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An Empirical Analysis of the Impact of Total Debt on the Economic Growth of Sri Lanka

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An Empirical Analysis of the Impact of Total Debt on the Economic Growth of Sri Lanka

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Abstract

Public debt is one of the key fiscal policy variables that can be influence the economic growth of any country. For this reason, policymakers and economists have worried about the relationship between debt and growth. Empirical studies of the relationship between debt and growth have, however, been recently contested because of their mixed results; negative vs positive and linear vs non-linear. Moreover, some researchers have found a non-linear relationship. There are several main theoretical perspectives which underpin this relationship between debt and growth. In the Keynesian view, debt and growth are positively related. However, Monetarist economists argue debt and growth have a negative relationship.

Sri Lanka has accumulated a large amount of debt over the past six decades from both domestic sources and external sources. Accordingly, the main objective of this study is to assess the impact of public debt on economic growth in Sri Lanka using time series data from 1960 to 2016. Other specific objectives are to identify the relationship between total domestic debt and external debt on economic growth and to identify significant policy implications and make suggestions to enhance economic growth. Thus, this study involves two analysis stages. The first one is an aggregate analysis, which assesses the impact of total debt on economic growth. The second one is a disaggregate analysis, which assesses the impact of domestic debt and external debt on economic growth separately. This study implements the Structural Vector Auto Regression (SVAR) approach to examine the impact of public debt on GDP growth in a short-term as well as medium-term in Sri Lanka.

This study confirms that total debt has a negative impact on GDP growth in Sri Lanka. In addition, based on the disaggregate analysis, we can conclude that domestic debt has a negative and significant linear relationship with GDP growth in Sri Lanka and external debt has a positive but insignificant relationship with GDP growth in Sri Lanka. Moreover, this study shows that debt service has a negative but insignificant impact on GDP growth in Sri Lanka.

Policymakers should consider alternative strategies to fill resource gaps, such as the budget deficit and saving-investment gap, without borrowing from domestic or external sources. Thus, the country should promote public private partnerships (PPPs) and foreign direct investment (FDI) instead of loans. For this reason, the necessary legal framework and infrastructure facilities need to be improved to attract more foreign and other private investors to promote economic growth in Sri Lanka.

Key words: Public debt, Domestic debt, External debt, Economic growth, Sri Lanka

1. Introduction

1.1 Background of the Study

Public debt is an important source of financing in developing countries for capital accumulation, infrastructure development and human resource development. Many developing countries such as Sri Lanka use public debt to finance their resource gaps, including fiscal, saving-investment and foreign exchange gaps. As a result, they have accumulated a large amount of debt, which they find difficult to sustain. For these reasons, public debt is one of the foremost macroeconomic problems that has affected fiscal and monetary policies in developing countries over the last few decades.

Recognizing this, many researchers have tried to assess the relationship between debt and growth to enable policymakers to prepare comprehensive policy plans to enhance economic growth. Empirical studies examining the impact of public debt on economic growth have recently been hotly debated in both developed and developing countries. However, these studies have found mixed results, which include positive, negative and non-linear relationships, meaning that the relationship between debt and growth may differ by country and over time.

Additionally, throughout the history of economics, many arguments have been proposed about the relationship between debt and economic growth. According to Keynesian theory, public debt has a positive impact on economic growth. However, Monetarist economists argue that these two variables have a negative relationship. Based on the theoretical background, we do not observe any common relationship between these two variables. The explanations are different based on their assumptions and the period analysed.

In 1950, Sri Lanka's total debt was Rs. 654 million. As a percentage of GDP, this was 16.9 percent. However, it has increased rapidly to Rs 9,387,303 million or 79.3 , as a percentage of GDP, in 2016. This total debt consists of both domestic debt and external debt. Therefore, a comprehensive study should be carried out to assess the impact of total debt on economic growth in Sri Lanka over the last six decades. Accordingly, this study focuses on assessing the impact of public debt on economic growth in Sri Lanka.

1.2 Research Objectives and Research Questions

The aim of this study is to investigate the impact of total debt on economic growth in Sri Lanka at aggregate and disaggregate levels using annual time series data from 1960 to 2016. Accordingly, the main research objectives of this study are as follows:

1. To investigate the impact of total debt on economic growth in Sri Lanka
2. To identify the relationships between domestic debt on economic growth and external debt on economic growth
3. To identify the relationship between debt service and economic growth
4. To identify significant policy implications and make suggestions to enhance economic growth

To accomplish the above objectives, the following research questions are developed:

1. How does total debt affect economic growth in Sri Lanka?
2. What are the relationships between domestic debt on economic growth and external debt on economic growth?

3. What is the relationship between debt service and economic growth?
4. What are the key policy implications that can be considered by policymakers to enhance economic growth?

1.3 Research Methodology and Data

To answer the above research questions, which are to examine the impact of public debt on GDP growth in Sri Lanka over the short-run as well as the medium-term, this study implements a Structural Vector Auto Regression (SVAR). The SVAR model is based on the theoretical structures of economic and politico-economic growth models and since a SVAR model is estimated with a lagged component, it is capable of capturing the dynamic feedback of jointly determined variables and their effects on other variables.

This study used the following two models to estimate the short-run and medium-term relationships between total debt, debt service, and economic growth through two main analyses: aggregate and disaggregate. The first model for the aggregate analysis is as follows:

Model 1

$$\Gamma_0 Y_t = \Gamma_1 Y_{t-1} + \beta_1 X_t + \varepsilon_t \quad E(\varepsilon_t \varepsilon_t') = \sigma_\varepsilon^2 I = \Sigma_\varepsilon \quad (1)$$

In Equation (1), Γ_0 is a (3 x 3) matrix of contemporaneous structural coefficients whose diagonal has values equal to one for the respective dependent variable.

$Y_t = [TDEBT_t, DSR_t, EG_t]'$ is a (3 x 1) column vector of the observed endogenous variables; Γ_1 is a (3 x 3) matrix of coefficients attached to lagged endogenous (or predetermined) variables Y_{t-1} ; β_1 is a (4 x 4) matrix of coefficients attached to exogenous variables; $X_t = [GPOP_t, INF_{t-1}, GCF_t, TROP_{t-1}]'$ is a (4 x 1) column vector of exogenous variables; and ε_t is a (3 x 1) column vector of structural innovations; and Σ_ε is a (3 x 3) variance-covariance matrix of structural innovations.

In the disaggregate analysis, the total debt is separated into two components - domestic debt and external debt. This is done to examine the impact of each type of debt separately. The following model was used for the disaggregate analysis:

Model 2

$$\Gamma_0 Y_t = \Gamma_1 Y_{t-1} + \beta_1 X_t + \varepsilon_t \quad E(\varepsilon_t \varepsilon_t') = \sigma_\varepsilon^2 I = \Sigma_\varepsilon \quad (2)$$

In Equation (2), Γ_0 is a (4 x 4) matrix of contemporaneous structural coefficients whose diagonal has values equal to one for the respective dependent variable.

$Y_t = [FDEBT_t, DDEBT_t, DSR_t, EG_t]'$ is a (4 x 1) column vector of the observed endogenous variables; Γ_1 is a (4 x 4) matrix of coefficients attached to lagged endogenous (or predetermined) variables Y_{t-1} ; β_1 is a (4 x 4) matrix of coefficients attached to exogenous variables; $X_t = [GPOP_t, INF_{t-1}, GCF_t, TROP_{t-1}]'$ is a (4 x 1) column vector of exogenous

variables; and ε_t is a (4 x 1) column vector of structural innovations; and Σ_ε is a (4 x 4) variance-covariance matrix of structural innovations.

This study used annual time series data from 1960 to 2016. All the data were obtained either from annual reports produced by the Central Bank of Sri Lanka or Ministry of Finance of Sri Lanka, World Bank and Asian Development Bank (ADB) data sources. All data were converted into real terms using a GDP deflator with a constant year of 2002.

1.4 Organization of the Study

As briefly discussed above, the relationship between debt and growth in Sri Lanka is uncertain in terms of social welfare development. Accordingly, this study is organized into six sections, with the introduction the first section. The second section presents an overview of the Sri Lankan economy over the last six decades, including current economic performance and total debt pattern. Section three reviews the theoretical background and some previous studies related to the impact of debt on economic growth. The data and methodology used in this study are clearly explained in the fourth section. Section five presents the results and compares them with previous findings and finally, section six concludes the overall discussion of the research findings, considers policy implications and provides some directions for future research.

2. Overview of Public Debt in Sri Lanka

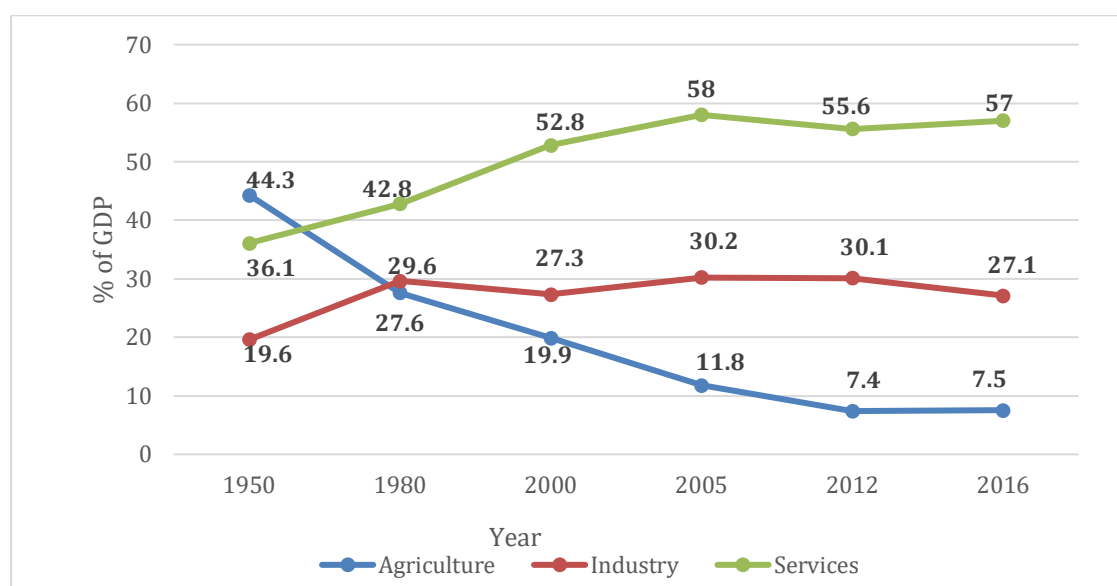
2.1 An Overview of the Sri Lankan Economy

Sri Lanka is a fast-growing middle-income country in the South Asian region, averaging an annual growth rate of approximately 6 percent over the last ten years. Since independence, the country has also recorded remarkable achievements in social and economic indicators despite experiencing both internal and external shocks. Sri Lanka suffered from terrorism problems from 1983 to 2009 as well as from seasonal natural disasters and an Indian Ocean earthquake (and resulting tsunami) in 2004. However, the country has recorded universal primary education enrolment, high life expectancies and a lower infant mortality rate as a result of its free education and healthcare policies.

