

# Does Quality of Government Matter in Public Health? The Case of Sri Lanka

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## ABSTRACT

Good governance can improve government expenditure efficiency and lead to better human development outcomes in education and health. The paper aims to shed light the influence of governance in determining public spending's efficacy in improving health outcomes in Sri Lanka. To find the study objectives, Augmented Dickey-Fuller unit root test, Johansen's co-integration tests, and the Vector Error Correction Model were employed using time series data.

The results confirmed that government expenditure on health without its interaction of governance indicators positively influences health status in the long term. Likewise, government expenditure on health and its interaction with governance indicators, namely corruption and government effectiveness, negatively influences health status in the long term in Sri Lanka. In contrast, government expenditure on health and its interaction with the rule of law positively impact health status. Besides, in the short run, government health expenditure positively impacts health status while governance indices with government expenditure were not influenced the health status. In Sri Lanka, where the effectiveness of public spending on health with the interaction of governance is comparatively low. Therefore, the current study stresses that the governance of Sri Lanka should be improved to enhance the effectiveness of public spending with good governance in order to improve the health outcomes.

**Keywords:** Public spending, Health status, Interaction of governance

## BACKGROUND OF THE STUDY

The Human Capital Model stresses that health is a durable capital stock that produces an output of healthy time. Health as a capital stock depreciates with age, which can be improved through investment (Grossman, 2017). Improving the health status through increasing expenditure of health services of the general public will positively contribute to economic growth via involving activities (Makuta & O'Hare, 2015). According to the World Health Organization (2003), in the health system, the government plays a crucial role in providing the nation's health system succeeds the required standard to provide a better quality of life. Therefore, there is a need for government and private to be involved in health spending to improve health outcomes.

Newly, scholars have raised their governance concerns regarding the concept of economic development. In this line, the relationship between public spending, development outcomes, and governance has become a vital concern. According to Ahmad & Hasan (2016) greater economic growth and productivity will be viable if good governance. Nevertheless, increased government expenditure may not improve development outcomes due to public expenditure and governance inefficiency. Government health spending does not occur in a vacuum, and it relies on established organizations, which are exceedingly influenced by governance. The impacts of poor governance issues increased the cost of both government and consumers,

worsened revenue leakage, and therefore decreased the resources available for health services, and ended up worsening health outcomes (Makuta & O'Hare, 2015).

Governance in Sri Lanka includes political instability, corruption, the rule of law, violence, voice and accountability, government effectiveness, and regulatory quality continue to be a severe problem. Whenever the government is ineffective, public services, including education and health, is inefficient and corrupt and functions under political pressure (Vinayagathan and Ramesh, 2019). The Sri Lanka case has deteriorated significantly from 2005 according to control of the World Bank's corruption record. The World Bank Governance Indicators (WGIs) of 2017 showed low governance status in Sri Lanka, which is evident when we look at all indicators, including the governance dataset (The World Bank Data, 2021).

Besides, in Sri Lanka, the efficiency of public spending on human development includes health outcomes, has been a debatable issue (Vijesandiran & Priyatharsiny, 2018). Sri Lanka is a lower-middle-income country; however, its public spending on health and education as a share of GDP is steadily lower than its other regional and income peer countries (Budget Brief: Education Sector Sri Lanka 2019; The world bank, 2020). In 2018, spending on public health (total as a % of GDP) of the lower-middle-income country was 4%, whereas the expenditure in Sri Lanka was 3.7 (World Bank, 2021). Similarly, as a share of total health expenditure in Sri Lanka, domestic public health expenditure declined (Budget Brief: Health Sector Sri Lanka 2019). According to the World Bank, domestic public health spending as a share of total health expenditure decreased from 53.6 percent in 2000 to 43.1 in 2018. As a share of government expenditure, domestic general government health expenditure is lower than other peer economies and decreased from 11.049 percent in 2004 to 8.26 in 2018 (The world bank, 2021). It indicates that the Sri Lankan government's priority on health from its domestic public resources is lower than before.

