FISCAL SUSTAINABILITY STANCE IN SRI LANKA

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Abstract

The sustainability of fiscal policy is at the forefront of policy concerns of Sri Lanka, fueled by a rising budget deficit and ever more burdensome public debt. If Sri Lanka needs to face future economic challenges successfully, then they need the sustainable fiscal formation. The purpose of this study is to find out whether fiscal policy of Sri Lanka is sustainable or not and to determine the degree of fiscal sustainability in Sri Lanka using annual fiscal data from year 1960 to 2018. Government Expenditure Gap and Government Output Gap were used to measure Public Debt to GDP Ratio while Primary Balance to GDP was used for fiscal sustainability stance. The co-integration result reveals that Debt to GDP Ratio has a negative significant impact on Primary Surplus to GDP ratio fiscal policy. It can be concluded that fiscal policy is sustainable in a weak form. However, the results of Fiscal Reaction Function estimated reveals that Debt to GDP Ratio has negative impact on Primary Surplus to GDP. Therefore, the fiscal policy is not sustainable. The economic policy makers should take immediate corrective actions to address the issues of fiscal unsustainability.

Keywords: *Co-integration Approach; Fiscal Reaction Function; Fiscal Sustainability*

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1. INTRODUCTION

The fiscal policy of a country has a major role in their economy to achieve both social and economic goals. After the recent global financial crisis in 2008-2009, many countries faced a fiscal imbalance situation and therefore policymakers were much concerned about concepts of debt sustainability and fiscal sustainability. In that, if government can finance its budget without excessive accumulation of debt that economy have sustainable fiscal policy (Bui, 2020).However, Sri Lanka has to confront a key issue of fiscal sustainability due to highly increasing public debt amount during the past decade and fiscal deficit during a long period.

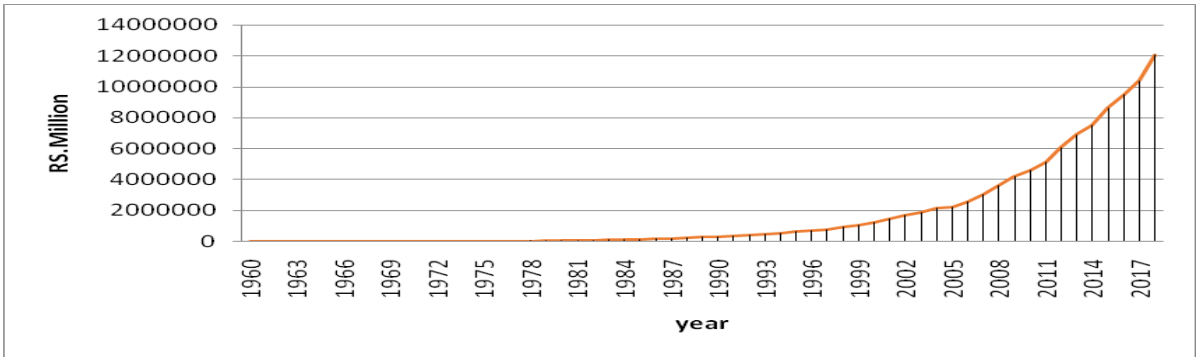

Figure 1: Total Government Debt
Source: CBSL Statistical Data Report (2019)

After the year of 1978 in which the open economy was introduced government debt has increased dramatically (Figure 1). According to the central bank report, the total debt in Sri Lanka was Rs. 13,031.5 billion at end 2019 and it was higher than 15.9% relating to 2018. Total public debt has grown at 13% per year in the last decade. However, the current economic growth rate persists 3-4% that is not a sustainable situation.

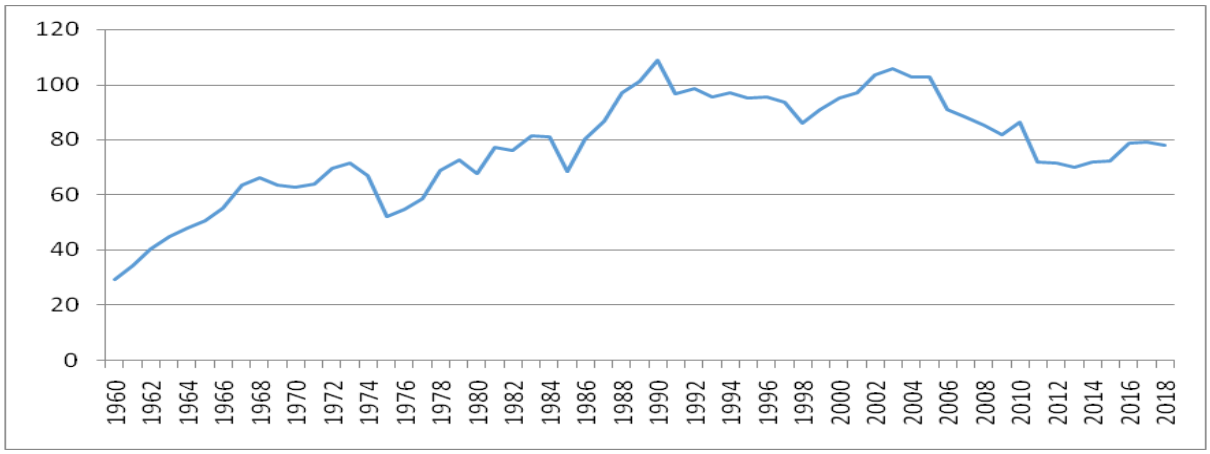

Figure 1: Debt to GDP ratio
Source: CBSL Statistical data rep

In case of total debt, it has represented considerable portion when it presented as percentage of GDP. The years of 1990,2002,2003,2004 and 2005 showed the highest debt to GDP ratio they are 108%, 103%, 105%, 102% and 102% respectively. Aggressive debt to GDP ratio which is higher than 60% implies a larger amount of financing needed for economic development.