2.2 Economic Performance of Sri Lanka

With the introduction of an open, market-oriented economic policy in 1977, rapid economic growth was expected from changing the traditional economic structure of the country. The government started deregulating, privatizing and opening the economy to international trade with the view toward improving living standards. In addition, mega-scale infrastructure development projects were implemented in many sectors, such as power generation, irrigation, and roads. As a result, sectoral contributions to GDP has gradually changed over the last six decades. In the 1950s, the agricultural sector contributed the highest amount, 44.3 percent, of GDP, while the service sector and industry sector contributed 36.1 percent and 19.6 percent, respectively. However, in 2012, this pattern changed rapidly, with the highest contribution coming from the service sector and the lowest contribution from the agricultural sector. Figure 2.1 shows the GDP composition as a percentage of GDP from 1950 to 2016. Table 2.1 shows the main economic indicators in years of 1960, 1980, 2000 and 2016.

Figure 2.1: GDP composition as a percentage of GDP, 1950-2016



Source: Central Bank Sri Lanka

Table 2.1: Main Economic Indicators

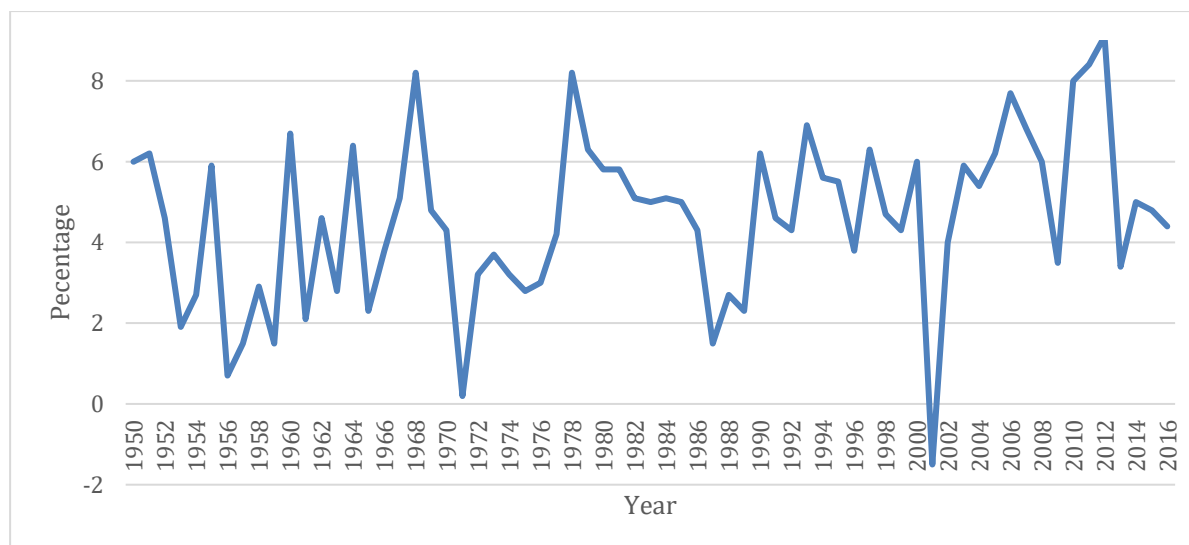
| Variable | Unit | 1960 | 1980 | 2000 | 2016 |
|--------------------|-------------------|------|------|------|-------|
| GDP | US \$ billions | 1.4 | 4.0 | 16.6 | 81.3 |
| GDP per Capita | US \$ | 142 | 273 | 869 | 3,835 |
| GDP Growth Rate | % | 6.7 | 5.8 | 6.0 | 4.4 |

Source: Central Bank Sri Lanka

2.3. Economic Growth

Sri Lanka has recorded a 5 percent average real GDP growth rate over the last six decades despite the conflict situation prevailing in the country over the last three decades. However, the GDP growth rate has fluctuated, as per Figure 2.2. Its highest rate was 8.2 percent in 2011, while the lowest rate of -1.5 percent was recorded in 2001. The main reasons for the low growth rate in 2001 were internal political conflict, a terrorist attack of the Colombo airport, drought and external shocks. However, since establishing peace in the country in 2009 by solving the terrorism problem, the country has recorded remarkable achievements as result of expansionary fiscal policy. Many mega scale development projects were implemented after 2009 and from these development initiatives, the country recorded an average GDP growth rate of 7.5 percent during the 2010–2013 period.

Figure 2.2: Annual GDP Growth Rate, 1950-2016

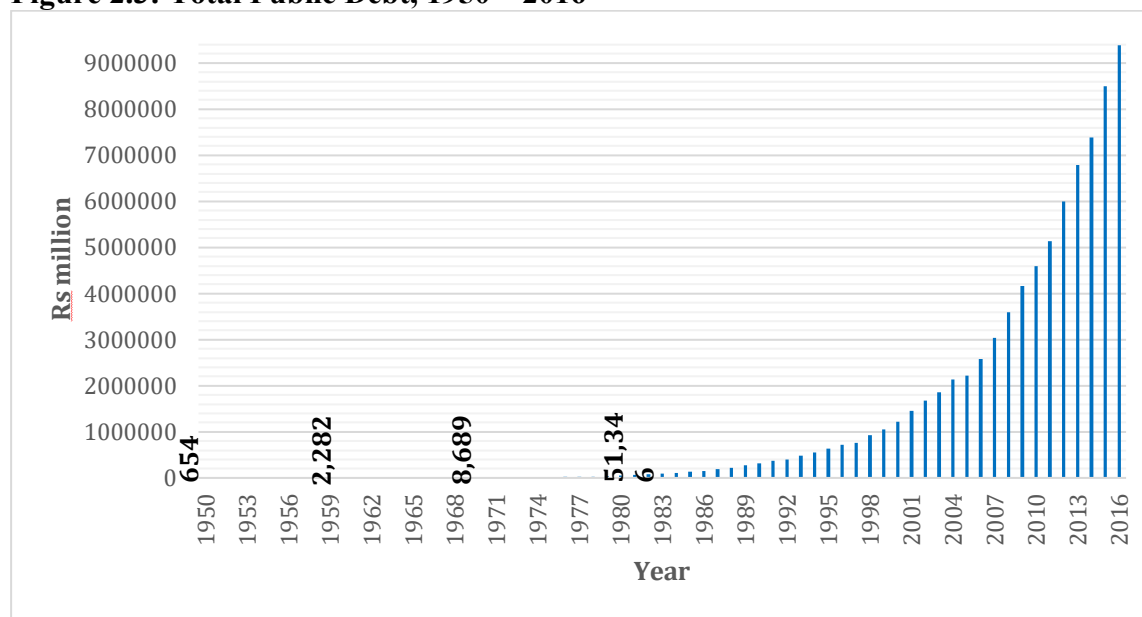


Source: Central Bank Sri Lanka

2.4. Public Debt in Sri Lanka

The total public debt of the country consists of both domestic debt and external debt. Total external debt includes project loans and non-project loans from bilateral and multilateral institutions. Domestic debt consists of banking and non-banking as loans taken from the Central Bank, other domestic commercial banks and other sources. As per Figure 2.3, total debt increased slowly from 1950 to 1977. Moreover, after introducing an open economy system in 1977 total debt increased further. In the 1980s, although the government started many development projects, savings were not sufficient to meet that investment demand. Therefore, the government borrowed money from domestic and external sources to fill this saving-investment gap. By 2000, the amount of total public debt was Rs 1,218,700 million. However, it rapidly increased to Rs 9,387,303 million with 77.6 percent of GDP in 2016. In contrast, the debt/GDP ratio has decreased from 97 percent in 2000 to 79.3 percent in 2016. As result of implementation of mega scale development projects, total debt increased rapidly from 2005 to 2016. In addition, the government spent large amounts of money during the reconstruction process in conflict-affected areas after establishing peace in the country. and steps have been taken to improve the standard of human resources of the country through the development of education and healthcare facilities. As a result, the budget deficit and saving-investment gap widened during this period. To fill these gaps, the government mainly used domestic and external debt during this period. As per Figure 2.3, total public debt increased slowly until the 1980s, and after that, it increased rapidly to Rs 9,387,303 million by the end of 2016.