Besides, governance has a central role in influencing public expenditure, and public spending often does not obtain the expected enhancement in human development outcomes (Rajkumar and Swaroop, 2008). The effects of government expenditure depend not only on its absolute values but also on its composition and the efficiency of this spending (Abdelsalam, et al., 2014). Budget allocations for public services are of public concern since they influence the efficiency of services introduced to people (Albassam, 2020). Thus, hardly allocating public resources for the appropriate goods and services may not lead to public services' desirable outcomes if the government involving the budget formulation, implementation, and monitoring are malfunctioning (World Bank, 2003).

Therefore, it must be taken solemnly to analyze that the efficacy of government expenditure and efficiency impact the quality of public services, including health and programs introduced to beneficiaries in the nation. Although the Sri Lankan government provides free healthcare services to all citizens, the most critical question is how governance may be severed in the public sector to use available public spending for productive purposes. The motivation of the study is derived from the lack of empirical studies that focus on governance, public spending, and health outcomes. Most of the previous authors had concentrated on economic outcomes in developed countries (Zhang & Zou, (1998), Ventelou & Bry, (2006). Nketiah-Amponsah, (2009), Yasin, (2011), Kouassi, (2018). The paper examines the importance of government expenditure, mainly health expenditure on health status, in taking into account the role of governance in affecting the health outcome of Sri Lanka. Therefore, the study's main objective is to empirically examine the influence of governance in determining public spending's efficacy in improving health outcomes.

## LITERATURE REVIEW

According to that empirical evidence, reasons are explained why government spending has less impact on development outcomes. First, an increasing percentage of public expenditure could lead to a crowding out of private sector provisions. Another reason public Expenditure's inefficiency comprises institutional

inefficiencies such as leakage of government expenditure and weak institutional capability (Rajkumar and Swaroop, 2008).

**In cases where public spending is found to have a low or negligible impact** (Guandong and Muturi, 2016; Maitra & Mukhopadhyay, 2013; Nurudeen and Usman, 2010; Ghosh and Gregoriou, 2009), **two explanations are given: first, and it is argued that the link between public spending and development outcomes could be severed because an increase in public provision could lead to a “crowding out” of private sector provision. This line** of reasoning does not question the efficacy of public spending percentage; instead, it contends that due to the substitution of public for private spending, the additional public provision in many cases has a negligible net marginal effect. The second set of possible reasons for the public expenditure ineffectiveness includes poor targeting and institutional inefficiencies such as leakage in public spending and weak institutional (Rajkumar and Swaroop, 2008). While this proposition, that public expenditure often does not yield the expected improvement in desirable outcomes, seems straightforward and difficult to agree with, severe empirical work has been done to support it.

Beside this, among the empirical studies, only a few numbers of studies are available relevant to institutional quality and public spending and the outcome. Researchers (Dzhumashev, (2014), Morozumi & Veiga, (2016), Khan et al., (2020), Arawomo & Adeoye, (2020) Thanh et al., (2020), have studied the associations between public spending, outcome, and governance. In this line, Dzhumashev (2014) revealed that the interaction between corruption and governance shapes the efficiency of public spending, which in turn, limits the growth effects of corruption. Equally, Thanh et al., (2020) found that good governance is vital in improving the impact of government expenditure on economic growth.

Meanwhile, a fair amount of research are available on public spending and the outcome of health. Musgrove, (1999). Filmer & Pritchett, (1999). Gupta et al., (2003) Çevik & Ta?ar (2013), Craigwell et al. (2012), Kofi Boachie et al. (2018) have researched the impact of public spending on health and confirm that the expenditure significantly led to better health status. Moreover, Gupta et al. (2003) suggested that increased public spending alone will not be adequate to improve health.