According to the international debt statistics 2018, Sri Lanka is a country with external debt accumulation weaknesses as it has a 59% external debt to GNI ratio (2016). It was higher than average of 26% for all developing countries. Further, there is a high interest payment to export ratio and our

external liquidity position is weakening in recent years. These factors imply the extent of debt burden in Sri Lanka and ultimately the economy could fall into debt distress where we face difficulties at debt service payment.

On the other hand, raising debt leads to increased interest payment on government debt and that limits the resource availability for fulfilling other commitments in the country (Deyshappriya, 2012; Priyadarshanee & Dayaratna-Banda, 2014).In Sri Lanka, interest payments demonstrate higher share than capital expenditures in recent years. It was 5.5%, 5.9% as percentage of GDP in 2017 & 2018 respectively while capital expenditures represent 5% & 4.5% as percentage of GDP in the same years. This situation has led to budget burden while causing the government to borrow more external debt for debt service and fill the fiscal deficit.

When looking from the primary balance point of view, the government must run primary surpluses in the future to reach fiscal sustainability (Thuy, 2019). A question arises about fiscal sustainability when primary balance compares with public debt in Sri Lanka. There has been a deficit in primary balance for the last few years since 1950. However public debt accumulation has increased that period and it represents 77.6% of GDP, while primary balance is 0.02% of GDP in 2017. Therefore, it's doubtful whether fiscal policy is sustainable with this situation. In the past decade the highest debt to GDP ratio of 86.2% recorded in 2009 was the final year of the civil war in Sri Lanka. Although primary balance to GDP ratio became positive values in recent couple of years, there remains a huge gap between these ratios.

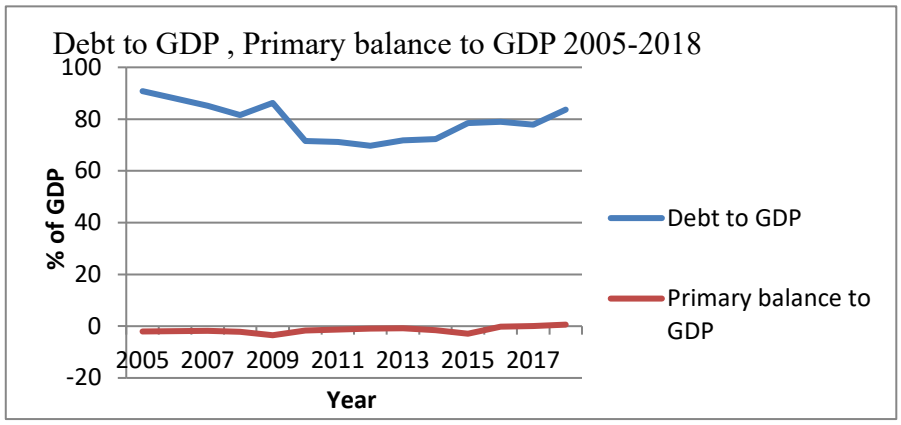

Figure 3: Debt to GDP, Primary balance to GDP 2005-2018
Source: CBSL Economic and Social Statistics of Sri Lanka

These issues of fiscal policy in Sri Lanka pose questions about both long run fiscal sustainability and economic development. As well as the GDP growth rate remains at low level while Debt to GDP rate increases continuously. After 2012, it is decreasing and in 2019 it recorded 2.3% of low level. Therefore, the problem of "How will debt level payoff in future?" arises in Sri Lankan context. However, there are limited researches available for Sri Lankan fiscal sustainability and most of them are used only IBC approach Deyshappriya, (2012); Rathnayake, (2019).In this study, researcher attempted to measure fiscal sustainability stance and degree of sustainability to extend current literature.

2. LITERATURE REVIEW

The several methods to assess fiscal sustainability can extract from literature. Government budget identity is the origin of a theoretical framework to analyze fiscal sustainability. At the elementary period researchers followed a univariate approach that analyzed the mean-reverting behavior of fiscal variables such as deficit and debt to GDP ratio (Shastri et al., 2017). One of the preceding researchers about fiscal sustainability Hamilton & Flavin (1986) investigated fiscal sustainability using the approach of government's intertemporal constraint (IBC) and found out that deficit follows a stationary stochastic

process. Later, studies of Hakkio & Rush, (1991); Quintos, (1995); Trehan & Walsh, (1991) have applied another multivariate method to test IBC using relationship between government revenue and expenditures and this method is based on transversely condition of IBC. If government revenue and expenditure inclusive interest payments cointegrated, that fiscal policy is sustainable. The condition under this framework is revenues and expenditures inclusive of interest payments be cointegrated.

