

DEFENCE EXPENDITURE AND ECONOMIC GROWTH: A CASE STUDY OF SRI LANKA USING CAUSALITY ANALYSIS

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Many countries allocate a significant amount of their income to defence related expenses, especially when involved in internal or external military conflicts. Political stability in a country is a key ingredient for attracting foreign and local investors and hence for economic growth. This paper analyses the relationship between defence expenditure and economic growth in Sri Lanka using data for the period 1975–2013 applying the latest developments in time series analysis. Interestingly, the results show that, in Sri Lanka, defence expenditure causes economic growth. There is no causal effect from economic growth to defence expenditure as generally expected. This result is unique as Sri Lanka went through 30 years of civil war which ended in 2009, which resulted in the loss of tens of thousands of civilian lives and cost several billions of dollars in annual defence expenditure throughout the war years.

1. Introduction

Defence expenditure can affect economic growth in both negative and positive ways. It can affect negatively through a number of possibilities including crowding out investments, interruptions to productive activities, increasing government debt etc. On the other hand, it could affect positively through an expansion of aggregate demand, infrastructure developments, employment creation, political stability etc. There are no theoretical results available about the direction of causality between defence expenditure and economic growth of a country. However, there are a number of empirical research studies which have analysed the direction of causality between defence expenditure and economic growth, but the results are inconclusive (for example, see Benoit, 1973; Chen, Lee and Chiu, 2014; Dunne and Uye, 2009; Galvin, 2003; Hou and Chen, 2013; Kollias, Mylonidis and Paleologou, 2007; and Na and Bo, 2013).

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The main aim of this paper is to investigate the casual relationship between defence expenditure and economic growth, with Sri Lanka as a case study. The Sri Lankan situation is a special case as the Sri Lankan Government was involved in a war against the Tamil Liberation movement known as the Liberation Tigers of Tamil Eelam (LTTE) from 1983–2009, which required a huge military expenditure. However, as the war was waged only in the Northern and Eastern parts of the country and away from its main centres of economic activity located in the southern parts of the country, the Sri Lankan government managed its economy with a significant positive economic growth rate throughout the 30 years of war. To conduct the war, the Sri Lankan government increased defence spending to unprecedented levels irrespective of its level of economic growth. When deciding on the defence expenditure, the Sri Lankan Government gave very little thought to its national income, as the only aim was to win the war against the LTTE. Some of the government's public policy makers argued that allocating larger sums of money for defence would allow political stability in the non-war regions and hence economic activity will be uninterrupted, while others argued that increased disproportionate defence expenditure has hindered the country's economic growth, which would have been in double-digits otherwise (for example, see Grober and Gnanaselvam, 1993; and Arunatilake, Jeyasuriya and Kelegama, 2000).

Even after winning the war against the LTTE in May 2009, the Sri Lankan Government continued to increase its defence spending despite pressure from the international community to scale down military activity in the war-ravaged areas and reduce defence spending. In the December 2014 Appropriate Bill tabled in the parliament, the Sri Lankan government allocated ₹285 billion for defence in 2015, which is about 13 per cent higher than the defence spending allocated for 2014, while the allocation on essential services such as health and education have been experiencing a rapid decline over the last three decades. Obviously, the Sri Lankan economic growth and its relationship to defence spending over the years requires rigorous investigation using recent developments in time series analysis.

The organisation of the remaining paper is as follows. In Section 2, we present the background information on Sri Lankan economy and defence expenditure. In the subsequent section, we present the data and analyse the time series properties of the variables used in the analysis. In Section 4, we investigate the casual link between defence spending and economic growth. In the final section we present our concluding comments.

2. Defence Spending and Economic Growth in Sri Lanka

Columns 2-4 of Table 1 present the Sri Lankan annual defence spending in current US dollars, constant US dollars (2005) and in per capita US dollars for selected years during the period 1975 to 2013. These data are collected from *SIPRI Yearbook* (2014) and *WDI* (2013). Figure 1 presents the plot of the complete time series of these three variables. As can be seen, per capita defence spending has increased from \$0.89 in 1975 to \$87.55 in 2013, almost by 100 fold. The important fact to note in the movement of this series is that,

Table 1: Defence spending, GDP and Government expenditure (in current and constant US\$), Sri Lanka, 1975–2013, Selected years

