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# External Debt Sustainability and Economic Growth in Sri Lanka

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## Abstract

Researchers have shown an increased interest in the nexus between economic growth and foreign borrowing. This study explores the effect of external debt sustainability on Sri Lanka's economic growth by applying a non-linear auto regressive distributed lag (NARDL) model, which allows us to decompose the effect of the debt variables into positive and negative effects, based on the annual data covering the period 1980 – 2021. The estimated NARDL model shows that external debt stock and foreign debt service payments had a robust short term and long-term effect on economic growth in Sri Lanka. The asymmetric cointegration results provide strong evidence for a long-run integration that exists between economic growth and external debt sustainability. The study discovered a strong and negative relationship between the decline in the external debt stock and economic growth, suggesting that lowering the stock of debt may boost economic growth. The study further discovered an asymmetric relationship between economic growth and debt service payments. Accordingly, an increase in debt service payments would lead to a decrease in growth, while a downward change in that would lead to an increase in growth. Concerning control variables, trade openness has a negative relationship with growth, whilst the real exchange rate indicates a positive nexus. The study also found that short-run findings are almost likely to be those in the long-run. In light of these findings, the low level of economic wellbeing in Sri Lanka can be attributed to debt overhang and the crowding out effect which discourages investment. As per the results, the real exchange rate is positive and not a significant determinant of trade balance in the short run, indicating the J-curve effect as not being valid for the case of Sri Lanka. In this context, a proper debt management mechanism should be implemented to maintain a sustainable external debt level in Sri Lanka.

**Keywords:** Asymmetric Cointegration, Debt Sustainability, Economic Growth, NARDL Model

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## INTRODUCTION

Investigating the relationship between external debt and economic growth has received considerable attention among academics and policy makers who influence the trajectory of the whole performance of the economy. Developing countries in particular rely highly on the option of foreign borrowings because of the difficulties they are facing in striving for economic growth and development (Toktaş et al., 2019). Along with the accumulation of new foreign debt however, there is increasing concern over reliance on more costly commercial borrowing in developing countries (Prizzon, and Mustapha, 2014; Salaiman, 2014). It is generally agreed that developing countries cannot develop without foreign borrowings to finance the capital deepening and technological gain (Imbs and Ranciere, 2005). However, a high level of external debt can generate deleterious effects on economic growth. The escalating fiscal deficits of developing countries have become a central issue for achieving sustainable economic growth. Evidently, increased fiscal deficits have forced to more reliance on external borrowings in developing countries (Shabbir, 2013). Recently research has shown an increasing interest in the impact of both higher levels of foreign debt and debt servicing costs on domestic capital formation and economic growth. External debt accumulation and debt servicing increase the issue of debt sustainability (Nega, 2021).

It is believed that reasonable levels of external debt of developing countries have a favourable impact on growth rates because of their limited capital stocks. However, a rise in debt can have a detrimental impact on economic growth by crowding out both domestic and foreign investments. As the debt stock rises investors anticipate that the government is likely to raise taxes to service its debt obligations. This decreases investment, resulting in negative impact on economic growth. Diamond (1965) demonstrates that variation in future tax payments for financing debt servicing can negatively impact on investor's decisions and economic growth. The debt overhang theory provides an explanation for the detrimental impact of high levels of external debt on economic growth. The debt "Laffer curve" illustrates this argument by presuming that higher debt stock levels are often correlated with decreased probabilities of debt repayment (Pattillo, C. et al., 2002). Borensztein (1990) holds the view that debt servicing obligations will yield a limited return on any incremental investment made in the debtor country. Moreover, increasing debt stock and debt servicing payments have an adverse impact on credit ratings. Sovereign ratings of the recipient country play a significant role in FDI inflows. More FDI is directed toward recipient nations with strong sovereign credit ratings (Cai, P., Q. Gan and S- J.

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Kim, 2018). Among the criteria for measuring creditworthiness, the capacity and willingness to service external debt appears to play a key role in the country's credit rating. In reality, the rise in the debt stock limits the government's ability to pay its external debt obligations, and lowers the economy's private fixed capital formation, which hampers economic expansion.

Krugman (1988) and Servan (2007) argue that high levels of public debt would increase resource misallocation, capital inefficiencies and economic uncertainty, leading to reduced economic growth. Highly indebted countries had to cut down on some of their social expenses in order to meet up with the challenges of servicing these debts. These countries were forced to devalue their currencies to direct the economies towards sustainable development. It is also accepted that external borrowing boosts investment and hence economic growth and development. Researchers do however feel that heavy foreign debt might have negative effects on economic growth by decreasing the amount of funds accessible to the private sector and raising the tax burden in the long-term.

In view of the Keynesian analysis, public debt does not hinder the income-generating potentialities and view the debt service cost as harmless to the economy (Buchanan, 1964). According to this ideology, governments should finance public investments that yield economic growth through public borrowing. The main Keynesian thought led to a considerable growth in public debt after the 1970s (Greiner, A. and Fincke, B., 2015). According to Ouedraogo (2015), the negative impact of debt on economic growth is failure to prudently deploy the borrowings to boost economic growth and hence debt repayment. It was assumed that, based on the Harrod – Domar model, external financial flows would expand investment directly to fast economic growth which can generate sufficient funds to repay these loans (Sprat, 2009). Some researchers claim that moderate levels of foreign borrowing would increase economic growth, primarily through boosting capital formation and increasing production (Wang, 2009; Hameed et al., 2008).

It is a widely held view that whatever of the perspectives favouring debt accumulation, it would inescapably create liability on the economy for repayment. The issue of debt sustainability has received considerable critical attention since the debt crisis of 1980. The 1980s came to be known as the "lost decade" in Latin America as some countries were suffering from economic stagnation and the "compression" of imports in many instances (Spratt, 2009). The most popular indicator for debt sustainability is solvency of the government. Accordingly, when the government is solvent, public debt is considered sustainable (Draksait et al. (2015). Foreign debt sustainability

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according to Akyüz (2007) is the likelihood that the government will be able to pay off its foreign debt in the future without having to make any changes to its balance of payments or restructure its borrowings. Sustainable debt has been defined by Drasait (2014) as the level of public debt which ensures meeting up with the government borrowing demand and which does not negatively influence the credibility of the government, and the capability to encounter long term debt obligations.