The paper investigated whether the quality of governance has a modifying influence on the effect of public health expenditure on health outcomes using panel data regression analysis. The results showed that public spending on health positively impacts health outcomes. In addition, they highlighted the impact is refereed by quality of governance, the higher quality of governance led on higher health outcomes and the lower quality of governance impact health at lower level (Makuta & O’Hare, 2015)

Rajkumar and Swaroop (2008), analyzed the relationship between public spending, governance, and the outcome of both health and education. The study found that good governance of countries’ public health spending led to lower child mortality rates. In addition, public spending in poorly governed countries has no influence on health outcomes. Another study was conducted to study the influence of public health expenditure and governance on health outcomes in Malaysia (Ahmad & Hasan 2016). They found a long-run association between health outcomes and determinants, including income level, public health expenditure, corruption, and government stability. In addition, they also revealed that public expenditure and corruption affect long- run and short-run health outcomes in Malaysia. Mhango & Chirwa (2018) analyzed the links between public health spending, governance, and health outcome. They revealed that corruption reduces the effectiveness of public health spending on health outcomes. Though, if there is poor governance, public spending on health deteriorates health outcomes.

Thus, there is need further analysis to find the influence of governance in determining public spending’s efficacy in improving health outcomes.

## METHODOLOGY

Our empirical analysis employs annual time series data covering from 2002 to 2019 for the case of health analysis in Sri Lanka. Those annual time-series data was collated from the World Bank data set, Economic and social statistics of Sri Lanka, Central Bank of Sri Lanka, and Transparency International.

Domestic general government health expenditure % of general government expenditure and Domestic private health expenditure (% of current health expenditure) measured government expenditure in the current study. As a measure of government spending outcomes, the infant mortality rate (per 1000 live births) was employed. Moreover, the worldwide governance indicators (WGI), namely Government Effectiveness (GE), and Rule of Law (RL), and Corruption perceptions index (CPI), were used as a measure of governance of Sri Lanka.

The following model was employed to analyze public health spending on infant mortality.

$$\ln HS_t = \beta_0 + \beta_1 \ln(GDPP) + \beta_2 \ln(GE)_t + \beta_3 \ln(PE)_t + \beta_4 \ln(HB)_t + \beta_5 \ln(DW)_t + \beta_6 \ln(SA)_t + \beta_7 G_t * \ln(GE)_t + BX + \varepsilon_t$$

The dependent variable is health status (HS) measuring by the infant mortality rate(per 1000 live births).Independent variables are GDP per capita growth (GDPP), domestic general government health expenditure as a % of general government expenditure (GE), domestic private health expenditure, as a % of current health expenditure (PE), Number of Hospital Beds(HB), Proportion of population using safety managed drinking water services (DW), Proportion of population using sanitation services (SA).

In addition, G represents a measure of governance indicators. To analyze the direct and the indirect effects that governance may have on health status, variable governance (G) entered the model both as an independent variable and interacted with the share of public health spending.

Governance indicators explicitly Government Effectiveness (GE), and Rule of Law (RL) were gathered from World Bank data set, while Corruption perceptions index (CPI) was collected from Transparency International. The worldwide Governance Indicators (WGI) reports six dimensions of governance such as voice and accountability, rule of law, government effectiveness, control of corruption, regulatory quality and political stability and absence of violence. These indicators are aggregate and individual governance indicators representing for over two hundred of nations from 1996. Governance indicators merge the observations of a huge number of enterprises, responds of expert survey and resident survey in developed and developing countries. Particularly, the aggregate indicators combine over thirty individual data sources collated by a several survey institute, international organisations, private institute, and non- governmental organisations (World bank. 2022).

A vector error correction model is employed to investigate the proposed objective of the study. Time series values were converted into their logarithms to interpret the variables' elasticity as an initial analysis step. The Augmented Dickey-Fuller (ADF) was employed in order to test stationary properties of time series data to avoid a spurious model due to trending variables since using non-stationary variables in the time series analysis leads to misleading inferences (Muthamia and Muturi, 2015).

The following augmented Dickey-Fuller regression model is employed to run the Augmented Dickey-Fuller unit root test.

$$\Delta Y_t = \alpha + \beta y_{t-1} + \delta t + \zeta k_j - 1_j \Delta y_{t-j} + \varepsilon_t$$

Where the constant term  $\alpha$  or time trend,  $\delta t$  is omitted and  $k$  specifies the number of lags specified in the lags () option.  $\beta$  is the parameter to be estimated and  $\varepsilon$  denotes a stochastic error term.