Year	Defence spending				GDP in Constant US\$m (base year 2005)	Per capita GDP Constant US\$m (base year 2005)	Government Expenditure		Defence spending as a percentage of GDP	Defence spending as a percentage of Government expenditure	Population (in millions)
	Current US\$m	Constant US\$m (base year 2005)	Per capita current US\$m	Current US\$m			Constant US\$m (base year 2005)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
1975	12	33.31	0.89	6201.96	458.93	353.78	752.0	0.54	4.43	13.5	
1980	31	64.82	2.09	8014.90	543.38	343.92	1092.6	0.81	5.93	14.8	
1985	189	369.11	11.93	10204.70	644.15	611.16	1293.0	3.62	28.55	15.8	
1990	187	299.49	10.99	12082.83	710.13	783.95	1395.5	2.48	7.51	17.0	
1995	764	959.70	42.13	15714.29	866.47	1494.71	1465.6	6.11	19.22	18.1	
2000	822	1005.31	43.03	20090.40	1051.74	1716.52	2885.6	5.00	18.85	19.1	
2005	644	644.00	32.78	24405.79	1242.40	3194.40	3194.4	2.60	11.06	19.6	
2006	791	743.63	39.83	26277.30	1323.26	4342.42	3500.5	2.80	11.52	19.9	
2007	1055	910.48	52.65	28063.32	1400.44	4940.74	3759.8	3.30	13.90	20.0	
2008	1511	1042.52	74.74	29733.11	1470.70	6589.02	4127.4	3.70	16.46	20.2	
2009	1522	1076.73	74.43	30785.34	1505.40	7408.64	4787.8	3.60	14.56	20.5	
2010	1532	1003.51	74.18	33253.08	1610.08	7718.11	4863.8	3.10	13.51	20.7	
2011	1750	1050.33	83.86	35995.10	1724.81	8751.94	5132.1	3.00	13.86	20.9	
2012	1533	993.91	75.41	38277.68	1883.00	8005.04	5159.1	2.60	13.13	20.3	
2013	1823	1112.75	87.55	41053.16	2004.26	8808.70	5382.8	2.80	14.25	20.5	

from time to time, the defence spending had sudden jumps reflecting the peak war periods. For example, at different time periods, when a new government took office defence spending was increased with the expectation of winning the war and then when this did not materialise, defence spending stabilised. During 1980–1985, 1995–2000 and 2007–2009, the war was at its peak and the defence budget was increased. Defence spending was at its lowest level when peace agreements were signed, in 1989 and 2002. However, several governments and international humanitarian organisations were surprised when the Sri Lankan government continued to increase its defence budget even after winning the war in 2009. In current dollars, the lowest defence budget was in the order of US\$600 million dollars during the peace period of 2002–2005, which was increased to US\$1076 million during 2009, the final year of the war. This has continued to increase to US\$1112 million in 2013, four years after the end of the war.

