

THE IMPACT OF PUBLIC DEBT ON DOMESTIC AND FOREIGN DIRECT INVESTMENTS IN DEVELOPING MARKET: AN ARDL BOUNDS TESTING APPROACH

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Abstract

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This research investigates the effect of the components of state government debts (domestic and external debts) on the various forms of investment (domestic investment and foreign direct investment — FDI) in Sri Lanka both in the short and long terms applying the ARDL bounds testing approach over the period, 1980–2020. The previous research has revealed that higher internal and external government borrowing lowers domestic investments in both the short and long terms, confirming the crowding-out effect of public debt on the volume of domestic investment of our country. The research discovered that internal debt accumulates FDI inflows in the short term, but it crowds out FDI when considering the long term. In contrast, foreign debt has a substantial inverse connection with FDI inflows in the short term, as expected, but it does not influence FDI in the long run. The findings also showed that higher lending rates of interest share a considerably inverted connection with domestic investments, but it does not have any impact on the long-term FDIs. However, in the short term, an increase in the rate of lending interest rate decreases the prospect of external financiers and crowds out the course of FDI in Sri Lanka. Further, the depreciation of the exchange rate decreases both domestic investment and the flow of FDI in the short-run, but it encourages both types of investments in the long run.

Keywords: Domestic Debt, External Debt, Domestic Investment, Foreign Direct Investment, Sri Lanka

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1. INTRODUCTION

The primary objective of each economy is to accomplish macroeconomic targets such as high and sustainable economic growth, full employment level, price stability, a 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 state spending and revenue to monitor and influence the economy through reducing unemployment rates, stabilizing business cycles, controlling inflation and interest rates (Kalugalla, Jayasundara, & Chandrarathne, 2020). When government expenditure exceeds its revenue from tax and non-tax sources, it is said to be a fiscal deficit (a budget deficit). In a situation

where government experiences a fiscal deficit, it can be financed by issuing currencies, curtailing foreign exchange reserves, applying for loans from foreign sources as well as local sources (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 (Mohanty & Panda, 2020). Printing money causes inflation by increasing the money supply and may incur negative effects to the economy in the long term. Moreover, increasing levies to unendurable levels or diminishing the principal expenses in order to reduce the budget deficits are major threats to the natural growth and development of the country (Fonseka & Ranasinghe, 2007). Even though these arguments suggested debt as a better financing option, excessive government borrowings over the capacity of the country cause 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.

State borrowings have been criticized by many sectors levelling warnings about the possibility of getting ensnared in an ugly debt cycle endangering the country's developmental trend but borrowing funds do not always have a negative impact on the economy if they are used effectively and constructively (Onafowora & Owoye, 2019). For instance, government borrowings to service debt payments, for current consumption or 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, in the long run, result in the development of the economy. 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 the majority of the residents are trapped in poverty (Ogunjimi, 2019).

In Sri Lankan history, since the 1940s the government started to adopt the deficit financing policy in which the government expenditure exceeded the government revenue. The 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 insufficient to satisfy the recurrent expenditure of the Sri Lankan economy which leads to an excessive budget deficit and higher debt profile. It directly affects resource allocation and macroeconomic activities.

Domestic public debt is one of the important sources for providing finance for the budget deficit (Fonchamnyo, Dinga, & Ngum, 2021). When government borrowings from domestic banking sources increase, it raises the demand for the loanable funds and may affect interest rates to rise up. At a higher interest rate, the usable cost of the private rises, making it more difficult for the private sector to access loanable funds.

As a result of this fiscal deficit, national savings will drastically reduce and thus the domestic investment. This is called 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.

A widely used indicator of public debt level is debt as a proportion of the GDP. When considering the Sri Lankan situation, the public debt that has been amassed during the past years has extended to a considerably higher proportion. Since 1950 to 2019, state debt in relation to the GDP showed an average of 70.18%. Considering the previous decades, the Sri Lankan experience shows an upward movement in both external and internal borrowings. Prior to the beginning of the 1960s, the portion of external debt in relation to the overall debt was rather minimal, and the public debt comprised mainly of domestic components. After the economic liberalization in 1977, a quick escalation in external debt could be seen compared to internal debt, which doubled the existent burden. Consequently, the total unpaid public debt grew dramatically from Rs 24,985 million in 1977 to Rs 924,699 million in 1998 presenting annual increase of 12%. The public debt/GDP ratio was 68.6% in 1977 and it had risen to an unprecedented height of 108.7% of GDP in 1989 and recorded 101% of GDP in 2020 (Central Bank of Sri Lanka [CBSL], 2020). The total debt to GDP ratio exceeded 100% from 2001 to 2004 and again in 2020 (see Appendix, Figure A.1). According to the study of Kumara and Cooray (2013), the maximum limit for public debt is 59.42% of GDP in Sri Lanka and once that limit is surpassed, it can have a damaging effect on GDP per capita growth. Along with public debt, the 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 directly reducing overall investment and indirectly reducing private investment. The total investment in an economy is cumulatively the sum of both domestic and foreign investible capital. Domestic investment, which can be disaggregated into private and public investments, is a vital component of total investment. Foreign direct investment (foreign investable capital) is the other side of the divide as it constitutes the volume of investment by foreign investors. It has been noticed that there was a significant fluctuation in the volume of both domestic and foreign investments in Sri Lanka for the period between 1980 and 2020 (see Appendix, Figure A.2). It also shows the volume of domestic investment exceeds FDI almost throughout the period under review. This indicates that domestic investment takes the lion's share in total investment in the economy and that 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 the country's economic growth and development process (Suresh & Suresh, 2011). According to the study of Egbetunde (2012), a higher debt profile lowers economic growth partly by lowering investment and increasing poverty. Thus, the objective of this research is to identify

