

# **The Impact of Public Debt on Domestic Investment and Foreign Direct Investment in Sri Lanka**

Sathanantham Shiyalini

*Postgraduate Institute of Humanities and Social Sciences (PGIHS),*

*University of Peradeniya, Sri Lanka*

*shiyalini06@gmail.com*

## **INTRODUCTION**

The primary objective of every economy is to achieve the macroeconomic goals such as high and sustainable economic growth, full employment level, price stability, favorable balance of payment and other internal and external stability. Emerging economies aim to achieve these macroeconomic goals by using fiscal, monetary and trade policies. Fiscal policy examines the government spending and revenue to monitor and influence the economy through reducing unemployment rates, stabilizing business cycles, controlling inflation and interest rates (Kalugalla et al. 2020). When government expenditure exceeds its revenue from tax and non-tax sources, it is said to be a fiscal deficit (budget deficit). In a situation where government experiences a fiscal deficit, it can be financed by issuing currencies, running down foreign exchange reserves, borrowing from abroad, and borrowing from domestic as well (Kalugalla et al. 2020).

Most of the developing economies suggest debt or borrowing options as a better deficit financing option as they do not cause inflationary effects in an economy compared with printing money or imposing high taxes on the public. Printing money causes inflation by increasing the money supply and has negative consequences on the economy in the long-term. Moreover, raising taxes to intolerable level or cutting down the capital expenditure in order to reduce the budget deficits are major threats to the high and sustainable growth and development of the country (Fonseka and Ranasinghe, 2007). Even though these arguments suggested debt as a better financing option, excessive government borrowings over the capacity of the country causes adverse impacts on an economy. In order to finance a higher budget deficit, the government borrows domestic and external debts which in turn increase the indebtedness and higher debt profile. Furthermore, the economy was forced to borrow additional debts in order to pay even the debt servicing payments for the existing debt. As a result, it may lead the country into a debt trap problem.

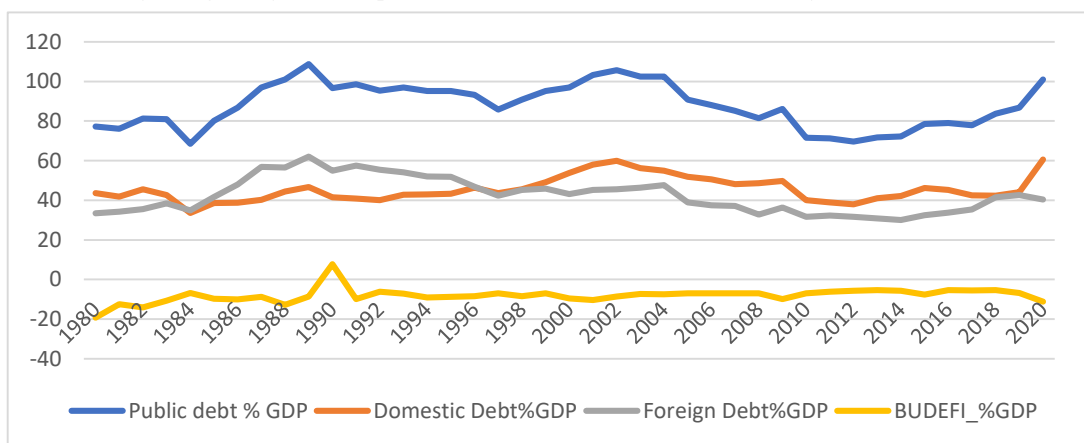
There are many criticisms against government borrowing as it can lead to a debt trap problem and put the country's development process at risk, but borrowing funds do not always have a negative impact

on the economy if they are used efficiently and productively. For instance, government borrowings to service debt payments, for current consumption or for recurrent expenditure may not stimulate the economic performances while borrowing to carry out long term development projects, increase capital expenditure and rational investment in productive ventures will lead to economic growth in the long term. Unfortunately, many developing countries like Sri Lanka borrow for the former reason, which is why their fiscal deficit and debt profile keeps increasing, investment keeps falling, unemployment rises, national output falls and majority of the residents are trapped in poverty (Ogunjimi, 2019).

In Sri Lankan history, since the 1940's the government started to adopt the deficit financing policy in which the government expenditure exceeded the government revenue. Most serious implication of this deficit financing policy is that after 1984, Sri Lanka experienced an excessive deficit budget. Since 1994, in nominal terms, government revenue is not sufficient to meet the recurrent expenditure of the Sri Lankan economy which leads to an excessive budget deficit and higher debt profile. It directly affects the resource allocation and macroeconomic activities.

Domestic public debt is one of the important sources for financing the budget deficit. When Government borrowings from domestic banking sources increases, it rises the demand for the loanable funds and may affect interest rates to rise up. At a higher interest rate, the usable cost for the private credit increases and then the ability to access loanable funds for the private sector may discourage. As a result of this fiscal deficit, national savings will drastically reduce and thus the domestic investment. This is called as the crowding out effect of public debt through government borrowing in the domestic financial market. The crowding out effect lowers the private investment directly and hampers future economic growth and development of the nation.