Figure 2.3: Total Public Debt, 1950 – 2016

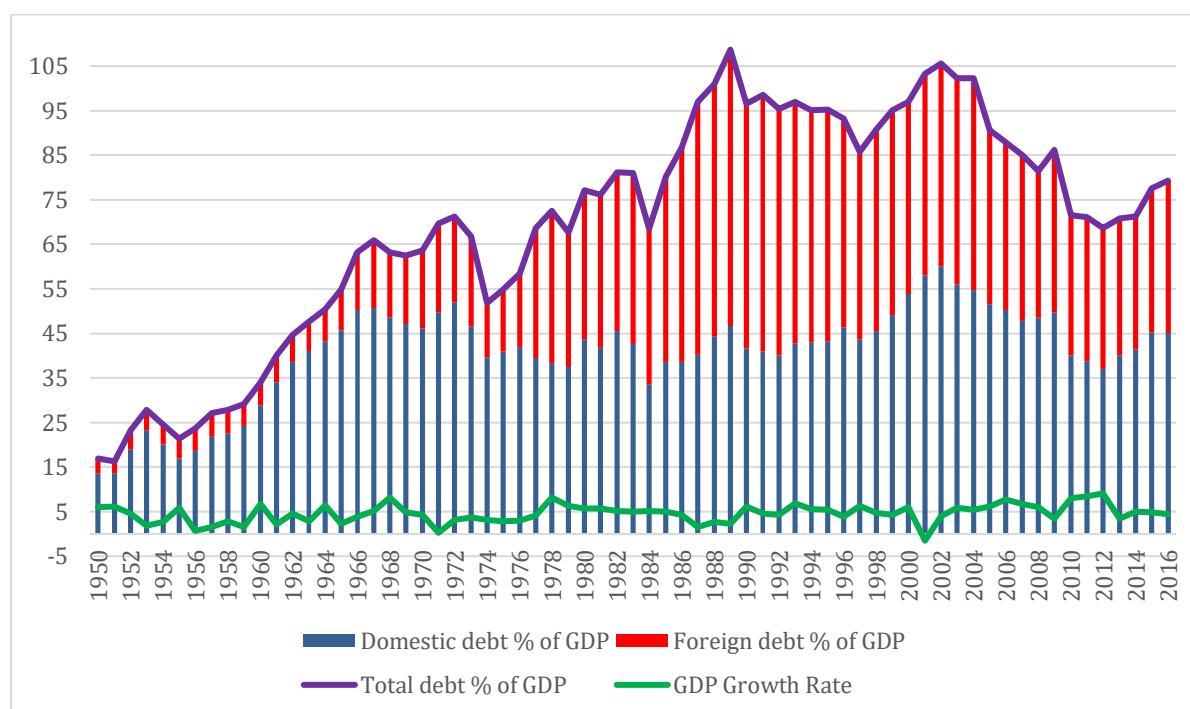


Source: Central Bank Sri Lanka

Domestic debt and external debt were Rs 529 million and Rs 125 million, respectively, in 1950. However, both of these increased gradually to Rs 5,341,507 million and Rs 4,045,796 million, respectively, during the period of 1950-2016. Total external debt increased marginally until the early 1990s but since then, it has increased dramatically. Total external debt includes bilateral loans obtained from other countries, such as China, Japan and India, and multilateral loans obtained from international agencies, such as the Asian Development Bank (ADB) and World Bank. Total domestic debt consists of loans taken from the Central Bank and other commercial banks. Unlike external debt, the country primarily used domestic debt to cover its budget deficits and investment-saving gaps since the 1970s.

As percentage of GDP, the total domestic debt and external debt ratios were 13.7 percent and 3.2 percent, respectively, in 1950. However, these increased to 45.1 percent and 34.2 percent, respectively, by the end of 2016. According to Figure 2.4, the external debt/GDP ratio increased slowly until 1977. However, after introducing open economy policies in 1977 the external debt/GDP ratio increased rapidly before experiencing a relative decrease after 2005.

Figure 2.4: Comparison of domestic debt GDP ratio, external debt GDP ratio and GDP growth rate, 1950-2016



Source: Central Bank Sri Lanka

Comparing total debt/GDP ratio with the GDP growth rate as indicated in Figure 2.4, the total debt/GDP ratio exhibited an increasing trend until 2005. After that, it decreased marginally from 2005 to 2012 and increased from 2012 to 2016. However, the GDP growth rate has fluctuated around 5 percent during last six decades. Because the country graduated to middle-income status in 2010, Sri Lanka is not eligible for concessionary loans from external sources. Thus, its cost of borrowing is now relatively high compared with the period before 2010. Concessionary loans consist of many favourable terms, such as low interest rates, long grace periods, and long loan repayment periods. However, with its graduation, the country has to obtain loans at competitive interest rates with fewer concessions. Therefore, it is essential to carefully evaluate the impact of debt on economic growth to avoid future adverse effects due to high borrowing costs.

Table 2.2: Key Debt Indicators

| Indicator | Value (%) |
|---------------------------------------|-----------|
| Debt / GDP Ratio | 79.3 |
| Domestic Debt / GDP | 45.1 |
| Foreign Debt / GDP | 34.2 |
| Total Interest / GDP | 5.2 |
| Debt Service / Government Revenue | 80.2 |
| Debt Service / Government Expenditure | 44.0 |

As described in this chapter, total public debt in Sri Lanka has been increasing rapidly over the last six decades, and its debt indicators are relatively high compared with other countries in the region. Therefore, evaluating the impact of debt on economic growth in Sri Lanka is timely and needed.

3. Review of the Theoretical Background and Empirical Studies

This chapter critically reviews the theoretical background as well as the empirical studies on the impact of total debt on economic growth. This chapter consists of two main sections. The first section explains the theoretical background on debt and growth, while the second section reviews the previous empirical studies.

3.1 Theoretical Background

3.1.1 Definition of public debt

Total public debt is an important source of financing for the country's main resource deficits, such as budget, saving-investment and foreign exchange deficits, to enhance infrastructure development and human resource development programs. Total public debt can be defined as the money owed by the government of a country to external sources and domestic sources. Thus, total public debt consists of both external debt, and domestic debt. External debt can be further divided as project Loan and non project loan while domestic debt can be divided as banking sector loan and non-banking sector loan.

3.1.1 Definition of economic growth

Gross Domestic Product (GDP) is the main macroeconomic indicator used to evaluate the economic growth of a country. Economic growth is defined as the overall economic performance of a country during a given period. Basically, economic growth shows how the economy utilizes scarce resources. GDP is the value of all final goods and services produced within a country in a given period (Mankiw 2009). According to the effective demand theory, GDP consists of main four components; consumption (C), investment (I), government expenditures (G) and net exports (X-M). Because total debt is used to fill the main resource gaps such as saving-investment, budget and foreign exchange gaps, it is clear that total public debt and other fiscal policy instruments have an influence on economic growth.

3.2 Theoretical Review of the Relationship between Public Debt and Growth

There are many arguments among the main economic groups in the field of economic policy with regards to the relationship between economic growth and public debt. These explanations differ based on their assumptions, starting point and time period. Specially, the following three schools of economics explain the effect of total debt on economic growth in different ways.

1. Keynesian paradigm
2. Monetarist paradigm
3. Ricardian paradigm

3.2.1 Keynesian paradigm

From the Keynesian point of view, if total debt is used as an expansionary fiscal policy tool, an increase in public debt will lead to increases in total consumption and total investment through a multiplier effect. Thus, transaction demand for money will increase. In these circumstances, it is argued that total public debt accelerates economic growth through the effect of expansionary fiscal policy on capital formation. The Figure 3.1 shows Keynesian view on debt-growth relationship.

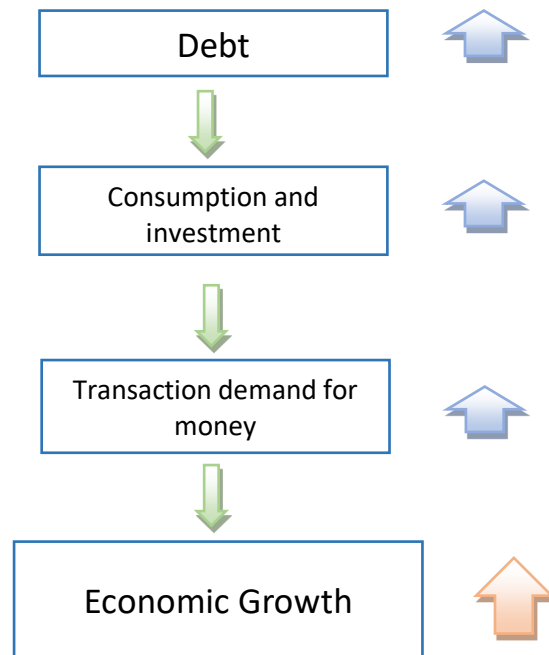


Figure 3.1 Keynesian paradigm – Effect of total debt on economic growth

3.2.2 Monetarist paradigm

Monetarists argue that the crowding-out effect on investment from increased interest rates produces a negative macroeconomic effect of total debt on economic growth. Accordingly, total debt implies a reduction of government saving because the government should allocate more money to loan repayment and interest payments from its total revenue. The decrease in the national savings puts pressure on the interest rate because loanable funds in the domestic market are limited and the government demands a higher rate. Hence, this increase in the interest rate adversely affects economic growth. In addition, the increase in the interest rate causes a reduction in private investment. This is called a crowding-out effect on investment. Decreasing domestic savings and investment adversely affects the economy. These macroeconomic impacts decrease economic growth over the long-run. Figure 3.2. shows the summary of the Monetarist view.