the presence of crowding-in or crowding-out effect of public debt on domestic and foreign direct investments (FDIs) and identify the relative impact of both domestic and external government borrowings on the various forms of investment in Sri Lanka for the period between 1980 and 2020.

The rest of this paper is structured as follows. Section 2 enunciated theoretical contextual and the reviewing of the related literature. Section 3 analyses the methods that have been employed to perform the empirical research. Section 4 encompassed with empirical findings and discussion, and eventually Section 5 concludes the study and makes evidence-based policy recommendations.

2. LITERATURE REVIEW

2.1. Theoretical background of the research

Theoretically, different schools of economists have different thoughts regarding the link between public debt on investment. According to the crowding-out hypothesis of neo-classical economists, a higher budget deficit raises interest rates for government borrowing in the domestic financial market. Thus, budget deficit crowds-out non-state investment as the non-state sector will borrow lesser amounts at a higher interest rate. In contrast, the Ricardian equivalence theory argued that when the government borrows money, there is no crowding out of the private investment as individuals will then decrease the amounts they consume and will intensify savings to cover up the rise in the impending taxation charges. Because of the multiplier effect, Keynesian economists claim that public investment through government expenditure crowds in private investment. On the other hand, conservative economists reason out that increased state expenditure cannot possibly boost all the activities of the economy (Thilanka & Ranjith, 2018). Hence, it is apparent that the impact of state debt on the investments of a country is nonetheless ambiguous.

2.2. Empirical review on public debt and domestic investment

According to the substantial empirical literature, researchers have had different perspectives regarding the effect of state debt on investments. For instance, Ogunjimi (2019) conducted a study to investigate the impact of state debt on various forms of investment in Nigeria in the short and long terms for the period between 1981 and 2016. This study disaggregated state debt into internal and foreign debt and tries to examine the impact of state debt on various forms of investments such as public 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 FDI. The findings revealed that domestic debt attracts both private and public investment in the short and long terms. On the other hand, external debt attracts private investment but resists public investment in the short and long terms.

Similarly, Akomolafe, Bosede, Emmanuel, and Mark (2015) investigate the impact of public debt on gross domestic investment in Nigeria between 1980 and 2010, using the Johansen cointegration technique and vector error correction model (VECM). The research disaggregated state debt into internal and foreign debt. The results indicate that internal debt is negatively related to domestic investment in the short and long run, implying that domestic debt crowds out investments. However, the findings show that foreign debt attracts domestic investment in the long run while crowding it out in the short run. King'wara (2014) also investigated the effects of domestic public debt on private investments in Kenya for 1967-2007. Johansen cointegration method had been used to detect the prevalence of the long-term cointegrating connection between the variables private investment, real GDP growth rate, real interest rate, domestic debt, and investment. The results showed that a higher level of internal public debt has had a crowding-out impact on the non-state investments in Kenya.

Similarly, Lidiema (2018) also examined the effect 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 autoregressive distributed lag (ARDL) technique was employed to determine the variables' long-run and short-run cointegration relationships. According to the ARDL results, there is a substantial negative connection between internal debt and gross fixed domestic capital formation in the short run, implying that a rise in internal debt crowds out gross fixed capital formation in Kenya. However, in the long run, there is an inconsequential negative long-term connection between domestic debt and gross fixed domestic capital formation. However, the effect of external debt on investment is definite and inconsequential in the long term yet negative and substantial in the short term.

In contrast, Apere (2014) examined the impact 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 that the relationship between external debt and private investment in Nigeria is negative up to a threshold level 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 the effect of state debt on private investment in the Bangladesh economy.

2.3. Empirical review on public debt and foreign direct investment

Moreover, in South Africa for the period of 1983 to 2013, Oche, Mah, and Mongale (2016) were conducting experimental investigation on the impact of state debt on FDI using the VECM. The long-run results indicate that the relationship between public

debt and FDI is positive and statistically significant. Similarly, there is a positive and significant relationship between interest rate and FDI in South Africa. However, the study found an insignificant negative relationship between exchange rate and FDI. In contrast, for the period between 1981 and 2016, Ogunjimi (2019) found that both domestic and external debts do not have a considerable effect on the FDI both in the short and long terms in Nigeria.

