

Estimating the Effect of Government Investment on GDP Growth

We estimated several regression equations to predict the effect of investment on GDP growth (RGDP). In all regressions, government investment (GINV) did not have any statistically significant effect on RGDP. However, total investment (INV) was significant at 10 per cent rate, when considered alone. The results of this regression and the corresponding regression with government investment as the independent variable, estimated for the years 1961 – 1996, are given below.[41]

RGDP = 3.33 + 0.11 GINV

(4.64)*** (1.60)

RGDP = 3.33 + 0.09 INV

(2.33)** (1.84)*

[41] These regressions were estimated using the fully modified Phillips-Hansen estimation procedure to correct for cointegration.

Appendix 3

Estimating Lost Income from Reduced Tourist Arrivals

In order to predict the counterfactual level of tourist receipts, we estimated the following regression equation by ordinary least squares from 1967 to 1983 and extrapolated the resulting trends to 1996.

$$RECEIPTS = 4109.1 - 180.8TIME + 37.6TIME2 - 3739.3D77,$$
$$(3.66)^{***} \quad (1.01) \quad (3.28)^{***} \quad (4.09)^{***}$$
$$\dot{R}^2 = 0.97$$

where RECEIPTS are actual tourist receipts in millions of 1996 Rs., TIME and TIME2 are linear and quadratic time trends, and D77 is a dummy which is 1 for years 1967 to 1977. As can be seen in Figure 3, the tourist arrivals to the country grew at an increasing rate from 1975 to 1983. Both linear and quadratic time trends are included to capture this non-linear growth. Further to these, a dummy D77 is also included as an explanatory variable to capture the policy and institutional reforms that took place after 1977. The results of the actual and predicted levels of tourist receipts are given in Table A2. Given that the average expenditure per tourist arrival in 1996 was about Rs.32,000 (in 1996 prices), our estimates predict that we would have had approximately 1 million tourists in 1996.

Table A2: Tourist Receipts in Rs. Mn. (1996)

Year	Actual	Predicted
1984	7941	13023
1985	6584	14232
1986	6408	15516
1987	6289	16875
1988	5695	18309
1989	5839	19818
1990	9418	21403
1991	10377	23062
1992	12835	24797
1993	13333	26606
1994	13855	28491
1995	12950	30451
1996	9559	32486

Table A3: Estimating Lost Earnings due to Foregone Foreign Investment

Year	Actual FDI (% GDP)	Predicted FDI (% GDP)	Lost FDI (% GDP)	Cumulative lost FDI (% GDP)	Value of gross exports: garment sector (Rs. Mn.) [1]	Net local earnings from garment sector [2] (Rs. Mn.)	Net local earnings from garment sector (% GDP)	Local earnings per unit of FDI	Lost Income (% GDP) [3]
Calculation	**AFDI**			**CLFDI**	**A**	**B = A * 0.15**	**C= B / GDP*100**	**D = C/AFDI**	**E = CLFDI * D * 0.5**
1984	0.54	1.23	0.69	0.69	7,548	1,132	0.74	1.37	0.47
1985	0.41	1.23	0.82	1.51	7,383	1,107	0.68	1.67	1.26
1986	0.44	1.23	0.79	2.30	10,224	1,534	0.85	1.94	2.23
1987	0.87	1.23	0.36	2.66	13,514	2,027	1.03	1.18	1.57
1988	0.62	1.23	0.61	3.27	14,921	2,238	1.01	1.64	2.68
1989	0.26	1.23	0.97	4.25	18,491	2,774	1.10	4.30	9.13
1990	0.54	1.23	0.69	4.94	26,623	3,993	1.24	2.32	5.73
1991	1.04	1.23	0.19	5.13	33,961	5,094	1.37	1.31	3.36
1992	1.53	1.87	0.34	5.47	53,456	8,018	1.89	1.24	3.38
1993	2.45	2.50	0.05	5.51	68,056	10,208	2.04	0.83	2.30
1994	1.59	2.50	0.91	6.43	76,520	11,478	1.98	1.25	4.01
1995	0.39	2.50	2.11	8.54	95,046	14,257	2.13	5.45	23.28
1996	0.91	2.50	1.59	10.12	105,341	15,801	2.05	2.25	11.39