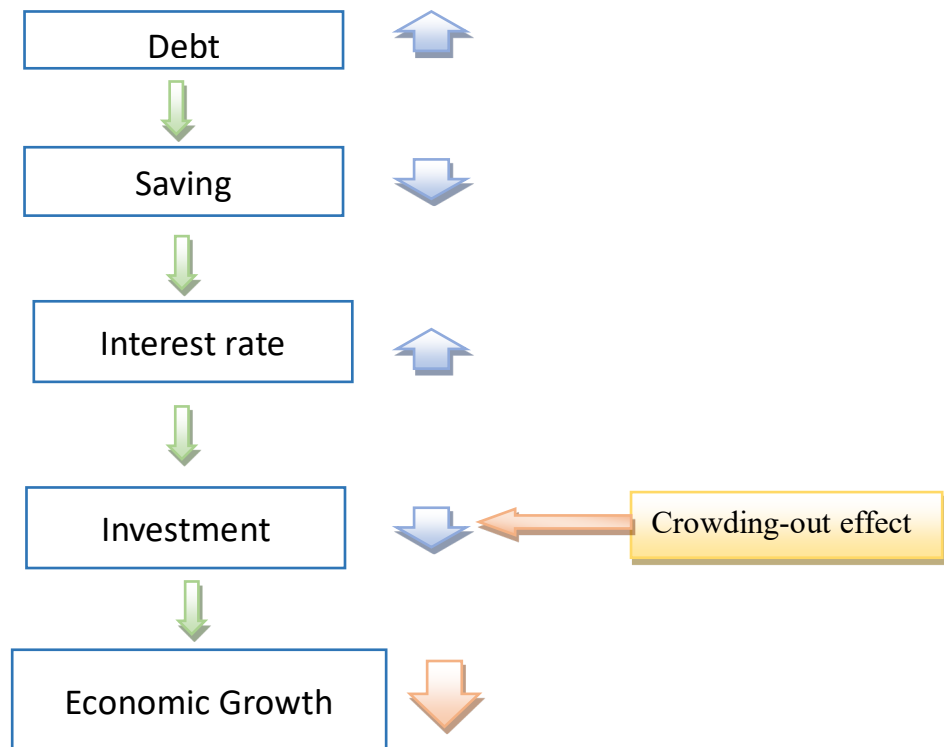


Figure 3.2 Monetarist paradigm – Effect of total debt on economic growth

3.2.3. Ricardian paradigm

In the Ricardian view, the effect of public debt on economic growth is neutral. The Ricardian Equivalence theorem indicates that the financing of public expenditures via taxation and borrowing is equal. On the one hand, the government expects that repayment of debt will take place through future taxation and households will increase their savings by purchasing treasury bills and bonds that have been issued by the government. Accordingly, future taxation and household saving offset each other. Therefore, according to Ricardo, the effect of public debt on economic growth is neutral.

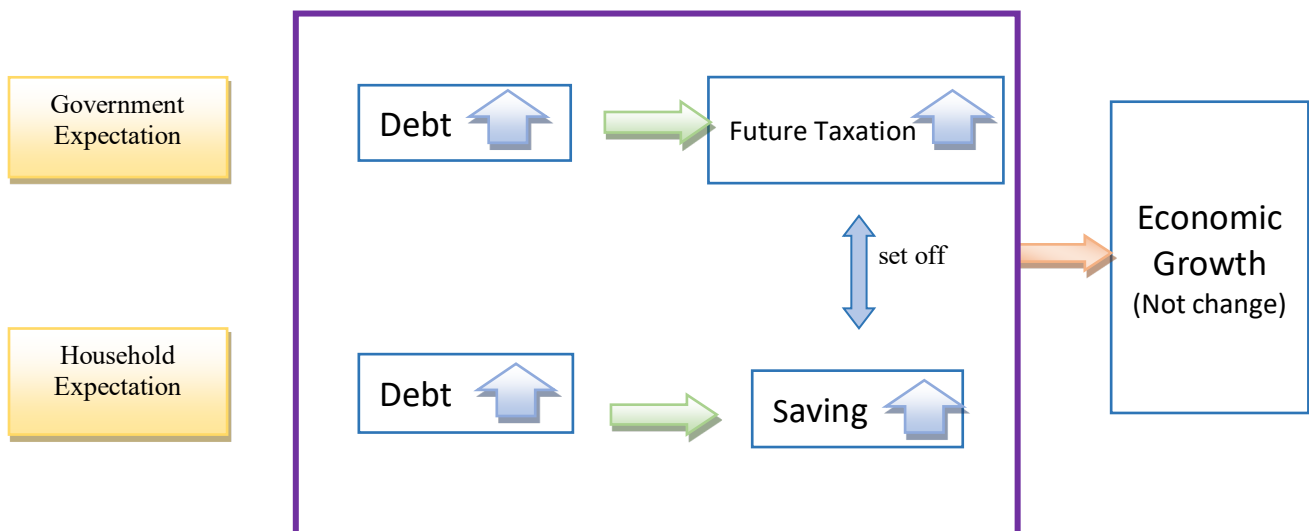


Figure 3.3 Ricardian paradigm – Effect of total debt on economic growth

3.3 Review of Empirical Studies

Existing empirical literature has examined the casual relationship between total public debt and economic growth with interest in this work increasing due to debates around the mixed results. Some researchers have found a negative relationship between these two macroeconomic variables, while others have found a positive relationship. In contrast, some researchers could not find a linear relationship but concluded that these two variables have a non-linear relationship. The findings of these previous empirical studies essentially depend on their estimation methodologies and country characteristics. Accordingly, the previous studies can be categorized in to main three groups based on their results.

3.3.1 Empirical studies of public debt and economic growth – Negative relationship

According to the monetarist view, public debt can negatively affect economic growth over the long-run. In line with this view, some studies show a negative relationship between total public debt and economic growth. Accordingly, an increase in total public debt can decrease economic growth by crowding-out investment.

Janaka and Naranpanawa et al., (2017) investigated the impact of external debt on economic growth in Sri Lanka using time series data from 1960 to 2015. They employed an autoregressive distributed lag (ARDL) approach. The result showed that the debt has a negative impact on economic growth, and that quantity of debt stock and as well as quality of the borrowings determine the impact of debt on economic growth. Further, they pointed out that low quality borrowing (i.e. heavy borrowing from non-concessional sources) may be the key factor that determines the negative impact debt on economic growth. In this study, they used total external debt and divided it into project loan, non-project loan and concessional, and non-concessional loan to determine impact of debt sources on economic growth.

Ramzan and Ahmad (2014) examined the impact of external debt on economic growth in Pakistan using annual data from 1970 to 2009 and an autoregressive distributed lag (ARDL) approach. They concluded that external debt has a negative effect on economic growth in Pakistan. They also noted that low inflation, trade openness and budget deficit are crucial for external debt effectiveness.

Bal and Rath (2014) concluded that public debt has a negative effect on economic growth in India using annual time series data from 1980 to 2011 and an autoregressive distributed lag (ARDL) approach. In this study, they divided total debt into domestic debt and external debt to determine the individual effects on economic growth. The results show that both domestic debt and external debt have a negative effect on growth, which implies that high public debt is reducing economic growth in India over the long-run.

Greenidge, Drakes and Craigwell (2010) examined the relationship between external debt and GDP in Caribbean countries. Their empirical results also show a negative relationship between these macroeconomic variables and economic growth. Cholifihani (2008) similarly found a negative relationship between external debt and GDP over both the short-run and long-run in Indonesia using yearly data from 1980 to 2005.

Woo and Kumar (2010) found a linear inverse relationship between debt and subsequent growth in a sample of emerging and advanced economies. They used annual data from 1970 to 2007

and a cross-country OLS methodology. However, they also found some evidence of nonlinearity in levels of debt having a significant negative effect on growth for the whole sample of emerging and advanced economies.

Few studies have been conducted to investigate the impact of total public debt on economic growth in Sri Lanka. However, Wijeweera et al (2005) investigated the long-run and short-run relationship between external debt and economic growth in Sri Lanka using time series data for period from 1952 to 2002. They found a negative but insignificant long-run relationship between external debt and economic growth.

3.3.2 Empirical studies on public debt and economic growth – Positive relationship

As per Keynesian macroeconomic theory, public debt can positively contribute to economic growth. Accordingly, some studies show a positive relationship between debt and economic growth. An increase in public debt, for example, has been found to cause an increase in consumption and government investment over the short-run, and increase economic growth through a multiplier effect.

Jayaraman and Lau (2009) examined whether external debt has contributed to economic growth in six Pacific Island countries using panel data from 1988 to 2004. Their findings show a positive relationship between external debt and growth. Chandia and Javid (2013) analyzed debt sustainability in the economy of Pakistan for the 1971–2008 period. Their results also show a positive relationship between GDP and debt. In addition, Feeny (2005) investigated the impact of foreign aid, including both loans and grants, on economic growth in Papua New Guinea (PNG) using time series data for the period from 1965 to 1999. The empirical model is estimated using an Autoregressive Distributed Lag (ARDL) approach to cointegration. The results show that foreign aid positively affects economic growth in PNG.

Ayadi (2008) conducted a comparative study of Nigeria and South Africa that examined the impact of external debt on economic growth. This study concluded that debt had a strong positive relationship with output growth, confirming the beneficial impact of debt in South Africa. As for Nigeria, debt was found to have a positive but statistically insignificant impact on output growth.

3.3.3 Empirical studies on public debt and economic growth – Nonlinear relationship

Checherita-Westphal and Rother (2012) investigated the average impact of government debt on per capita GDP growth in 12 euro-zone countries over a 40-year period beginning in 1970. They found a concave (inverted U-shape) relationship between the public debt ratio and the economic growth rate, with a debt turning point at 90–100 percent of GDP. The channels through which public debt has a non-linear impact on economic growth rate are private savings, public investment and total factor productivity.

Baum, Westphal and Rother (2013) tested the relationship between debt and growth in the euro area using data for 12 countries over the period from 1990 to 2010. Their results show a positive relationship between debt and growth over the short-run, but after a threshold level additional debt can negatively affect economic growth. They estimated a debt-GDP threshold level for the euro area of 95 percent.

Hameed and Ashraf (2008) assessed the long-run and short-run relationships between the external debt and economic growth of Pakistan using time series data from the 1970–2003 period. This study concluded that the effect of public debt on growth is positive up to a certain level after which it is negative. In addition, they noted that debt service has a negative effect on growth over the short-run and the long-run. Nurazira et al (2013) analyzed how external debt contributes to economic growth in Malaysia using quarterly data from 1991 to 2009. They found that the accumulation of external debt is associated with an increase in Malaysia's economic growth up to an optimal level, and additional increases in external debt beyond that threshold level have adversely affected the Malaysian economy.

Based on the above empirical studies, we can conclude that the evidence of a relationship between GDP growth and total debt is mixed. The relationship can vary by country and over time. Therefore, in this research, we try to assess this relationship for the case of Sri Lanka.

4. Data and Methodology

As per the previous empirical studies and theoretical background, debt may have a negative or positive relationship to growth and in some instances there may be a non-linear relationship between economic growth and public debt. In this context, the main objective of this research is to examine the impact of public debt on economic growth in Sri Lanka at the aggregate level as well as at the disaggregate level by employing the most appropriate econometric model.