Using structural vector autoregressive framework (SVAR), Senibi, Oduntan, Ayo, Makwal, and Eldad (2017) surveyed the reaction of the internal investments and FDI to the shocks from state debt between 1981 and 2015. The findings revealed that high foreign public debt and domestic public debt crowded out domestic investment. Nonetheless, FDI did not show any substantial reaction to the shocks from state debt as high indebted profile countries tend to decrease the FDI influses. In addition, depreciation of the exchange rate decreases the domestic investment, but it supports the influx of FDIs to the host country. Moreover, the lending interest rate negatively related to FDI inflows, implying an incline in the rate of interest rate together with the high inflation in Nigeria, downgrades the expectation of foreign investors and reduces the flow of FDI.

Nunnenkamp, Semple, and Semple (1991) researched developing countries' appeal for FDIs concentrating on debt overhang and sovereign risk as being the foremost impediments to the influx of FDI. This study used regression analysis for 35 host developing countries and various subgroups. The research declared that a higher debt burden generates restraints on new private lending as well as in terms of FDI influses, but the empirical findings revealed that the effect of public debt on FDI in Germany was not as anticipated since it is not too strong. Similarly, Azam and Khan (2011) examined the effect of state debt on FDI in Pakistan using the time series data from the period 1981 to 2007. OLS analyzing technique is employed to examine the effect of state debt on FDI. The findings of the research revealed that state debt was statistically significant indicating that state debt has a negative impact on the influx 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 the 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) re-examined 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 the crowding-in effect of public debt on private investment in the long run. Moreover, Kalugalla et al. (2020) conducted a study to identify the presence of the 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 concluded the absence of the crowding-out effect in Sri Lanka.

Hence, it is clear that the effect of public debt on the investment of a country is still ambiguous and debatable. Moreover, from the few studies that examined the effect of public debt on investments in Sri Lanka, the whole components of investment (private, public investments, and FDI) and public debts were not used to investigate which might not give a true picture of the link between public debts and the volume of investment in Sri Lanka. For instance, in the studies by Thilanka and Ranjith (2017) and Kalugalla et al. (2020), they analyzed the relationship between public debt and private investment in Sri Lanka but did not consider the influence on public investment and FDI inflows. In order to fill this research gap, the current study tries to identify the presence of the crowding-in or crowding-out effect of domestic and external public debt on domestic and FDIs in Sri Lanka.

3. RESEARCH METHODOLOGY

3.1. Research data and model specification

For the period between 1980 and 2020, this research examined the impact domestic and external public debts on the volume of investment (domestic and foreign direct investment — FDI) in Sri Lanka. The justification for selecting data from 1980 is that during the post-liberalization period, both domestic and external debt started to increase enormously and caused unfavorable effects on the economy (Thilanka & Ranjith, 2017). Furthermore, the time series data used in this study for the above-mentioned period were derived from the Central Bank of Sri Lanka's (CBSL) annual reports and the World Bank Database's Development Indicators. This study tried to investigate the impact of public debt on various forms of investment such as domestic investment and 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 Azam 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:

$$DOINV = f(DODBT, EXDBT, LEINT, EXCHR) \quad (1)$$

$$FDI = f(DODBT, EXDBT, LEINT, EXCHR) \quad (2)$$

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:

$$\text{LnDOINV}_t = \beta_0 + \beta_1 \text{LnDODBT}_t + \beta_2 \text{LnEXDBT}_t + \beta_3 \text{LnLEINT}_t + \beta_4 \text{LnEXCHR}_t + \varepsilon_t \quad (3)$$

$$\text{LnFDI}_t = \beta_0 + \beta_1 \text{LnDODBT}_t + \beta_2 \text{LnEXDBT}_t + \beta_3 \text{LnLEINT}_t + \beta_4 \text{LnEXCHR}_t + \varepsilon_t \quad (4)$$

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\$), ε 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* (β_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 β_3 is expected to be negative. Further, the coefficient of *EXCHR* (β_4) can be either positive or negative. This is because 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 $\beta_1, \beta_2 < 0$).

3.2. Data analysis method

Since most time series variables have spurious regression problems, it is necessary to check the stationary qualities 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 to identify the order of integration of the variables.

The Engle-Granger method and Johansen method require that all of the variables in equation (3) and equation (4) be integrated in the same order and the error term should be integrated in order zero to form the long-run relationship. However, if variables in equation (3) and equation (4) have a different order, that is $I(1)$ and $I(0)$, we can use a new cointegration method which was developed by Pesaran, Shin, and Smith (2001). This procedure, also known as the autoregressive distributed lag (ARDL) approach to cointegration was employed to investigate the existence of a long-run cointegration relationship among variables in the study.