Most of pioneer studies have followed common assumptions that are constant expected real rate of interest and difference stationarity of the revenue and expenditure processes. Trehan & Walsh, (1991) extended literature by relaxing these assumptions. First they adjust the requirement that expenditures and revenues be difference stationary. Next they investigated fiscal sustainability with constant expected real rate of interest and variant expected real rate of interest. The finding implies that to satisfy IBC the existence of a stationary linear combination of the stock of debt and the net-of-interest deficit is necessary and sufficient as long as a quasi-difference of the net-of-interest deficit is stationary when expected real rates are constant. Further, they have proved that stationarity of the inclusive-of-interest deficit is sufficient to ensure intertemporal budget balance, as long as the expected real rate is positive.

On the other hand, fiscal rules are time-varying. There are evidences of structural breakers or regime changes that breached the assumptions of simple linear policy that are constant over time. As pioneers of sustainability testing Hakkio & Rush (1991); Quintos (1995) has provided evidence for structural breakers. Leeper (1991) introduced new terminology that is active and passive policies. These findings confirmed that sustainability position is varying from regime to regime. In recent years Aldama & Creel (2016); Favero & Monacelli (2005) investigated fiscal insatiability applying markov switching model.Chua et al. (2018) applied regime switching model based fiscal sustainability test based on Aldama & Creel (2016, 2019).They identified periods of 1978-1983 and 1986-1990 as non-sustainable fiscal regimes while other periods are sustainable. Further results find out that Lanka's fiscal policy satisfies the No-Ponzi game condition by considering regime-specific feedback coefficients of fiscal rule.

Most recently studies of Adams et al., (2010); Akosah (2016); Bui, (2020) have followed the fiscal reaction function which is a model based approach to estimate fiscal sustainability in economies. This method was introduced by Bohn (1998, 2007) challenging the time series literature on fiscal policy sustainability tests.

2.1 The Intertemporal Budget Constraint Approach (IBC)

The intertemporal budget constraint is the origin point of fiscal sustainability. The IBC approach for fiscal sustainability finds whether the past behaviour of revenue, expenditure and the fiscal deficit could be continued indefinitely without prompting an adverse response from lenders (Cashin & Olekalns, 2000). This IBC approach starts with the government budget identity. According to (Bohn, 2007), the budget constraint is as follows.

$$B_t = {}^{0}_{t} - R_t + (1 + r).B_{t-1} \qquad (2:1)$$

Where B_t , G^0_t , R and r denote debt at end of the period ,non-interest spending ,revenues and interest rate respectively. Using this budget constraint, we can derive relationship between expenditure and revenue as follows.

$$+(1 + r)B_{1-t} = R_t + B_t \qquad (2:2)$$

Rewriting Equation 2:2 for the subsequent periods of t+1, t+2, t+3… and recursively. Solving that equation leads to the following intertemporal budget constraint.

$$B_0 = \sum_{t=1}^{\infty}\delta_t(R_t - {}_t) + \lim_n \to \infty\, \delta_n B_n \qquad (2:3)$$

Where the $\delta_t = \prod^{t}_{s=1} 1/ (1 + r_s)$ is discount factor. Here debt level at time 0 equals to present value of expected budget surplus plus a limit value for debt as time goes to infinity.

$$B_0 = \sum_{t=1}^{\infty} \delta_t (R_t - \quad _t) \tag{2:4}$$

Equation 2:4 presents first condition for fiscal policy to be sustainable. Now remain part of the equation 2:3 presents second condition of sustainability which is transversality or non-Ponzi condition. It will be satisfied when discounted debt level goes to zero in limit.

$$\lim_n \to \infty \delta_n B_n = 0 \tag{2:5}$$

2.2 Co-integration

Here, assesses the long run relationship between government expenditures and revenue. The theoretical framework underlying the use of the co-integration methodology relies on the government's dynamic budget constraint and on the assumption that the interest rate follows a stationary stochastic process. According to Hakkio & Rush, (1991), fiscal sustainability can be tested using following co-integration regression.

$$R_t = a + b \quad _t + \varepsilon_t \tag{2:6}$$

Where R, G denote government revenue and expenditure inclusive of interest payment respectively while ε_t is stationary random variable, a and b represent co-integration parameters. Following Quintos, (1995) Equation 1 can be used to identify weak and strong sustainability. Fiscal policy is strongly sustainable if R and G co-integrated and b=1.As well as fiscal stance weakly sustainable when 0<b<1.