There is a concern that the level of external borrowing in Sri Lanka has risen to an unsustainable level. There was an unprecedented increase in Sri Lankan external borrowing from $ 16.4 billion in 2010 to $ 54.8 billion in 2019. The situation of debt sustainability began to get worse when commercial borrowing reached from $ 3 billion in 2010 to $17.5 billion in 2019 (Central Bank, 2020). It has been recorded that commercial borrowing has increased by 449% during this period. Given that, huge external debt raises the risks in debt sustainability in the economy. It is important, therefore, to examine the problem of foreign debt sustainability and its impact on economic growth in Sri Lanka and to offer policy implications.

In the present study, we explore the relationship between the foreign debt burden and economic growth in Sri Lanka between 1980 and 2021. It is noteworthy that the dramatic increase in foreign debt in Sri Lanka has not been accompanied by a substantial increase in economic growth. Along with this rising debt stock, there is increasing concern over high inflation, rising unemployment and increasing poverty in the recent past. This paper critically examines the impact of debt sustainability on economic growth in Sri Lanka using a nonlinear autoregressive distributed lag (NARD) model. Accordingly, the paper will review the effects of both foreign debt stock and debt service payments on economic growth.

The organization of the remaining sections of the paper is as follows. Section 2 of this study will review related empirical studies. Section 3 gives a brief overview of Sri Lankan foreign debt sustainability and economic growth. Section 4 explains the methods used in the study and the data sources. The results and discussion of the findings are contained in section 5 and conclusions and recommendations are presented in the final section.

## LITERATURE REVIEW

This section reviews the theoretical literature and empirical studies on external debt sustainability and economic growth. Most of what we know about the nexus between external debt service payments and economic growth is based on studies that have been published in the literature. Approaches adopted in much of the studies have been linear, by employing

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debt-growth nexus, and monotonic (Mathew and Abetayo, 2022; Akram, N. 2017; Ndubuisi, 2017). The correlation between foreign debt and economic growth, which has been the subject of empirical studies in developing countries, is typically inconclusive. Classical economists argue that public debt, in particular foreign debt accumulation may adversely affect economic growth. It crowds out economic growth by discouraging both domestic and foreign investors (Modigliani, 1961; Krugman, 1988). Fosu (1999) using data from 1980 – 1990 for 35 Sub Saharan African countries based on the augmented production function framework notes that, a country which is suffering from a huge debt service issue is plausible to have a low productive mix resulting from the lack of foreign exchange liquidity. The lack of availability of foreign liquidity reduced the investment and forced a high reliance on short-term funds to service foreign borrowings. The high debt service is likely to decrease capital and labour productivity of these countries. Osk and Wijnbergen (1995) in their seminal article investigated Mexico's debt and debt service reduction process with the London Club creditors. They argue that even though the external debt service has facilitated the increase of the foreign capital inflow, it is unlikely to achieve sustainable growth. The net effect will depend on the level of investment and export response. Soydan and Bedir (2015) used a panel analysis technique to analyze data from moderately indebted middle-income countries over the years 1985 to 2013 and showed that foreign debt had a negative linear influence on productive investment. Sachs (1989) posits that highly indebted countries will have to allocate a large portion of their limited foreign reserves to meet up with debt service obligations and hence they have to curb the allocation for accelerating economic growth.

Many researchers point out the crowding out effect of external debt servicing on economic growth (Clements et al. (2003); Claessens et al. (1996); Karugol (2004); Fosu (1996); Pattillo et al. (2004); Patanio and Agustina 2007).). Karagol (2002) investigated the impact of foreign debt service payments on economic growth in Turkey by applying the Johansen and Juselius maximum likelihood estimation technique using the data for the period of 1956 to 1999. The study found a negative short and long run relationship between debt service payment and economic growth. Hence, the author concluded that debt servicing weakens capital formation. Serieux and Samy (2001) used panel data for a cross section of 53 low and lower-middle income nations covering the period 1970-1999 to assess the effects of debt servicing on investment, human capital, and economic growth. The findings showed that the debt burden might dampen growth by crowding out both public and private investment. The findings also suggest

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that this effect might not be consistent across countries. In a similar vein, Kharusi and Ada (2018) found that Oman's external debt had a negative and significant impact on economic growth using timeseries data from 1990 to 2015 and an autoregressive distributed lag cointegration model. One study by Weeks (2000) examines the association between external debt service payments and economic growth in two groups of countries comprising 18 Latin American and 4 Asian countries (Indonesia, Malaysia, Singapore, and Thailand), using data from 1960 to 1994 and the ordinary least square approach. The author concluded that foreign debt servicing costs negatively related to the economic growth in selected Latin American countries whilst newly industrialized Asian countries exhibited an insignificant relationship between these two variables.

Another study by Shabbir (2013) used data from 70 developing nations for the years 1976 to 2011 to examine the relationship between foreign debt and economic growth in developing countries. This analysis used a linear panel data model with fixed factors and random effects. The author argues that a rise in foreign debt reduces debt solvency and harms economic expansion. Further results show that an increase in foreign debt would reduce private fixed capital formation. In a recent study, Nega (2021) used descriptive trend analysis and panel data analysis to examine the debt sustainability and its impact on economic growth of 24 Sub Saharan African (SSA) nations based on the data from 2000 to 2017. According to the author, low income SSA countries' economic growth is negatively and significantly impacted by their foreign public debt.

However, several researchers (Al-Refai, 2015; Akram, 2017; Spilioti and Vamvoukas 2015; Hansen, 2002; Wang 2009) have made an effort to demonstrate that foreign debt has had a favourable impact on economic growth in light of their findings. Al-Refai (2015) investigated the association between debt and economic growth in Jordan over the years 1990 to 2013 using the Cobb-Douglas production function. The estimated results point out that external debt and have a negative and insignificant effect on economic growth in Jordan. In a study on public debt and economic growth, Akram (2017) used the Autoregressive Distributed lag (ARDL) model to investigate the effects of public debt on investment and economic growth in Sri Lanka over the years 1975 to 2014. The findings show that although servicing of debt has a negative relationship with per capita GDP and investment, external debt has assisted economic growth. Further research has found that external debt was crucial to progress throughout the civil war. In their investigation of public debt and economic growth utilizing Greek data for over 40 years beginning in 1970, Stella and

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Vamvoukas (2015) show a positive and statistically significant influence of public debt on GDP growth. The effect of foreign borrowing on economic growth in Malaysia was examined by Baker and Hassan (2008) using the vector autoregressive (VAR) technique and the variables GDP, foreign debt, capital accumulation, labour force, and human capital. The study found that increasing foreign debt accelerated economic growth. In a key study, Jilenga et al. (2016) found that foreign debt has a long-term positive effect on economic growth for Tanzania using a bounds test technique on the ARDL model using data from 1971 to 2011. According to the analysis, there was no short-term causal relationship between foreign debt and economic growth. Hansen (2002) used a regression analysis based on a sample of 50 highly indebted poor countries (HIPC) and non-HIPC countries to investigate the effects of debt service payments on growth and investment. The findings suggest that lowering debt service payments slightly boosts investment and growth.

