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Impact of Government Spending on Education and Health in Sri Lanka
A Provincial Level Analysis

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A Provincial Level Analysis

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ABSTRACT

This study examines the impact of government spending on educational and healthcare development outcomes at the provincial level in Sri Lanka with the objectives of (1) to investigate the impact of government expenditure on education in terms of the student failure rate at the provincial level; (2) to investigate the impact of government expenditure on health in terms of infant mortality rate at the provincial level; (3) investigate the performance of other provinces in terms of social outcomes compare with that of Western Province and recommends policy implications based on the results. Panel data analysis technique has been utilized for the data set of seven provinces[2] of Sri Lanaka for the period of 1995 to 2011.

The empirical results imply that government spending by provincial councils does have an effect on student failure rates and infant mortality rates. But with the presence of other regional factors the quality of government spending is questionable. These findings are confirmed by the previous research in this field such as Rajkumar and Swaroop (2008), Baldacci, et al. (2008). Moreover, the performance of provinces in education and health sectors are varied with reference to Western Province. To attain the goals of education and healthcare sectors, the sum of government spending is not always what matters, but the quality. Therefore the provincial councils should not depend entirely on increasing the allocation of budget to improve the outcomes. Implementing monitoring and evaluation systems would be advantageous in advancing the effectiveness and quality of provincial budget allocation.

Keywords: Government spending, Human Capital, Education, Health, GDP, Sri Lanka

JEL codes: I15, I22, O15

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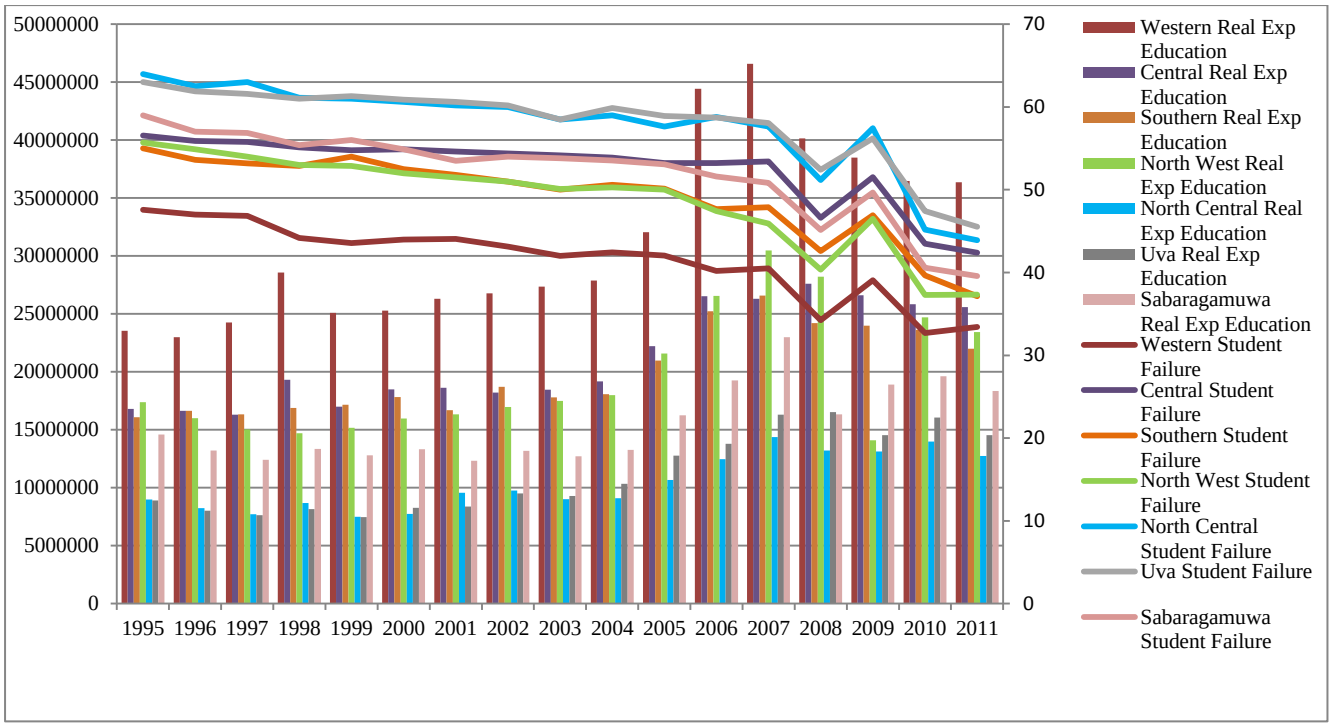
2. Eastern and Northern Provinces has been excluded due to unavailability of data

1.0 Introduction

The role of human capital in fostering economic development is well recognized in the literature. Education and health are two essential dimensions of human capital and core elements of Millennium Development Goals (MDGs)[3] Government spending on education and healthcare can increase economic growth, promote income equality and reduce poverty (Barro, 1991). The precise relationship between spending and social outcomes in education and health is unknown. This leads many researchers and policy makers to question whether the amount matters at all (Hanushek, 1986). The findings in terms of outcomes from spending on education and health sectors are mixed. (Sanjeev Gupta, 2002).

Education and health are prioritized sectors in nurturing human capital in most countries particularly in developing countries. Therefore, the budget allocation for education and health in Sri Lanka has been increasing noticeably over the last decade. (Figures 1-1 and 1-2).

Figure 1-1: Real Expenditure (Rs. Mn) on Education and Student Failure Rates in GCE O/L[4] amongst Provinces from 1995 to 2011

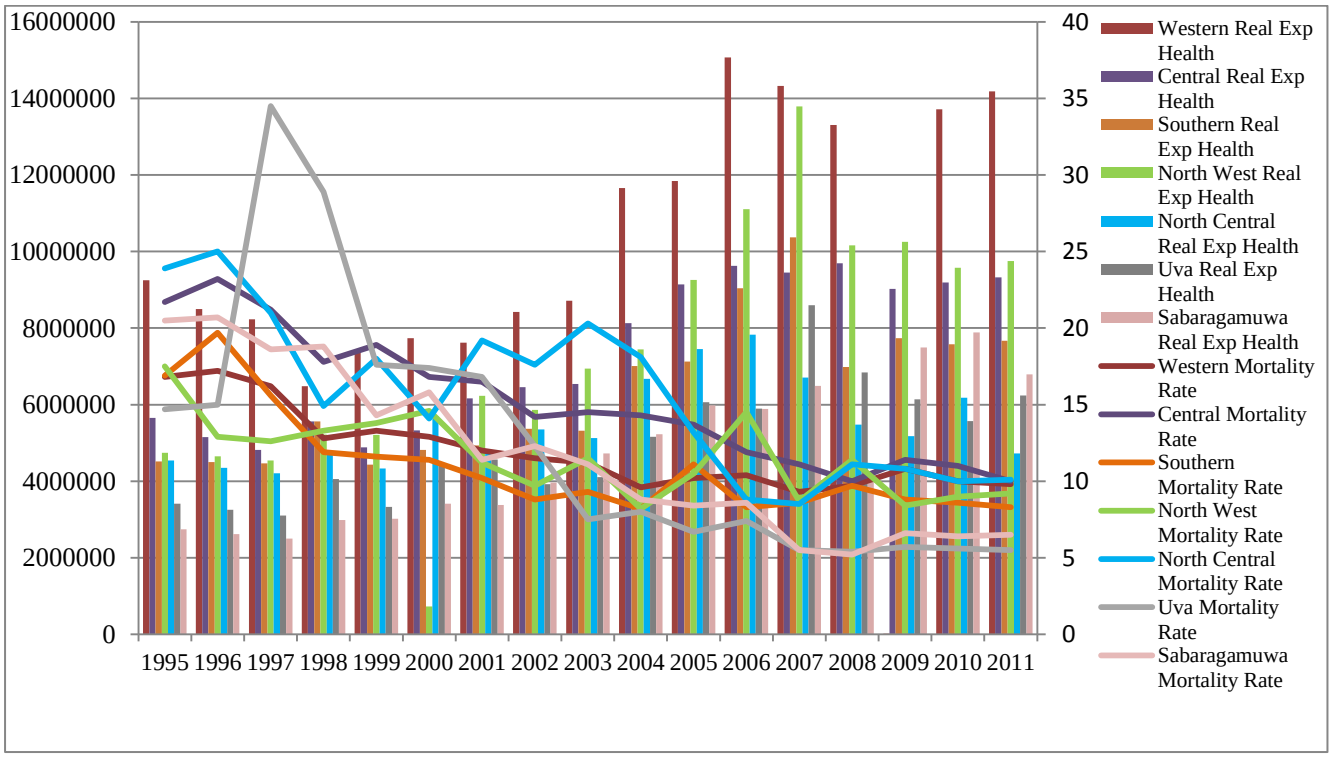


Source: Ministry of Local Government and Provincial Councils and Ministry of Education

[3] Millennium Development Goals by United Nations.