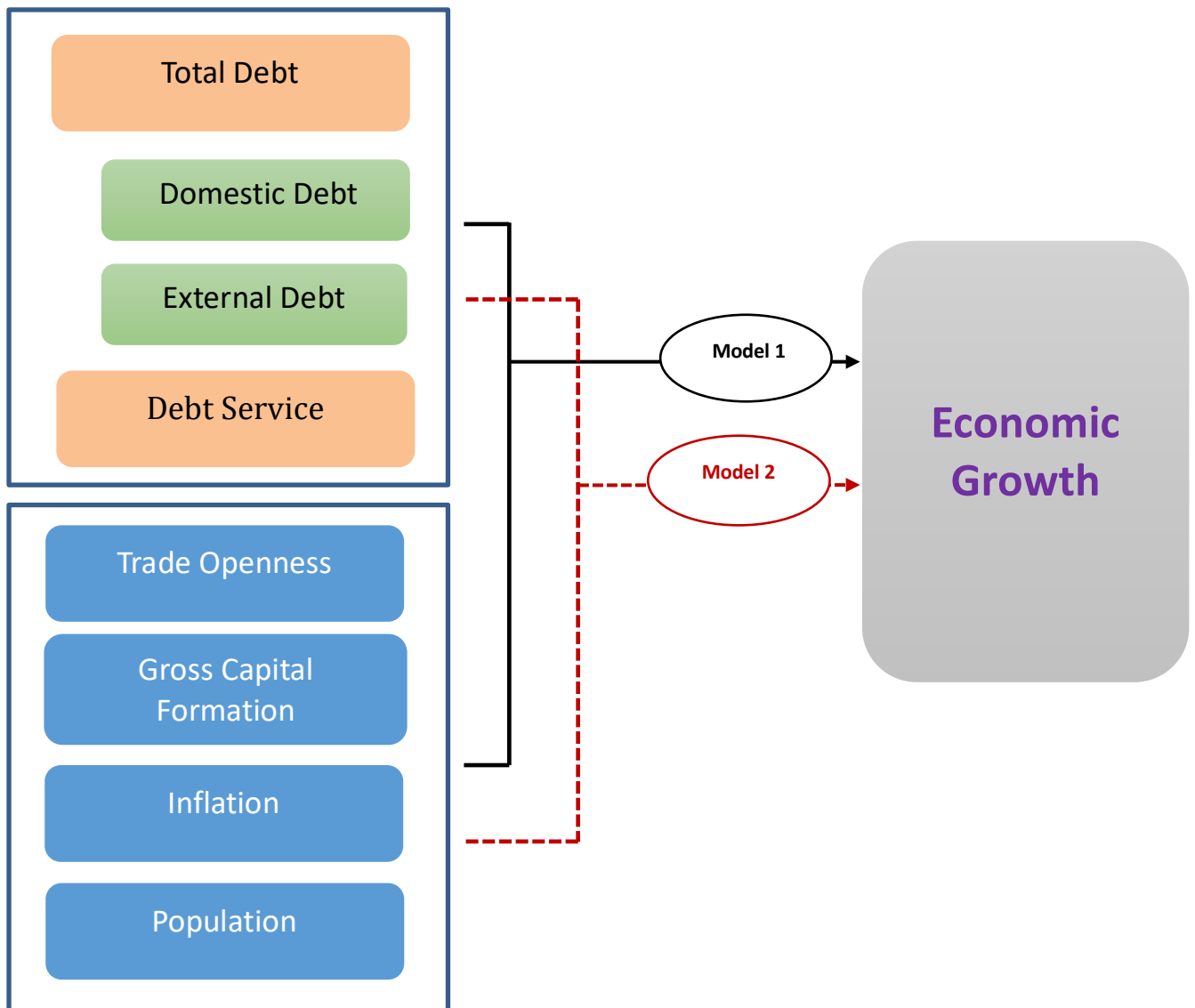
4.1 Analytical framework of the study

The analytical framework of this study is used to achieve the following research objectives:

1. To investigate the impact of total debt on economic growth in Sri Lanka
2. To identify the relationships between domestic debt on economic growth and external debt on economic growth
3. To identify the relationship between debt service and economic growth
4. To identify significant policy implications and make suggestions to enhance economic growth

Figure 4.1 shows two main channels through which total debt impacts economic growth in Sri Lanka using annual time series data from 1960 to 2016. Model 1, which is aggregate analysis of this framework, aims to analyse the impact of total public debt and debt service on the economic growth of Sri Lanka. In addition to the research variable of interest, which is debt, four control variables, namely, trade openness, gross capital formation, inflation, and population growth rate are used. Model 2 of this analytical framework was designed to estimate the impacts of domestic debt and external debt on economic growth separately.

Figure 4.1 **Research Framework**



4.2 Model Specification

As indicated in the research framework, two research models are used to meet the research objectives. Model 1 is used to capture the aggregate effect on economic growth, while Model 2 is used to capture the disaggregate effect, controlling for other macro factors.

4.2.1 *Aggregate analysis*

The main purpose of the aggregate analysis is to achieve the main research objective, which is to examine the impact of total debt on economic growth. In this aggregate analysis, the GDP growth rate is used as a dependent variable. To assess the impact of total debt on economic growth, total debt as a percentage of GDP and debt service as a percentage of exports are included in the growth model. GDP is affected by many other macroeconomic variables, which must be included in the GDP equation to avoid speciation bias in the debt-growth relationship.

For this reason, we also include four control variables; trade openness, gross capital formation, inflation and population growth.

Trade openness is measured as the ratio of exports plus imports to real GDP. This reflects the extent to which the economic activities of the country are linked to the rest of the world. A country with a more open trade policy, such as Sri Lanka, can more quickly adopt newly developed ideas and technologies from the rest of the world than an economy with more restricted trade. Therefore, trade openness is more useful for developing countries to enhance their economic growth. However, if a country's imports are greater than its exports, this can have a negative impact on economic growth. As Sri Lanka exports less than it imports we expect trade openness to have a negative effect on economic growth in this research.

Gross capital formation refers to the net increase in physical assets within the measurement period. It does not account for the consumption of fixed capital, and also does not include land purchases. It is a component of the expenditure method of calculating GDP.

Inflation is the rate at which the general level of prices for goods and services is rising and, consequently, the purchasing power of currency is falling. Central banks attempt to limit inflation, and avoid deflation, in order to keep the economy running smoothly.

Human capital is another important variable to determine the economic growth of the country. Many studies have used labour force data as a proxy for human capital. However, due to the unavailability of labour force data over the last six decades, we included the *population growth rate* in the growth model as a proxy for human capital. We expect the population growth rate to have a positive impact on economic growth.

Finally, we included different structural breaks, before the analysis, as various years for different variables to remove un-stationery status.

Therefore, the basic model for the aggregate analysis in this study is as follows:

Model 1

$$\Gamma_0 Y_t = \Gamma_1 Y_{t-1} + \beta_1 X_t + \varepsilon_t \quad E(\varepsilon_t \varepsilon_t') = \sigma_\varepsilon^2 I = \Sigma_\varepsilon \quad (1)$$

In Equation (1), Γ_0 is a (3 x 3) matrix of contemporaneous structural coefficients whose diagonal has values equal to one for the respective dependent variable.

$Y_t = [TDEBT_t, DSR_t, EG_t]'$ is a (3 x 1) column vector of the observed endogenous variables; Γ_1 is a (3 x 3) matrix of coefficients attached to lagged endogenous (or predetermined) variables Y_{t-1} ; β_1 is a (4 x 4) matrix of coefficients attached to exogenous variables; $X_t = [GPOP_t, INF_{t-1}, GCF_t, TROP_{t-1}]'$ is a (4 x 1) column vector of exogenous variables; ε_t is a (3 x 1) column vector of structural innovations; and Σ_ε is a (3 x 3) variance-covariance matrix of structural innovations.

The main purpose of the disaggregate analysis is to separately assess the impact of total domestic debt and external debt on economic growth (Bal et al., 2014). In the disaggregate analysis, we have divided total debt into domestic debt and external debt and included it in the standard growth model. Control variables are the same as in Model 1. After disaggregating domestic debt and external debt, it is easy to make strong policy recommendations in terms of each variable.

The model for the disaggregate analysis of this study is as follows:

Model 2

$$\Gamma_0 Y_t = \Gamma_1 Y_{t-1} + \beta_1 X_t + \varepsilon_t \quad E(\varepsilon_t \varepsilon_t') = \sigma_\varepsilon^2 I = \Sigma_\varepsilon \quad (2)$$

In Equation (2), Γ_0 is a (4 x 4) matrix of contemporaneous structural coefficients whose diagonal has values equal to one for the respective dependent variable.

$Y_t = [FDEBT_t, DDEBT_t, DSR_t, EG_t]'$ is a (4 x 1) column vector of the observed endogenous variables; Γ_1 is a (4 x 4) matrix of coefficients attached to lagged endogenous (or predetermined) variables Y_{t-1} ; β_1 is a (4 x 4) matrix of coefficients attached to exogenous variables; $X_t = [GPOP_t, INF_{t-1}, GCF_t, TROP_{t-1}]'$ is a (4 x 1) column vector of exogenous variables; ε_t is a (4 x 1) column vector of structural innovations; and Σ_ε is a (4 x 4) variance-covariance matrix of structural innovations.

The shocks are identified by employing the Cholesky factorization such that the ordering of variables is according to the prior theoretical and empirical claims on the relationships between debt and growth. The short- and the medium-term elasticities are obtained by accumulating relevant dynamic impulse responses. An estimate is considered significant if zero is outside the 68% confidence intervals (CI).

4.3 Methodology Specification

This study implements a Structural Vector Auto Regression (SVAR). The SVAR model is based on the theoretical structures of economic and politico-economic growth models. It is capable of capturing the dynamic feedback of jointly determined variables and their effects on other variables since a SVAR model is estimated with a lagged component. The fundamental requirement for the specification of this SVAR model is to have a theoretical basis for the model (Green 2003, p. 595-597). SVAR can be used to estimate relationships between endogenously determined variables. The SVAR approach yields precise estimates for short- and medium-run parameters.