Using panel data covering 93 developing countries from 1960 to 1998, Pattillo et al. (2002) investigated the relationship between external debt payments and growth rates using various econometric techniques, including the instrumental variable method, the Least Square Method, the fixed effect and system- generalized method of moments (GMM). The authors made an effort to examine the nonlinearity of the association between growth and foreign debt. The results show that investment levels and consequently economic growth have not been impacted by external debt.

Some scholars have focused primarily on the nonlinear relationship between economic growth and external debt (Adekunle et al., 2021; Qureshi and Liaqat, 2020; Matthew and Adetayo, 2022). Based on the findings of the threshold regression analysis, Adekunle et al. (2021) looked into the non-linear relationship between external debt and economic development in Nigeria from 1981 to 2015. The study discovered that high external debt servicing had a crowding-out impact. The majority of these empirical study findings meanwhile have concentrated on threshold effects. The direction and size of the consequences of foreign indebtedness on economic growth have received little attention up until recently. It is crucial to separate debt variables into positive and negative components in this context in order to better understand the effects of external debt servicing on growth. Using data for Nigeria from the years 1981 to 2020, Matthew and Adetayo (2022) employed a non-linear autoregressive distributed lag (NARDL) model that allows one to separate the positive and negative effects of debt payments on growth. Based on the findings, they concluded that while debt service payments and total debt stock both have a major short-term impact on

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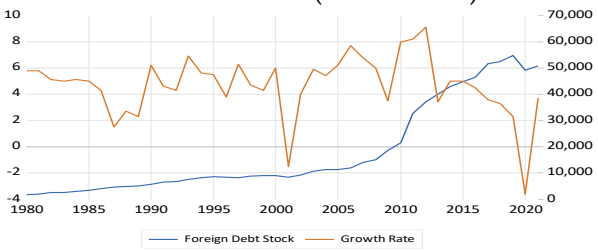
economic growth only a decrease in total debt stock is crucial for long-term economic growth.

It is noteworthy that there is no evidence in Sri Lanka for analysis of asymmetries in the effect of external debt on economic growth. The NARDL model, which allows us to classify the impact of the total stock of external debt and debt servicing payments into positive and negative changes is used in the current study to close this gap and assist in understanding the differences in the magnitude and direction of these two debt sustainability variables.

## Overview of Foreign Debt Sustainability and Economic Growth in Sri Lanka

The rapid rise in foreign debt resulting from persistent and high budget deficits is unsustainable. It is apparent from figure 01 that the GDP growth rate for Sri Lanka is associated with a relatively high fluctuating rate of public external debt between 1980 and 2021. Public external debt refers to the sum of the central government, guaranteed state-owned enterprises debt and central bank debt. The aggregate public external debt increased from about 41 percent of GDP in 1980 to 60 percent in 2021, in nominal terms, from $ 1667 million in 1980 to $ 54811 million in 2019, which brought home the issue of debt sustainability. During the study period, the foreign debt ratio oscillated in the range of 41 - 73 percent (see figure 01). The IMF and World Bank suggest a sustainable debt/GDP ratio limit for developing countries as 25% (Spratt, 2009). As shown in Figure 1, the stock of external debt had significantly expanded by 2019 and had reached $5.8 billion, more than two times compared to the debt level in 2000. Since Sri Lanka is classified as a middle-income country, access to concessional foreign credits has been limited. Consequently, the share of commercial borrowings has increased from 5 percent in 2006 to 52.3 percent by 2021 (Central Bank, 2021).

Figure 01 Foreign Debt Stock and Economic Growth Rate (1980 – 2021)




Source: Compiled from the World Bank, the *World Development Indicator Data Base* and the Central Bank of Sri Lanka *Annual Reports* (Various Years)

It has been estimated that 24 percent of the total outstanding external debt will mature in 9 years and almost 76% percent is to be matured after 10 years (Ministry of Finance, 2022). What is interesting from figure 1 is that relatively there was a negative correlation between foreign debt stocks and economic growth. For instance, it can be seen from the graph that there is a clear decreasing trend of the growth rate with the extraordinary increase of foreign borrowings since 2012. The rapid growth performance over the

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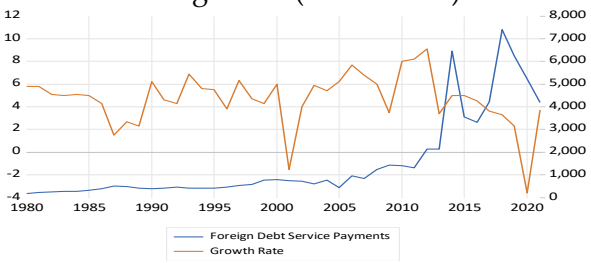
period 2002 -2012 witnessed from the declining debt burden could be indicated by receiving additional resources through reduced external debt service obligations to enhance economic growth.

Currently, the major challenge ahead in Sri Lanka is how to service the high level of external borrowings while continuing efforts to achieve sound economic growth. In figure 02, there is a clear trend of rising external debt service payments since 2007. The faster growth of external debt service payments after 2007 has been attributed to escalating repayments on medium term commercial borrowings starting (Kappagoda, 2009). The most striking observation that emerges from figure 02 is the slowdown in the growth rate with the rapid increase of debt servicing payments after 2012. In an evaluation of foreign debt sustainability, it is essential to explore the composition of total external debt since it directly influences debt repayments. Evidently, Sri Lanka's escalating short term foreign debt has deleteriously affected the process of debt servicing. The ratio of short-term debt to total debt increased from 6.4 percent in 2000 to 16.6 percent in 2021.The IMF established several indicators after the debt crisis of the less developed countries for debt sustainability (Spratt, 2009). Accordingly, the ratio of debt service to exports and reserves can be used to measure the debt sustainability of a country. There has also been a dramatic turnaround in external debt servicing.