Figure 1: Trend of budget deficit and public debt in Sri Lanka as a share of GDP (1980-2020)



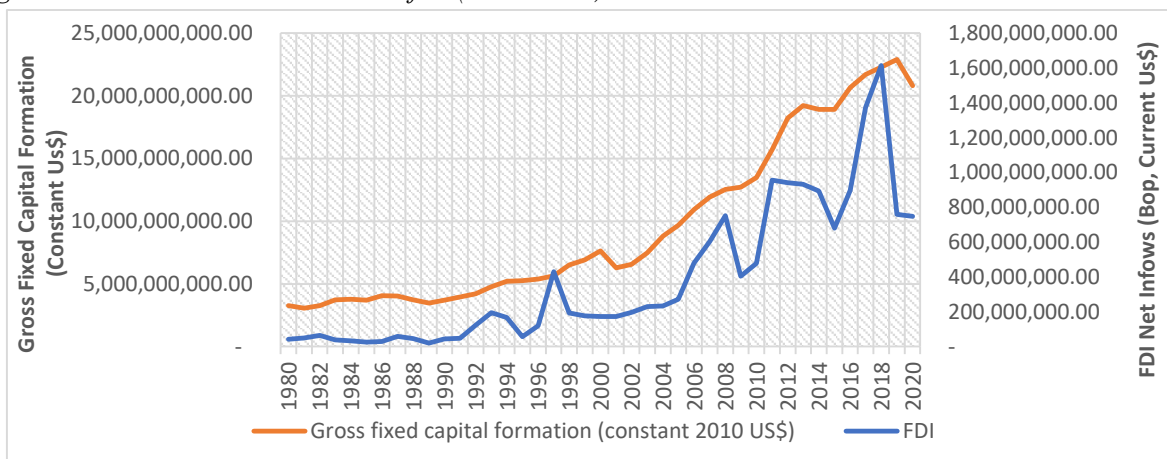
Source: Computed by Author from CBSL Annual Report (2020)

A widely used indicator of public debt level is debt as a percentage of the GDP. In the case of Sri Lanka, accumulated public debt over the years has reached such high proportions. Government Debt to GDP in Sri Lanka averaged 70.18 percent of GDP from 1950 until 2019. The figure 1 shows the

accumulation of large public debt and recorded an increasing trend in both foreign and domestic debt over the last few decades. Prior to the early 1960s, the share of external debt in total debt was small, and the public debt was primarily held internally. After the economic liberalization in 1977, the rapid increase in external debt, by comparison with the domestic debt, presented a double burden. As a result, the total outstanding public debt increased sharply from Rs. 24,985 million in 1977 to Rs. 924,699 million in 1998 showing an annual average growth rate of 12%. The public debt/GDP ratio was 68.6% in 1977 and it had increased up to an all-time high of 108.7% of GDP in 1989 and recorded 101 percent of GDP in 2020 (Central Bank Annual Report, 2020). The total debt to GDP ratio exceeded 100 percent from 2001 to 2004 and again in 2020. According to the study of Kumara and Cooray (2013), the threshold level for public debt is 59.42 percent of GDP in Sri Lanka and above this level, public debt makes a negative impact on GDP per capita growth. Along with public debt, higher burden of debt payments has been a challengeable issue in Sri Lanka.

According to Karagol (2002), the cost of servicing public debt can crowd out public investment expenditure (capital expenditure), by reducing total investment directly, and private investments indirectly. The total investment in an economy is cumulatively the sum of both domestic and foreign investable capital. Domestic investment, which can be disaggregated into private and public investment, is a vital component of total investment. Foreign direct investment is the other side of the divide as it constitutes the volume of investment by foreign investors. Figure 2 shows the volume of investment (domestic and foreign investments) in Sri Lanka between the year 1980 and 2020.

Figure 2: Sri Lanka's Investment Profile (1980-2020)



Source: Computed by Author from CBSL Annual Report (2020)

It is apparent from the Figure that there are significant fluctuations in the volume of both domestic and foreign investments in Sri Lanka for the above period. It also shows the volume of domestic investment exceeds foreign direct investment almost throughout the period under review. This indicates that domestic investment takes the lion share in total investment in the economy and that the Sri Lanka is not so attractive to foreign investors.

In Sri Lanka, the rising share of budget deficit financing and debt service payment expenditure impedes the flowing resources towards public and private investments, which in turn affects country's economic growth and development process. According to the study of Egbetunde (2012), higher debt profile lowers economic growth partly by lowering investment and increasing poverty. Thus, it is important to identify the effects of public debt on the volume of investment in Sri Lanka.

## **LITERATURE REVIEW**

According to the substantial empirical literatures, the impact of public debt on investment differed from country to country. Theoretically, different school of economists have different thoughts regarding the relationship between public debt and investment. According to the neoclassical perspective, a budget deficit crowds out private investment by raising interest rates. In contrast, the Ricardian Equivalence theory argued that when the government borrows money, there is no crowding out of private investment because people will reduce consumption and increase saving to cover up the increase in future tax liabilities. Because of the multiplier effect, Keynesian economists claim that public investment through government expenditure crowds in private investment. On the other hand, Conservative economists argue that increased government spending cannot possibly boost overall economic activity (Thilanka& Sri Ranjith,2018). Furthermore, researchers have had different perspectives regarding the impact of public debt on investment.

### **Empirical Review on Public Debt and Domestic Investment**

Ogunjimi(2019) conducted a study to investigate the impact of public debt on the various forms of investment in Nigeria both in the short-run and long-run for the period between 1981 and 2016.This study disaggregated public debt into domestic and external debt and tries to investigate the impact of public debt on various forms of investment such as, public investment, Private investment and Foreign Direct Investment (FDI).The results showed that domestic debt crowds-in both private and public investment in the short-run and long-run. On the other hand, External debt crowds-in private investment but crowds-out public investment both in the short-run and long-run.