4.4 Data

This study used annual country-level data for Sri Lanka from 1960 to 2016 obtained from annual reports produced by the Central Bank of Sri Lanka and Ministry of Finance and Planning. Population growth data were obtained from the Department of the Census and Statistics, while the GDP deflator data were obtained from the World Bank database. All data were converted into real values based on a GDP deflator (2002 = 100). Due to the lack of labour

force data, this study used the population growth rate as a proxy. The GDP growth rate is used as a dependent variable. A summary of the variables and data sources used to analyse the impact of debt at the aggregate level and disaggregate level is presented in Table 4.1.

Table 4.1 : Summary of the variables and data sources

| Codes | Definition | Source (s) |
|-------|---|------------|
| EG | Economic growth (growth of real GDP). | CBSL |
| TDEBT | Total debt as a proportion of real GDP (log). | CBSL |
| DDEBT | Domestic debt as a proportion of real GDP (log). | CBSL |
| FDEBT | External debt as a proportion of real GDP (log). | MOF |
| DSR | Debt Service Ratio | CBSL |
| GPOP | Growth of population (log first difference) | DCS |
| INF | Inflation (log first difference of Consumer Price Index) (one period lag) | CBSL |
| GCF | Growth of gross capital formation | CBSL |
| TROP | Trade openness (export plus imports as a proportion of real GDP) (one period lag) | CBSL |

5. Empirical Results and Discussion

The estimation process starts by testing the time series properties of the data using the two break LM unit root test introduced by Lee and Strazicich (2003). The results of the unit root test is presented in table 5.1.

Table 5.1: Two-Break Minimum LM Unit Root Test

| <i>Variables</i> | <i>K</i> | <i>S_{t-1}</i> | | <i>I(d)</i> | | | | | | |
|--|----------|------------------------|------|-------------|-------|-------|-------|----|------|------|
| <i>EG</i> | 0 | -7.4* | | <i>I(0)</i> | | | | | | |
| <i>TDEBT</i> | 1 | -4.9 | | <i>I(1)</i> | | | | | | |
| <i>DDEBT</i> | 5 | -4.5 | | <i>I(1)</i> | | | | | | |
| <i>FDEBT</i> | 5 | -6.2** | | <i>I(0)</i> | | | | | | |
| <i>DSR</i> | 0 | -4.9 | | <i>I(1)</i> | | | | | | |
| <i>GPOP</i> | 2 | -6.6* | | <i>I(0)</i> | | | | | | |
| <i>INF</i> | 4 | -6.9* | | <i>I(0)</i> | | | | | | |
| <i>GCF</i> | 0 | -8.2* | | <i>I(0)</i> | | | | | | |
| <i>TROP</i> | 5 | -4.9 | | <i>I(1)</i> | | | | | | |
| <i>Critical values of Lee and Strazicich (2003, Table 2) two-break minimum LM unit root test</i> | | | | | | | | | | |
| λ_2 | 0.4 | | 0.6 | | 0.8 | | | | | |
| λ_1 | 1% | 5% | 10% | 1% | 5% | 10% | 1% | 5% | 10% | |
| 0.2 | - | -5.50 | - | - | -5.74 | -5.32 | -6.33 | - | - | |
| | 6.16 | | 5.27 | 6.41 | | | | | 5.71 | 5.33 |
| 0.4 | - | - | - | - | -5.67 | -5.31 | -6.42 | - | - | |
| | | | | 6.45 | | | | | 5.65 | 5.32 |
| 0.8 | - | - | - | - | - | - | -6.32 | - | - | |
| | | | | | | | | | 5.73 | 5.32 |

Note: In this study we have used Model C (two breaks in the intercept and two breaks in the trend) of Lee and Strazicich (2003) to perform the unit root test. K is the lag length, which is selected using the general-to-specific method by setting the maximum lags (k_{\max}) up to 5. S_{t-1} is the minimum LM statistic of the coefficient on the unit root parameter. $I(d)$ denotes the order of integration of relevant variable. λ_i is a vector containing the location of breaks. * and ** symbols show statistical significance of relevant coefficients at 1% and 5% levels respectively. All the calculations were obtained using RATS 9.1 version.

The results of unit root test show that four variables are non-stationary with breaks, whereas other variables are trend-stationary with breaks. Break effects of each individual series were removed by estimating an OLS regression with dummies for respective break years. Non-stationary variables are transformed into stationarity by taking their first differences whereas all the other trend-stationary variables are transformed to stationarity by removing their time trends. The order of the underlying VAR model is selected based on the AIC and HQIC criteria with the smallest values for one lag (0.27, 0.78) against two (0.33, 1.06) and three (0.34, 1.30) lags respectively. The LM test for residual autocorrelation of the underlying VAR (1) model further confirmed that the model does not suffer from autocorrelation at the 1% significant level since the p-value for the null of no autocorrelation is 0.03. Figure 2 shows that all the

eigenvalues lie inside the unit circle and hence the underlying VAR (1) satisfies the stability condition.

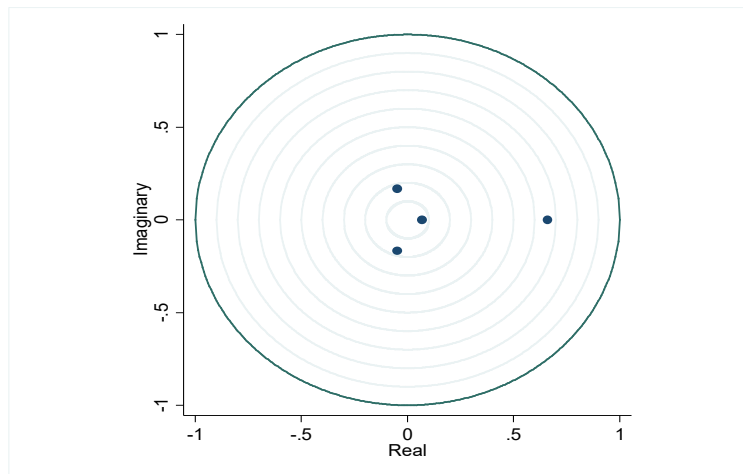


Figure 5.1. Roots of the companion matrix of the underlying VAR (1) model

5.1 Empirical Results

Firstly, we tried to obtain the long-run relationship between debt and growth using Auto Regressive Distributed Lag (ARDL) approach. Since, we couldn't obtain any significant long-run relationship, as a next step we tried to assess medium- and short-term relationships by employing Structural Vector Autoregressive (SVAR) approach. The results of the estimated SVAR (Short-run and Medium-run coefficients) are presented in Table 5.2.

First, we estimated Model 1 (Equation 1) for the aggregate level analysis to examine the impact of total debt on economic growth using time series data from 1960 to 2016. This analysis was conducted using the Structural Vector Autoregressive (SVAR) estimation technique.

Model 1 of the table above shows the results of the aggregate analysis, while Model 2 shows the results of the disaggregate analysis which is included both total domestic debt and external debt into the model. In the results for Model 1, the coefficient of the research interest variable, which is total debt, is negative and statistically significant at the short-term as well as medium-term. This is consistent with the Monetarists view on debt-growth relationship. That is, there are many reasons to have this negative impact. One of main reason is that debt may have a crowding-out impact on private investment. As a result of a high level of debt, the banking sector cannot lend more money for private investment and this leads to a negative impact on economic growth via reduction of private investments. These results are similar with the Bal (2014) and Ramzan (2015). As expected, debt service ratio shows a negative relationship with growth but it is statistically insignificant.

Table 5.2 Results of the estimated of SVAR – Short-run and Medium-run coefficients

| 1% point initial shock to the innovation of: | Dependent variable: Economic Growth | | | |
|--|--|--|--|--|
| | Model 1 | | Model 2 | |
| | Short-term elasticity (after 2 years) | Medium-term elasticity (after 8 years) | Short-term elasticity (after 2 years) | Medium-term elasticity (after 8 years) |
| TDEBT | -0.26* (-0.29,-0.25) | -0.25* (-0.29,-0.24) | - | - |
| DDEBT | - | - | -0.47* (-0.50,-0.19) | -0.47* (-0.50, -0.19) |
| FDEBT | - | - | 0.002 (-0.12, 0.025) | 0.10 (-0.12, 0.13) |
| DSR | -0.34 (-0.42, 0.27) | -0.35 (-0.42, 0.27) | -0.22 (-0.31, 0.29) | -0.23 (-0.31, 0.29) |

According to the empirical results of the Model 2, we found that total domestic debt has a negative and significant impact on economic growth in the short-term and medium-term. This result is not surprising since the cost of borrowing of domestic debt is relatively high compared with external debt. In contrast, as per the empirical results of Model 2, total external debt has a positive but insignificant impact on economic growth in the short-term and medium-term. The likely explanation behind this positive impact is that majority of the external debt are concessionary loans obtained from foreign countries and multinational organizations. Therefore, cost of borrowing is very low. However, coefficient of the external debt is statistically insignificant. As occurred in Model 1, debt service ratio shows a negative but insignificant relationship on economic growth in the short-term and medium-term.

5.2 Accumulated Impulse Response

The following accumulated impulse response graphs shows impact of total debt, domestic debt, external debt and debt service on economic growth respectively.