[4] General Certificate of Education Ordinary Level (GCE O/L) examination is the first milestone in school education. Examination is held at end of Grade 11 as a subject examination based on syllabi of Grades 10 and 11. Achievement standards at this examination demonstrate the percentage of school candidates (first attempt) who have been qualified to study next level, the General Certificate of Education Advanced level. (GCE A/L)

Figure 1-2: Real Expenditure on Health (Rs. Mn) and Infant Mortality Rates amongst Provinces from 1995 to 2011



Source: Ministry of Local Government and Provincial Councils and Department of Registrar General

The increase of the budget for education and health is mainly due to the completely free education and healthcare policy of the country. But the planning and the quality of spending of the allocated budget is still questionable. As Suryadarma (2008) notes, the jump in public spending after decentralization is caused by factors unrelated to educational outcomes, and implies that the government is using free education for the purpose of political campaigning. This is confirmed by Filmer (2007), who says that increasing school numbers is an attractive option for policy makers. However if the argument is true that the government spending on education and health does matter for the social indicators that can be support foster economic growth, promote income equality, enhance productivity and reduce poverty as confirmed by many researches, it is important to check that the relationship between spending and outcomes really matters. Therefore knowing the real impact of public spending on education and health sectors at the provincial level would be helpful in providing policy recommendations to the local authorities for their future strategies.

The analysis is carried out at the provincial level with a focus on government spending on education and health sectors. The analysis of education expenditure is controlled for factors including Gross Domestic Product (regional GDP), adult literacy rate, student-teacher ratio, access to medical services and access to safe drinking water. The analysis of health expenditure is controlled for factors including Gross Domestic Product (regional GDP), adult literacy rate, poverty head count, and access to safe drinking water.

However student failure rate of GCE O/L may not really reflect the qualitative outcome of educational development of the provinces. Though previous literature suggest educational outcome is determined by inputs like ratio of student library, ratio of student classroom, composition of private to public school , etc., could not include those control variables due to failure to obtain data. Similarly the factors like doctor population ratio, composition of private to public hospitals etc. that determine health outcome could not include due to the failure to the same reason. Only the expenditure done by provincial councils were used as the government expenditure on both sectors, the expenditure done directly on provinces by the central government was excluded from the analysis.

Though Sri Lanka consists of nine provinces, analysis is done only on seven provinces due to unavailability of data. Western Province, Central Province, Southern Province, North Western Province, North Central Province, Uva Province and Sabaragamuwa Province are incorporated in the analysis. Eastern Province and Northern Province, which are the provinces which have been under war conditions for almost three decades, were excluded due to unavailability of required data.

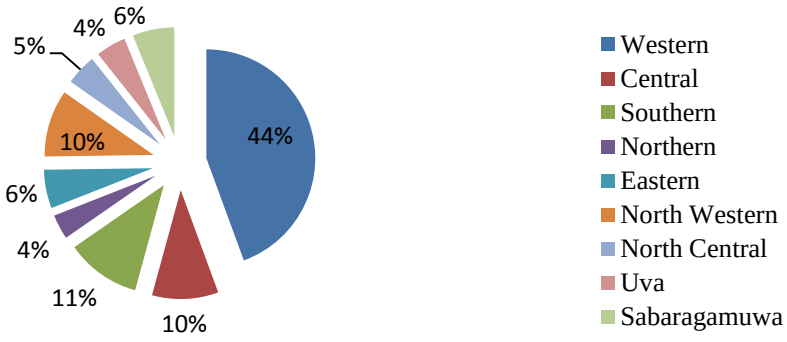
Finally, the succeeding part of the paper will be organized as follows. Chapter 2 will describe the human capital development in Sri Lanka. Chapter 3 provides an overview of relevant literature. Chapter 4 will describe the data and methodology. Chapter 5 presents the findings and discussion of the study, followed by Chapter 6 which offers conclusions and policy recommendations.

2.0 Government Spending on Human Capital Development in Sri Lanka

Sri Lanka has become a middle-income country with a per capita GDP at market prices of US$ 2,836 (Central Bank Report, 2011). It showed a growth in its economy of 8.3% in 2011, the highest in Sri Lanka's post-independence history. The real GDP growth of fiscal year 2010 was 8%. In 2013 the per capita GDP at market prices was US$ 4,929 (Central Bank Report, 2014). Provincial councils were established in 1987 under the 13th amendment to the 1978 Constitution of Sri Lanka. These provincial councils are the first administrative level of the country. The economic performance, i.e, share to GDP and the social living standards vary from province to province due to differences in capabilities, resources and geographical factors. Figure 2-1 shows the share contributed by each province to the GDP in 2011.

The government of Sri Lanka has placed a priority on human resource development by enhancing investment in health and education sectors. Sri Lanka has performed well in terms of health and education coverage with relatively low expenditures in comparison to other developing countries. Wide access to primary health care and primary education in most areas of the country has led to impressive achievements in both health and education sectors. The government provides universal, free education from primary to university level. The social indicators have been amongst the best among developing countries, even

comparable to some developed countries. According to the Human Development Report 2013, Sri Lanka's HDI (Human Development Index) ranked 0.715 against a global average of 0.694 (Ministry of Finance Annual Report, 2013,).



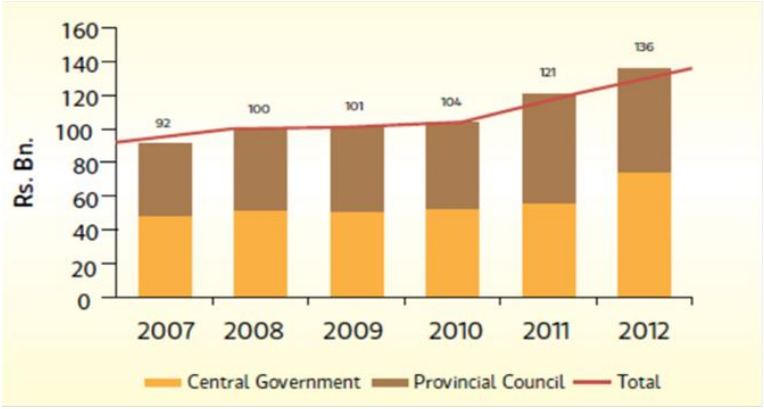
Source: Central Bank Report, 2012

Figure 2-1: Performances of Provinces – Share of GDP in 2011

2.1 Government Expenditure on Education

Education is considered as a fundamental right in Sri Lanka. The Department of Statistics of states that, the literacy rate of the population is 92%, higher than expected for a developing country and the highest in South Asia. Education plays a major part in the life and the culture of the country. The whole education system, primary (elementary school), secondary (middle and high school) and tertiary (university) is provided as an entirely free service. According to the governance system of Sri Lanka, the responsibilities of the education system lie with both the Central Government and Provincial Councils.

Figure 2-2 : Education Expenditure by Central Government and Provincial Councils



Source: Department of National Budget

Both the central and provincial governments spend money to enhance education. Expenditure is mainly organized on four major themes: promoting equitable access, improving quality, enhancing efficiency and equity of resource allocation, and maintaining an

effective system of service delivery. Government expenditure in provincial councils reflects the investments and costs associated with education. Government is pledged to provide funding to provide education for all. It covers government contributions towards the expense of school construction and maintenance (service delivery), teacher salaries, text books, as well as nutrition programs and uniforms (student welfare).