2.3 Bohn's (1998) model-based approach

Since stationarity test and co-integration test have fundamental issues relating to fiscal sustainability (Bohn, 1998) introduced fiscal reaction function to test fiscal sustainability. This model based fiscal sustainability test applied to study to measure fiscal policy reaction to raising debt level. This approach looks at the intertemporal budget constraint in terms of a feedback relationship from the stock of initial debt to the primary surplus in an economy characterized by risk-averse lenders and uncertainty. Here used following model to check whether fiscal response is corrective to rising debt (Bohn, 1998, 2018).

$$PS_t = p.\,DEBT_t + \alpha_0 + \alpha_g.\quad AP \quad _t + \alpha_y.\,Y\,AP \quad _t + \varepsilon_t \tag{3:2}$$

Where,

PS_t= Primary surplus to GDP

$DEBT_t$ = Debt to GDP at the beginning of the period

$G\,GAP_t$ = PS_tGovernment Expenditure gap

$YGAP_t$ = Output gap

α_g = Coefficient of the government expenditure gap

α_y = Coefficient of the output gap

ε_t = Error term

Here the sufficient condition for fiscal sustainability is coefficient of debt level (p) should consist between zero and unity (Shastri et al., 2017). The closer p is to unity, there is high is the response of primary surplus to an increase in public debt which is a sustainable fiscal situation. On the contrary, if p is negative or not significantly different from 0, the primary surplus reduces after an increase in public debt or does not respond at all; that is an unsustainable fiscal policy (Bui, 2020; Kaur & Mukherjee, 2012).

In test of fiscal sustainability researcher used variables in ratio type as GDP-ratios and similarly scaled series provide more credible information about the fiscal series than raw real data (Bohn, 2018) and to get natural definition of sustainability that keeps pace with economic growth and to achieve similarly scaled series that offer easily interpretable information (Shastri et al., 2017)

In FRF approach, researchers used the following two control variables that used by following Bohn, (1998).

G GAP- Government expenditure gap (G gap) denoted temporary government expenditures and it used to capture unexpected expenditures, unrelated to the economic cycle. G gap has been identified as a non-debt determinant of primary surplus. G gap is the deviation of actual primary expenditures from the trend. G gap measured by extracting the deviation in real primary expenditures from its trend (actual expenditures less potential expenditures) through the Hodrick- Prescott filter (HP-filter) and divided by potential expenditures.

Y GAP – Government output gap (Y gap) denoted cyclical variation of output while it also identified as non-debt determinant of primary surplus in Barro's (1979) tax smoothing model. Y gap also calculated by extracting the deviation in real GDP from its trend (actual GDP less potential GDP) through the Hodrick- Prescott filter (HP-filter) and divided by potential GDP.

The researcher calculated the G gap and Y gap as percentage to GDP as follows.

$$Y\ GAP = \left(1 - \frac{y_t}{y_t^*}\right)\frac{g_t^*}{y_t} \quad \& \quad G\ GAP = \frac{g_t - g_t^*}{y^t}$$

3. RESEARCH METHODOLOGY

The researcher used annual fiscal operations data from 1960 to 2019 for this study and the deductive approach has used to conduct this study as the study being general to specific. As well as this study followed a quantitative research approach and used conclusive research design to find out answers for research questions. As analytical model, two approaches were used in the empirical analysis of fiscal sustainability are co-integration approach proposed by Hakkio & Rush, (1991) and model based approach proposed by Bohn, (1998) that is fiscal reaction function analysis and in this study, public debt to GDP is used as a dependent variable, primary balance to GDP ratio as an independent variable while allocating two control variables G gap and Y gap to investigate fiscal sustainability in Sri Lanka.

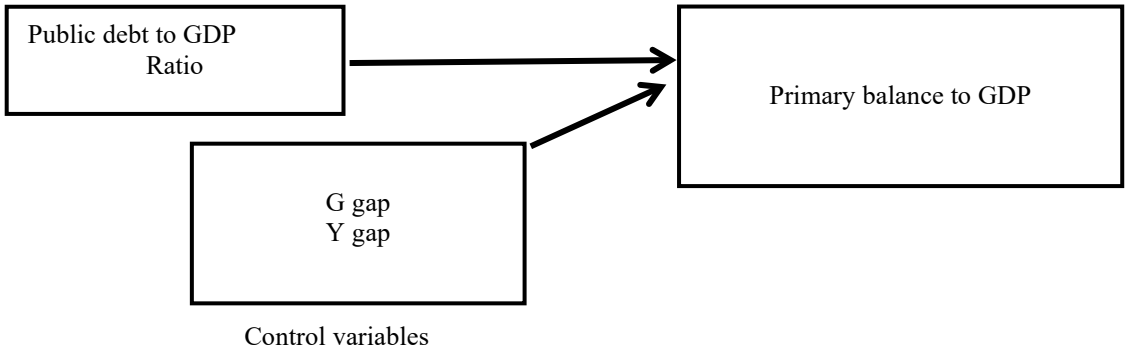

Figure 3: Conceptual framework
Source: Bohn's (1998) model based approach

Two of approaches co-integration test and fiscal reaction function test used to robust the fiscal sustainability results. As unit root test based approaches became incapable to test fiscal sustainability, this study also used fiscal reaction function. Unit root tests are inconsistent and misleading because they do not properly adjust for fluctuations in GDP and in government spending (Bohn, 1998). Unit root test and co-integration approach incapable to rejecting the sustainability because debt can be stationary after any finite number of differencing operations and IBC can be satisfied when revenue and with-interest spending series are integrated of arbitrarily high order(Bohn, 2007).