Similarly, Akomolafe et al. (2015) investigate the impact of public debt on gross domestic investment in Nigeria between 1980 and 2010, using Johansen Co-integration technique and Vector Error Correction Model (VECM). The study disaggregated public debt into domestic and external debt. The results indicate that domestic debt is negatively related to domestic investment in both the short and long run, implying that domestic debt crowds out investment. However, the findings show that external debt attracts domestic investment in the long run while crowding it out in the short run. Kingwara, (2014) also examined the impact of domestic public debt on private investment levels in Kenya over the period of 1967-2007. Johansen cointegration method was employed to detect the existence of long-run cointegrating relationship among the variables private investment, real GDP

growth rate, real interest rate, domestic debt and investment. The findings revealed that higher level of domestic public debt has had a crowding out effect on private investment in Kenya.

Similarly, Lidiema (2018) also studied the impact of government domestic borrowing on domestic investment from 1975 to 2014, using Gross fixed capital formation as a dependent variable while Domestic debt, financial development, gross domestic savings, real interest rate and GDP per capita as explanatory variables. The Auto Regressive Distributed Lag (ARDL) technique was used to determine the variables' long-run and short-run co-integration relationships. According to the ARDL results, there is a significant negative relationship between domestic debt and gross fixed domestic capital formation in the short run, implying that an increase in domestic debt crowds out gross fixed capital formation in Kenya. However, in the long run, there is an insignificant negative long run relationship between Domestic debt and gross fixed domestic capital formation. On the other hand, the impact of External Debt on investment is positive and insignificant in the long run but negative and significant in the short run.

In contrast, Apere (2014) investigated the effect of domestic and external debt on private investment in Nigeria from 1981 to 2012. The major findings of this study show that the impact of domestic debt on private investment in Nigeria is linear and positive, implying the crowding in effect of domestic debt on private investment. However, the impact of external debt on private investment in Nigeria is nonlinear but U-shaped. This means the relationship between external debt and private investment in Nigeria is negative up to a threshold level, and becomes positive beyond the threshold level. Similarly, Majumder (2007) revealed in his study that there is no crowding-out effect of public debt in Bangladesh. The results show that public debt has a positive impact on private investment, implying the crowding in effect of public debt on private investment in the Bangladesh economy.

### **Empirical Review on Public debt and Foreign Direct Investment**

Moreover, Oche et al. (2016) empirically investigate the effect of public debt on foreign direct investment in South Africa for the period 1983 – 2013, using Vector Error Correction Model. The long-run estimation results indicate that the relationship between public debt and foreign direct investment, is positive and statistically significant. Similarly, there is a positive and significant relationship between interest rate and foreign direct investment in South Africa. However, the study found an insignificant negative relationship between exchange rate and foreign direct investment. Similarly, Wamwalaba (2017) in his study concludes that public debts crowd in Foreign Direct Investment (FDI) in Nigeria. In contrast, Ogunjimi (2019) found that both Domestic and external debts do not significantly influence FDI both in the short-run and long-run in Nigeria for the period between 1981 and 2016.

Using Structural Vector Autoregressive Framework (SVAR), Senibi et al. (2017) surveyed the response of domestic investment and foreign direct investment to shocks from public debt between

1981-2015. The findings revealed that high foreign public debt and domestic public debt crowded out domestic investment. However, FDI failed to respond to shocks from public debt significantly as high indebted profile countries tend to reduce FDI inflows. In addition, depreciation of exchange rate decreases the domestic investment but it encourages the inflow of foreign direct investment to the host country. Moreover, lending interest rate negatively related to FDI inflows, implying an increase in the rate of interest rate couple with the high inflation in Nigeria, lowers the expectation of foreign investors and reduce the flow of FDI.

Nunnenkamp et al. (1991) surveyed developing countries' attractiveness for FDI focusing on debt overhang and sovereign risk as major hindrance to inflow of FDI. This study used regression analysis for 35 host developing countries and various subgroups. The study explained that higher debt burden creates constraints on new private lending as well as in terms of FDI inflows but the empirical results showed that the impact of public debt on FDI in Germany was not as expected since it's not too strong. Similarly, Khan and Khan (2011) examined the impact of public debt on FDI in Pakistan using the time series data from the period 1981 to 2007. OLS analyzing technique is employed to investigate the impact of public debt on FDI. The result of the study showed that public debt was statistically significant implying that public debt has negative effect on the inflow of FDI in Pakistan. implying that higher lending interest rate constrains domestic investment

In the case of Sri Lanka, using time series annual data from 1988 to 2015, Thilanka and Ranjith (2017) aimed to identify the crowd in/out effect of public debt on private investment through both domestic and foreign debt in Sri Lanka and the findings revealed that both domestic and external debt crowd out private investment in the long-run. In contrast, another empirical study conducted by Thilanka and Ranjith (2018) to re-examine the impact of public debt on private investment in Sri Lanka for the period of 1978 to 2015. Empirical findings of this study show the evidence for the presence of crowding-in effect of public debt on private investment in the long-run. Moreover, Kalugalla et al. (2020) conducted a study to identify presence of crowding out effect of government expenditure and budget deficits on private sector investments in Sri Lanka. The results revealed that there is a positive relationship between budget deficit and private investment and concludes the absence of the crowding-out effect in Sri Lanka.

