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Abstract

At present, continuous accumulation of government debt and its consequences to the economy become a vibrant and debatable topic in Sri Lanka. Analysts and policy makers are divided in their opinion with regard to the economic consequences on the debt incurred by the Sri Lankan government. This study discusses the existing theoretical and empirical literature on the relationship between public debt and economic growth. Initially, the study reviews the theories related to public debt and economic growth nexus and thereafter proceed to survey the recent empirical literature available on the above. It has been observed that the existing theoretical literature on debt and growth nexus suggest highly heterogeneous conclusions despite the negative relationship which exist between public debt and economic growth and are widely accepted by economists. Subsequent to the recent empirical findings of inverted nonlinear relationship between public debt and economic growth, the economists widely focus to find out the optimal debt levels of countries. The study shows an inverted U-shaped nonlinear relationship between public debt and economic growth in Sri Lanka which is between the threshold of 80 per cent and 90 per cent. In addition to the above, the study finds that there is a considerable gap existing among available literature that does not address the channels through which public debt affect economic growth in a detailed manner.

Key word: public debt, economic growth, debt threshold, debt channels

Introduction

The debate over the magnitude of government debt and its relationship to economic growth is always at the forefront of policy discussions among economists. Analysts and policy makers are divided on the nexus between public debt and economic growth whether it is neutral, negative or positive. The Ricardian view emphasises that there is no difference exists between debt finance and tax finance as sources of government expenditure and therefore advocates neutrality of debt to economic growth; the neo-classists however are of the view that public debt has negative

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consequences for economic growth on the long run and therefore suggests a negative correlation between debt and economic growth (Ricardo, 1951, Barro, 1974, Modigliani, 1961 and Diamond, 1965). The Keynes’s view on public debt is another doctrine which emphasis the expansionary government budget for enhancing economic activities of a country (Keynesian, 1936). In addition to these views, recent empirical studies on public debt and its consequences suggest a nonlinear relationship to public debt and economic growth on the long run. These different views and conclusions have kept this topic alive and debatable throughout the centuries.

The relationship between public debt and economic growth is a widely discussed theoretical topic, though its conclusions are highly heterogeneous as explained above. Empirical studies of public debt however are scarce in comparison to the theoretical literature and most of the existing studies in this area are mainly focused on situations in the United States of America (USA), European countries and other developed countries, where debt finance is used to postpone tax collection. The fiscal policy dimensions of a developing country are totally different to that of a developed country. In a developing country government expenditure is higher than revenue in most instances and the government generally continues to operate with deficit budgets. Thus, public debt is used to increase the capacity of the government to meet its expenditure especially capital expenditure for development purposes (Aizenman, Kletzer and Pinto, 2007). It has been observed that the facts relevant to developing countries have been neglected in existing studies related to examine the relationship between public debt and economic growth.

In Sri Lanka, the topic of public debt management takes center position in economic debates prevalent amongst the economists, police makers and analysis groups, as government of Sri Lanka heavily borrows from bilateral and multilateral agencies as well as international capital markets under commercial terms and invests in infrastructure projects. However, substantial research work has not been conducted to examine the consequences of the high level of public debt stock on the economy of Sri Lanka though there are very few studies which scrutinize the public debt of Sri Lanka in relation to various single aspects of the economy in the past. Banda and Priyadarshanee

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2 Several papers could be cited to prove this argument. Some of those papers are Barro, 1979; Checheritta & Rother, 2012 and Ceccheitti et al., 2011
are some of the studies which evaluate the consequences of public debt of Sri Lanka. Furthermore, identifying the channels through which debts affect economic growth is a new phenomenon undertaken by the study on public debt and economic growth. Public debt has several consequences on key macroeconomic variables such as interest rate, inflation, consumption, investments, employment and financial markets and some of these consequences are determinant factors of economic growth. In order to identify the channels through which debt affect growth, all the consequences of public debt to the economy need to be identified in detail. Only the few most recent studies touch on this aspect and identifying one or two channels in their studies (Checherita & Rother, 2012). The presence of in-depth studies has not been made available for review.