Figure 02 Foreign Debt Service Payments and economic growth (1980 – 2021)




Source: Compiled from the World Bank, the *World Development Indicator* Data Base and the Central Bank of Sri Lanka *Annual Reports* (Various Years)

The external debt service ratio to exports averaged 21.44 percent in 1980-89 and since then it has exhibited a marked downward trend; it declined from 18 percent in 1990 to 13 percent in 2006. After 2007, this ratio demonstrated a noticeable escalation. It increased from 15 percent in 2008 to 52 percent in 2020 (see figure 03).

Figure 03 External Debt Service in Sri Lanka (1980 – 2021)


Source: Compiled from the World Bank, the *World Development Indicator* Data Base and the Central Bank of Sri Lanka *Annual Reports* (Various Years)

As revealed by evidence recently, foreign reserves in Sri Lanka remarkably dried up in the ensuing anarchy. In particular, external

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creditors need to be ensured that the country maintains its foreign reserves at a sustainable level. Figure 03 shows that there has been a steady increase in debt service payments in the country with respect to both exports and foreign reserves. In terms of the categorisation developed by the World Bank and the IMF based on external debt indicators of developing countries, Sri Lanka clearly now falls into the category of being highly indebted (World Bank, 2022).

## METHODOLOGY

### Hypothesis of the study

Debt sustainability could have a beneficial impact if it is used to boost the country's economic wellbeing, but it could also have a negative impact on economic growth due to the debt overhang and crowding out effect which hinders investment and stimulates capital flight. Note that debt stock measures debt overhang and debt servicing is used to quantify debt crowding out, respectively. The current study hypothesizes that a significant amount of accumulated debt will have a negative impact on economic growth due to the debt overhang and debt crowding out effect.

### Model specification

Numerous macroeconomic variables exhibit asymmetry, which is important to human conditions (Shin et al., 2014). In reality, we use the nonlinear auto regressive distributed lag model (NARDL) to capture the asymmetries of external borrowing on economic growth because the cointegration approach does not enable us to identify the asymmetries. In light of this, we used a nonlinear ARDL model that Shin et al. (2014) recently created. This model allows us to capture both the short-run and the long-run asymmetric relationship between external debt and economic growth in Sri Lanka. The current study specifies the following regression model, following Matthew and Adetayo (2022).

$$RGDP_t = a + a_1 + a_2 FDS_t + a_3 FDSP_t + GFCF_t + REXR_t + TRADE_t + U_t \quad 01$$

Where: RGD is real GDP, FDS stands for foreign debt stock, FDSP refers to debt service payments, GFCF represents gross fixed capital formation, REXR implies real exchange rate, TRADE represents trade openness, meaning that the sum of a country's exports and imports as a percentage of its GDP, and $U_t$ indicates disturbance term. Real GDP can be affected by other variables which must be included in the growth equation in order to avoid specification bias in the specified model. Accordingly, trade openness, gross domestic fixed capital formation, and real exchange rates were included in the model as control variables. The GDCF is employed as a proxy variable for capital stock, whilst TRADE reflects the extent of economic activity of a country with rest of the world. In addition, it is the general consensus that significant overvaluation of a domestic currency

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has a negative impact on economic growth (Easterly, 2005).

The increase or decrease in debt stock and debt service payments can have a different magnitude and direction of effects on economic growth. In order to capture this asymmetric impact, we can convert the above regression 01 into a NARDL model which allows us to decompose the negative and positive influence of these two independent variables on economic growth.

$$dRGDP_t = \alpha_0 + \alpha_1 RGDP_{t-1} + \alpha_2 FDS^+_{t-1} + \alpha_3 FDS^-_{t-1} + \alpha_4 FDSP^+_{t-1} + \alpha_5 FDSP^-_{t-1} + \alpha_6 GFCF_{t-1} + \alpha_7 REXR_{t-1} + \alpha_8 TRADE_{t-1} + \sum_{i=1}^{m} \beta_{1i}\, d(RGDP_{t-i}) + \sum_{i=0}^{n} \gamma^+_{1i} d(FDS_{t-i}) + \sum_{i=0}^{n} \gamma^-_2 d(FDS_{t-i}) + \sum_{i=0}^{q} \theta^+_1 d(FDSP_{t-i}) + \sum_{i=0}^{q} \theta^-_2 d(FDSP_{t-i}) + \sum_{i=0}^{p} \delta_1 d(GFCF_{t-i}) + \sum_{i=0}^{p} \delta_2 d(REXR_{t-i}) + \sum_{i=0}^{p} \delta_3 d(TRADE_{t-i}) + \mu_t \quad 02$$

Where, $\alpha_o - \alpha_{8,}$ are long run coefficients, whilst $\beta_1$ , $\gamma_1 - \gamma_2$, $\emptyset_1 - \emptyset_2$, and $\delta_1$ -$\delta_2$ , represent the short run coefficients for relevant variables, m, n, p, and q are lag order. The $FDS_t^+$ represents the increase or positive change in foreign debt stock, $FDS_t^-$ captures the decrease or negative change in foreign debt stock. Likewise, $FDSP_t^+$ represents increase or positive change in foreign debt payments, while $FDS_t^-$ indicates decrease or negative change in foreign debt payments. Partial sum processes of positive and negative changes in FDS and FDSP can be estimated as follows.

$$FDS_t^+ = \sum_{i=1}^{t} d(FDS_t^+) = \sum_{i=1}^{t} \max\,(d(FDS_i), 0) \quad 03$$

$$FDS_t^- = \sum_{i=1}^{t} d(FDS_t^-) = \sum_{i=1}^{t} \min\,(d(FDS_t), 0) \quad 04$$

$$FDSP_t^+ = \sum_{i=1}^{t} d(FDSP_t^+) = \sum_{i=1}^{t} \max\,(d(FDSP_t), 0) \quad 05$$

The study used annual time series data for the period from 1980 to 2021. The data was gathered from different sources: the annual reports of the Central Bank of Sri Lanka and the World Development Indicators of the World Bank.