Hence, it is apparent that the effect of public debt on investment of a country is still ambiguous. In order to fill this research gap, this study aims to identify the presence of crowding in or crowding out effect of public debt on domestic and Foreign direct investments in Sri Lanka.

## **DATA AND METHODOLOGY**

### **Research Data and Model Specification**

This study investigated the impact of public debt (domestic and external debts) on the volume of investment (domestic investment and foreign direct investment) in Sri Lanka for the period between

1980 and 2020. The justification for selecting data from 1980 is because that after economic liberalization, both domestic and external debts started to increase enormously and cause unfavorable effects on the economy. Furthermore, the times series data which were employed in this study for the above mentioned period, extracted from the annual reports of the Central Bank of Sri Lanka and World Development Indicators of World Bank Database. This study tried to investigate the impact of public debt on various forms of investment such as, Domestic Investment and Foreign Direct Investment (FDI). Theoretically, total investment consists of both domestic and foreign investment (Senebi et al. 2017). Thus, this study estimated two investment models where domestic investment and foreign direct investment were dependent variables (Ogunjimi, 2019).

In this study the public debt was disaggregated into domestic and external debt in order to identify the relative impact of both domestic and external debt on investment in Sri Lanka. Theoretically, interest rate and exchange rate are key determinants of both domestic and foreign investment and are thus added to the models as control variables. This study adopted and modified the model of Khan and Khan (2011) and Oche et al. (2016) and regressed domestic debt, external debt, lending interest rate and exchange rate as explanatory variables on the two investment models which are presented as follows,

$$DOINV = f(DODBT, EXDBT, LEINT, EXCHR) \text{-----} (1)$$

$$FDI = f(DODBT, EXDBT, LEINT, EXCHR) \text{-----} (2)$$

This model is further translated into logarithmic form to ensure uniformity and avoid some problems of misspecification during the econometric analysis. The econometric models can be specified as follows:

$$\ln DOINV_t = \beta_0 + \beta_1 \ln DODBT_t + \beta_2 \ln EXDBT_t + \beta_3 \ln LEINT_t + \beta_4 \ln EXCHR_t + \varepsilon_t \text{-----} (3)$$

$$\ln FDI_t = \beta_0 + \beta_1 \ln DODBT_t + \beta_2 \ln EXDBT_t + \beta_3 \ln LEINT_t + \beta_4 \ln EXCHR_t + \varepsilon_t \text{-----} (4)$$

Where *DOINV* is the domestic investment which is proxied by gross fixed capital formation (Constant US\$), *FDI* is the Foreign direct investment net inflows (BOP current US\$) which is used as a proxy for foreign investment, *DODBT* is the Domestic Debt as a percentage of GDP, *EXDBT* is the external debt as a percentage of GDP, *LEINT* is the lending interest rate, *EXCHR* is the Official exchange rate (LCU per US\$),  $\varepsilon$  is the error correction term and *t* is the time period (1980-2020). Based on the existing empirical and theoretical literature, we have expected that the coefficient of *LEINT* ( $\beta_3$ ) is negative. In general, if lending interest rates are high, investment decreases. Conversely, if lending interest rates are low, investment increases. Thus, the coefficient of  $\beta_3$  is expected to be negative. Further, the coefficient of *EXCHR* ( $\beta_4$ ) can be either positive or negative. This is because that an exchange rate depreciation (appreciation) stimulates (dampens) investment by enhancing demands in

both the domestic and export markets, but it reduces (increases) investment because of the increasing cost of imported intermediate goods and the user cost of capital. Finally, based on empirical literature the coefficient of both *DODBT* and *EXDBT* variables are also expected to be either positive or negative ( $\beta_1, \beta_2 > 0$  or  $\beta_1, \beta_2 < 0$ ).

### Data Analyzing

Most of the time series variables are found to have unit roots as they are not stationary or their variances increase with time. If a variable is non-stationary, it has a unit root meaning there is a problem of spuriousness if the regression is to be estimated using the ordinary least squares (OLS). Therefore, it is necessary to check the stationary properties of the time series variables before estimating the long-run relationship between the variables. The unit root test is the formal method to test the stationary of a time series data. In this study, the unit root test is performed by using the Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) Unit root tests.

After the preliminary unit root analyses, ARDL bounds testing approach was employed to investigate the existence of a long-run cointegration relationship among the variables in the study. The ARDL co-integration bound testing procedure is given by equation (5) and (6):

$$\begin{aligned} \Delta \ln DOINV_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \ln DOINV_{t-i} + \sum_{i=0}^{q_1} \alpha_2 \Delta \ln DODBT_{t-i} + \sum_{i=0}^{q_2} \alpha_3 \Delta \ln EXDBT_{t-i} + \\ & \sum_{i=0}^{q_3} \alpha_4 \Delta \ln LEINT_{t-i} + \sum_{i=0}^{q_4} \alpha_5 \Delta \ln EXCHR_{t-i} + \delta_1 \ln DOINV_{t-1} + \\ & \delta_2 \ln DODBT_{t-1} + \delta_3 \ln EXDBT_{t-1} + \delta_4 \ln LEINT_{t-1} + \delta_5 \ln EXCHR_{t-1} + u_t \quad \text{--- (5)} \end{aligned}$$

$$\begin{aligned} \Delta \ln FDI_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \ln FDI_{t-i} + \sum_{i=0}^{q_1} \alpha_2 \Delta \ln DODBT_{t-i} + \sum_{i=0}^{q_2} \alpha_3 \Delta \ln EXDBT_{t-i} + \\ & \sum_{i=0}^{q_3} \alpha_4 \Delta \ln LEINT_{t-i} + \sum_{i=0}^{q_4} \alpha_5 \Delta \ln EXCHR_{t-i} + \delta_1 \ln FDI_{t-1} + \delta_2 \ln DODBT_{t-1} + \\ & \delta_3 \ln EXDBT_{t-1} + \delta_4 \ln LEINT_{t-1} + \delta_5 \ln EXCHR_{t-1} + u_t \quad \text{--- (6)} \end{aligned}$$