Table 2-1: Components of Government Expenditure on Education (Rs. Mn)

Component /Year	2005	2006	2007	2008	2009	2010	2011
Service Delivery	40,265	52,520	61,830	63,700	65,961	73,443	84,413
Teacher Salary	7,500	874	11,231	11,179	12,602	13,428	14,614
School Uniforms	1,060	963	1,067	582	1,260	949	1,364
School Textbooks	1,080	1,123	2,250	3,387	2,196	141	2,294
Midday Meals	166	722	1,308	1,649	2,251	2,474	2,630
School capital works	7,751	5,328	5,862	6,422	6,571	6,823	8,021
Total	48,016	57,848	67,692	70,122	72,532	80,266	92,434

Source: Department of National Budget.

Note: Details of central government is shown here, since due to the difficulty to obtain details of provincial councils

In addition, the facilities available at schools, such as safe drinking water and sanitation facilities, vary widely amongst provinces. Table 2-2 shows the prevailing situation of the schools at the provincial level and national level. It is evident that most schools do not have sufficient drinking water and sanitation facilities.

Table 2-2: Variation of Basic Facilities of Schools among Provinces

Province	Basic facilities at school			
	Adequate drinking facility not available		Adequate toilet facility not available	
	No. of schools	% of schools	No. of schools	% of schools
Western	38	2.9	564	42.3
Central	330	22.6	57	40.9
Southern	125	11.4	565	51.7
Northern	116	13.3	377	43.1
Eastern	223	21.9	536	52.7
North Western	231	19.0	76	65.5
North Central	175	22.5	478	61.5
Uva	201	24.0	263	31.4
Sabaragamuwa	234	21.2	548	49.6
Sri Lanka	1,673	17.2	4,724	48.6

Source: Ministry of Education

2.2 Government Expenditure on Health

The vision of Sri Lanka's health care system is to create a healthier nation that contributes to the country's socio-economic development actively. The health care system provides universal coverage to the entire population, with services provided free of charge.

This sector is expected to be a patient-focused system. The target of the healthcare sector is to provide a quality healthcare system to address both emerging non communicable and communicable diseases as well as nutritional issues in the country. To achieve that, it is expected to equip all hospitals and medical facilities with enough resources such as medical professionals, modern medical equipment, essential drugs, and ambulances to build up the confidence amongst the general public regarding the service provided by government hospitals. In urban, developed areas well-equipped, modern, private health care services are also available in addition to the government hospitals, but in rural areas government hospitals are the only primary healthcare providers which offer updated modern medical facilities. Therefore the government has diverted its resources to improve health facilities throughout the country. Table 2-3 and shows the distribution of healthcare resources in provincial level Sri Lanka in year 2011. It clearly illustrates how imbalanced the dispersal of resources which directly affect health status of people.

Table 2-3: Distribution of Healthcare Resources (2011)

Province	Teaching Hospitals	District General Hospitals	Base Hospitals	Divisional Hospitals	Primary Health Care Units	Bed Strength	Medical Officers	Nurses
Western	13	3	10	43	74	20,528	5,458	10,874
Central	4	3	6	84	64	9,531	1,867	4,115
Southern	2	2	8	53	60	7,515	1,315	3,632
Northern	1	4	6	48	33	4,945	547	825
Eastern	1	2	12	38	71	5,607	982	1,849
North Western	0	1	7	52	78	6,610	1,272	2,574
North Central	1	1	5	45	34	5,038	657	1,588
Uva	0	1	5	44	29	4,554	724	1,567
Sabaragamuwa	0	1	7	52	33	5,433	901	2,210
Total	22	18	66	459	476	69,761	13,723	29,234

Source: Ministry of Health

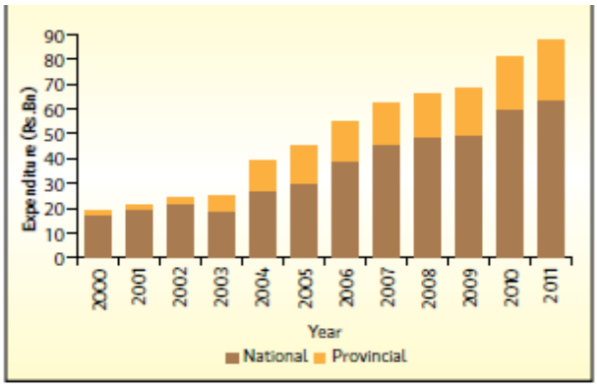
Government spent a vast amount of money for the development of health sector. And the government budget has been increased remarkably over the past decade. Table 2-3 shows the government spending on healthcare for the period of 2003 to 2011 for both national and provincial levels. In 2011 the total expenditure was Rs. 88 billion, that reflects a 91% increase with compared to year 2005 spending.

The graph in Figure 2-3 shows the national and provincial level healthcare spending over the period of 2000 to 2011 and it reflects a rapid increase of expenditure after 2004.

Table 2-7: Government Spending on Health (Rs. Bn) (2002 - 2011)

Description/Year	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total government expenditure on health (both capital and recurrent)	25	39	46	55	62	66	68	81	88
Health expenditure as a share of total government expenditure	3.7	5.9	5.7	5.2	4.5	4.7	3.	4.1	4.8
Per capita government health expenditure	1,299	2,004	2,339	2,716	3,000	3,215	3,325	3,631	3,994

Source: Department of National Planning



Source: Department of National Budget

Figure 2-4: National and Provincial Level Health Expenditure 2000-2011

2.3 Budget Allocation System in Provincial Councils

The Provincial Councils of Sri Lanka were established under the 13th amendment to the constitution. The 13th amendment to the Constitution and the Provincial Councils Act No.42 of 1987 are the legislative enactments that define the financial powers of Provincial Councils. The Chief Secretary of the Provincial Council (the highest bureaucrat), is the authority that is responsible for financial management in a Provincial Council. He is assisted in functions related to finance by the Deputy Chief Secretary (Finance), who is usually an accountant. The budget of a Provincial Council is called the Annual Financial Statement. It has to be passed by the respective Provincial Council and approved by the Provincial Governor.

There are number of sources of funds for a Provincial Council, such as grants for new establishment (recurrent) costs from Central Government, block grants to meet all recurrent expenditures for the devolved functions (by Constitution) receivable from the Central Government, criteria-based grants for capital expenditures, allocations made by the Members of Parliament in the area of the Provincial Council, devolved revenues (Ex: vehicle licenses, court fines, stamp duties, turnover taxes), contributions made under national projects (e.g., Integrated Rural Development Project), loans, profits from commercial operations (advance accounts) and other receipts such as donations, grants etc.

Figure 2.4 illustrates how the funds flow from central government to provincial councils through Finance Commission and other respective ministries. While Figure 2-5 outlines the various steps that occur during the budget making process. The bureaucrats as well as the political entity of provincial council are responsible for planning budget in any provincial council.