### Brief explanation of variables

The current study real GDP (RGDP) has been used to represent economic growth as it reflects the change in production in the economy. In order to adjust for price changes the GDP was deflated by the GDP deflator. Foreign debt stock (FDS) is computed including the public and publicly guaranteed debt amounts. Foreign borrowings have both positive and negative effects on economic growth. It has commonly been assumed that reasonable levels of borrowing stimulate growth and development by reducing pressure on domestic savings (Wang, 2009; Kharusi and Ada, 2018). However, excessive stocks can generate liquidity constraints and deleterious macroeconomic issues in the borrowing country mainly through crowding outs of domestic investment (Fosu,1966; Kharusi and Ada, 2018). It is believed that in terms of the debt overhang hypothesis, increasing debt

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service payments (FDSP) have a negative effect on the growth by reducing capital and labour productivity. The real exchange rate (REXR) has been included in the study as a control variable as it can play a dominant role in achieving macroeconomic stability in an open economy. As some argue, the real exchange rate affects the economic growth through influencing investment (Kyereboah and Agyire, 2008; Matthew and Adetayo, 2022). Accordingly, it is expected the REXR to stimulate economic growth. Real exchange rate (REX) was defined as $NER\left(P^f/_{Pd}\right)$, where NER represents nominal exchange rate, $P^f$ is world price and $P^d$ stands for domestic price. Except TRADE variable, RGDP, FDSP, GFCF and REXR are log transformed. The log-log specification is employed to facilitate the interpretation of estimated coefficients as elasticities. The table 01 represents the descriptive statistics of all the variables.

Table 01 Descriptive statistics of the variables

| Variable | Mean | Minimum | Maximum | Std.Dev | Skewness | Jarque-Bera | Probability | Obs. |
|---|---|---|---|---|---|---|---|---|
| RGDP | 12.7494 | 12.7713 | 13.7701 | 0.6693 | 0.1674 | 2.9452 | 0.2293 | 42 |
| FDS | 9.3281 | 7.4186 | 10.9116 | 1.0024 | 0.1276 | 1.6653 | 0.4348 | 42 |
| FDSP | 6.7574 | 5.1918 | 8.9086 | 1.0244 | 0.6948 | 4.0519 | 0.1318 | 42 |
| GFCF | 12.7494 | 9.9448 | 15.2904 | 1.7209 | 0.0028 | 3.0727 | 0.2151 | 42 |
| REXR | 3.7257 | -0.0209 | 5.3028 | 1.8245 | -1.0782 | 8.7149 | 0.0128 | 42 |
| TRADE | 55.2863 | 32.3525 | 78.64 | 12.5882 | -0.2122 | 2.5801 | 0.2752 | 42 |

Source: Authors' Computation, 2022

## RESULTS AND DISCUSSION

### ADF and Philips- Perron Test

The current study, the Phillips-Perron (PP) and the Augmented Dickey-Fuller (ADF) tests, which are widely used in unit root tests, have been applied to show the series are stationary or nonstationary, and their order of integration.

It should be noted that the ARDL bounds testing approach is mainly based on the crucial assumption that all the variables are integrated in order zero, I(0) or order, I(1). The results of both ADF PP unit root tests statistics show that all the variables are non-stationary in levels while they became stationary after taking the first differences or I (1) (see Table 02). Once the stationarity of variables is confirmed, the ARDL bounds test approach can be applied.

Table 02 Unit Root Test

| Variable | ADF | | Phillips-Perron | | I(d) |
|---|---|---|---|---|---|
| | Test statistics | P - Value | Test statistics | P - Value | |
| ΔLRGDP | -9.0517 | 0.0000 | -9.2863 | 0.0000 | I (1) |
| ΔLFDS | -9.0517 | 0.0000 | -10.5576 | 0.0000 | I (1) |
| ΔLFDSP | -4.3523 | 0.0013 | -4.3062 | 0.0015 | I (1) |
| ΔLGFCF | -4.9308 | 0.0002 | -4.8206 | 0.0003 | I (1) |
| ΔLREXR | -3.0988 | 0.0347 | -3.0988 | 0.0347 | I (1) |
| ΔTRADE | -6.4195 | 0.0000 | -6.4251 | 0.0000 | I (1) |

Source: Authors' Computation, 2022

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### Cointegration Test

The first step of the asymmetric cointegration approach is estimating the NARDL model to identify whether there is a long – run relationship among the variables selected in the model. Accordingly, we estimated the equation 02 based on the NARDL model developed by Shin et al., (2014) using the Stepwise Least Squares method. Then we applied the bound test approach to check the cointegration relationship using the Wald test.

The null and alternative hypotheses for cointegration test among variables in equation (2) are as follows:

$$H_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0$$

$$H_1 \neq \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq 0$$

To apply the NARDL bound test approach in testing the existence of a long run relationship between foreign debt and economic growth however, the F-statistics needs to be compared with the bound critical values based on Pesaran and Shin (1999) Table C1 case III. The above null hypothesis that there is no co-integration (no long run relationship) was rejected based on the result from equation 1. The existence of cointegration among the variables can be tested using the two critical values obtained from Pesaran and Shin (1999) for a given significance level. The estimated F statistic (which is 96.16) is higher than the upper bound critical value (4.43) at the 1% level of significance (see Table 03). From these results, we can conclude that there exists strong evidence for a cointegration relationship between economic growth and the other explanatory variables in the model.

Table 03 Wald test for long-run cointegration

| Test statistic | Value | df | probability |
|---|---|---|---|
| F- statistic | 96.1583 | 8, 20 | 0.0000 |
| Chi-square | 769.2663 | 8 | 0.0000 |
| Bound test critical values for unrestricted and no trend. | | I (0) | I (1) K = 8 |
| 1 % | | 3.15 | 4.43 |
| 5 % | | 2.45 | 3.61 |
| 10 % | | 2.12 | 3.23 |

Source: Authors' Computation, 2022

The validity of the model and results can be checked from the results of the diagnostic tests in Table 08. The results of the Lagrange Multiplier (LM) test are used to check the serial correlation of the residual. The Breusch-pagan-Godfrey test is employed to determine the heteroscedasticity for the NARDL regression model. These test results suggest that the model is specified and valid for interpretation of the results of the NARDL model for co-integration. From the data in Table 04 it is apparent that the model is not serially correlated, and the errors are homoscedastic as probabilities of F-statistics are higher than 5 percent the level. Furthermore, as revealed by the normality test, residuals are normally distributed.

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Table 04 Diagnostic test

| Diagnostic test | Value | Probability |
|---|---|---|
| Breusch-Godfrey Serial Correlation LM Test – F-statistic | 2.2245 | 0.1370 |
| Heteroskedasticity Test: Breusch-pagan-Godfrey – F-statistic | 0.7338 | 0.7327 |
| Normality test: Jarque bera | 4.0832 | 0.1295 |

Source: Authors' Computation, 2022

Figures 04 and 05 depict the results of the CUSUM and CUSUM SQUARE tests. These figures clearly indicate that statistics fall within the bands of 5% confidential interval indicating the stability of parameters.