Where, the terms associated with the summation signs,  $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$  in the above model represent the short-run dynamic coefficients, whereas  $\delta_1, \delta_2, \delta_3, \delta_4, \delta_5$  are the long-run coefficients,  $p, q_1, q_2, q_3$  and  $q_4$  are the optimum lag lengths and  $u_t$  is the white noise error term. In this study, Akaike Information criterion (AIC) is applied to determine the optimal lag order of each series of the ARDL model. To investigate the existence of long-run relationships between the variables, bound testing procedure is used, which is based on the F-test. A F-test is actually a test of the hypothesis of no cointegration among the variables ( $H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$ ) against the existence of cointegration among the variables ( $H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$ ). If the computed F-statistic falls below the lower bound critical value, the null hypothesis of no-cointegration cannot be rejected. Contrary, if the computed F-statistic lies above the upper bound critical value; the null hypothesis is rejected, implying that there is a long-run cointegration relationship among the variables in the model.



Nevertheless, if the calculated F-statistic lies between the lower and the upper bounds, conclusive inference may not be made.

After detecting the existence of cointegrating relationship, the long run coefficients of the ARDL model for DOINV and FDI can be estimated. As a final step, we obtain the short-run dynamic parameters by estimating an error correction model. Thus, equation (5) & (6) can be further transformed as in equation (7) & (8) respectively to accommodate the error correction term with one period lagged( $ECT_{t-1}$ ):

$$\Delta \ln DOINV_t = \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \ln DOINV_{t-i} + \sum_{i=0}^{q_1} \alpha_2 \Delta \ln DODBT_{t-i} + \sum_{i=0}^{q_2} \alpha_3 \Delta \ln EXDBT_{t-i} + \sum_{i=0}^{q_3} \alpha_4 \Delta \ln LEINT_{t-i} + \sum_{i=0}^{q_4} \alpha_5 \Delta \ln EXCHR_{t-i} + \phi ECT_{t-1} + \mu_t \quad \text{-----}(7)$$

$$\Delta \ln FDI_t = \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \ln FDI_{t-i} + \sum_{i=0}^{q_1} \alpha_2 \Delta \ln DODBT_{t-i} + \sum_{i=0}^{q_2} \alpha_3 \Delta \ln EXDBT_{t-i} + \sum_{i=0}^{q_3} \alpha_4 \Delta \ln LEINT_{t-i} + \sum_{i=0}^{q_4} \alpha_5 \Delta \ln EXCHR_{t-i} + \phi ECT_{t-1} + \mu_t \quad \text{-----}(8)$$

Where,  $\phi$  is the speed of adjustment parameter which should have statistically significant and negative sign to support the co-integration between the variables and  $\mu_t$  is the pure random error term. Then, beside ARDL bounds test, the post estimation diagnostics are generated to establish how the investment models (3) & (4) fits the data.

## RESULTS AND DISCUSSION

### Unit root test results

The ADF and PP unit root test results in table 1 shows that all the variables are stationary at first difference [I(1)] except lending interest rate which is stationary at level [I(0)]. Thus, the unit root test results confirms that the dependent variable in two investment models is I(1) and the independent variables are a mixture of I(0) and I(1). It also reveals that none of variables are I(2) or higher order . Thus, the ARDL approach is more suitable than other approaches for examining relationships between the variables. Akaike Information criterion (AIC) advocated that to use ARDL (4,4,1,1,2) and ARDL (4,3,4,4,4) modals for the analysis of Domes investment model and Foreign Direct Investment model respectively.

Table 1: Unit Root test results

Variable	Augmented Dickey-Fuller test(Constant)		Phillips-Perron test (Constant)		Order of Integration
	At level	First Difference	At level	First Difference	

<i>LnDOINV</i>	0.074	-4.704***	0.098	-4.460***	I(1)
<i>LnFDI</i>	-1.263	-6.899***	-0.882	-9.061***	I(1)
<i>LnDODBT</i>	-1.743	-4.858***	-1.743	-4.616***	I(1)
<i>Ln EXDBT</i>	-1.528	-6.077***	-1.714	-6.152***	I(1)
<i>LnLEINT</i>	-5.148***	-	-4.703***	-	I(0)
<i>LnEXCHR</i>	-2.157	-7.064***	-2.480	-7.024***	I(1)

Note: '\*\*\*', '\*\*' and '\*' represent 1%, 5% and 10% level of significance respectively

Source: Authors' calculation

### ARDL Bounds test Cointegration results

Table 2: Result of ARDL Bounds Test Approach to Cointegration

Level of Significance	LnDOINV= F(LnDODBT, LnFODBT, LnEXCHR)			LnFDI= F(LnDODBT, LnFODBT, LnLEINT, LnEXCHR)		
	Critical Value		F- statistic	Critical Value		F- Statistic
	Upper Bound	Lower Bound		Upper Bound	Lower Bound	
1% Sig. Level	4.37	3.29	19.83***	4.37	3.29	4.94***
5% Sig. Level	3.49	2.56		3.49	2.56	
10% Sig. Level	3.09	2.2		3.09	2.2	

Note: '\*\*\*', '\*\*' and '\*' represent 1%, 5% and 10% level of significance respectively.