Notes:

1. 1984, 1985 - Statistical Abstract of the Democratic Socialist Republic of Sri Lanka. 1986-1995 Textile Statistics of Sri Lanka (Various Issues). 1996 - Sri Lanka Socio-Economic data 1998. (Statistics Dept, Central Bank of Sri Lanka).
2. Following Athukorale (1995) is predicted to be 15% of the gross export value.
3. The net cost to the economy, after accounting for reemployment of resources in alternative industries, is assumed to be 50% of the lost gross income.

Table A4: Estimating Lost Income due to Lost Human Capital due to Death and Injury

Year	Lost Human Capital [1]						Average daily wage rates (Rs.)[3]	Yearly shadow price of labour [4] (Rs.)	Lost Income (Rs. Mn)	Lost Income (% GDP)
	Killed in action	Wounded in action [2]	LTTE	Civilians	Total Lost Human Capital	Cumulative Lost Human Capital (A)				
Calculation						A	B	C = B * 260 * 0.9	D = A * C / 1000000	E = D / GDP * 100
1983	119	42	1122	1786	3069	3069	34.14	7,989	24.52	0.02
1984	214	76	1122	1786	3197	6138	37.73	8,829	54.19	0.04
1985	214	76	1122	1786	3197	9335	39.49	9,241	86.26	0.05
1986	214	76	1122	1786	3197	12532	42.30	9,898	124.05	0.07
1987	214	76	1122	1786	3197	15730	46.12	10,792	169.75	0.09
1988	214	76	1122	1786	3197	18927	51.28	12,000	227.11	0.10
1989	447	464	1122	1786	3818	22124	59.79	13,991	309.54	0.12
1990	447	464	1122	1786	3818	25942	72.37	16,935	439.32	0.14
1991	447	464	1122	1786	3818	29760	92.07	21,544	641.17	0.17
1992	447	464	1122	1786	3818	33578	105.46	24,678	828.63	0.19
1993	447	464	1122	1786	3818	37396	125.47	29,360	1,097.96	0.22
1994	447	464	1122	1786	3818	41214	158.64	37,122	1,529.95	0.26
1995	2739	1427	1122	1786	7074	45032	184.02	43,061	1,939.15	0.29
1996	2739	1427	1122	1786	7074	52107	213.47	49,951	2,602.79	0.34

Notes: 1. Goonetilake, 1998.

2. Since even injured individuals can participate in some economic activity, only 50% of the human capital of the injured are assumed to be lost.

3. Males for digging pits. Economic and Social Statistics of Sri Lanka - various issues.

4. Assumptions: shadow price is 90% of market wage; 260 working days per year.

References

Angell, Norman, *After All: The Autobiography of Norman Angell, (New York: Farrar, Straus and Young, 1910).*

Athukorala P., "Foreign Direct Investment and Manufacturing for Export in a New Exporting Country: The Case of Sri Lanka," *The World Economy*, Vol. 18, No. 4 (1995), pp. 543-564.

Azar, E, "Protracted Social Conflicts: Ten Propositions," in E. Azar and J. Burton, *International Conflict Resolution: Theory and Practice* (Sussex: Wheatsheaf, 1987), pp. 29-30)

Azar, E., *The Management of Protracted Social Conflict: Theory and Cases,* (Hampshire, UK: Dartmouth Publishing Co., 1990)

Benoit E., *Defence and Economic Growth in Developing Countries* (Lexington, Mass.: Lexington Books, 1973).

Bunselmeyer, Robert E., *The Cost of the War,*(Hamden, Connecticut: Archon Books, 1975).

Central Bank of Sri Lanka, *Annual Report*, (Colombo: Central Bank of Sri Lanka, various years).

CBSLGJV, *Economic Progress of Independent Sri Lanka* Central Bank of Sri Lanka Golden Jubilee Volume (Central Bank of Sri Lanka, Colombo, 1998).