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

$$\begin{aligned} \Delta \text{LnDOINV}_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \text{LnDOINV}_{t-i} + \sum_{i=0}^{q_1} \alpha_2 \Delta \text{LnDODBT}_{t-i} + \sum_{i=0}^{q_2} \alpha_3 \Delta \text{LnEXDBT}_{t-i} + \sum_{i=0}^{q_3} \alpha_4 \Delta \text{LnLEINT}_{t-i} + \\ & + \sum_{i=0}^{q_4} \alpha_5 \Delta \text{LnEXCHR}_{t-i} + \delta_1 \text{LnDOINV}_{t-1} + \delta_2 \text{LnDODBT}_{t-1} + \delta_3 \text{LnEXDBT}_{t-1} + \delta_4 \text{LnLEINT}_{t-1} + \\ & + \delta_5 \text{LnEXCHR}_{t-1} + u_t \end{aligned} \quad (5)$$

$$\begin{aligned} \Delta \text{LnFDI}_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \text{LnFDI}_{t-i} + \sum_{i=0}^{q_1} \alpha_2 \Delta \text{LnDODBT}_{t-i} + \sum_{i=0}^{q_2} \alpha_3 \Delta \text{LnEXDBT}_{t-i} + \sum_{i=0}^{q_3} \alpha_4 \Delta \text{LnLEINT}_{t-i} + \\ & + \sum_{i=0}^{q_4} \alpha_5 \Delta \text{LnEXCHR}_{t-i} + \delta_1 \text{LnFDI}_{t-1} + \delta_2 \text{LnDODBT}_{t-1} + \delta_3 \text{LnEXDBT}_{t-1} + \delta_4 \text{LnLEINT}_{t-1} + \\ & + \delta_5 \text{LnEXCHR}_{t-1} + u_t \end{aligned} \quad (6)$$

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, the appropriate lag order of each series of the ARDL model is determined using the Akaike information criterion (AIC).

To investigate the existence of long-run relationships between the variables, the bounds testing procedure is used, which is based on the F-test. An F-test is actually a test of the null

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 ($H1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$). After detecting the existence of the long-run 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) and equation (6) can be further transformed as in equation (7) and equation (8), respectively to accommodate the error correction term with one period lagged (ECT_{t-1}):

$$\begin{aligned} \Delta \text{LnDOINV}_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \text{LnDOINV}_{t-i} + \sum_{i=0}^{q_1} \alpha_2 \Delta \text{LnDODBT}_{t-i} + \sum_{i=0}^{q_2} \alpha_3 \Delta \text{LnEXDBT}_{t-i} + \sum_{i=0}^{q_3} \alpha_4 \Delta \text{LnLEINT}_{t-i} + \\ & + \sum_{i=0}^{q_4} \alpha_5 \Delta \text{LnEXCHR}_{t-i} + \phi ECT_{t-1} + \mu_t \end{aligned} \quad (7)$$

$$\begin{aligned} \Delta \text{LnFDI}_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \text{LnFDI}_{t-i} + \sum_{i=0}^{q_1} \alpha_2 \Delta \text{LnDODBT}_{t-i} + \sum_{i=0}^{q_2} \alpha_3 \Delta \text{LnEXDBT}_{t-i} + \sum_{i=0}^{q_3} \alpha_4 \Delta \text{LnLEINT}_{t-i} + \\ & + \sum_{i=0}^{q_4} \alpha_5 \Delta \text{LnEXCHR}_{t-i} + \phi ECT_{t-1} + \mu_t \end{aligned} \quad (8)$$

where, ϕ is the speed of adjustment parameter which should have statistically significant and negative sign to support the cointegration between the variables and μ_t is the pure random error term.

Then, besides the ARDL bounds test, the post estimation diagnostics are generated to establish how the investment Model 3 and Model 4 fit the data.

4. RESULTS AND DISCUSSION

4.1. Unit root test results

The ADF and PP unit root test results in Table 1, confirm that the dependent variable in the two investment models is I(1) and the independent variables are a mixture of I(0) and I(1). It also noteworthy that none of the variables are I(2) or

higher order. Thus, the ARDL approach is more suitable than other approaches for examining relationships between the variables.

For the analysis of the domestic investment (DOINV) model and the foreign direct investment (FDI) model, the Akaike information criterion (AIC) recommended using the ARDL (4, 4, 1, 1, 2) and ARDL (4, 3, 4, 4, 4) models, 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	
LnDOINV	0.074	-4.704***	0.098	-4.460***	I(1)
LnFDI	-1.263	-6.899***	-0.882	-9.061***	I(1)
LnDODBT	-1.743	-4.858***	-1.743	-4.616***	I(1)
LnEXDBT	-1.528	-6.077***	-1.714	-6.152***	I(1)
LnLEINT	-5.148***	-	-4.703***	-	I(0)
LnEXCHR	-2.157	-7.064***	-2.480	-7.024***	I(1)

Notes: ***, **, and * represent 1%, 5%, and 10% level of significance, respectively. Source: Authors' calculation.

4.2. ARDL bounds test

Table 2 shows the results of the ARDL bounds test, which show that the variables in the two investment models have a long-term relationship. Accordingly, the estimated F-statistic value of 19.83 for the domestic investment model is more than the upper bound critical value (at 1%, 5%, and 10% level of significance). Thus, the null hypothesis of no cointegration is rejected, indicating there exists a stable long-run cointegrating relationship between domestic investment, domestic debt, external debt,

exchange rate, and lending interest rate in the domestic investment model.