The Akaike Info Criterion (AIC) selected the optimal lag length (k=4).

Source: Authors' Computation using EViews 10

Table 2 represents the results of ARDL Bounds F-test to identify the existence of co-integrating relationship between the variables. It shows that the computed F-statistic of domestic investment model 19.83 is greater than the upper bound critical value at all levels of significance (1%, 5% and 10% level of significance). Thus, the null hypothesis of no cointegration is rejected, indicating there exist a stable long-run cointegrating relationship between domestic investment, domestic debt, external debt, exchange rate and lending interest rate in domestic investment model.

Similarly, the computed F- statistic value of 4.94 of the FDI model, which is greater than the upper bound critical value at all levels of significance(1%, 5% and 10% level of significance). Thus, the null hypothesis of no cointegration is rejected, indicating there exist a stable long-run cointegrating relationship between FDI, domestic debt, external debt, exchange rate and lending interest rate in FDI model.

### Results of Long Run and Short-Run ARDL Estimated Models

Having determined the cointegration status of two specified models of this study, it is needful to proceed to the estimation of the long-run and short-run ARDL models; the results of which are presented in Table 3 and 4 respectively.

*Table 3: Results of the ARDL Long-Run Model*

Variables	Domestic Investment Model	Foreign Direct Investment Model
LnDODEBT	-1.0589*** (0.0000)	-0.0147* (0.0699)
LnEXDEBT	-0.4097 *** (0.0067)	-0.0158 (0.2044)
LnLEINT	-0.1888** (0.0370)	0.0441 (0.2754)
LnEXCHR	1.0077*** (0.0000)	0.0282 *** (0.000)
Constant	24.7603 *** (0.000)	17.5849***(0.000)

*Note: '\*\*\*', '\*\*' and '\*' represent 1%, 5% and 10% level of significance respectively.*

*Probability values are in parenthesis*

**Source: Authors' Computation using EViews 10**

According to the long-run estimation results of the Domestic Investment model, both domestic and external debt have a significant negative impact on the domestic investment in Sri Lanka at 1% significant level, implying that higher domestic and external government borrowing lowers the volume of investment of our country. The long run coefficient of the Domestic Debt (DD) and External Debt (EXD) depict, when domestic debt increases by 1% of GDP, Domestic investment decreases by 1.0589% of GDP and when external debt increases by 1% of GDP, Domestic Investment decreases by 0.4097% of GDP. In line with the objective of the study, it is clear that public debt including both domestic and external debts crowds-out the volume of domestic investment of Sri Lanka in the long-run. This is consistent with the findings of Kamundia et al. 2015; Akomolafe et al. 2015; Olweny & Chiluwe, 2012; Lau et al. ,2019; Abdullahi et al. 2016. The long-run results further showed that domestic debt has a greater influence on domestic investment than external debt in Sri Lanka.

Similarly, in the long run, there is a significant negative relationship between domestic debt and foreign direct investment inflows, implying that higher domestic debt profile discourages foreign investors and crowds out foreign direct investment (FDI) inflows in Sri Lanka. This is related to the finding of Senibi et al. 2017; Nunnenkamp et al.1991; Khan and Khan, 2011. However, there is an insignificant negative relationship between external debt and FDI inflows in long-run, as high indebted profile countries tend to reduce FDI inflows.

Further, there is a significant negative long-run relationship between lending interest rate and domestic investment in Sri Lanka, at 5% level of significance. The negative estimated coefficient of this variable LEINT implies that the higher lending interest rate increase the cost of capital and subsequently reduce the volume of domestic investment in the long-run. However, FDI exhibit insignificant response from lending interest rate in the long-run.

Finally, the depreciation of exchange rate stimulates both domestic investment and the inflow of foreign direct investment to the host country. The effect of exchange rate on domestic investment and FDI inflows is highly significant. The estimated long- run coefficient of EXCR in domestic investment and FDI models implies, that 1% depreciation in exchange rate (appreciation) stimulates (dampens) domestic investment and FDI inflows by 1.0077% and 0.0282% respectively in Sri Lanka in long-run, by enhancing demands in both the domestic and export markets. This is in line with the findings of Snebi et al. 2017.

*Table 4: Results of the ARDL Short-Run Model (Error Correction Model of ARDL)*

<b>Variables</b>	<b>Domestic Investment Model (ARDL (4,4,1,1,2) modal)</b>	<b>Foreign Direct Investment Model (ARDL (4,3,4,4,4) model)</b>
D( LnDOINV (-1))	-0.0186 (0.8162)	
D( LnDOINV (-2))	-0.095153 (0.2793)	
D( LnDOINV (-3))	-0.235505 (0.0079)	
D(LnFDI (-1))		1.2947*** (0.0003)
D(LnFDI (-2))		0.4030** (0.0463)
D(LnFDI (-3))		0.4058* (0.0654)
D(LnDODBT)	-0.2813*** (0.0002)	0.0303 (0.1343)
D(LnDODBT (-1))	0.1284 (0.1454)	0.0428* (0.0509)
D(LnDODBT (-2))	-0.1471** (0.0482)	0.0538** (0.0236)