Chan S., "Military Expenditures and Economic Performance," *World Military Expenditures and Arms Transfers* (Washington D.C.: Arms Control and Disarmament Agency, 1986).

Colletta, N. T., M. Kostner, and I. Wiederhofer, *The Transition from War to Peace in Sub-Saharan Africa* (Washington, D.C.: Directions in Development, The World Bank, 1996).

Collier, Paul and Anke Hoeffler, "On Economic Causes of Civil War", *Oxford Economic Papers*, Vol 50 (1998), pp. 563-573.

Deger S., "Economic Development and Defence Expenditure," *Economic Development and Cultural Change* Vol. 35 (1986), pp. 179-96.

Dreze, Jean and Amartya Sen, *Indian Development: Selected Regional Perspectives,* (Oxford and Delhi: Oxford University Press, 1997).

Faini R., P. Annez and L. Taylor, "Defence spending, economic structure, and growth: evidence among countries and over time," *Economic Development and Cultural Change* Vol. 32 (1982), pp. 487 – 98.

Goonetileke, "Counting the Costs of the War," in Kumar Rupesinghe (Ed.), *Negotiating Peace in Sri Lanka – Efforts, Failures & Lessons*, (London: International Alert of London, 1998), pp. 335-345.

Grober, M.L. and S. Gnanaselvam, 'The Economic Effects of the Sri Lankan Civil War', *Economic Development and Cultural Change*, (1993), pp. 395-405.

Gunasinghe N., "The Open Economy and its Impact on Ethnic Relations in Sri Lanka.," *Lanka Guardian*, Colombo, November 15, 1988, in Sasanka Perera (Ed.), *Newton Gunasighe: Selected Essays* (Colombo: Social Scientists Association, 1996), pp.183-203.

Gunaratna, R., *Sri Lanka's Ethnic Crisis & National Security* (Colombo: South Asian Network on Conflict Research, 1998).

Jones, J.H., *The Economics of War and Conquest: An Examination of Mr. Norman Angell's Economic Doctrines*, (London: P.S. King and Son, 1915).

Kelegama, S., "Economic Cost of Conflict in Sri Lanka" in Rotberg, R.I. (ed.), *Creating Peace in Sri Lanka*, (Washington, D.C.: Brookings Institution Press, 1999).

Knight, M., N. Loayza and D. Villanueva, "The Peace Dividend: Military Expenditure Cuts and Economic Growth", *IMF Staff Papers, 43 (1996)*, pp. 1-37.

Lim, D, "Another Look at Growth and Defence in Less Developed Countries," *Economic Development and Cultural Change,* Vol. 31 (1983), pp. 377-84.

Marga, *Cost of War* (Colombo: The National Peace Council of Sri Lanka, 1998).

Ministry of Shipping, Ports, Rehabilitation and Reconstruction, *Emergency Reconstruction and Rehabilitation Programme (ERRP) – Phase II*, (Colombo: Resources Development Consultants Ltd, 1995).

Mizon, Grayham E., "A Simple Message for Autocorrelation Correctors: Don't", *Journal of Econometrics*, Vol 69, No.1 (1995).

O'Sullivan, "Household Entitlements During Wartime: The Experience of Sri Lanka," *Oxford Development Studies*, Vol. 25, No. 1 (1997), pp.95-121.

Richardson, J.M. (Jr) and S.W.R. de A. Samarasinghe, 'Measuring the Economic Dimensions of Sri Lanka's Ethnic Conflict' in Samarasinghe, S.W.R. de. S. and R. Coughlan (ed.), *Economic Dimensions of Ethnic Conflict* (New York: St. Martin's Press, 1991).

Department of Census and Statistics, *Statistical Abstract of Sri Lanka*, (Colombo: Ministry of Policy Planning and Implementation, 1989).

United Nations Development Programme, *Human Development Report*, (New York: Oxford University Press, 1997).

United Nations, *Tourism Master Plan Shri Lanka* (Madrid: United Nations Development Programme/World Tourism Organization, 1993).