4. ANALYSIS AND RESULTS

Table 1: Descriptive statistics

	PS	***Debt***	***YGAP***	***GGAP***	***R***	***G***
Mean	0.035	0.769	-7E-05	9.442	0.196	0.274
Median	0.030	0.779	-4E-06	1E-06	0.205	0.275
Maximum	0.157	1.087	8E-05	0.0007	0.289	0.427
Minimum	-0.0004	0.291	-0.0003	-0.0003	0.116	0.173
Std. Dev.	0.027	0.188	0.0001	0.0002	0.038	0.053
Skewness	1.791	-0.447	-1.495	1.516	-0.375	0.342
Kurtosis	8.27	2.639	3.615	4.257	2.451	3.521
Jarque-Bera	99.841	2.291	22.919	26.497	2.130	1.822
Probability	0.000	0.318	0.00001	0.000	0.344	0.402
Sum	2.063	45.354	-0.003	0.005	11.566	16.148
Sum Sq. Dev.	0.043	2.050	1E-06	3E-06	0.0879	0.166
Observations	59	59	59	59	59	59

The researchers primarily used descriptive statistics for all variables and Table 1 shows the Descriptive statistics of six variables that are included in fiscal sustainability test. Summary statistics for all variables calculated using annual data from 1960 to 2018.According to the results, mean value primary surplus to GDP ratio (PS) is 0.034973 with possibility to change positively or negative by 0.027486 from its mean value. PS data spread with low data variability from 0.157900 to 0.000400. The debt to GDP ratio showed 0.768712 mean values while it can be deviate from mean to both sides by 0.188024. It deviates from minimum value of 0.291000 to maximum of 1.087000 with low data variability. There are two control variables included in the study namely output gap (Y gap) and expenditure gap (G gap). Here, the mean value for y gap is -6.659556 with 0.000134 of deviation for both sides. Its minimum value is -0.000398132 while maximum is 7.99054. G gap which is remain control variable has 9.44247703 of mean value and 0.0002320508 standard deviation value. It can be deviate to minimum value of -0.000316329 and maximum value of 0.000700428. There are another two variables, government revenue (R) and government expenditures (G) which are applied to estimate co-integration approach. Here, R and G have mean values 0.196034 and 0.273695 respectively. R can be deviate for both sides by 0.038935 with minimum of 0.116000 and maximum of 0.289000. Here, the researcher investigated fiscal stance of the Sri Lanka using two approaches of co-integration and Bohn's (1998) model based approach. The results of both approaches have separately presented in below.

4.1 Co-integration approach

The researcher applied co-integration approach as first method to find out whether fiscal policy in Sri Lanka is sustainable or not. As the first step, the stationarity of interesting variables has been tested using annual data through the ADF test. The results of test have presented in table 2. According to that results both government revenue and expenditures are non-stationary at level I(0) and stationary at their first differenced specification I(1).Hence the Standard Engle and Granger's procedure (1987) were applied to test co-integration between Rand G. As the first step Ordinary Least square method applied to level data. According to OLS test results its R-squared value is greater than Durbin-Watson statics of the model and therefore we can say that model is suffering from spurious error. In theoretically, co-integration requires that error term (residuals) of a model stationary at level while variables are stationary at first difference. Therefore, here estimated unit root test for residuals using ADF test. The error term has become stationary at level which is confirmed the co-integration relationship between R and G. Here the t statistics 3.670986 is greater than critical t value for the Engle-granger co-integration t-test statistics 3.37 under the 95% confidence level. Therefore, we have to accept alternative hypothesis which is residual has no unit root that is residual is stationary.

Table 1: Unit Root test

Variable	*ADF*		
	None	Intercept	Intercept & Trend
R	0.3556	0.5856	0.1164
D(R)	0.0000	0.0000	0.0000
G	0.3744	0.7520	0.6447
D(G)	0.0000	0.0000	0.0000

Table 2: OLS Test

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
G	0.639237	0.045581	14.02407	0
C	0.021078	0.012709	1.658545	0.1027
R-squared	0.775303	Durbin-Watson stat		0.749395
Adjusted R-squared	0.77136			

Table 4: Error term unit root test results

Null Hypothesis: RESID01 has a unit root			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.670986	0.0071
Test critical values:	1% level	-3.548208	
	5% level	-2.912631	
	10% level	-2.594027	

4.2 Bohn's (1998) model-based approach

The researcher applied Bohn's (1998) model-based approach as second method to find out whether fiscal policy in Sri Lanka is sustainable or not and used to robust the fiscal sustainability results. Here, IBC approach looks at in terms of feedback of primary surplus to debt level in the economy. If corrective action has taken relating to debt ratio, primary surplus ratio becomes positive function of debt ratio. Following equation was estimated.

$$PS_t = p.DEBT_t + \alpha_0 + \alpha_g.\ AP_t + \alpha_y.Y\,AP_t + \varepsilon_t$$

Primary balance to GDP ratio has been considered as the dependent variable of the model while Debt to GDP ratio applied as independent variable. Government Expenditure gap and output gap used as control variables to captures the former cyclical conditions and the accounts for unexpected expenditures, unrelated to the economic cycle, such as military expenditures (Shastri et al., 2017).The variation of these variables are plotted from e-views as follows.