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

Table 2. Result of ARDL bounds test

Level of significance	LnDOINV = F(LnDODBT, LnFODBT, LnLEINT, LnEXCHR)			LnFDI = F(LnDODBT, LnFODBT, LnLEINT, LnEXCHR)		
	Critical value		F-statistic	Critical value		F-statistic
	Upper bound	Lower bound		Upper bound	Lower bound	
1% level of significance	4.37	3.29	19.83***	4.37	3.29	4.94***
5% level of significance	3.49	2.56		3.49	2.56	
10% level of significance	3.09	2.2		3.09	2.2	

Notes: ***, **, and * represent 1%, 5%, and 10% level of significance, respectively. The AIC selected the optimal lag length (k = 4). Source: Authors' computation using EViews 10.

4.3. Results of long-run and short-run ARDL estimated models

After determining the cointegration condition of two of the study's models, it is time to estimate the long-run and short-run ARDL models, the results of which are shown in Table 3 and Table 4, respectively.

Table 3. The long-run estimation results

Variables	DOINV model	FDI model
LnDODBT	-1.0589*** (0.0000)	-0.0147* (0.0699)
LnEXDBT	-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)

Notes: ***, **, 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 a 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 and external debt depicts, when domestic debt rises by 1% of GDP, domestic investment falls by 1.0589% of GDP, and when external debt rises by 1% of GDP, domestic investment falls by 0.4097% of GDP. Based on the study objective, it is obvious that in the long run, Sri Lanka's state debt, comprising both domestic and external debts, crowds out the volume of domestic investment. This is consistent with the findings of Kamundia, Gitahi, and Mwilaria (2015), Akomolafe et al. (2015), Olweny and Chiluwe (2012). 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 a higher domestic debt profile discourages foreign

investors and crowds out FDI inflows. This is related to the finding of Senibi et al. (2017), Nunnenkamp et al. (1991), Azam and Khan (2011). In the long run, however, an insignificant negative relationship between external debt and FDI inflows, as nations with high debt profiles tend to minimize FDI inflows.

Further, there is a significant negative long-run relationship between lending interest rate and domestic investment in Sri Lanka, at a 5% level of significance. The negative estimated coefficient of this variable *LEINT* implies that the higher lending interest rate increases the cost of capital and subsequently reduces the volume of domestic investment in the long run. However, FDI shows no

substantial reaction to lending interest rates in the long run.

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

Table 4. Findings of the ARDL short-run model (ECM of ARDL)

Variables	DOINV model (ARDL (4, 4, 1, 1, 2) model)	FDI model (ARDL (4, 3, 4, 4, 4) model)
<i>D(LnDOINV(-1))</i>	-0.0186 (0.8162)	
<i>D(LnDOINV(-2))</i>	-0.095153 (0.2793)	
<i>D(LnDOINV(-3))</i>	-0.235505 (0.0079)	
<i>D(LnFDI(-1))</i>		1.2947*** (0.0003)
<i>D(LnFDI(-2))</i>		0.4030** (0.0463)
<i>D(LnFDI(-3))</i>		0.4058* (0.0654)
<i>D(LnDODBT)</i>	-0.2813*** (0.0002)	0.0303 (0.1343)
<i>D(LnDODBT(-1))</i>	0.1284 (0.1454)	0.0428* (0.0509)
<i>D(LnDODBT(-2))</i>	-0.1471** (0.0482)	0.0538** (0.0236)
<i>D(LnDODBT(-3))</i>	-0.2490*** (0.0022)	
<i>D(LnEXDBT)</i>	-0.0077 (0.9167)	-0.0719*** (0.0013)
<i>D(LnEXDBT(-1))</i>		-0.0005 (0.9769)
<i>D(LnEXDBT(-2))</i>		-0.0835*** (0.0047)
<i>D(LnEXDBT(-3))</i>		-0.0398** (0.0396)
<i>D(LnLEINT)</i>	0.1113*** (0.0002)	-0.0551* (0.0414)
<i>D(LnLEINT(-1))</i>		-0.0568** (0.0351)
<i>D(LnLEINT(-2))</i>		-0.0831*** (0.0050)
<i>D(LnLEINT(-3))</i>		-0.0659*** (0.0097)
<i>D(LnEXCHR)</i>	-0.1742 (0.1171)	0.03369** (0.0132)
<i>D(LnEXCHR(-1))</i>	-0.2887*** (0.0047)	-0.0599*** (0.0002)
<i>D(LnEXCHR(-2))</i>		-0.0336** (0.0489)
<i>D(LnEXCHR(-3))</i>		-0.0349* (0.0832)
<i>ECT(-1)</i>	-0.4304*** (0.0000)	-1.0467*** (0.0000)
R-squared	0.8946	0.8597
Adjusted R-squared	0.8482	0.7111

Notes: ***, **, 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 the ARDL model in Table 4, the variable domestic debt has a significant negative impact on domestic investment, confirming the presence of a crowding-out effect of domestic debt in the short-run as well in Sri Lanka. Further, it was found that the variable external debt has a negative impact on domestic investment in the short run as well, but the impact is not statistically significant.