Figure 04 Cumulative sum of residual

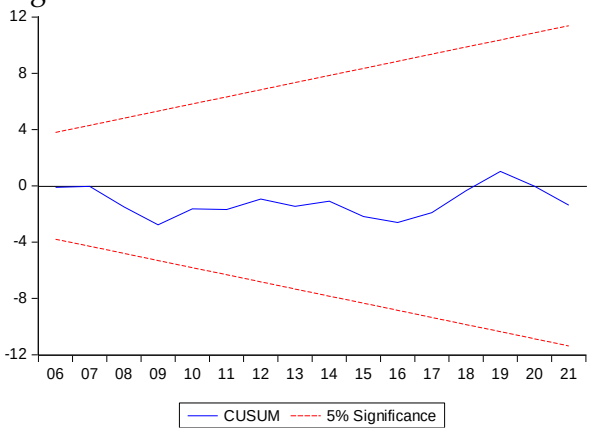
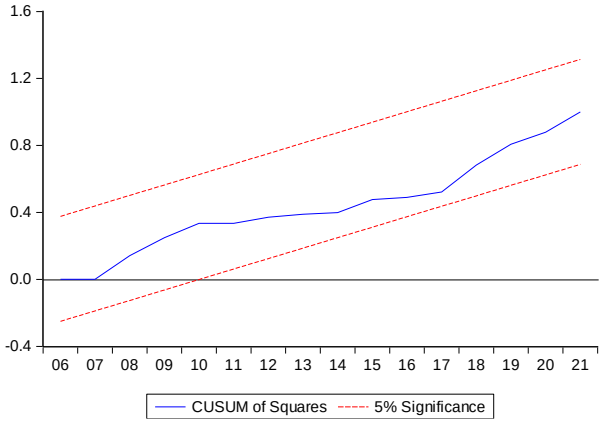



Figure 05 Cumulative sum of squares of residual




Using the results from the estimated NARDL model, the long-run estimates for the relationship between economic growth and selected macroeconomic variables are reported in Table 05.

Table 05 Long run coefficients of the NARDL model

| Variable | Coefficient | Std. Error | T - Statistic | Probability |
|---|---|---|---|---|
| $LFDS^{+}$ | -0.0322 | 0.04984 | -0.65033 | 0.5229 |
| $LFDS^{-}$ | -0.5074 | 0.15864 | -3.21994 | 0.0043 |
| $LFDSP^{+}$ | -0.0737 | 0.01739 | -4.26397 | 0.0004 |
| $LFDSP^{-}$ | -0.07790 | 0.02194 | -3.57450 | 0.0019 |
| LGDCF | 0.07329 | 0.04809 | 1.53408 | 0.1407 |
| LTRADE | -0.16707 | 0.03748 | -4.48770 | 0.0002 |
| LREXR | 0.0342 | 0.00879 | 3.91510 | 0.0009 |

Source: Authors' Computation, 2022

As shown in Table 05, the positive effect of external debt stock on economic growth is insignificant. However, a decrease in debt stocks has a negative impact on growth. On average, the growth rate would lead to an increase by 0.5 percent due to a 1 percent decrease in foreign debt stocks. Furthermore, increase in foreign debt service payments would lead to decrease in economic growth, 1 percent increase in debt service payments may influence to decrease in growth by 0.07 percent. The variable $LFDSP^{-}$ also shows a significant negative impact on growth indicating that a decrease in debt service payments would result in higher growth. These results agree with the findings of the earlier studies

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(Pattillo et al., 2002; Akram, 2017; Soydan and Bedir, 2015; Nega, 2021; Sharaf, 2021). Toktaş, Y. et al. (2019) found a direct correlation between net stock of foreign debt and economic growth in their causality analysis for Turkey. Another significant finding is that the intensity of the positive impact on growth brought about by a decline in debt service payments is greater than the magnitude of the negative impact produced by an increase in debt service payments. According to the findings, an increase in external debt service payments of 1% is expected to result in a 0.08 percent decrease in growth, while an increase in debt service payments of 1% causes a 0.07 percent slowdown in economic growth. Soydan and Bedir (2015) have shown similar findings. The results indicate that excessive indebtedness could hurt the economy in the long run. A possible explanation for these results may be the lack of foreign capital to finance productive investment, since the government has to allocate critical foreign exchange reserves towards debt repayments by and large. It was shown that debt service payments continuously hamper economic growth mainly in developing countries through the effect of resource depletion (Akanbi, A. et al. 2022). During the study period, there was a clear upward trend in the debt service to export ratio. The debt service ratio increased from 12% in 1980 to 35% in 2020. (Central Bank Sri Lanka, 2021). In reality, foreign creditors are benefiting more from debt servicing rather than domestic investors (Karagol, 2002; Cunningham, 1993). However, these results differ from the findings of Matthiw and Adetayo (2022). They claim that in the long run, debt service payments have no significant impact on Nigeria's economic growth. However, the analysis finds that increasing debt service payments have a negative impact on growth, whereas decreasing debt service payments have a positive effect on growth in the short run. Stephens (2001), based on an empirical study covering highly indebted 24 African countries, showed that debt service payments slow down growth by crowding out public spending on critical physical and human capital formation. They argue that a decrease in debt stock would lead to low economic growth by dwindling the expansion of opportunities.

The findings indicate that gross fixed capital formation is insignificant in the long run with correct signs as hypothesized. In the meantime, trade openness and real exchange rates are highly significant and have an effect on growth. In this study, trade openness was found to be negatively related to economic growth. Trade could be beneficial for economic growth if it can direct the economy towards greater factor accumulation with technology diffusion. Trade can impede growth when foreign demand is inconsistent, domestic supply is unreliable, and products are not competitive (Farahane and Heshmati, 2020). Manufacturing exports in Sri Lanka are characterized

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as highly import intensive and labour intensive (Athukorala and Rajapathirana, 2000). Hence, a possible explanation for this result may be the lack of net addition to national income from export expansion in Sri Lanka. On the other hand, trade liberalization, which began in the late 1970s, had a negative impact on the domestic small- and medium-scaled industries' productivity. In reality, domestic industries that have newly been built need to be protected from international competition. It has been estimated that the effective rate of protection for domestic manufacturing has decreased from 70% in 1991 to 56% in 2002 (World Bank, 2005). Note that over the past four decades, the imports values as a percentage of the GDP increased faster than exports. A high real exchange rate, meaning that under valuation of the domestic currency, stimulates economic growth (Rodrik, 2008). The result demonstrates that economic growth will be expected to increase by 0.034 percent for a 1 percent increase in real value relative to Sri Lankan Rupee.