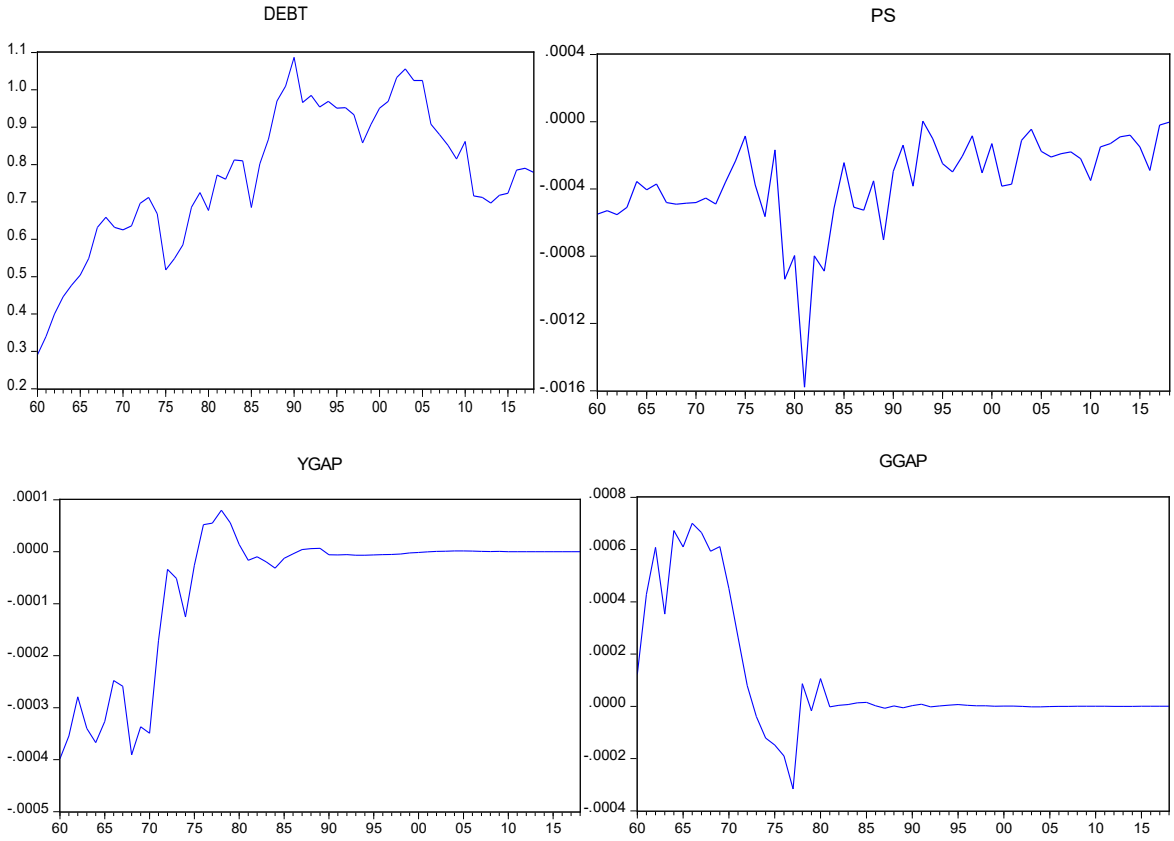

Figure 4: Primary balance to GDP
Source: CBSL Report (2019)

The stationarity of the data was tested using Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests and it has shown in Table 5. Results of both ADF and PP test identified that Primary surplus ratio, Y gap and G gap found to be stationary in level series while first difference of government debt ratio found to be stationary. There was different stationarity level of variables; hence theoretically, OLS estimation is not reliable in here. Therefore, Fiscal Reaction Function estimated through the Autoregressive Distributed Lag (ARDL) approach.

Table 5: Unit Root Test

Variable	ADF					
Ps	0.21	0.0028	0.1068	0.0063	0.002	0.0203
D(Ps)	0.0000	0.0000	0.0000			
Debt	0.08	0.6583	0.8053	0.087	0.6287	0.7987
D(Debt)	0.0000	0.0000	0.0000			
Y Gap	0.01	0.0131	0.0005	0.0058	0.0187	0.0005
D(Y Gap)	0.0000	0.0000	0.0000			
G Gap	0.006	0.0143	0.0004	0.0058	0.0198	0.0004
D(G Gap)	0.0000	0.0000	0.0000			

4.3 ARDL Approach

Autoregressive Distributed Lag (ARDL) which is developed by Pesaran et al., (2001)model is apply when variables are integrated at mix of order I(0) and I(1). In this study dependent variable and control variables are stationary at I (0) while independent variable stationary at I (0). To run a regression data should be transformed, otherwise model results would be spurious. As well as other commonly used co-integration methods of granger causality and johensan co-integration test were not suitable in here. In Granger causality test there are two variables apply and in the johensan co-integration test data must be make stationary at same level. Therefore, following previous literatures also, researchers applied ARDL model for estimate FRF. Before estimate ARDL model, proper lag length should be identified. As there is no proper lag length founded in literatures, researcher applied Vector Autoregressive (VAR) method to identified proper lag length (Table 7). According to VAR lag length criteria lag 4 which is can be identified as the suitable lag level for run ARDL model as it is selected from LR criteria.