It follows to find a co-integrating relationship if all variables are being non-stationary. Johansen’s co-integration multivariate procedure is employed to show whether the variables are co-integrated in the long run (Muthamia and Muturi, 2015). Finally, the Vector Error Correction method (VECM) was employed to describe the variables’ interrelationship as the variables are found to have a cointegrating relationship. Thus, the study analyses the long-term and short-term relationship among the variables.

In this study, if we consider a VAR with  $p$  lags,

$$Y_t = v + A1Y_{t-1} + A2Y_{t-2} + \dots + ApY_{t-p} + \varepsilon_t \quad \dots\dots\dots 1$$

Where  $Y_t$  is a  $K \times 1$  vector of variables,  $v$  is a  $K \times 1$  vector of parameters,  $A1 - Ap$  is  $K \times K$  metrics of parameters, and  $\varepsilon_t$  is a  $K \times 1$  vector of disturbances.  $\varepsilon_t$  has a mean 0 and has covariance metric  $\Sigma$ . VAR(p) can be written as a VECM using some algebra and it has rewritten in VECM form as,

$$\Delta Y_t = v + \Pi Y_{t-1} + \sum_{i=2}^{p-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t \quad \dots\dots\dots 2$$

Where  $\Pi = \sum_{j=1}^{p-1} A_j - I_k$  and  $\Gamma = \sum_{j=1}^{p-1} A_j$

The  $v$  and  $\varepsilon_t$  are identical. Further, Johansen VECM framework allows for a constant and a linear trend and assume that there are  $r$  cointegrating relations, we can rewrite the VECM as,

$$\Delta Y_t = \alpha \beta' y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + v + \delta t + \varepsilon_t \quad \dots\dots\dots 3$$

Because the above model shows the differences of the data, the constant denotes a linear time trend in the levels, and the time trend  $\delta t$  indicates a quadratic time trend in the levels of the data. VECM analysis includes a constant or a linear time trend for the differences without allowing for the higher-order trend that is specified for the levels of the data.

## MEASURING THE EFFICACY OF PUBLIC HEALTH SPENDING

### Augmented Dickey Fuller Test Results

The results of ADF unit roots test are presented in table 01 showing all variables incorporated in the study are stationary at first difference I (1). Since unit roots test statistics of selected variables are found to be higher negative values and MacKinnon p-value also established to be significant at one percent and five percent significant level as well.

**Table 01: Augmented Dickey Fuller Test Results**

Variables	Test statistics (first difference)	Order of Integration	MacKinnon p-value
Mortality rate, infant (per 1,000 live births) (lnMI)	-5.725	I(1)***	0.0000
GDP per capita growth (annual %) (lnGDPP)	-5.235	I(1)***	0.0000
Domestic general government health expenditure (% of general government expenditure) (lnGE)	-4.920	I(1)***	0.0000
Domestic private health expenditure (% of current health expenditure) (lnPE)	<b>-4.326</b>	<b>I(1)***</b>	<b>0.0004</b>

Number of hospital beds (lnHB)	-5.383	I(1)***	0.0000
Proportion of population using safety managed drinking water services (lnDW)	-5.456	I(1)***	0.0000
Proportion of population using sanitation services in Sri Lanka (lnSA)	-9.978	I(1)***	0.0000
Government expenditure on health × corruption perceptions index (GE*CPI)	-3.264	I(1)**	0.0166
Government expenditure on health × Government effectiveness (GE*GEF)	-3.244	I(1)**	0.0176
Government expenditure on health × Rule of law (GE*RL)	-4.720	I(1)***	0.0001

\*\*\* And \*\* indicate one percent and five percent significant level respectively

**Table 02: Results of Johansen tests for Cointegration**

<b>Model 01: Efficacy of public health spending</b>					
Maximum rank	Parms	LL	Eigenvalue	Trace statistic	5% critical value
0	7	232.72081	.	137.2826	124.24
1	20	263.92416	0.97977	74.8759*	94.15
2	31	279.86844	0.86372	42.9874	68.52
3	40	288.45205	0.65800	25.8202	47.21
4	47	295.84096	0.60292	11.0423	29.68
5	52	299.5421	0.37038	3.6400	15.41
6	55	301.16175	0.18328	0.4008	3.76
7	56	301.36213	0.02474		
<b>Model 02: Efficacy of public spending with governance</b>					
0	7	69.895986	.	223.9242	124.24
1	20	135.10365	0.99971	93.5088*	94.15
2	31	156.03858	0.92697	51.6390	68.52
3	40	168.82329	0.79772	26.0696	47.21
4	47	178.31803	0.69482	7.0801	29.68
5	52	180.75713	0.26279	2.2019	15.41
6	55	181.7566	0.11744	0.2029	3.76
7	56	181.85807	0.01260		