From the results of the NARDL model (Table 06) it was found that there is evidence for the short run asymmetry nexus between external debt sustainability and economic growth. As indicated by the results, both positive and negative movements of debt stocks are statistically significant. The result shows that the upward change in debt stocks negatively influences economic growth in the short run. It is noticed that a 1 percent increase in debt stocks results in a 0.11 percent decrease in economic growth. As we found in the long run, a similar reaction from the growth to debt service payments can be seen in the short run.

Table 06. The results of Nonlinear ARDL model

| Variable | Coefficient | Std. Error | t-Statistics | Probability |
|---|---|---|---|---|
| Intercept | 12.6743 | 0.8527 | 14.8730 | 0.0000 |
| LRGDP (-1) | -1.0067 | 0.0509 | -19.7787 | 0.0000 |
| $LFDS^{+}$ (-1) | -0.0324 | 0.0499 | -0.6503 | 0.5229 |
| $LFDS^{-}$ (-1) | 0.5108 | 0.1587 | 3.2199 | 0.0043 |
| $LFDSP^{-}$(-1) | -0.0742 | 0.0174 | -4.2639 | 0.0004 |
| $LFDSP^{-}$(-1) | 0.0784 | 0.0219 | 3.5745 | 0.0019 |
| LTRDE (-1) | -0.1682 | 0.0375 | -4.4877 | 0.0002 |
| LGFCF (-1) | 0.0738 | 0.0481 | 1.5341 | 0.1407 |
| LREXR (-1) | -0.0345 | 0.0088 | -3.9151 | 0.0009 |
| d($LFDS^{+}$(-2)) | -0.1095 | 0.0417 | -2.6282 | 0.0161 |
| d($LFDS^{-}$) | 0.2393 | 0.1349 | 1.7725 | 0.0915 |
| d($LFDSP^{+}$(-4)) | -0.0879 | 0.0155 | -5.6566 | 0.0000 |
| d($LFDSP^{-}$) | -0.0997 | 0.0226 | -4.4079 | 0.0003 |
| $d$($LFDSP^{-}$(-3)) | 0.0787 | 0.0227 | 3.4740 | 0.0024 |
| d(LRGDP(-3)) | -0.0502 | 0.0249 | -2.0084 | 0.0583 |
| d(LGFCF) | 0.2528 | 0.0419 | 6.0260 | 0.0000 |
| d(LGFCF(-3)) | 0.2104 | 0.0263 | 8.0083 | 0.0000 |
| d(LTRADE) | -0.1375 | 0.0627 | -2.1930 | 0.0484 |
| d(LTRADE(-1) | -0.2023 | 0.0708 | -2.8550 | 0.0115 |
| d(TRADE(-2) | -0.2957 | 0.0980 | -3.0192 | 0.0000 |
| d(REXR(-1) | 0.0754 | 0.0287 | 2.6275 | 0.0183 |
| D(REXR(-2) | -0.0454 | 0.0216 | -2.1038 | 0.0516 |
| R -squared | 0.981 | Akaike info criterion | | -5.6073 |
| Adjusted R-squared | 0.967 | Schwarz criterion | | -4.8672 |
| S.E. of regression | 0.013 | Hannan-Quinn criter. | | -5.3464 |

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| | | | |
|---|---|---|---|
| F-statistic | 66.94427 | Durbin-Watson stat | 2.3976 |

Source: Source: Authors' Computation, 2022

As per the results, even though the control variable GFCF was not significant in the longrun, it is highly significant and positively related to economic growth in the shortrun. This finding confirms that physical capital is crucial to stimulate the shortrun growth in the economy. A significant increase in economic growth can also be achieved in the long run through an increase in productive capacity overtime. It is thus clear that a lack of capital formation constraints economic growth. The percentage share of the gross domestic fixed capital formation (GDCF) in Sri Lanka shows an up and down pattern over the study period. This ratio decreased from 31.3 in 1980 to 21.9 and 25.9 percent in 1990 and 2010 respectively and it later rose to 27 percent in 2019. It should be noted that the shortrun response of growth to trade openness and the real exchange rate is comparable to the longrun response.

### The asymmetry tests

In this section, we will present evidence for asymmetric relations between foreign debt sustainability and economic growth. The estimated NARDL model's main premise was that changes in the external debt variables whether positive or negative, can have an impact on economic growth of varying magnitudes. In other words, the relationship between debt-related variables and growth is asymmetric. Both the positive change and the negative change have a long-run negative effect on economic growth. To determine whether there is evidence of long-run asymmetry, we apply the Wald test in Eviews 9. In an asymmetry test, basically, we check if the coefficients are equal or not. If the coefficients are equal, it means that there is no asymmetry. Table 07 depicts the results of the long-run asymmetry test for two debt variables.

Table 07. The Results of the Wald test for long-run Asymmetry

| | FDS | | FDSP | |
|---|---|---|---|---|
| Null hypothesis | $\alpha_2/\alpha_1 = \alpha_3/\alpha_1$ | | $\alpha_4/\alpha_1 = \alpha_5/\alpha_1$ | |
| | Value | Probability | Value | Probability |
| t - statistics | 3.0049 | 0.0070 | 5.5721 | 0.0000 |
| F - statistics | 9.0297 | 0.0070 | 31.0485 | 0.0000 |
| Chi-square | 9.0297 | 0.0027 | 31.0485 | 0.0000 |

Source: Authors' Computation, 2022

Clearly it is noticed that the null hypothesis can be rejected as the F-statistics of both the variables are highly significant because the P – value is less than 5 percent. We can conclude that there exists an asymmetry in the long-run impact of FDS and FDSP on economic growth in Sri Lanka. Turning now to the empirical evidence on the short-run asymmetry test depicted in table 07, the null hypothesis for the short-run asymmetry test is that the positive sum of each of the regressors equals that of the negative sum of the relevant variables, indicate that debt variables have a symmetric effect on the growth. The results demonstrate

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that the null hypothesis for two variables is rejected based on the highly significant F-value (see table 07) meaning that the short-run effects of foreign debt stock and debt service payments on growth are asymmetric.