Figure 2-4 : Basic Structure of Flow of Funds to Provincial Councils

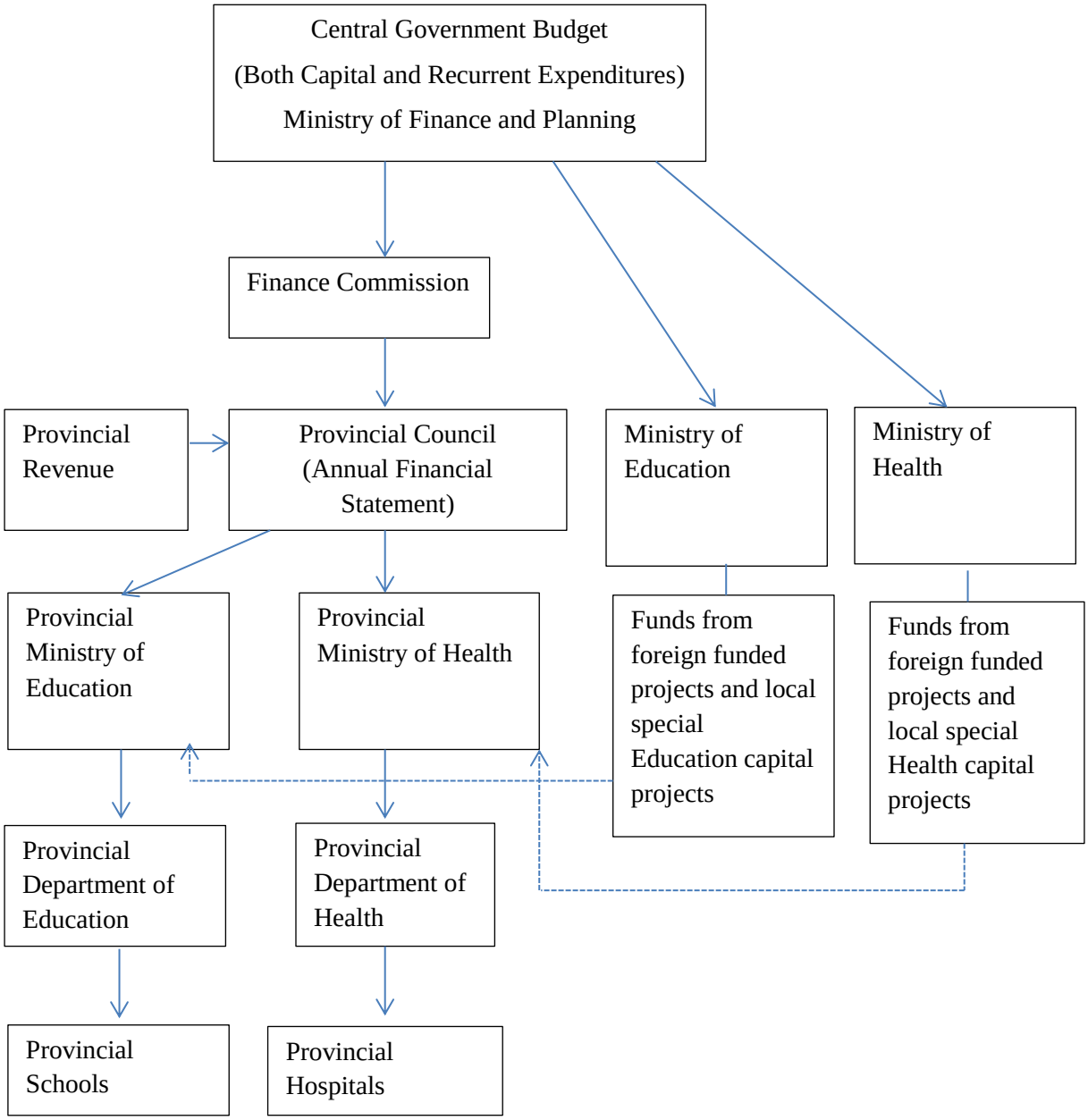
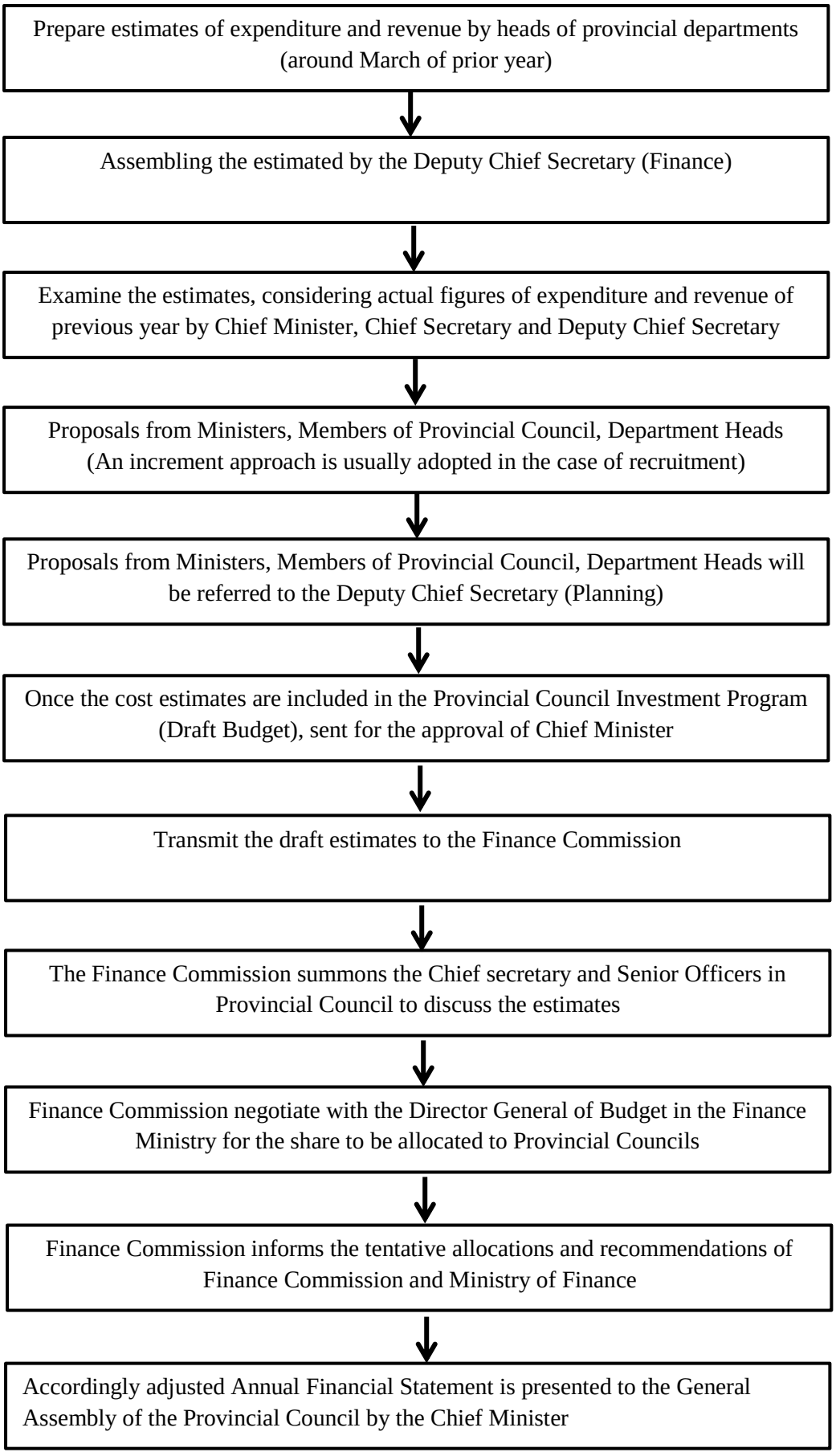


Figure 2-5: Annual Budget Making Process of a Provincial Council



3.0 Review of Empirical Studies

Many economists tried to identify the relationship between the social outcome and government spending on education and health sectors in numerous perspectives. By time series, cross-country or panel data analysis they argued that there is a mixed relationship between social outcomes and the government spending on education and health sectors. Intuitively, student achievement as an outcome of development in the education sector will increase as the government spending on the education sector increases. The infant mortality rate as an outcome of development in the health sector will decrease as the government spending on health sector increases, as well. Increasing government expenditure causes more resources to be put into place in any sector. Increasing the number of teachers, building new classrooms, improving infrastructure facilities, providing additional teaching/learning materials in the education sector should result in a better outcome. Putting more resources in to the health sector by building hospitals, improving infrastructure, purchasing equipment, or hiring more doctors should result in better outcomes.

However empirical studies do not confirm that better outcomes are always a result. There are an enormous number of factors that determine how the government spending attains the envisioned targets. Many scholars and researchers have made substantial efforts to attempt to reveal the relationship between spending and social outcomes. Some found significant causal relationships between both variables while others had the opposite findings.