Table 6: Lag Length Criterion (VAR)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	1325.138	NA	2.62e-27	-49.85427	-49.70556*	-49.79708
1	1356.605	56.99588	1.47e-27	-50.43791	-49.6944	-50.15199*
2	1371.596	24.89218	1.54e-27	-50.39986	-49.06155	-49.88521
3	1389.501	27.02640	1.47e-27	-50.47175	-48.53863	-49.72837
4	1412.568	31.33564*	1.19e-27	-50.73841	-48.21049	-49.76629
5	1434.310	26.25449	1.05e-27*	-50.95509*	-47.83236	-49.75424

* Indicates lag order selected by the criterion

Table 7: Estimation results of ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
PS(-1)	0.510	0.134	3.796	0.001
PS(-2)	0.354	0.130	2.724	0.010
DEBT1	-0.001	0.000	-2.753	0.009
DEBT1(-1)	0.001	0.000	1.476	0.149
DEBT1(-2)	0.000	0.000	-0.092	0.928
DEBT1(-3)	0.000	0.000	-0.402	0.690
DEBT1(-4)	0.001	0.000	2.647	0.012
YGAP	0.222	0.931	0.239	0.812
YGAP(-1)	0.703	0.854	0.823	0.416
YGAP(-2)	0.097	1.002	0.096	0.924
YGAP(-3)	-0.312	0.964	-0.323	0.748
YGAP(-4)	1.830	0.730	2.506	0.017
GGAP	1.996	0.443	4.510	0.000
GGAP(-1)	-2.038	0.538	-3.789	0.001
GGAP(-2)	-0.890	0.535	-1.663	0.105
GGAP(-3)	1.054	0.423	2.491	0.018
GGAP(-4)	1.332	0.436	3.053	0.004
C	0.000	0.000	-0.591	0.558

Based on those results, the developed model can be written as follows.

$$PS_t = -2.6056 + 0.51000PS_{(-1)} + -0.00120DEBT1 + 1.9961GGAP + 1.829YGAP_{(-4)} + \varepsilon_t$$

According to above results all the independent variables have significant impact on dependent variable. Independent variable of debt to GDP ratio has - 0.00120 of negative impact on independent variable. As a control variable expenditure gap (G GAP) has 1.9961 positive significant impacts and output gap (Y GAP) has 1.829 positive significant impact on dependent variable. Finally, we can conclude that fiscal policy in Sri Lanka is unsustainable as debt to GDP ratio has negative significant impact on primary surplus to GDP ratio.

ARDL Bound Test Cointegration

Table 3: ARDL Bound Test Results

Test Statistic	*Value*	*Asymptotic: n=55*		
		Significance	I(0)	I(1)
F-statistic	2.148801	10%	2.508	3.356
K	3	5%	2.982	3.942
Actual Sample Size	54	1%	4.118	5.2

Table 8 shows results of ARDL bound testing that is applied to identify whether there is a long run relationship or not. That means tests co-integration. According to the bound test F- statics there is no long run relationship between variables. F statistic of 2.148801 is less than lower boundary I (0) at 10%, 5% and 1% significant levels. Therefore, we can only interpret short run relationship between variables.

Next it's important to test serial correlation in the model to confirm good fitness of the model. There are two methods to check serial correlation in the model. First method is use Durbin-Watson value (DW). In this study there is 2.202095 DW value that confirmed model is free from serial correlation. The second method is Breusch–Godfrey test or langrage Multiplier (LM) test. In the ARDL model LM test is most suitable as DW cannot be used for serial correlation of higher order and when the lagged dependent is used as regressor (Giraba, 2019).In the LM test null hypothesis is there is serial correlation. According to the LM test results there is no serial correlation. LM test results are as follows.

Table 9: LM Test Results

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.674299	Prob.F (2,34)	0.5162
Obs*R-squared	2.060174	Prob.Chi-Square (2)	0.3570

To test the whether parameters remain constant across sample here researchers conducted both cumulative sum and cumulative sum square tests were applied. The estimated results are as follows.