D(LnDODBT (-3))	-0.2490*** (0.0022)	
D(LnEXDBT)	-0.0077 (0.9167)	-0.0719*** (0.0013)
D(LnEXDBT (-1))		-0.0005 (0.9769)
D(LnEXDBT (-2))		-0.0835*** (0.0047)
D(LnEXDBT (-3))		-0.0398** (0.0396)
D(LnLEINT)	0.1113*** (0.0002)	-0.0551* (0.0414)
D(LnLEINT (-1))		-0.0568** (0.0351)
D(LnLEINT (-2))		-0.0831*** (0.0050)
D(LnLEINT (-3))		-0.0659*** (0.0097)
D(LnEXCR)	-0.1742 (0.1171)	0.03369** (0.0132)
D(LnEXCR (-1))	-0.2887*** (0.0047)	-0.0599*** (0.0002)
D(LnEXCR (-2))		-0.0336** (0.0489)
D(LnEXCR (-3))		-0.0349* (0.0832)
ECT (-1)	-0.4304*** (0.0000)	-1.0467*** (0.0000)
R- squared	0.8946	0.8597
Adjusted R- squared	0.8482	0.7111

*Note: '\*\*\*', '\*\*' and '\*' represent 1%, 5% and 10% level of significance respectively.*

*Probability values are in parenthesis*

**Source: Authors' Computation using EViews 10**

According to the short-run estimation results of ARDL model in table 04, the domestic debt has a significant negative impact on domestic investment, confirming the presence of a crowding out effect of domestic debt in short-run as well in Sri Lanka. Further, it was found that the external debt has a negative impact on domestic investment in short-run as well, but the impact is not statistically significant.

According to the short-run estimation results, domestic debt has a direct effect on FDI in Sri Lanka but, this effect worsens in the long-run. This is due to the fact that when the government borrows, it spends on public projects that can stimulate effective demand while also attracting and enhancing

Foreign Direct Investment inflows to the host country. However, in the long-run, higher debt service payments impede flowing resources towards economic development and limit the space available for capital expenditure which could discourage FDI inflows. This is related to the findings of Oche et al. 2016. through External debt do not have any significant impact on FDI inflows in the long-run, it has a significant negative impact on FDI in the short-run, implying the presence of a crowding out effect of external debt on FDI inflows.

Further, the lending interest rate depicts significant direct relationship with domestic investment in short-run, implying that the lending interest rate does not harm private and public domestic investments in short-run period. However, it is negatively related to FDI inflows in short-run, implying that an increase in the rate of lending interest rate lowers the expectation of foreign investors and reduce the flow of FDI.

Short-run estimation results further revealed that the exchange rate is inversely related to both domestic and foreign direct investments, implying that the depreciation of exchange rate decreases both the domestic investment and foreign direct investment inflows of Sri Lanka in short-run. This is because that the depreciation of exchange rate eventually increases the cost of imported intermediate goods and the user cost of capital in short run as our country's export sector is highly depended on imported raw materials and intermediate goods.

According to the table 4, the error correction term (ECT (-1)) follows a priori expectation as it both negative and statistically significant for all two investment models. This is further evidence of co-integration relationships among the variables in these models. For the domestic investment model, speed of adjustment value (error correction term coefficient) of -0.4304 implies that a shock in domestic investment (DOINV) in the current period will be restored at speed of about 43.04 percent in the next period. This implies that it will take the Sri Lankan government more than two years to completely recover from the DOINV shock in the current period. This is related to the study of Ogunjimi, 2019. Similarly, in the FDI model, the error correction term (ECT) coefficient of -1.0467 shows that a shock in FDI in the current period will be restored at an adjustment speed of 104.67% or less than a year. To put it differently, it will take less than one year for disequilibrium in FDI to coverage to long-run.

In addition, adjusted R- squared value in domestic investment model implies that the explanatory variables (DODBT, EXDBT, LEINT, EXCHR) explain DOINV by about 84.82%. Similarly, in FDI model, the adjusted R-squared value implies that the explanatory variables (DODBT, EXDBT, LEINT, EXCHR) explain the depended variable FDI by 71.11%.

Table 5 also presents the post-estimation diagnostic tests, the purpose of which is to ensure that the estimated equations do not violate the Classical Linear Regression Model (CLRM) assumptions of no serial correlation, normal distribution, homoscedasticity, and correct specification, among others. The

post estimation test results indicate that cointegration approach to ARDL bounds test models pass all the diagnostic tests. The results show that these two investment models are normally distributed, correctly specified and avoid of serial correlation and heteroscedasticity.

Table 5: Results of Post estimation Diagnostic tests

Type of Diagnostic Tests	Domestic Investment Model	Foreign Direct Investment Model
Normality Test	0.6993 (0.7049)	0.2654 (0.8757)
Breusch-Godfrey Serial Correlation LM Test:	0.3384 (0.7174)	0.6224 (0.1214)
Heteroskedasticity Test: Breusch-Pagan-Godfrey	1.5542 (0.1740)	1.0542 (0.4802)
Ramsey RESET Test of misspecification of variables	1.1154 (0.3042)	0.6698 (0.4305)