The reminder of this study is organised as follows: Section 2 discusses the prominent theories related to the nexus between public debt and economic growth and the theories on the channels through which public debt affect economic growth. Section 3 presents the latest empirical literature available on the relationship between public debt and economic growth and the existing empirical studies in relation to public debt channels that affect economic growth. Meanwhile, studies related to public debt of developed countries and developing countries are discussed in section 4. Section 5 discusses on the literature related to Sri Lanka. Finally Section 6 concludes.

**Public Debt and Economic Growth: The Theories**

Subsequent to the neo-classical responses to traditional economic growth theories, a large volume of literature discusses the relationship between public debt and economic growth and it has also become a vital theme of discussion among economists and policy-makers. Despite this topic being extensively discussed, the findings vary across the studies and no firm agreement has been reached by the economists, analysts and policy makers on how public debt influences economic growth. Three main theoretical views exist in relation to the economic effect of budget deficit and debt finance namely: Ricardian view, Keynesian view and neoclassical view (Bernheim, 1989). Meanwhile, some of the latest studies directly explore the positive impact of public debt on economic growth on the long run even though it has not become popular among policy makers (Alesina & Tabellini, 1990 and Martin, 2009).
Nexus between Public Debt and Economic Growth – Theoretical Foundation

Initially, economists focus on the question “is debt finance equal to tax finance?” As Buchanan (1976) mentioned it is an age-old question in the public finance theory. However, subsequent to the neoclassical responses, economists and policy makers confirm that public debt is a matter for economic growth. Subsequently, economists commenced to examine “what type of relationship exists between public debt and economic growth?” The findings for this question are highly heterogeneous and economists suggest different views on public debt theory.

Theoretical framework on the nexus between public debt and economic growth could be built on three pillars namely Ricardian view, Keynesian view and neoclassical view. The existing literature however reveals that the Ricardian, Keynesian and neo-classists views theoretically challenge each other on the nexus between public debt and economic growth. However, it is observed from a practical point of view that one cannot simply conclude that one particular view is correct and other views are incorrect or a particular theory is much more compatible for an economy and the others are irrelevant. Each theory is relevant in a given economic circumstance and therefore one cannot expect to fix a particular school of thought for all economies of the world. In reality, a combination of these different theories and views might work together and the practical consequences of public debt on economic growth will comprise of different paradigms (Bernheim, 1989).

The Neutrality Theory of Public Debt or Ricardian Equivalence

David Ricardo - in the essays on the funding system (1951) - was the first to propose Ricardian equivalence or invariance theorem and subsequently several economists (Musgrave, 1959 and Barro, 1974) contributed to the theorem. According to the invariance theorem, the government debt is not a burden to the economy and under certain assumptions, the choice between debt and tax would not affect the aggregate demand of an economy. The government can borrow to finance the budget deficit and individuals behave in a way that the present tax cut will increase the future taxes and therefore, they reduce the current consumption and increase the savings to pay future tax increases. As a result, the effect of the aggregate demand of an economy would be similar irrespective of whether the government taxes now or later. Accordingly, public debt has no effect on economic growth and does not have a bearing on a government using tax revenue or debt finance to meet its expenditure (Ricardo, 1951, Barro, 1974 and Greiner, 2012).
The Ricardian equivalence theorem depends on several assumptions; 1) people behave as infinite horizon life, 2) capital markets are perfect with the typical person’s real discount rate being similar to that of the government, 3) the future taxes and income of the government are certain and 4) the economy functions at a full employment level. Despite a group of economists who continue to endorse that the Ricardian equivalence theorem is valid yet, a powerful counterattack was spearheaded by the contributions of Buchanan (1976), Blanchard (1995) and Weil (1989). They mainly criticize the assumptions and argue that these assumptions are invalid in a practical context.