Table 02 represents the outcomes of the Johansen cointegration test of health expenditure. According to the estimated results without the interaction of governance, at the first level (Max rank 0), the study strongly rejects the null hypothesis of no cointegrating equations among the variables since the trace statistics  $r = 0$  of 137.2826 exceeds the critical value of 124.24. Although, we accept at max rank = 1 results that there exist one cointegrating vector equations among the variables due to trace statistics being higher than the 5% critical value.

The max rank (1) and rest of the max ranks (2,3,4,5 & 6) results confirmed that there are long run co-integrated vector equations among the variables, and those variables have been moving together. Therefore, the Johansen tests of cointegration exposed that the selected variables are cointegrated. Accordingly,

government and private expenditure on health, GDP per capita growth, and sanitation and drinking water service would determine the health status (Infant mortality rate) in the long term.

The results of model 02 reject the null hypothesis and accept that there are cointegrating equations among the variables. In particular, the max rank (1, 2,3,4,5 &6) results found that there are co-integrated associations among the variables, and those variables have been moving together. Therefore, the Johansen tests of cointegration revealed that the selected variables with governance are cointegrated. Therefore, the study confirms a long-run relationship between the variables with government governance (Government effectiveness, the rule of law, and corruption) would determine the health status (Infant mortality rate) in the long term.

Moreover, both models are found to have a cointegrating relationship; consequently, the Vector Error Correction method is employed to investigate the dynamic interrelationship among the stationary variable in order I (1).

**Table 03: Results of Johansen normalized cointegration coefficients**

<b>Model 01: Efficacy of public health spending</b>				
Variables	coefficients	Standard Error	t- statistics	p- statistics
lnMI	1.000	—	—	—
lnGDPP	-0.152533***	0.0102489	-14.88	0.000
lnGE	-2.330785***	0.078355	-29.75	0.000
lnPE	-2.843929***	0.125537	-22.65	0.000
lnHB	2.157311***	0.212359	10.16	0.000
lnDW	-1.990767***	0.722375	-2.76	0.006
lnSA	5.277212***	1.08636	4.86	0.000
constant	-24.77336			
<b>Model 02: Efficacy of public spending with governance</b>				
lnMI	1.000	—	—	—
GE*CPI	0.000519***	7.75e-06	66.92	0.000
GE*GEF	0.77594***	0.000596	1302.11	0.000
GE*RL	-0.323682***	0.001167	-277.43	0.000
lnHB	-6.584732***	0.030595	-215.22	0.000
lnDW	-5.250493***	0.100028	-52.49	0.000
lnSA	66.80038***	0.152424	438.25	0.000
Constant	-214.8562			

\*\*\* indicates one percent and five percent significant level respectively

Table 03 shows the results of normalized cointegration coefficients. The model can be formed by reversing the signs according to Johansen’s method. According to the results, the models for **public health spending and public health spending with the interaction of governance** can be specified as follows.

$$\text{Model 01: } \ln MI_t = 24.77336 + 0.152533 \ln GDPP + 2.330785 \ln GE_t + 2.843929 \ln PE_t - 2.157311 \ln HB_t + 1.990767 \ln DW_t - 5.277212 \ln SA_t$$

$$\text{Model 02: } \ln MI_t = 214.8562 - 0.000519 \text{GE} * \text{CPI} - 0.77594 \text{GE} * \text{GEF}_t + 0.323682 \text{GE} * \text{RL}_t + 6.584732 \ln HB_t + 5.250493 \ln DW_t - 66.80038 \ln SA_t$$

In model 01, except for the number of hospital beds and sanitation services, all other variables are found to have statistically significant at one percent level, revealing that they have a positive and significant effect on infant mortality rate (health status). Specifically, the results explore that GDP per capita growth, safety managed drinking water services, domestic general government health expenditure, and domestic private health expenditure positively impact the infant mortality rate in Sri Lanka. Whereas the number of hospital beds and sanitation services negatively impacts the infant mortality. Thus, the coefficient for domestic general government health expenditure reveals that if the domestic general government health expenditure is 10% there will be a 23.3% increase in infant mortality rate(health status).Similarly, a 10% increase in domestic private health expenditure without the interruption of governance is likely promoting the infant mortality rate (health status)by 28.4%.