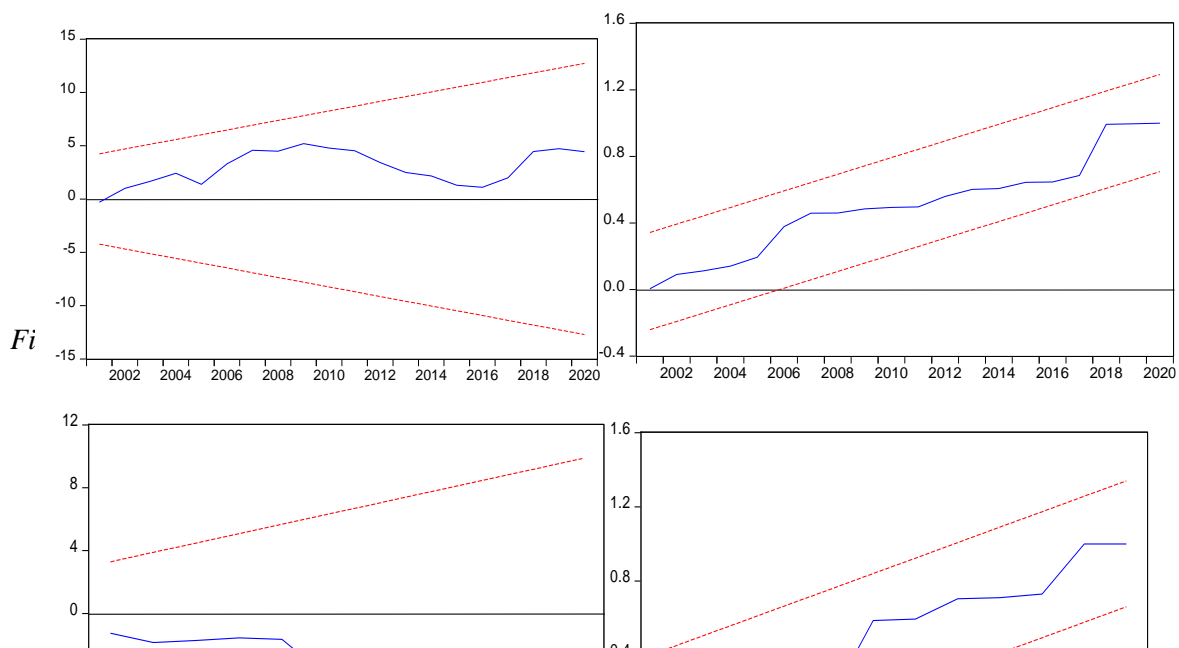
Note: '\*\*\*', '\*\*' and '\*' represent 1%, 5% and 10% level of significance respectively.

Probability values are in parenthesis

Source: Authors' Computation using EViews 10

In addition, Figure 3 and 4 reveal that the plots of the CUSUM and CUSUMSQ statistics of the two estimated models stay within the critical bounds of 5 percent level of significance. These tests indicate no evidence of any significant structural instability over the studied time period. They confirm that these two models pass the stability test and are adjudged stable. Hence, the results of this study qualify to be useful for policy formulation and prescriptions.

Figure 3: DOINV Model Plot of CUSUM and CUSUMSQ of Recursive Residuals



**Source: Authors' Computation using EViews 10**

## **CONCLUSION AND RECOMMENDATION**

This study was conducted to identify the presence of crowding-out or crowding-in effect of public debts (domestic and external debt) on various forms of investment (domestic investment and foreign direct investment) in Sri Lanka for the period between 1980 to 2020. Both ADF and PP unit root tests were conducted to identify the stationary properties of the time series variables and the results revealed that all the variables were I(1), with the exception of the lending interest rate (LnLEINT), which was only I(0). Thus, the ARDL bounds test approach has been employed which confirmed the existence of a long-run cointegrating relationship among the variables in the domestic investment and FDI models.

The ARDL long-run and short-run estimation results reveal the evidence for the presence of crowding out effect of both domestic and external debt on domestic investment in Sri Lanka both in the short-run and long-run. It was also found that domestic debt crowds out FDI inflows in long-run, but it crowds-in the flow of FDI in the short-run. Furthermore, external debt has a significant inverse relationship with FDI inflows in the short-run, as expected, but it does not influence FDI in long-run.

Moreover, lending interest rate (LEINT) shows the significant inverse relation with domestic investment in long-run, implying that higher the rate of LEINT lowers private and public investment. However, the impact of lending interest rate turns out to be positive and significant in short-run, implying that the lending interest rate below a particular threshold level, does not harm private and public domestic investments in short-run. For the case of FDI, the lending interest rate does not have any significant impact on FDI inflows in long run. However, it has a significant negative impact on FDI in Short-run, implying an increase in the rate of lending interest rate lowers the expectation of foreign investors and crowd out the flow of FDI to Sri Lanka. Further the exchange inversely related to domestic and foreign direct investment in short-run, implying that the depreciation in exchange rate crowds out the volume of domestic and foreign investments of Sri Lanka. However, in the long-run,



the depreciation of exchange rate stimulates both domestic and foreign direct investments in Sri Lanka, by enhancing demands in both the domestic and export markets.

Thus, the overall findings of this study revealed that the higher public debt profile in Sri Lanka adversely affect the domestic investment and FDI inflows. The results further concluded that the impact of domestic debt on various forms of investment in Sri Lanka is greater than external debts. Based on these empirical findings, this study recommends that policymakers develop and implement appropriate policies to ensure that public debts are effectively used for the purpose for which they were borrowed, as well as make concerted efforts towards effectively manage debt levels in order to increase the volume of investment in the country and achieve the desired level of economic growth.

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