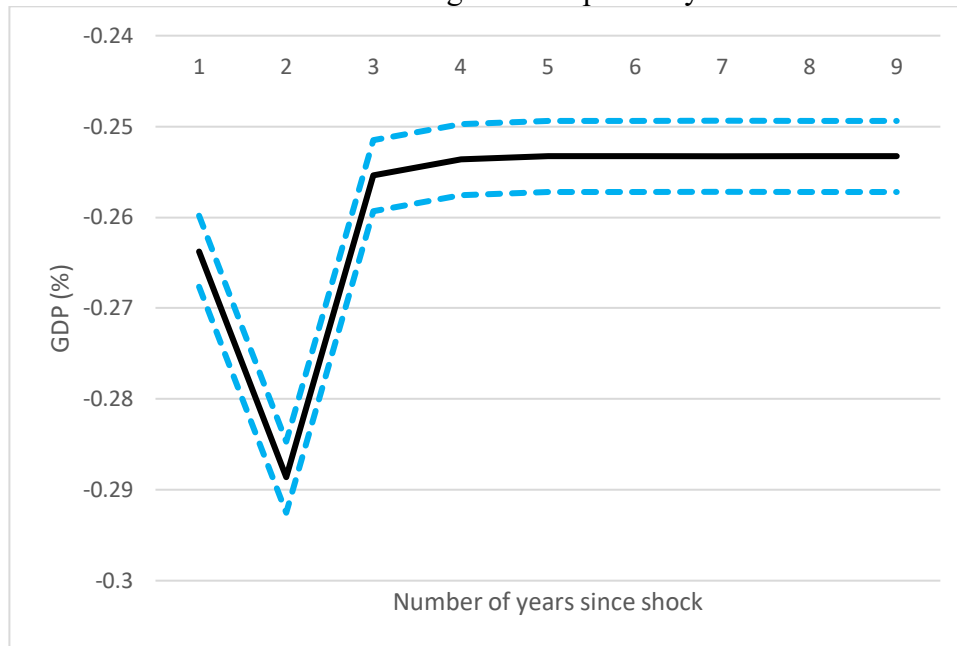


Figure 5.2: Accumulated response of economic growth to a 1% point GDP increase in total debt

This graph shows a negative impact of total debt on economic growth in the medium-term. When total debt increases by 1% the first two years show a huge negative impact on economic growth. However, after eight years it has a negative, significant and stable relationship with economic growth.

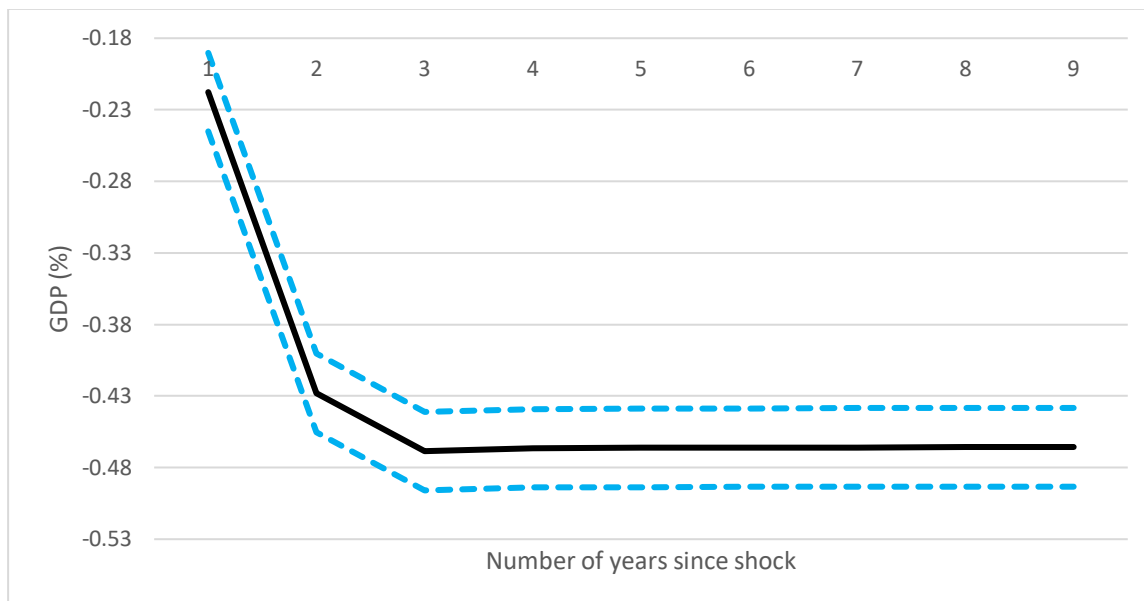


Figure 5.3 Accumulated response of economic growth to a 1% point GDP increase in domestic debt

Figure 5.3 shows a negative impact of total domestic debt on economic growth in the medium-term. When total domestic debt increases by 1%, the first two years show a negative impact on economic growth. However, after eight years it has a negative, significant and stable relationship with economic growth.

Figure 5.4: Accumulated response of GDP to a 1% point GDP increase in external debt

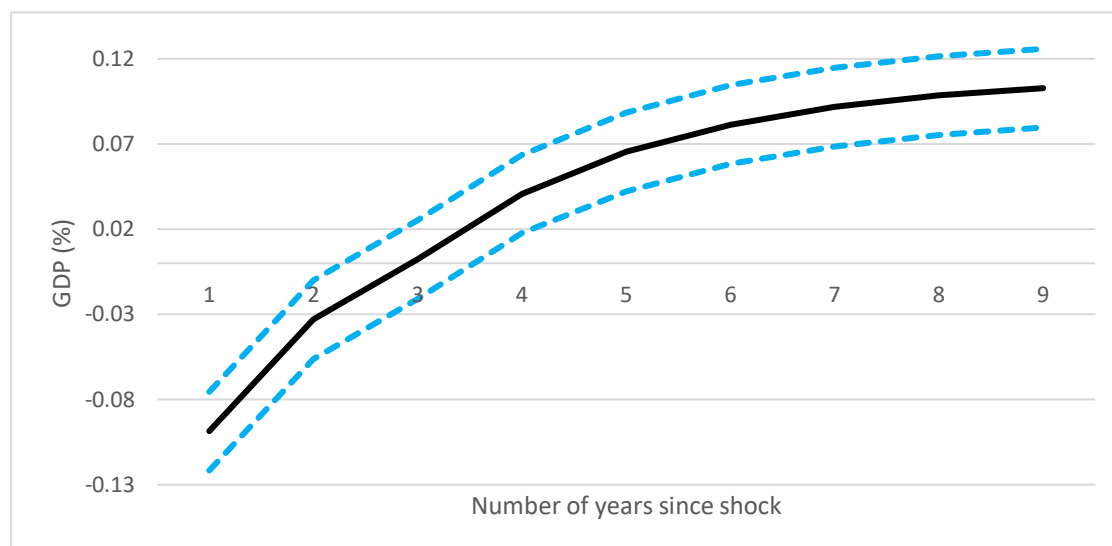


Figure 5.4 shows a positive but insignificant impact of total external debt on economic growth in the medium-term. When total external debt increases by 1%, it shows a positive impact on economic growth.

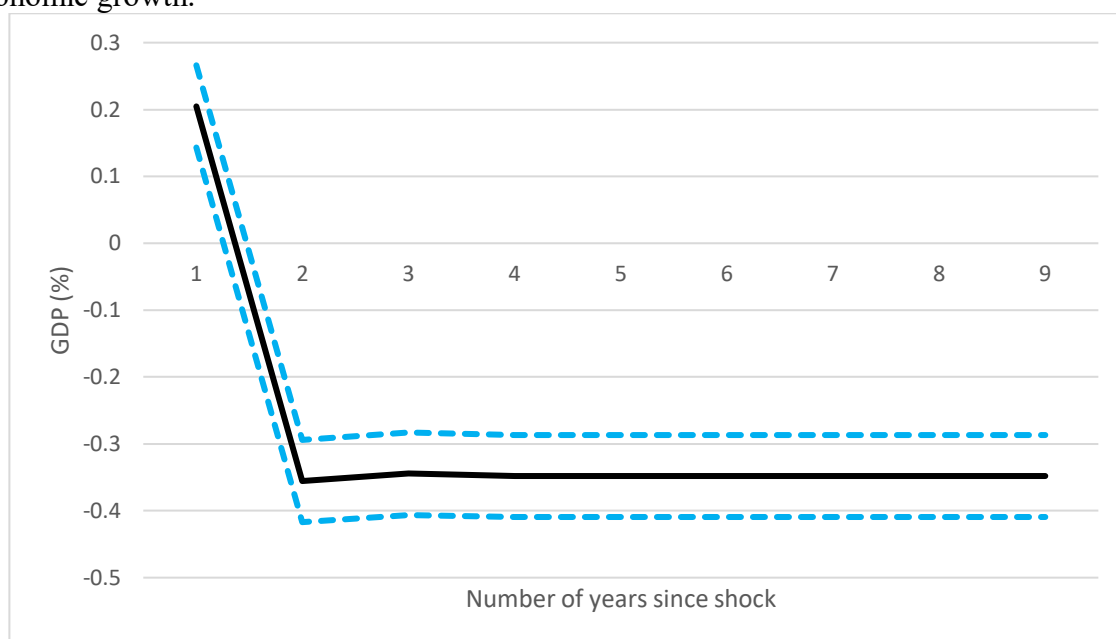


Figure 5.5: Accumulated response of economic growth to a 1% point GDP increase in debt service

Figure 5.5 shows a negative impact of debt service on economic growth in the medium-term. When total debt service increases by 1%, the first two years show a huge negative impact on

economic growth. However, after eight years it has a negative and stable relationship with economic growth.