Rajkumar and Swaroop (2008), examine the relationship between public spending, outcomes and governance in the health and education sectors. The study was done for 57 countries over the period of 1990, 1997 and 2003 for the education sector analysis. They used educational attainment to measure outcome by following several previous studies, such as Barro and Lee (1996), but to maintain the consistency with the health analysis they utilized student failure instead of student pass rate. They found that the most important factor in explaining the variation in the failure to complete primary education is per capita GDP. But the results did not show a significant relationship with the public spending on education. For the analysis of health spending they have used a sample of 228 observations over the periods of 1990, 1997 and 2003 for 91 developed and developing countries. They studied the impact of public health spending on child (under 5 years old) mortality. The key spending measure was total public health expenditure, which is available for a large cross-section of countries. They found that the amount of public health spending and per capita was associated with a reduction of child mortality. Their results also show that countries where women are more literate, child mortality is lower. The surprising result of this study is that public spending often does not yield the expected improvement in outcomes.

Baldacci, et al. (2008), studied the relationships between social spending, human capital and growth in developing countries by using panel data for 118 countries for the period of 1971 to 2000. This study explored the channels linking social spending, human capital and growth and compared the effects of alternative economic policy interventions with separate modeling for education and health capital. It found that one possible cause of mixed results in the literature on whether the spending on education and health care improves

social indicators was a lack of available data and measurement problems. For the education spending analysis the equation examined the direct impact of educational spending on educational capital, as proxied by the composite primary and secondary school enrollment rate. They found that educational spending positively affects educational capital through both a contemporaneous effect and a lagged effect. The results showed a strong relationship from health capital on educational capital. In the health analysis they started with a general assumption that educational capital would affect health outcomes directly in a similar way to the previous education equation; however the relationship between educational capital and health outcomes was dropped due to no significant impact being found. Nevertheless, they found that health spending has a positive and significant impact on health capital, but the effects are contemporaneous. An increase in health spending decreases under-5 child survival rates, but lagged health spending has no further effect on health status as did educational spending. Similarly they found income is negatively associated with child mortality and the level of mother's education decreases child mortality. Moreover the paper found a positive and significant impact on growth from educational and health capital; and these positive effects of both education and health spending are strongly influenced by the quality of governance. To minimize the presence of biases in the analysis mainly from heterogeneity and fixed effects related endogeneity, the fixed effect analysis was used.

Meanwhile Gupta, Verhoeven, and Tiongson (2002) study the effectiveness of government spending on education and healthcare in developing and transition economies. This paper uses cross-sectional data for 50 such countries with the objective of showing that increased public expenditure on education and health care is associated with improvements in both access to and attainment in schools and reduction in infant child mortality rates, respectively. Unlike the literature discussed above, this paper found that the education regressions are robust to different specifications, but the relationship between health care spending and infant mortality rate is weaker. They checked the impact of educational spending on two indicators, enrollment rates and student attainment and found that greater public spending on primary and secondary education has a positive impact on those widely-used measures of educational attainment. The results demonstrated that socioeconomic indicators such as urbanization, percentage of population in the 0-14 age group, and per capita income are important in explaining variances in enrollment rates. Also the increased health care spending reduces child and infant mortality rates. Adult literacy rate and income per capita are consistently significant in all the health regressions. Additionally, the income elasticities are comparable with the previous literature. Furthermore, the study illustrates that both education and health are affected by per capita income, urbanization, adult literacy, and access to safe sanitation and water; private sector spending also matters.

4.0 Data and Methodology

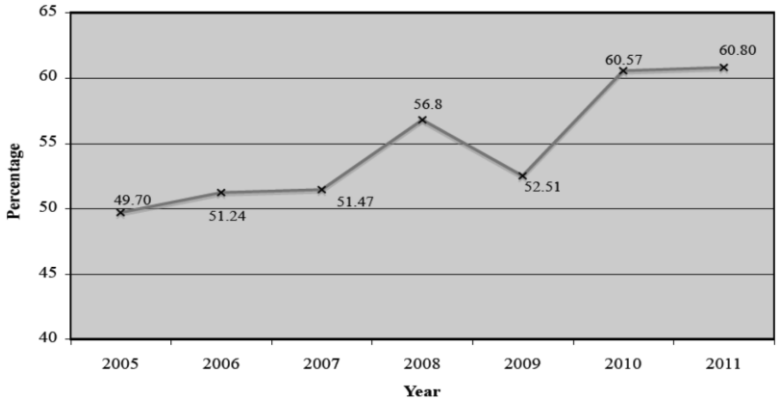
This study is conducted by using a data set collected from 7 out of 9 provinces in Sri Lanka over a period of 16 years (1995 to 2011).

4.1 Analysis on Education Spending

4.1.1 Student Failure as a Measurement of Educational Outcome

As a measurement of educational development outcome of provinces in, this study utilizes the provincial student failure rate in General Certificate of Education (Ordinary Level) Examination (GCE(O/L) Examination). The data set was obtained from the Ministry of Education in Sri Lanka. Provincial student failure rate in GCE (O/L) examination is defined as the percentage of students that did not qualified to enter the secondary level, out of total number of students that sat for all the compulsory subjects of the GCE (O/L) examination at the provincial level. The failure rate was utilized regardless of achievement rate to maintain consistency with the health analysis, since the provincial infant mortality rate is used in the health analysis by following Rajkumar and Swaroop (2008). The student enrollment rate is not used as a measurement of education outcome as the data of provincial level student enrollment is difficult to obtain. Additionally, many studies state that the net enrollment is not quite accurate in measuring the correct number of students who actually enter or receive schooling. As Filmer and Pritchett (1999) note, in the context of South America, enrollment in grade one is around 100%, but due to high dropout rates a large proportion of students that were enrolled do not complete primary education. Tertiary-level education is not included in this study as the budgets from provincial councils for the education sector do not include funding for that level of education.

Figure 4-1: Student Achievement in GCE O/L Examination in Sri Lanka



Source: Ministry of Education

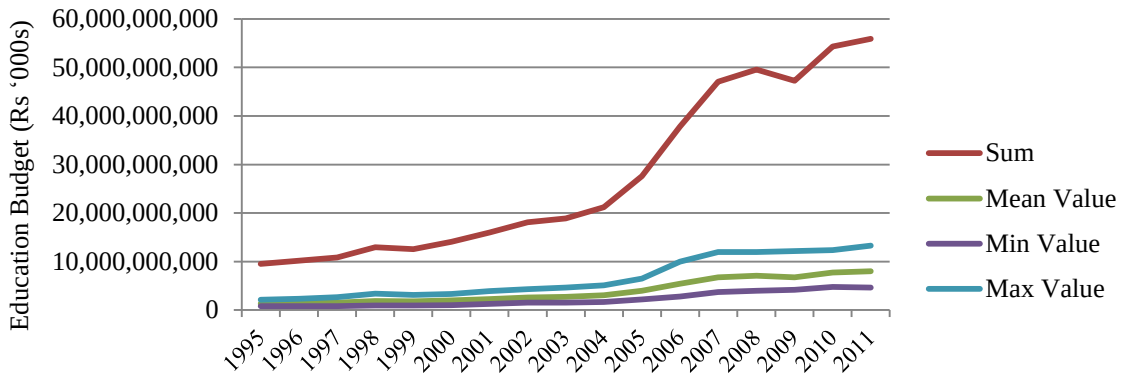
4.1.2 Government Spending on Education Sector

Data on government spending in education was collected from progress report of the Ministry of Local Government and Provincial Councils. The period of data availability is from 1995 to 2011 for seven provinces.