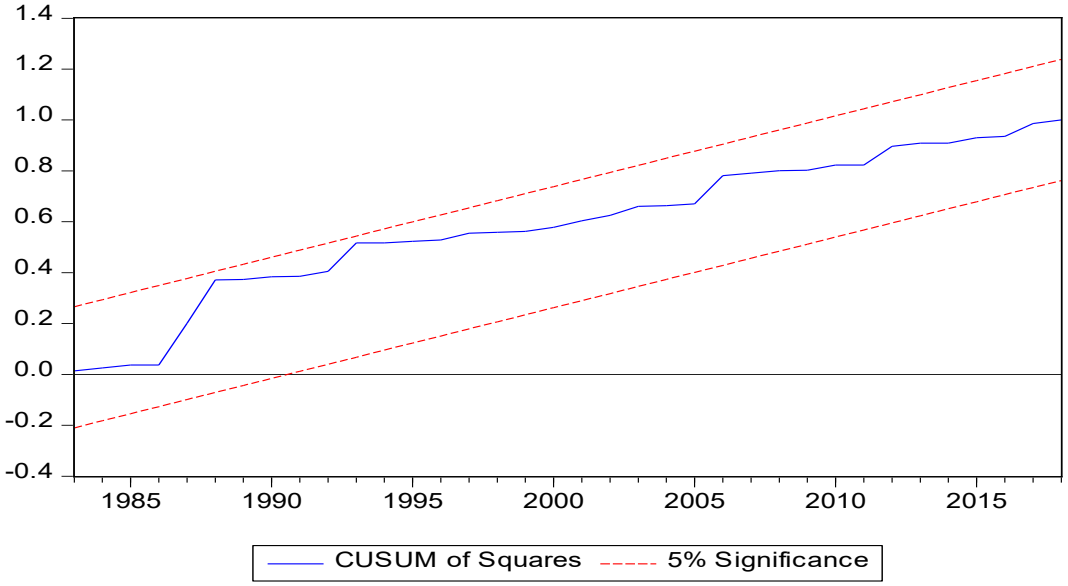

Figure 5: CUSUM of squares test
Source: Survey data (2020)

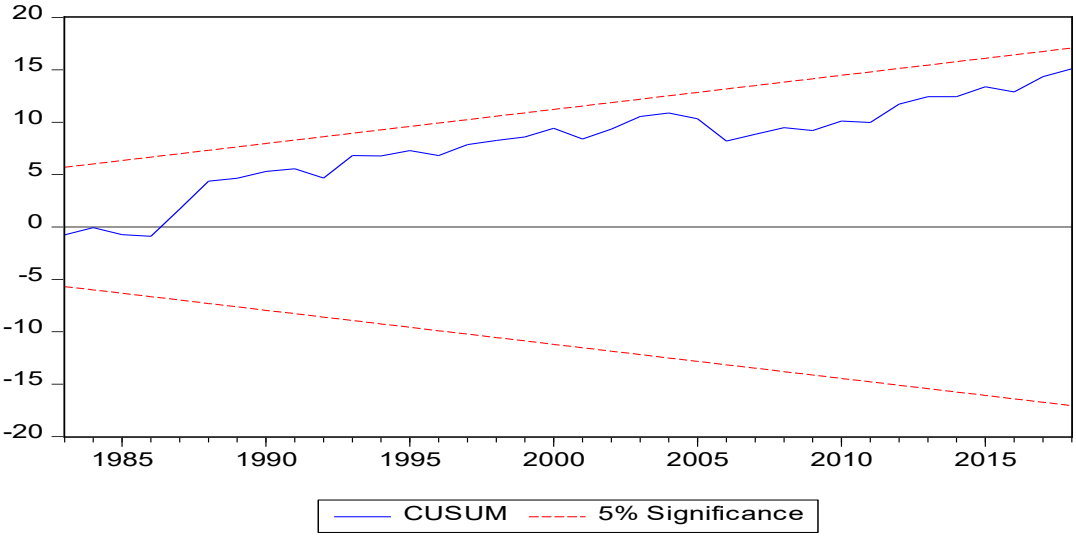

Figure 6: CUSUM Test
Source: Survey data (2020)

According to above test results, both CUSUM test and CUSUM square test are within 5% significant level. Therefore, we can say that model is stable.

5. CONCLUSION

This study mainly focused to investigate whether fiscal policy is sustainable or not Sri Lanka. The fiscal sustainability most commonly defined as the situation that fiscal policy satisfied government intertemporal budget constraint. In literature, there are main three approaches have been used to measure fiscal sustainability. They are Intertemporal Budget Constraint (IBC), co-integration approach and fiscal reaction function approach. The data for the study were collected from Annual reports and statistical reports of Central Bank of Sri Lanka for the period of year 1960 to 2018.

The researcher investigated to find out whether Sri Lankan fiscal policy is sustainable or not as general objective and to examine the degree of fiscal sustainability in Sri Lanka as sub objective. Sustainability of fiscal policy has analyzed applying two approaches; co-integration approach and Fiscal Reaction Function approach to robust the results. In the first approach, fiscal sustainability examined using co-integration between government revenue and government expenditures. In the second approach, fiscal sustainability examines in the term of primary policy reaction on debt level. Therefore, primary surplus to GDP ratio and debt to GDP ratio used as dependent and independent variable respectively. Two control variables included output gap (Y Gap) and expenditure gap (G Gap) to capture cycle conditions and unexpected expenditures that unrelated to economic cycle. These control variables have been worked out by extracting the deviation in real GDP/expenditures and their trend through HP-Filter. In the co-integration approach results reveal that co-integration between government revenue and expenditures. Therefore, fiscal policy is sustainable under the co-integration approach. However, the sustainability show weak form as the coefficient of 0.639237 debt to GDP is greater than 0 and less than 1($0< b >1$). In the FRF approach all the independent variables has significant impact on dependent variable of primary surplus to GDP ratio. However, debt to ratio has negative impact on primary surplus. Therefore, the results found that fiscal policy is unsustainable in fiscal reaction function.

According to the results Sri Lankan fiscal policy is sustainable under co-integration approach. However, it's unsustainable under FRF method. According to the literature, co-integration approach is not much reliable to accept unsustainable and it shows a weak sustainability. Therefore, it can be concluded that fiscal policy is unsustainable as our debt also highly increasing in recent time period. Therefore, Sri Lanka should prepare national level economics policies to overcome the challenges of fiscal unsustainability

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