In the FDI model, domestic debt has a direct effect on FDI in Sri Lanka in the short run 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 FDI 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). However, it is negatively related to FDI inflows in the short run, implying that an increase in the lending interest rate discourages the expectation of foreign investors and reduces the flow of FDI.

Further, the lending interest rate depicts a significant direct relationship with domestic

investment in the short run, implying that the lending interest rate does not harm private and public domestic investments in the short-run period. However, it is negatively related to FDI inflows in the short run, implying that an increase in the lending interest rate discourages the expectation of foreign investors and reduces 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 the exchange rate decreases both the domestic investment and foreign direct investment inflows of Sri Lanka in the short run. This is because the depreciation of the exchange rate eventually increases the cost of imported intermediate goods and the user cost of capital in the short run as our country's export sector is highly dependent on imported raw materials and intermediate goods.

According to Table 4, the error correction term (*ECT(-1)*) carries the expected negative sign and it is statistically significant for all two investment models. This is further evidence of cointegration relationships among the variables in these models. For the domestic investment model, the speed of adjustment value (error correction term coefficient) of -0.4304 indicates that a shock in domestic

investment (*DOINV*) in the present period will be restored at speed of about 43.04% in the following period. This means that in the current period, the Sri Lankan government will need more than two years to fully recover from the *DOINV* shock. This is connected to Ogunjimi's (2019) research. Similarly, the error correction term (ECT) coefficient of -1.0467 in the FDI model indicates that a shock in FDI in the current era will be recovered at a 104.67% adjustment speed or less than a year. To put it another way, it will take less than a year for FDI imbalance to be covered in the long run. In addition, adjusted R-squared value in the domestic investment model implies that the explanatory variables (*DODBT*, *EXDBT*, *LEINT*, *EXCHR*) explain *DOINV* by about 84.82%. Similarly, in the FDI model,

the adjusted R-squared value implies that the explanatory variables (*DODBT*, *EXDBT*, *LEINT*, *EXCHR*) explain the dependent variable FDI by 71.11%.

The post-estimation diagnostic tests use to confirm the assessed equations do not break the classical linear regression model (CLRM) assumptions of no serial correlation, normal distribution, homoscedasticity, and accurate specification, among others (Table 5). According to the post estimation test results of two investment models, the cointegration approach to ARDL bounds test models passes all the diagnostic tests, implying that residuals are normally distributed, correctly specified, and avoid serial correlation and heteroscedasticity.

Table 5. Results of the post-estimation diagnostic tests

Type of diagnostic tests	<i>DOINV</i> model	<i>FDI</i> 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)

Notes: ***, **, and * represent 1%, 5%, and 10% level of significance, respectively. Probability values are in parenthesis.
Source: Authors' computation using EViews 10.

The plots of the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) statistics of the two estimated models remain within the critical constraints of the 5% level of significance (see Appendix, Figure A.3 and Figure A.4). These tests reveal no evidence of severe structural instability within the time period under consideration. They affirm that these two models have passed the stability test and have been declared stable. Thus, the findings of this study are appropriate for policy formation and prescribing.

5. CONCLUSION

This research was conducted to identify the presence of crowding-out or crowding-in effect of public debts (domestic and external debt) on various forms of investments (domestic and foreign direct investment) in Sri Lanka for the years ranging from 1980 to 2020. Both ADF and PP unit root tests were conducted to test the stationarity of the time series variables and the results revealed that all the variables were I(1), except for the lending interest rate (*LnLEINT*), which was only I(0). Thus, the ARDL bounds testing approach was used in the study. The ARDL bounds F-test confirmed the presence of a long-term cointegrating connection between the variables in the domestic investments and FDI models.

The ARDL long-run and short-run estimation results reveal the evidence for the presence of crowding out the impact of both domestic and external debt on domestic investment in Sri Lanka in both the short run and long run. It was also found that domestic public debt crowds out FDI inflows in the long run, but it crowds in the flow of FDI in the short run. Moreover, external debt has a significant inverse connection with FDI inflows in the short term, as expected; however, it has no long-term effect on the FDIs.

Moreover, the lending interest rate (*LEINT*) shows a significant inverse relation with domestic investment in the long term, indicating that a higher rate of *LEINT* lowers private and public investment.

Nonetheless, the effect of lending interest rate resulted in being positive and significant in short term, indicating that the lending interest rate below a particular threshold level, does not harm private and public domestic investments in the short term. For the case of FDI, the lending interest rate did not show any substantial effect on FDI inflows in the long term. However, it has a significant negative effect on FDI in the short term, implying an increase in the rate of lending interest rate that decreases the expectancies of foreign investors and crowds out the flow of FDI to Sri Lanka. Further, the exchange rate is inversely related to domestic and foreign direct investment in the short run, implying that the depreciation in the exchange rate against the US dollar crowds out the volume of domestic and foreign investments of Sri Lanka. Yet, in the long term, the depreciation of the exchange rate stimulates both domestic and foreign direct investments in Sri Lanka, by improving the requirements of both the internal and export markets.