Table 4-1: Education Government Spending In Provinces over 1995 to 2011 (Rs. ’000s)

Year	Sum	mean	min	max	N	Sd
1995	9,482,000	1,354,571	795,000	2,100,000	119	455,321
1996	10,177,000	1,453,857	802,000	2,300,000	119	527,061
1997	10,825,180	1,546,454	828,050	2,634,650	119	626,063
1998	12,918,657	1,845,522	961,113	3,365,180	119	822,888
1999	12,577,495	1,796,785	917,682	3,090,225	119	758,539
2000	14,037,590	2,005,370	1,017,695	3,320,145	119	807,470
2001	15,972,677	2,281,811	1,237,902	3,882,084	119	903,141
2002	18,098,017	2,585,431	1,519,726	4,286,103	119	965,920
2003	18,862,598	2,694,656	1,516,836	4,602,214	119	1,074,988
2004	21,191,886	3,027,412	1,662,280	5,100,506	119	1,167,940
2005	27,592,380	3,941,768	2,158,742	6,475,634	119	1,440,382
2006	37,853,698	5,407,671	2,806,527	9,993,372	119	2,414,339
2007	47,078,718	6,725,531	3,683,094	11,942,874	119	2,734,092
2008	49,590,644	7,084,377	3,939,636	11,978,874	119	2,782,806
2009	47,288,270	6,755,467	4,146,275	12,154,454	119	2,884,980
2010	54,317,000	7,759,571	4,741,000	12,353,000	119	2,523,849
2011	55,907,000	7,986,714	4,654,000	13,290,000	119	2,892,620
Total	463,770,810	6,252,972	37,387,558	112,869,315		25,782,407

Figure 4-2: Education Government Spending In Provinces from 1995 to 2011



Source: Calculated from the Progress Report of Ministry of Local Government and Provincial Councils

4.1.3 The Set of Regional Characteristics

As noted in the previous literature, education outcomes are affected by not only government spending but also other regional factors such as socio-demographic characteristics that are particular to those regions. Below are the independent variables included in the regression on student failure rates in provinces to control for socio-demographic effects. These data is obtained through Department of Census and Statistics Sri Lanka.

Literacy rate: The percentage of the population age 15 above who can with understanding, read and write a short, simple statement about their everyday life. Provinces where people have a higher interest in education might demand a higher share of allocation to education sector, for that reason adult literacy rate is used as an independent variable.

Access to medical services: Percentage of childbirths which receive medical treatment occurred in provinces, is been used as a proxy of access to medical services. The importance of including health factors in the specification of education analysis is confirmed by the study of Baldacci et al. (2008). It states that failure to capture the interaction between education and health sectors and the significant spill-overs amongst those sectors will lead to understatement of the effect of spending on social indicators.

Access to safe drinking water: This indicates the percentage of households with access to safe clean drinking water. Protected wells, pipe borne water and tube wells are considered as safe sources while unprotected wells, rivers, tanks, or streams are listed as unsafe sources. This reflects the accessibility of safe drinking water in the provinces.

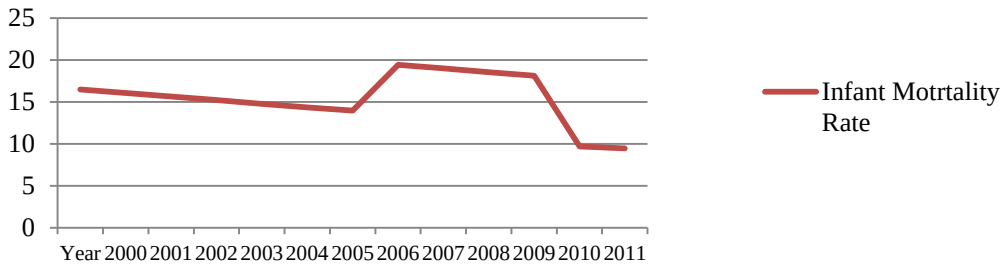
Student-Teacher ratio: Student–teacher ratio is the number of students who attend a school divided by the number of teachers in the province.

4.2 Analysis on Health Spending

4.2.1 Infant Mortality Rate as a Measurement of Health Outcome

Infant mortality rate or child mortality rate is widely used as a measurement of health outcomes in the academic literature, for example Gupta, Verhoeven, and Tiongson (2002) and Rajkumar and Swaroop (2008). Infant mortality rate is an estimate of the number of deaths of infants under one year old in a given year per 1,000 live births in same year. This rate is often used as an indicator to measure the health and well-being of a nation, since the factors affecting the health of the entire population can also impact the mortality rate of infants. Therefore this study uses the provincial infant mortality rate as the measurement of health status in provinces.

Figure 4-3: Infant Mortality Rate of Sri Lanka



Source: Department of Registrar General Sri Lanka

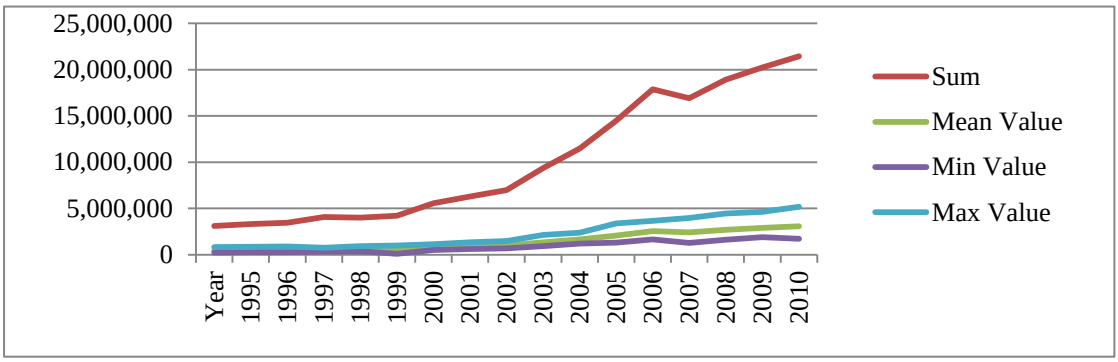
4.2.2 Government Spending on Health Sector

In a similar way to the education analysis, data on government health spending is collected from the progress reports of the Ministry of Local Government and Provincial Councils. The period of data availability is from 1995 to 2011 for seven provinces.

Table 4-2: Health spending across provinces over 1995-2011 (Rs. '000s)

Year	Sum	Mean Value	Min Value	Max Value	N	Sd
1995	3,109,000	444,143	245,000	825,000	119	173,866
1996	3,302,000	471,714	262,000	850,000	119	174,169
1997	3,460,174	494,311	271,612	894,019	119	183,800
1998	4,071,039	581,577	351,701	763,926	119	125,151
1999	4,014,308	573,473	371,706	911,985	119	164,709
2000	4,221,847	603,121	95,500	1,015,356	119	262,816
2001	5,561,914	794,559	498,771	1,124,291	119	189,727
2002	6,295,804	899,401	627,643	1,346,979	119	228,995
2003	6,975,120	996,446	690,312	1,465,733	119	245,834
2004	9,386,835	1,340,976	945,012	2,132,704	119	372,518
2005	11,491,104	1,641,586	1,208,184	2,393,896	119	392,886
2006	14,496,917	2,070,988	1,324,196	3,388,997	119	669,781
2007	17,877,131	2,553,876	1,664,423	3,673,546	119	742,173
2008	16,918,800	2,416,971	1,269,397	3,969,946	119	861,698
2009	18,934,995	2,704,999	1,635,699	4,460,904	119	870,265
2010	20,227,000	2,889,571	1,887,000	4,646,000	119	849,279
2011	21,444,000	3,063,429	1,727,000	5,182,000	119	1,046,297
Total	171,787,988	24,541,141	15,075,156	39,045,282		7,553,963

Figure 4-4: Health Spending in Provinces over 1995 to 2011



Source: Calculated from the Progress report of Ministry of Local Government and Provincial Councils

4.2.3 The Set of Regional Characteristics

Similarly, the government's role is only a part of the story. Health outcomes are also affected by some other factors, especially socio-demographic characteristics. The following are the variables included in the analysis as independent variables to control the socio-demographic effects on provincial infant mortality rate; all of those are obtained through the Department of Census and Statistics Sri Lanka.

Poverty Head count Index: This indicator is calculated as the percentage of the population in the provinces who live below the national poverty line.

Other Indicators: Similar to the education analysis portion of the study, two additional indicators, literacy rate and access to safe drinking water, were also used as regional characteristic variables for the health care analysis. The definitions of the indicators are the same as those for the education analysis.