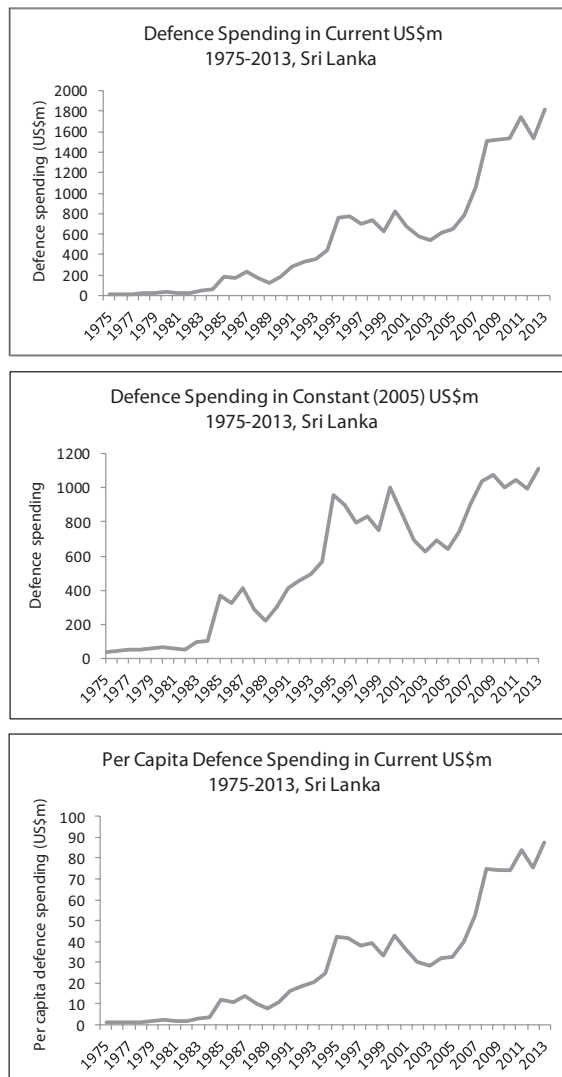


Figure 1: Defence Spending, Current and Constant US\$, Sri Lanka, 1975–2013

Columns 5 and 6 of the table, give the total GDP and per capita GDP, both in constant (2005) US dollars. Figure 2 plots the complete series of these two variables. While the per capita defence spending has increased by almost one hundred times from \$0.89 in 1975 to \$87.55 in 2013, the per capita GDP has increased only approximately 5 fold from US\$459 in 1975 to US\$2004 in 2013. Columns 7-8 of Table 1 give the government expenditure in current and constant prices and columns 9-10 of the table give the defence spending as a proportion of GDP and government expenditure. The last column presents the Sri Lankan population from 1975 to 2013. Figure 3 plots the complete time series of these four variables (in columns 7-10). Sri Lanka defence spending as a percentage of GDP has increased from 0.54 per cent in 1975 to 3.62 per cent in 1985 and then fell to 1.94 per cent in 1989. This ratio peaked to 6.11 per cent in 1995 and fell to a very low level of around 3 per cent during the peace years 2002–2005 and then increased to 4 per cent by 2009 when the war ended.

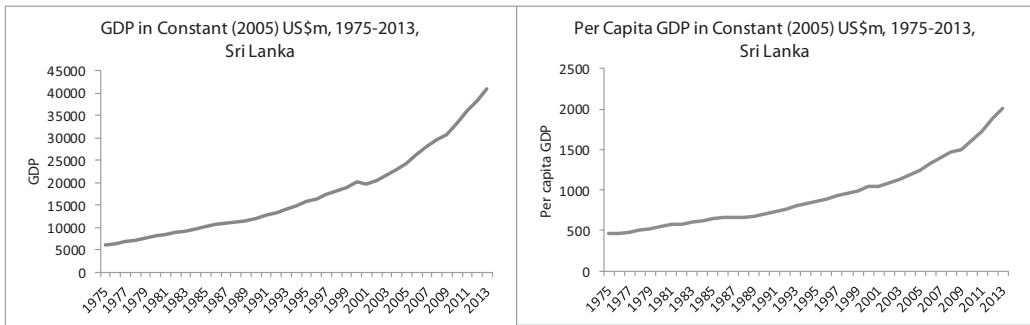


Figure 2: Gross Domestic Product, Sri Lanka, 1975–2013

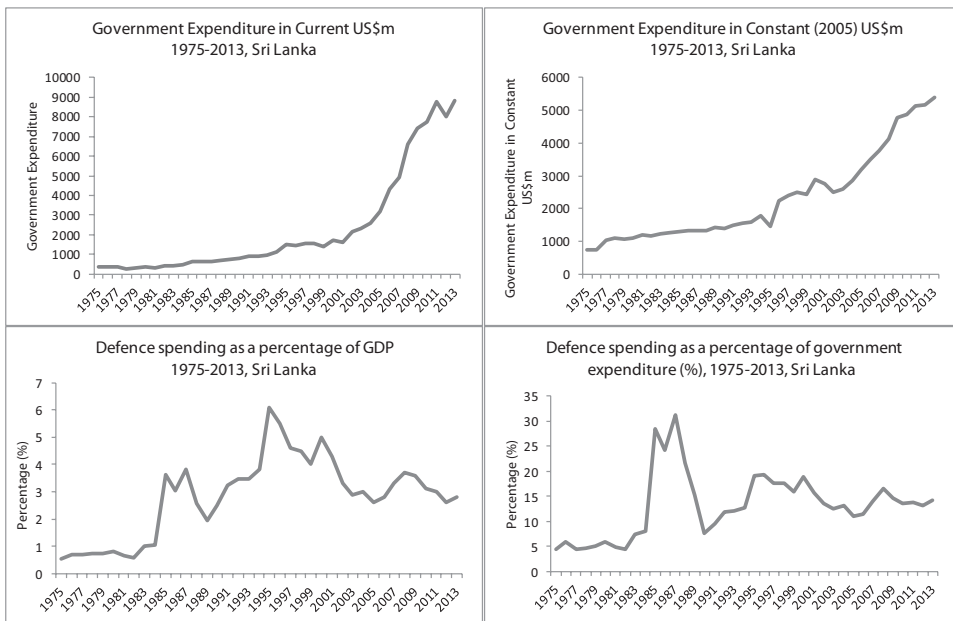


Figure 3: Defence Spending as a percentage of GDP and Government Expenditure, Sri Lanka, 1975–2013