Thus, the overall findings of this study revealed that the higher public debt profile in Sri Lanka adversely affects the domestic investment and FDI inflows. The results further concluded that the effect of domestic debt on various forms of investments in Sri Lanka is greater than external debts. Based on these empirical results, this research suggests for the policymakers to develop and execute suitable policies to ensure that state debts are used efficiently for the reason for which they were borrowed, as well as make resolute attempts to efficiently manage debt levels in order to enhance the amount of investments in the country.

For instance, using public debt in vast infrastructures development projects such as road networks, highways, telecommunication, and electricity projects will encourage and motivate non-state investment and FDI inflows. Further, misappropriation and misuse of funds need to be thoroughly investigated, and state debts should be utilized in the best possible manner in order to boost investment and economic growth in Sri Lanka.

Policymakers must ensure that debt is committed for the purpose of stimulating the economy through investment in capital formation and other social overhead capital, rather than for political motives. Finally, the lending interest rate should be appropriately modified to encourage investment.

Further, the government should attempt to manage public debt in the most appropriate manner so that it can decrease the stress on interest rates. Moreover, steps ought to be implemented toward increasing the income through suitable tax policy amendments and the use of non-bank borrowings in the long term. The findings of this study are very vital importance in the current era. Since most developing countries have been experiencing a lack of export and financial problems in repaying their loans during the past two years due to the pandemic, this study sheds insight on how to manage public debt and future investment prospects.

Theoretically, this study contributed to a higher public debt profile that would adversely affect the domestic investment and FDI inflows. The findings of the paper expand the levels of significance of the combination of domestic and foreign investment on public debt. The results are significant for future research to expand and forecast the link between public debt and various forms of investment. Further, the research findings filled the research gap which considers the relative impact of both domestic and external debts on various forms of investments (both domestic and foreign investable capital) in Sri Lanka and reveals the true picture of the link between public debts and the whole components of investments (domestic and foreign investable capital). Future research may take into account variables such as political stability, domestic lending to the non-state sector, and real interest rates, as this investigation was performed based on the availability of data and time frame.

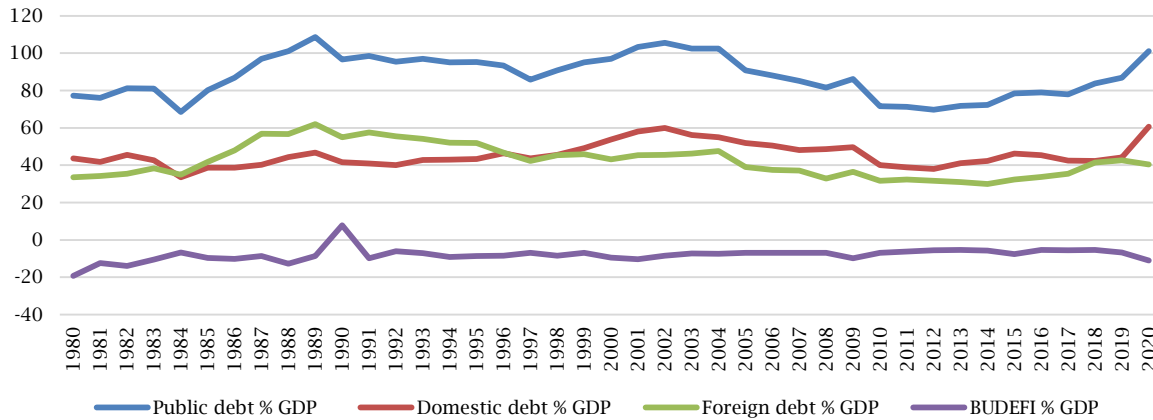
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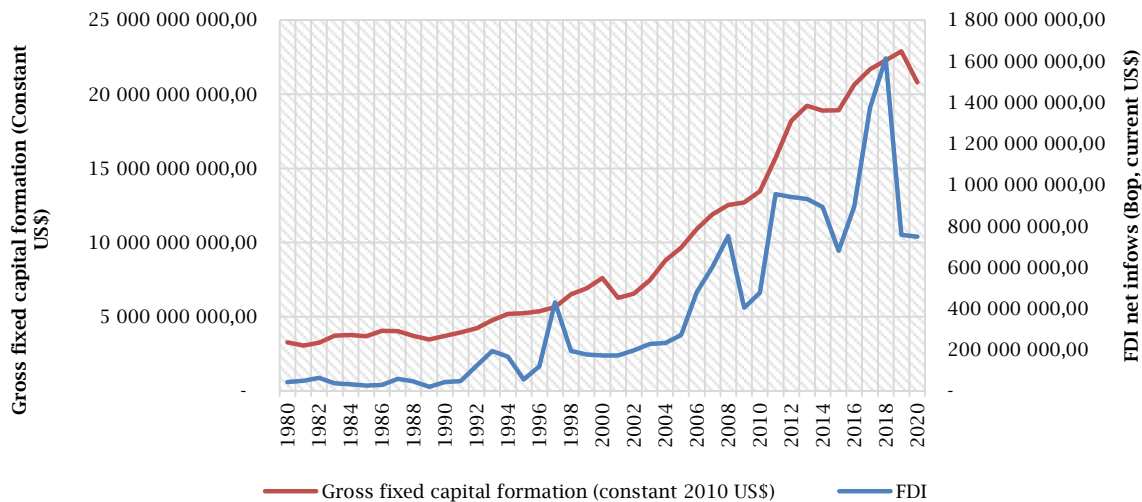
APPENDIX