4.3 Methodology

4.3.1 Theoretical Model

By following Rajkumar and Swaroop (2008), as well Filmer and Prichett (1999), the social outcome is defined as below.

$$Outcome_{it} = e^{A_{it}} * \left(\frac{GDP_{it}}{N_{it}}\right)^{\alpha} * \left(\frac{Pubex_{it}}{GDP_{it}}\right)^{\beta} \quad where\ \alpha > 0; \beta > 0 \qquad Equation\ 1$$

Where,

$Outcome_{it}$ - Social indicator as an outcome of government spending
A_{it} - Specific regional factors
GDP_{it}/N_{it} - Income per capita
$Pubex_{it}/GDP_{it}$ - Government expenditure as a share of GDP
i and t - Province and year respectively

In the model $Outcome_{it}$ represents the social indicator as a measurement of educational development and healthcare development in province *i* in year *t*. Outcome is a function of per capita GDP, $(GDP_{it}|N_{it})^{\alpha}$ and government expenditure as a share of GDP, $(Pubex_{it}|GDP_{it})^{\beta}$ and specific regional factors, $e^{A_{it}}$. Given that α>0, if income increases in the province, the outcome should increase accordingly. Moreover β≥0 implies that if government expenditure increases, the outcome should pick up or at least not worsen too. The engagement of regional factors $e^{A_{it}}$ infers that development outcome differs with the specific characteristics of the province.

4.3.2 Empirical Model for Education

By taking the linear form of Equation 1 and entering the descriptions for the education sector, we obtain the following equation:

$$\ln(OutcomeEdu)_{it} = \alpha_0 + \alpha_1 \ln(PCGDP)_{it} + \alpha_2 \ln(PubExEdGDP)_{it} + AX_{it} + \varepsilon_{it} \ldots . Equation\ 2$$

Here $OutcomeEdu_{it}$ is provincial student failure rate in GCE(O/L), as a measure of education outcome in province *i* and year *t*. Following the theoretical model it is determined by the income level in province, $PCGDP_{it}$ and government expenditure on the education sector as a share of GDP, $PubExEdGDP_{it}$. X_{it} is the set of control variables that reflects

regional characteristics which include: adult literacy rate, access to medical services, student-teacher ratio and access to safe drinking water. In the equation α_0 is the constant, and α_1, α_2 are the parameters to be determined. And α_2 is the parameter that reflects the effect of government spending on student failure rate.

4.3.3 Empirical Model for Health

Incorporating the descriptions for health sector into linear form of equation one and we get:

$$\ln(OutcomeHea)_{it} = \beta_0 + \beta_1 ln(PCGDP)_{it} + \beta_2 ln(PubExHeGDP)_{it} + BY_{it} + \delta_{it} \ldots\ldots \textit{Equation 3}$$

In Equation 3, $OutcomeHea_{it}$ is provincial infant mortality rate, as a measure of healthcare outcome in province *i* and year *t*. Similarly, following the theoretical model it is determined by the income level in province, $PCGDP_{it}$ and government expenditure on health sector as a share of GDP, $PubExHeaGDP_{it}$. Y_{it} is the set of control variables that reflects regional characteristics which includes: adult literacy rate, poverty head count index and access to safe drinking water. In the equation β_0 is the constant, and β_1, β_2 are the parameters to be determined. And β_2 is the parameter that reflects the effect of government spending on infant mortality rate.

To cope with the fixed effect related endogeneity due to unmeasured time-invariant provincial factors such as culture, climate, geographical factors that have not been measured in this study, fixed effect estimation is carried out in order to eliminate the bias from those omitted variables. The Hausman test[4] has been used to determine which estimation method, fixed effect and random effects, is more appropriate (i.e., more consistent and more efficient). The null hypothesis is that both estimators are consistent but the random effect is more efficient than the fixed effect. The alternative hypothesis H_1 is that the random effect is not consistent. If the null hypothesis is not rejected, the random effect is preferable, if the null is rejected, the test suggests the use of the fixed effect method of estimation. In the education analysis as the test statistics is 26.83 and prob>chi2 value is 0.0002, so the H_o is rejected, and this suggests that the fixed effect method is the most consistent estimation. For the health analysis, the test statistics is 6.48 and prob>chi2 value is 0.2625, so the H_o cannot be rejected, and this suggests that the random effect method is preferred.

4.3.4. The Performances of Provinces in Education and Health Sectors

To answer the third research question, OLS estimation is carried out by including dummy variables for provinces. The equation for the education sector estimation is as follows:

$$ln(OutcomeEdu_{it}) = \gamma_0 + \gamma_1 ln(PCGDP)_{it} + \gamma_2 ln(PubExEdGDP)_{it} + \sum_{j=1}^{6} \rho_j D_j + \epsilon_{it}$$

Equation 4

Equation 5, for the estimation of the performance in the health sector is described below:

$$ln(OutcomeHea_{it}) = \pi_0 + \pi_1 ln(PCGDP)_{it} + \pi_2 ln(PubExHeaGDP)_{it} + \sum_{j=1}^{6} \sigma_j D_j + \theta_{it}$$

Equation 5

Where; D_j is dummycentral, dummysouthern, dummynorthwestern, dummynorthcentral, dummyuva, dummysabaragamuwa (Dummy variables for all provinces except Western Province). The unobserved heterogeneity (i.e. fixed effect) component is captured by those individual dummies. ρ_j and σ_j are the parameters that reflect the performance of each province in the education and health sectors respectively. The Western Province is considered as the reference province, since it has been shown the highest contribution to country's GDP (See figure 2-2). Therefore the coefficients of the dummy variables can reflect the performance of provinces in comparison to Western Province. If the coefficient shows a negative sign, this means the province is performing better than Western Province. If the coefficient shows a positive sign, it means the performance of that province is not as good as Western Province.

5.0 Empirical Results and Discussion

5.1 Impact of Government Spending of Education Sector on Student Failure Rate

This section will discuss the causal relationship between share of government spending on education and the student failure rate in GCE (O/L) examination at the provincial level. STATA software was used for the estimation. The results obtained through running Equation 2 in regression analysis are shown below in table 5-1. The table shows the estimated coefficients of respective variables. The asterisk embedded with the coefficients denotes the level of significance.

The results clearly indicate that the educational government spending in provincial level significantly affects the student failure rate in province. The p-value is significant at 1% significance level. In the model both share of government spending on education and student failure rate is included in log form. Therefore, a 1% increment in share of educational government spending will result in 0.01% reduction of provincial student failure rate. Filmer (2007), found a similar result when he analyzed the impact of school availability on enrollment rate, the impact is significant but the magnitude is low. The income level, designated by per capita GDP indicates that a 1% increase in income level will decrease the student failure rate at the provincial level by 0.25%. The p-value of this variable is significant at 1% significance level, too. This result is consistent with the findings of almost all the literature in this field. Intuitively, this is not unexpected; a society with higher income places a higher emphasis on education and can support their children financially to gain quality education. This result is consistent with the findings of Rajkumar and Swaroop (2008). This study controls for a set of regional characteristics, which might have an impact on the student attainment in provinces, other than income level. The sign of the literacy rate is quite

unexpected, but it doesn't show a significant impact on student failure, but naturally the province with a larger proportion of educated adults should reflect a higher growth of education that would produce higher attainment. The variable, access to medical services which reflects health status, indicates a statistically significant impact on student failure rate at the 1% significance level. A 1% increase in access to medical services is associated with 0.0002% decrease of provincial student failure rate. This suggests that having better health facilities in a province is expected to enhance student attainment. Likewise, access to safe drinking water, which represents the infrastructure capability, is significant at the 10% significance level. An increase of this factor by 1% associates student failure to decrease by 0.0028%.

Table 5-1: Results of education regression

Dependent Variable: Student failure rate (log)	**Estimation method: Fixed Effect Analysis**	
	Coefficient	**Standard error**
Per capita GDP (log)	-.2511 ***	(.0429)
Government expenditure on education (log)	-.0174 ***	(.0051)
Literacy rate (%)	.01518	(.0500)
Access to medical services (%)	-.0002 ***	(.000005)
Student teacher ratio (%)	-.0248 **	(.0109)
Access to safe drinking water (%)	-.0028 *	(.0016)
Constant	5.617 ***	(.4076)
Adjusted R-Square	0.8534	
F-statistic	47.33	
Prob.(Hausman test)	0.0002	
Number of observations	98	

Note: *, **, *** denotes 10%, 5%, 1% statistical significance levels

The finding for the impact of student-teacher ratio on the student failure rate is quite astounding. The expected sign is positive, but the results show an unexpected negative sign. An increase in student- teacher ratio is related with a 0.248% rise in the student failure rate and it is statistically significant at the 5% significance level. A possible reason for this unforeseen finding might be because of the recruitment of an excess number of teachers[5] to the schools. Writing in the *Commonwealth Partnership Report 2012/2013*, Balasooriya states, "In Sinhala medium provincial schools, the excess of teachers was more than 19,502, while in Tamil medium national schools the figure was more than 2,488" (p. 143). Though lower student teacher ratios should lead to higher student attainment, the situation has worsened in Sri Lanka due to an unbalanced teacher distribution in schools. This can be affect adversely to the educational outcome, since the salaries of teachers are also included in government spending. However in the regression the revere causality can be happened, because of the failure to control student quality of regions due to unavailability of relevant data. This can be cause to the negative influence of the student teacher ratio to the student attainment too.