Table 2: Tests of stationarity

Variable	Level						First Difference					
	ADF Test		PP Test		KPSS Test		ADF Test		PP Test		KPSS Test	
	Test statistic	p-value	Test statistic	p-value	Test statistic	CV at 5% level	Test statistic	p-value	Test statistic	p-value	Test statistic	CV at 5% level
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
GDP	1.45	1.00	1.30	1.00	0.205	0.146	-3.85	0.01	-3.87	0.01	0.131	0.146
DS	-2.76	0.22	-2.87	0.18	0.711	0.463	-6.39	0.00	-6.85	0.00	0.119	0.463
DSGDP	-1.60	0.77	-1.51	0.81	0.207	0.146	-6.34	0.00	-6.36	0.00	0.306	0.463
DSGE	-2.48	0.33	-2.56	0.45	0.144	0.146	-3.80	0.01	-6.08	0.00	0.098	0.463

Table Notes: CV is critical value

Table 3: Cointegration test results

Variable	H ₀	H ₁	Trace Value Test		Eigen Value Test		Residual Test	
			Test statistic	p-value	Test statistic	p-value	ADF Value	p-value
DS vs GDP	r = 0	r ≥ 1	19.798	0.236	14.521	0.221	-1.470	0.537
DSGDP vs GDP	r = 0	r ≥ 1	19.579	0.248	14.309	0.234	-1.580	0.482
DSGE vs GDP	r = 0	r ≥ 1	22.695	0.118	18.644	0.064	-2.340	0.400

3. Time Series Properties of the Variables

We consider the following four variables in natural logarithms for the remaining analysis of the paper: (1) Defence spending (DS) in constant 2005 US dollars; (2) Per capita GDP (GDP); (3) Defence spending as a proportion of GDP (DSGDP); and (4) Defence spending as a proportion of government spending (DSGE). We first investigate the time series properties of these data series. We first test for stationarity using the unit root test and then employ the Johansen test to investigate whether the series are co-integrated. Table 2 presents the results based on the three unit root tests, namely, the Augmented Dicky-Fuller (ADF) test, Phillips-Perron (PP) test and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. For the first two tests, the null hypothesis is that the series has a unit root (i.e., the series is non-stationary) and, for the third test, the null hypothesis is that the series has no unit root (i.e., the series is stationary). As can be seen, all four variables are non-stationary in levels and are stationary in their first differences. Therefore, all four variables are I(1).

Table 3 presents the co-integration test results based on the Johansen test and the Granger unit root test based on the residuals (H_0 : The residual series is non-stationary, i.e., the variables are not cointegrated). As can be seen, there is no evidence of co-integration between the per capita GDP and any one of the other three variables. Since there is no cointegration between per capita GDP and any of the other three variables and as all the variables are I(1), from here onwards, we use the variables in the first-differenced form.

4. Causality between Defence Expenditure and Economic Growth

Now we investigate the direction of causality between per capita GDP and each of the three variables, namely, total defence spending, defence spending as a percentage of GDP and defence spending as a percentage of government expenditure. We employ the Granger causality test for this purpose. The results for the causality tests are provided in Table 4. As

Table 4: Causality test results

Null Hypothesis	Test statistic ϕ	p-value	Conclusion at the 5% level	
Ho: GDP does not Granger cause Defence Expenditure	0.378	0.680	Do not reject Ho	GDP \rightarrow Defence Expenditure
Ho: Defence expenditure does not Granger cause GDP	2.835	0.070	Reject Ho*	Defence Expenditure \rightarrow GDP
Ho: GDP does not Granger cause Defence Expenditure as a percentage of GDP	0.387	0.660	Do not reject Ho	GDP \rightarrow Defence Expenditure
Ho: Defence expenditure as a percentage of GDP does not Granger cause GDP	3.053	0.060	Reject Ho*	Defence Expenditure \rightarrow GDP
Ho: GDP does not Granger cause Defence Expenditure as a percentage of Government Expenditure	0.908	0.414	Do not reject Ho	GDP \rightarrow Defence Expenditure
Ho: Defence expenditure as a percentage of Government expenditure does not Granger cause GDP	6.560	0.004	Reject Ho	Defence Expenditure \rightarrow GDP

Table Notes: * at the 10% level of significance.

can be seen, in all cases, there is no causality from GDP to defence spending while there is causality from defence spending to GDP. Therefore, in Sri Lanka, only a unidirectional causality exists from defence spending to GDP, and hence to economic growth.

5. Concluding Comments

In this paper, we presented an analysis of the relationship between defence expenditure and economic growth, using Sri Lanka as a case study. The Sri Lankan government allocated an unprecedented share of its budget for defence expenditure, irrespective of the country's economic growth, to fight against the LTTE in the North and East of the country. This kept the South of the country free from any war activities enabling a peaceful environment in the South of the country to be maintained. This in turn gave the impression to the local and international business community that the Sri Lankan economy was stable. The government achieved its aim of winning the war and keeping the economy growing with great success. This observation is supported by the causality test results, which indicates a unidirectional causality from defence spending to economic growth.

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