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



Source: Authors' computation from CBSL (2020).

Figure A.2. Sri Lanka's investment profile (1980-2020)



Source: Authors' computation from CBSL (2020).

Figure A.3. Plot of CUSUM and CUSUMSQ for DOINV model

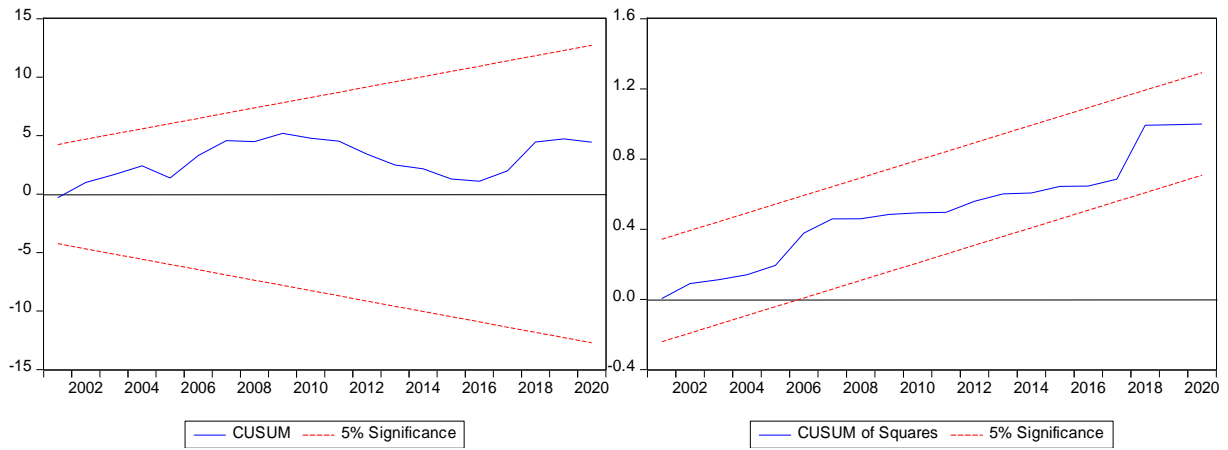
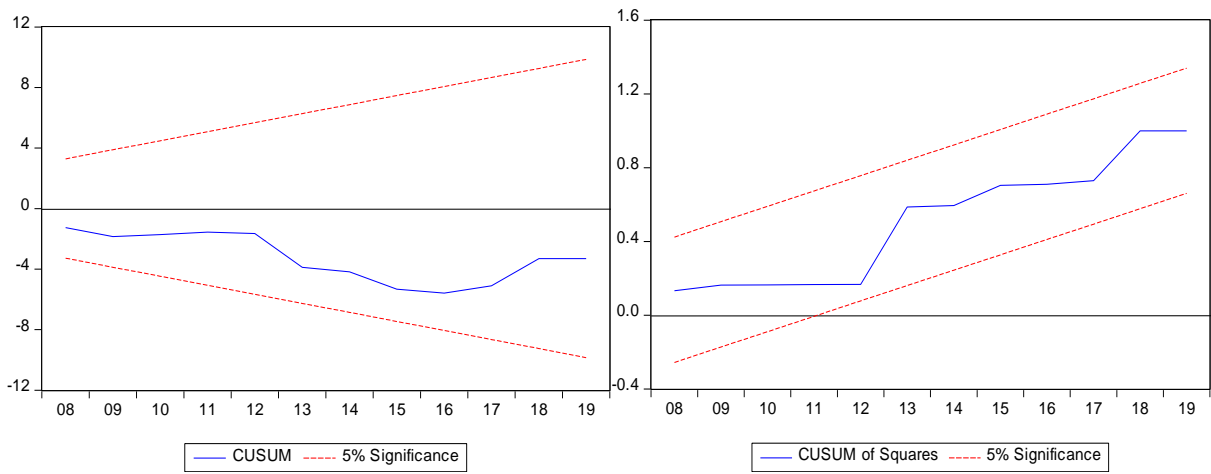


Figure A.4. Plot of CUSUM and CUSUMSQ for FDI model



Source: Authors' computation using Eviews 10.