6. Conclusion and Policy Implications

6.1 Conclusion

This study examined the relationship between the total debt and GDP growth of Sri Lanka using time series data from 1960 to 2016 and employing an Structural Vector Auto Regression (SVAR) econometric methodology. The following research objectives and questions were investigated to develop existing policies to enhance economic sustainability through sound fiscal management:

1. To investigate the impact of total debt on economic growth in Sri Lanka
2. To identify the relationships between domestic debt on economic growth and external debt on economic growth
3. To identify the relationship between debt service and economic growth
4. To identify significant policy implications and propose suggestions to enhance economic growth

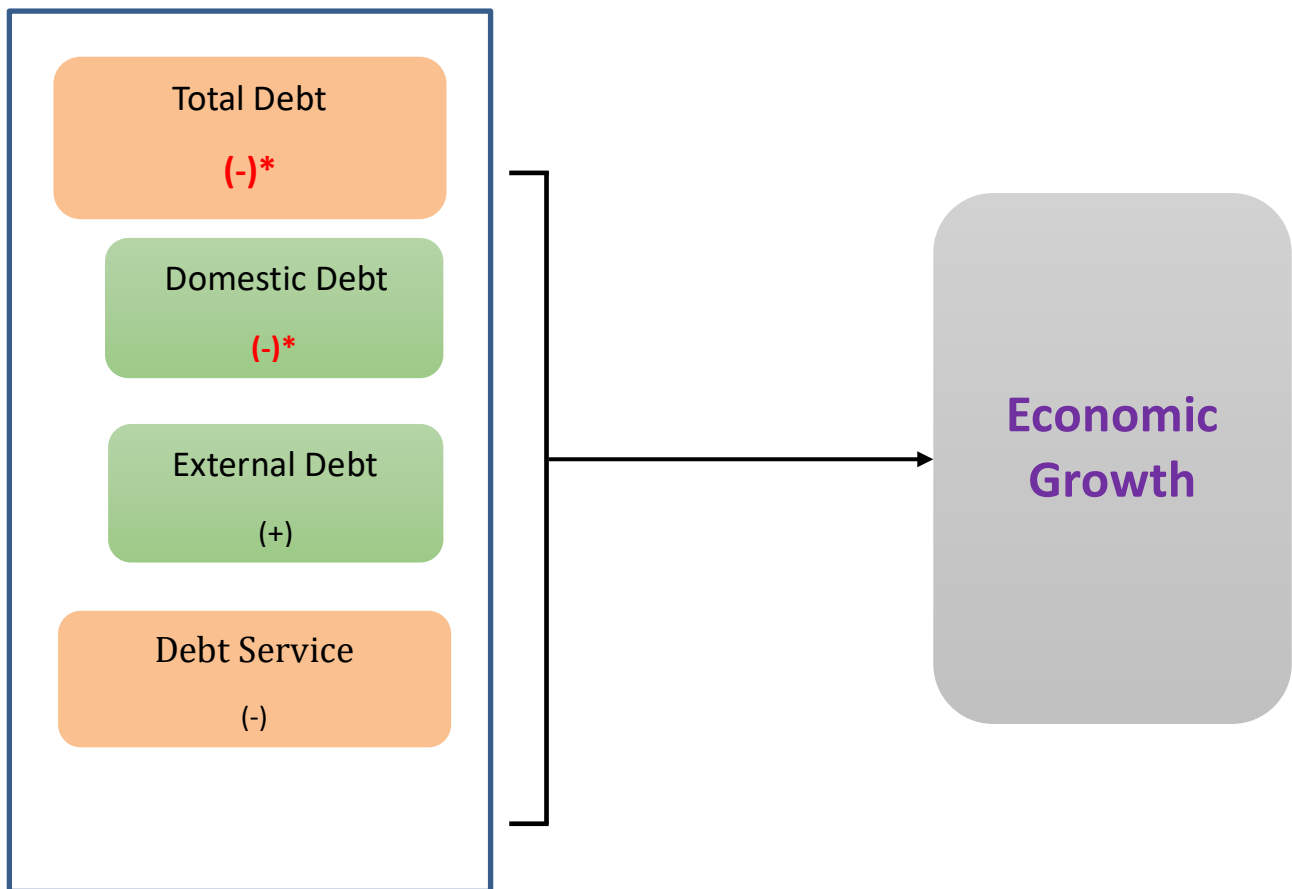
The following research questions are developed in response to the above objectives:

1. How does total debt affect economic growth in Sri Lanka?
2. What are the relationships between domestic debt on economic growth and external debt on economic growth?
3. What is the relationship between debt service and economic growth?
4. What are the key policy implications that can be considered by policymakers to enhance economic growth?

Based on the empirical analysis explained above, the findings of this study can be summarized as follows:

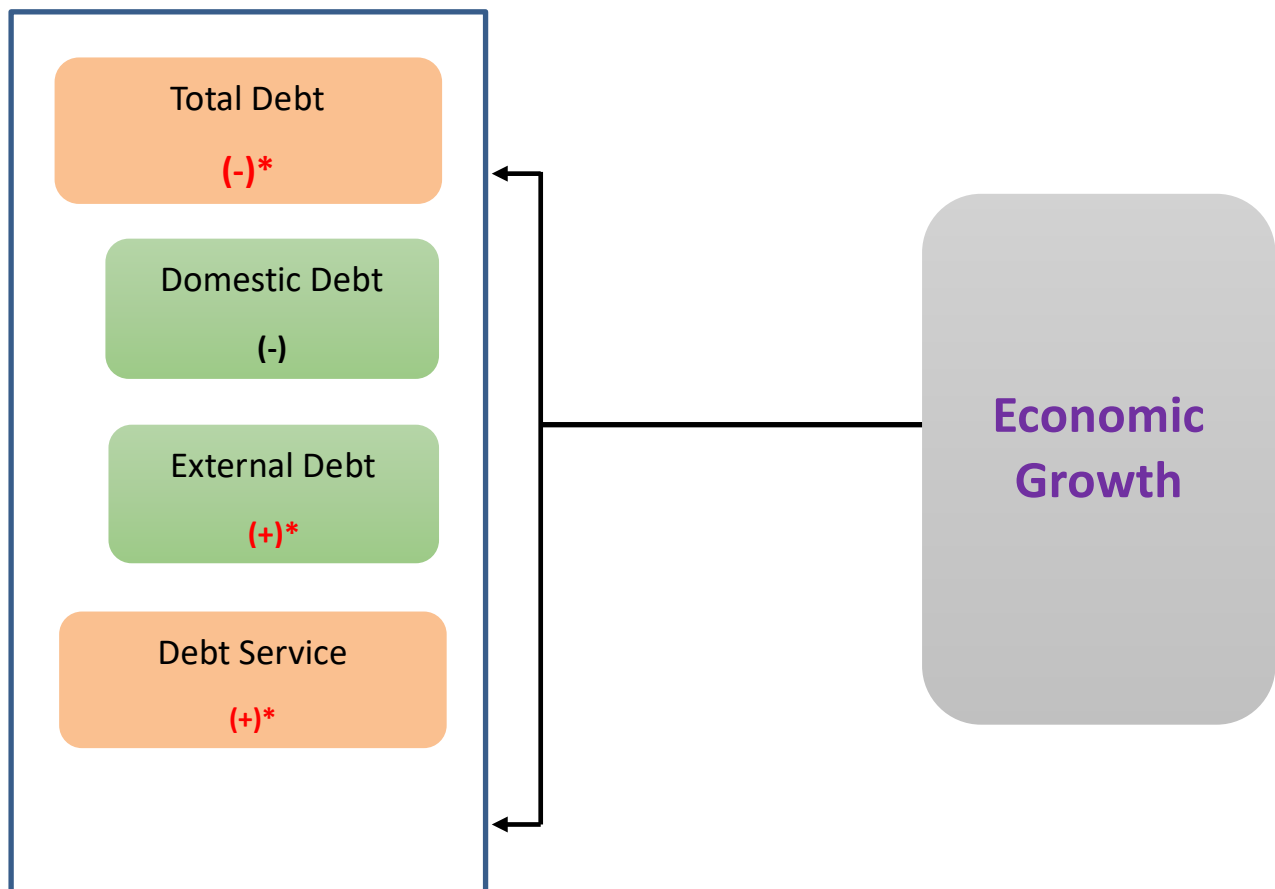
The main empirical result of this study, shown in Figure 6.1, is that total debt has a negative impact on GDP growth in Sri Lanka. There is also no significant relationship between debt service and GDP growth and, based on the disaggregate analysis which is Model 2, we can conclude that in Sri Lanka, domestic debt has a negative linear relationship with GDP growth. There is no significant relationship between external debt on GDP growth. These findings are very useful for policymakers engaged in short-term and medium-term policy planning for the development of the country.

Figure 6.1: Empirical Findings



In addition, the empirical results of reverse causality are summarized as follows.

Figure 6.2: Reverse Causality



According to the empirical results of Model 2 for reverse causality, GDP growth has a negative relationship with total debt in aggregate analysis and a negative relationship in disaggregate analysis. In addition, GDP growth has a positive relationship with external debt in disaggregate analysis. However, there is no significant relationship between debt service and GDP growth.

6.2 Policy Implications

Based on the findings of this study, we can identify strong policy implications for the economic growth of the country.

- **Use alternative financing tools**

The country cannot reduce government expenditures or government investments by targeting a reduction of the public debt. Therefore, alternative strategies should be applied to fill resources gaps, such as budget deficits and saving-investment gap. Moreover, the country should promote public private partnerships (PPPs) and foreign direct investment (FDI) rather than borrowing loans from external or domestic sources. For these reasons, the necessary legal framework and infrastructure facilities need to be improved to attract more foreign and private investors.

- **Identify threshold level of debt**

The country should maintain a debt/GDP ratio below the identified threshold through a comprehensive analysis to avoid negatively affecting GDP growth. This is particularly important in the case of domestic debt.

- **Ensure efficient utilization of debt**

The country should take necessary steps to ensure the efficient utilization of debt. Debt should only be used for growth enhancing investment activities such as to develop the infrastructure, education, health and agriculture sectors. Therefore, the efficiency of public debt can be improved by reallocating funds among sectors and targeting high returns to debt. The government should also take the necessary steps to ensure efficient utilization of debt. If a country uses debt for consumption purposes, the returns to debt are very low. Under these circumstances, debt should only be used for investment to develop the infrastructure, education, health and agriculture sectors. Therefore, the efficiency of public debt can be improved by reallocating funds among sectors and targeting high returns to debt.

- **Increase government revenue**

Majority of debts are obtained to fill saving-investment gap and fiscal gap. Thus, strong action needs to be taken to increase government revenue and, in particular tax structure and collection procedures need to be improved.

- **Increase export revenue**

The country should introduce export promotion activities such as establishing export-processing zones, introducing export-oriented crops and goods and introducing innovation into exported goods to increase the volume of exports.

6.3 Suggestions for Future Study

This study is related to the field of fiscal policy and tried to assess the impact of debt on economic growth in Sri Lanka using a few macroeconomic variables. However, there are many macroeconomic, political and social factors that can influence economic growth in any country. Therefore, other relevant macroeconomic and political variables should be included in the growth equation to assess the impact of debt on economic growth in the future.

Additionally, this study is limited to Sri Lanka, but it is important to assess the impact of debt on the economic growth of developing countries or, at least, for the South Asian region to determine policy directions for future economic activities in the region. Therefore, a panel analysis of the South Asian region should be conducted.

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