The results of model 02 found that government health expenditure with corruption and government effectiveness have a negative impact on infant mortality (health status).If a 10% increase in government health expenditure with the interruption of corruption and government effectiveness is likely to discourage the educational attainment by 0.059% and 77.6%, respectively. In contrast, government health expenditure and its interaction with the rule of law positively impacts health status. A 10% increase in government health expenditure with the interruption of with the rule of law is likely to promote the educational attainment by 3.34%.Further, safety managed drinking water services and a number of hospital beds also positively impact the infant mortality (health status).

Overall, the Johansen normalized cointegration results confirmed that government expenditure on health without its interaction of governance indices positively influences the health status, while government expenditure on health and its interaction with governance indices (corruption and government effectiveness)negatively influences the health status in the long term in Sri Lanka. Though the government expenditure on health and its interaction with the rule of law positively impacts the health status.

**Table 04: Results of vector error correction model**

<b>Model 01: Efficacy of public health spending</b>				
Variables	$\alpha$ coefficients	Standard Error	t- statistics	p-statistics
lnMI	0.415341	0.207212	2.0	0.045
lnGDPP	1.209095	1.490614	0.81	0.417
lnGE	0.608491**	0.237851	2.56	0.011
lnPE	-0.018201	0.151244	-0.12	0.904
lnHB	-0.114269	0.071174	-1.61	0.108
lnDW	0.024257	0.016197	1.50	0.134
lnSA	-0.019168	0.016464	-1.16	0.244
<b>Model 02: Efficacy of public spending with governance</b>				
lnMI	-0.755738	0.638061	-1.18	0.236
GE*CPI	23.45347	50.5218	0.46	0.642
GE*GE	-0.861288	0.641786	-1.34	0.180
GE*RL	-0.093075	0.358863	-0.26	0.795
lnHB	0.018571	0.015271	1.22	0.224
lnDW	-0.003124	0.003520	-0.89	0.375
lnSA	0.000640	0.003571	0.18	0.858

\*\*\* And \*\* indicate one percent and five percent significant level respectively



The following table (04) shows the Vector Error Correction Model results. The results found that government health expenditure positively impacts the health status (infant mortality rate) in the short – term, whereas all other variables included in model 01 do not influence the health status in the short run.

Similarly, the VECM results of model 02 found no relationship between the independent variables and (infant mortality rate) health status in the short run. Particularly, governance indices, namely corruption, the rule of law, and government effectiveness with government expenditure, are not influence the health status.

## CONCLUSION

The objective of this study was to investigate whether governance determines public spending's efficacy in improving health status in Sri Lanka. In terms of health outcome, the Johansen cointegration tests revealed a long-run relationship between the variables with governance (Government Effectiveness, the rule of law, and corruption) that would determine the health status in the long term. Moreover, the Johansen normalized cointegration results confirmed that government expenditure on health without its interaction of governance indices positively influences health status, while government expenditure on health and its interaction with governance indices (corruption and government effectiveness) negatively influences infant mortality rate (health status) in the long term in Sri Lanka. However, the public expenditure on health and its interaction with the rule of law positively impacts health status. Moreover, the results of the short- term found a positive impact of government health expenditure on health status without the governance indicators. In contrast, government expenditure with governance indicators has no relationship with health status in the short- run.

In Sri Lanka, where the state of governance is not influencing educational status effectively. Predominantly the effectiveness of public spending on health with the interaction of governance is comparatively low. Therefore, the study shows that the government should improve the efficiency of using health spending with good governance and promote the positive effect of public health expenditures.

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