5.2 Impact of Government Spending of Health Sector on Infant Mortality Rate

This section will discuss the causal relationship between the share of government spending on health and the infant mortality rate at the provincial level. The results obtained after running Equation 3 in regression analysis are shown below in Table 5-2. Both government spending on health and infant mortality rate is in log form in the model.

Table 5-2: Results of the Health Regression

Independent Variable:	**Random Effect Analysis**	
Infant mortality rate (log)	**Coefficient**	**Standard error**
Per capita GDP (log)	-0.3121***	(.0317)
Government expenditure on health (log)	-.7340**	(.0390)
Literacy rate (%)	-.0750***	(.0048)
Poverty head count index (%)	.0165***	(.0023)
Access to safe drinking water (%)	-.0014	(.0235)
Constant	11.2854**	(5.3473)
Adjusted R-Square	0.6190	
Prob.(Hausman test)	0.2625	
Number of observations	98	

The empirical results clearly show that health spending in a province significantly affects infant mortality rate of province. That is statistically significant at 5% significance level. A 1% increase in health spending will result in 0.73% decrease of infant mortality rate in province. Government spending on healthcare shows a stronger relationship with the infant mortality rate than the impact shown by educational spending on student attainment. This finding confirms those in Rajkumar and Swaroop (2008).

In the same way as in the education analysis, in the health analysis, income level, which is designated by per capita GDP, shows that an increase in income level will decrease the infant mortality in a province by 0.31%. This value is significant at 1% significance level. This finding is consistent with the findings of much of the literature in this field concerning the negative relationship between income and infant mortality rate. Obviously, a society with higher income should have the economic strength to maintain a healthy lifestyle, unlike a poorer one. This analysis also controls for a set of regional characteristics that might have an influence on the infant mortality rate. Poverty head count index shows a significant impact on infant mortality, which is an increase in poverty head count will result in a 0.01% growth in infant mortality. Moreover, literacy rate possesses a negative and significant impact on infant mortality, which suggests that the province with a large portion of educated adults will have a lower rate of infant mortality. The control variable access to safe drinking water does not show a statistically significant impact on infant mortality, but the sign is as expected.

5.3 Analysis to Check the Performances of Provinces

This section will discuss the performance of provinces in their respective education and healthcare sectors by comparing them to Western Province as the reference group. OLS regression was carried out by including provincial dummies, with the exception of the Western Province, which was used for comparison. The results obtained through running Equations 4 and 5 in regression analysis are shown below in Table 5-3.

Table 5-3: OLS regression to check performances of provinces

Variable	**OLS for Education**		**OLS for Health**	
	Coefficient	Std. Error	Coefficient	Std. Error
Per capita GDP (log)	-.2384***	(.0284)	-.2713**	(.1363)
Education spending (log)	-.1068***	(.0202)		
Health spending (log)			-.7035***	(.0831)
Dummy Western				
Dummy Central	.0442	(.0300)	.0162	(.1414)
Dummy Southern	-.0981***	(.0287)	-.3056**	(.1349)
Dummy North Western	-.0212	(.0289)	-.2382*	(.1336)
Dummy North Central	.0890***	(.0345)	-.0271	(.1636)
Dummy Uva	.0757**	(.0364)	-.3507**	(.1710)
Dummy Sabaragamuwa	.0010	(.0329)	-.3189**	(.1541)
Constant	6.1922***	(.2625)	6.1658***	(1.2632)
Number of observations	119			

According to above results dummy southern shows significant results in both education and healthcare sectors. The result in the education sector is statistically significant at 1% significance level, and at 5% significance level in health regression. The sign is negative, therefore the performance of Southern Province is better than the performance of Western Province, i.e. reference group. The higher coefficient in health analysis than education analysis implies that the Southern Province perform well in health sector. The dummy central does not show significant results in either education or health sectors and the sign is positive. Dummy sabaragamuwa doesn't show significant results in education analysis but shows significant results in health analysis at 5% significance level. The negative sign of that coefficient suggests that the Sabaragamuwa Province is performing well in the health sector compared to Western Province.

The dummy variables for both North Central and Uva Provinces show positive and statistically significant results in the education sector regression, but only dummy uva shows negative and significant coefficient in health regression. This implies that both North Central and Uva Provinces are not performing well in the education sector, but only Uva Province shows better performance in health sector compared to Western Province. Uva and Sabaragamuwa Provinces are typically rural regions of Sri Lanka, and the poverty headcount is higher than other provinces. In year 2010 the poverty head count ratio of Uva Province and Sabaragamuwa Provinces were 13.7 and 10.6 while the national was 8.9. This may be the

reason for showing poor performances in education sector. North Western Province also performs well only in the health sector, but its result for the education regression is not significant.

6.0 Conclusions and Policy Recommendations

6.1 Conclusions

This study was carried out to investigate the impact of public spending in the education and health sectors on student failure rate in GCE (O/L) Examination and infant mortality rate respectively in seven provinces in Sri Lanka over the period of 1995 to 2011.

By summarizing the main empirical findings of this study, the answers for the research questions which stated in Chapter One are as follows.

1. The empirical results implied that government spending on education has a negative impact on student failure rate in GCE (O/L) at the provincial level (i.e., causes the failure rate to decrease). But the findings indicate a counter-intuitive result in that the student-teacher ratio had a positive affect (on student failure rate (i.e., caused the rate of failure to increase). This suggests that government spending on education might affect inversely the quality of educational outcomes. It means that spending more of the budget in the education sector does not guarantee that the student failure rate will decrease. Hence it would not be realistic to lower student failure rates by simply increasing the overall amount of government spending; the quality of spending must also be considered.

2. The empirical result showed that the government spending on health sector has an impact on infant mortality rate at the provincial level. This suggests that an increase in government spending on health care might work to decrease infant mortality. However, we could not make a conclusive prediction based on these results because some of the control variables which affect health outcome that excluded from this study might affect the amount and direction of impact.

3. According to the findings only Southern Province performed well in both education and health sectors compared to Western Province. Both North Central and Uva Provinces did not perform well in the education sector, but only Uva Province performs well in the health sector with assessed against the outcomes in Western Province.

6.2 Policy Recommendations

One objective of this study is to draw the attention of policy makers and help them to grasp the importance of reviewing government spending on education and health towards better social outcome. To achieve that, some policy recommendations are elaborated below.

1. Policy makers should implement a better spending strategy to improve the quality of educational government spending, since although increased spending is generally associated with increased student attainment, some factors can affect the quality of educational outcomes inversely, such as student-teacher ratio.

2. Policy makers can organize well planned skill development training programs to enhance the teacher quality to improve the value of spending on education. Moreover, policy makers should consider formulating a better teacher recruitment criterion, such as a school-based recruitment policy to overcome excess teacher carder and an imbalanced distribution of teachers amongst schools.

3. Normally such a huge budget expenditure is subject to keen inspection by any government; however due to the present firm constraints on government budgets in Sri Lanka, governments may be searching for methods to control or reduce the growth of expenditures on education and health. Hence, the provincial councils should identify other potential determinants that can enhance education and health outcomes before allocating more resources to the development process.

4. The central government should form a well-planned control mechanism to monitor and evaluate the performance of governmental spending and the composition of budget in provinces. This monitoring and evaluation system would be targeted at advancing the effectiveness and quality of provincial budget expenditures.

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