Table 07. The Results of the Wald test for short-run Asymmetry

| | FDS | | FDSP | |
|---|---|---|---|---|
| Null hypothesis is | $\sum_{i=0}^{n} \lambda_i^+ = \sum_{i=0}^{n} \lambda_i^-$ | | $\sum_{i=0}^{q} \theta_i^+ = \sum_{i=0}^{q} \theta_i^-$ | |
| | Value | Probability | Value | Probability |
| t - statistics | -2.3348 | 0.0301 | 3.3701 | 0.0030 |
| F - statistics | 5.4514 | 0.0301 | 11.3573 | 0.0030 |
| Chi-square | 5.4514 | 0.0196 | 11.3573 | 0.0008 |

Source: Authors' Computation, 2022

Having discussed the results of shortrun and longrun asymmetry tests, now we move on to explore the dynamic multiplier graphs which are plotted to the estimated NARDL model, as shown in figures 06 and 07. The lines in figure 06 represent the intertemporal effects of the debt stock increase and decrease on economic growth. The positive change in foreign debt stock, depicted by a continuous black line, leads to growth reduction, which is stronger than the negative effect of debt stock (the dashed black line). The difference between the two effects is presented by the dashed red line, i.e., the asymmetry. In figure 7, shortrun and longrun effects of the upward and downward movements of foreign debt service payments on economic growth are presented. The increase in FDSP appears to have a stronger impact on growth than a decrease in FDSP.

Figure 06. Dynamic Multiplier of Foreign Debt Stock

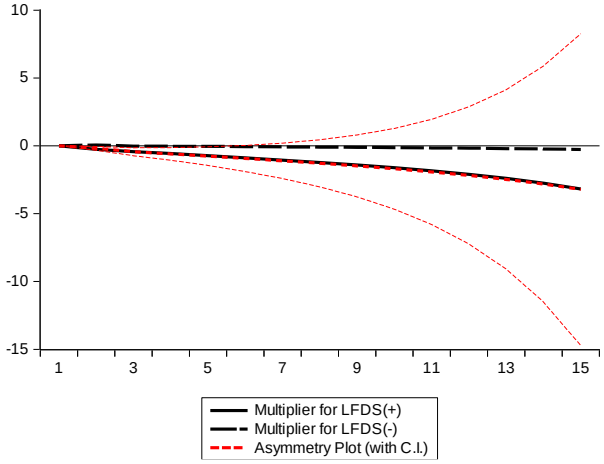
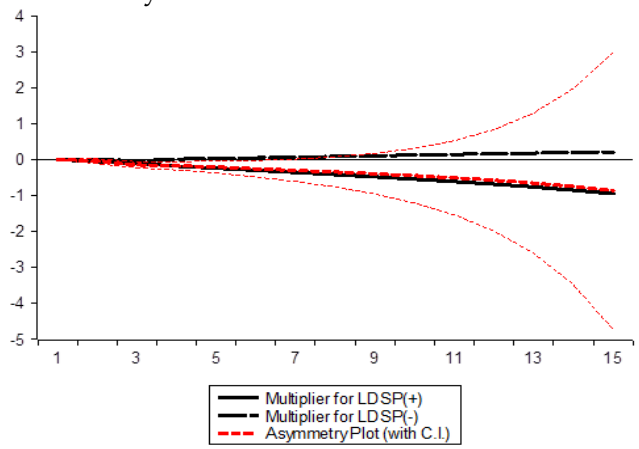



Figure 07. Dynamic Multiplier of Foreign Debt Service Payments




## CONCLUSION

The rising level of external debt for Sri Lanka poses a challenge to economic growth and some cautions are called on the sustainability of debt in the country. Investigating the debt overhang and crowding out impacts on investment brought on by rising foreign debt stock and debt servicing costs over the recent

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period was the goal of this study. The NARDL model, which considered potential ways to capture the various effects of debt stock and debt service payments on economic growth as they increased or decreased, was deemed to be the appropriate approach to use for this inquiry. The results suggest that the accumulation of external debt has a detrimental effect on capital formation which is important for long-term economic growth. It was shown that decreasing in foreign debt stock exerts a statistically significant positive impact on the growth, meaning that, the debt stock is asymmetric in the long run. Furthermore, both the short and long-term empirical evidence indicates a negative correlation between debt service payments and economic growth. In such a context, reducing external debt stock becomes crucial for sustainable growth. The massive increase in Sri Lanka's external debt has not been accompanied by a significant improvement in the infrastructure of the country or economic growth. It is noteworthy that some recently constructed infrastructure may not be efficient or profitable from an economic perspective. These findings suggest that significant amounts of public investment spending often do not result in a growth in the stock of productive capital. The study also shows that debt service payments have a significant negative influence on Sri Lanka's economy.

It also found that the positive impact of a decrease in foreign debt service payments on economic growth is more prominent than the adverse effect of an increase in that on growth. As per the findings, the main channel through which external debt might negatively influence economic growth appears to be the debt stock rather than the liquidity constraint issue denoted by the debt servicing payments. In reality, the uncertainty of investors created by high indebtedness would lead to low economic growth by discouraging new investments and encouraging less productive short-term investments. Even though capital formation was not a significant determinant in the long run, it appears to be more vital for short run economic growth in the country. Over the study period, the investment ratio displays an upward and downward trend. Another possible explanation for this might be that significant government spending has not led to meaningful economic growth. Contrary to expectations, the results showed that trade openness has a significant negative impact on growth in the long run. Besides, we found strong evidence that the increase of the real exchange rate contributes to economic well-being in the long run, whilst it does not help in the short run. The work contributes to existing knowledge on external debt sustainability and growth by shedding light on the different effects of debt stock and debt service payments when they increase as opposed to decrease using the NARDL model.

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The evidence from this study suggests that much emphasis needs to be given to reducing the current expenditure in place of continuously relying on external borrowing and reallocating foreign funds to the development heads. As a fragile economic structure in the country emerged mainly from short term and commercial foreign borrowing, the study recommends borrowing from sources having less volatile and low interest whilst implementing a prudent debt management mechanism to keep the debt level within a sustainable limit. Further, a deeper analysis is required to better understand how external debt influences economic growth widely taking into account the fiscal, monetary and exchange rate policies and the institutional structure of the economy.

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