Meanwhile, several weaknesses can be highlighted in the Ricardian equivalence theorem. The first is that Ricardo could not prove his theorem by an empirical analysis. Although Barro was a core contributor to the Ricardian Equivalence (Barro, 1974), he was subsequently convinced that the Ricardian Equivalence is valid only for first-order proposition (Barro, 1979). The third weakness prevalent is the non-practicality of the assumptions, as mentioned above; Ricardo’s assumptions are invalid in the real world. Therefore, in view of the above weaknesses, it raises doubt on the practicality of the Ricardian Equivalence theorem and holding the invariance theorem for the purpose of analyzing public debt and economic growth.

Neoclassical View on Public Debt or Negative Consequences of Debt

Neoclassical view on public debt takes an opposite view to the Ricardian equivalence theorem and advocates that changes in public debt have an impact on economic growth. Accordingly, changes in government borrowings and a high level of public debt would have a negative impact on economic growth on the long run (Elmendorf and Mankiw, 1999). Economists and policy makers widely accepted the above neoclassical view by suggesting theoretically and empirically that high debt level is negatively correlated with the growth rate of an economy and therefore suggest an adverse relationship between public debt and economic growth on the long run (Modigliani, 1961, Diamond, 1965, Borrow, 1979 and Blanchard, 1985).

The main argument of this theory is based on the fact that individuals will not rationally behave as expected in the Ricardian view and therefore they will not reduce the current consumption level by expecting future tax increases. Accordingly tax reduction and debt finance would have positive
effect on disposable income, aggregate demand and overall output on the short run and reduce the utility level of an individual eventually (Modigliani, 1961 and Diamond 1965). Meanwhile, when substantial public debt increases inflation, economic uncertainties and financial depression, it would have a negative bearing even on the short run (Cochrane, 2011). Resultantly, there is the possibility of negative consequences of public debt in both the short and long term.

Further, it has been identified that high government debt increases the future debt service payment of an economy, especially interest payments on government borrowings due to the increase in future taxes whilst it reduces the disposable income of an individual, savings and thus capital stock on the long run (Diamond, 1965). As a result, the debt financing of government expenditure is likely to have negative consequences on the output of the economy through the capital accumulation.

When economists deal with the neoclassical view on public debt they mainly assumed two economic conditions; the first assumption being that the economy is operated at equilibrium condition or in a steady state condition. The second assumption being that government expenditure for goods and services are fixed and debt finance is used to smooth the tax rates during the period (Barro, 1979). However, the applicability of these two assumptions for a developing country is a controversial issue, since developing countries do not operate at steady state economic conditions and the deficit budgets are submitted by governments for the purpose of meeting additional capital expenditure rather than smoothening tax rates.

**Keynesian View on Public Debt or Positive Consequences of Debt**

The Keynesian view on public debt advocates positive consequences of budget deficit and debt finance on economic activities, especially in the short term. During the time of prolonged depression in the 1930s, the Keynesian suggested that governments should increase their expenditure and decrease the taxes to boost the economies. This view was further advocated, that increased government expenditure, directly as well as through a chain of indirect effects, is likely to stimulate aggregate demand of economy. On the other hand a tax cut would increase the disposable income of individuals and that would create more demand for goods and services. Eventually these consequences would increase the employment level of the economy and this cycle will be repeated with the same effect. Therefore, if resources are unemployed in an economy, government should
take initiatives to expand the fiscal policy; increase spending, cut taxes and the use of debt finance to boost economic growth (Keynesian, 1936).

The Keynesian theory however is under criticism by neo-classists since it concerns the impact only on the short term and it does not consider the impact in relation to future generations. The Keynesian economists moreover counter argue that “the long run is a sequence of short runs” and therefore the impact on the current generation is more important than the future generations (Bernheim, 1989). Further, the Keynesian view is a contradiction of the conventional view on fiscal policy and public debt where it was believed, at that time, that the market economy recovers on its own, government interventions are not preferable and the balanced budget is the best fiscal approach. However, the 2008/09 global financial crisis proves that government intervention is necessary to recover from a recession. The US Treasury and European Central Bank had intervened in their economy and financial markets to recover from the economic depression in those countries. Further, The Keynesian analysis suggests to implement a short term solution to boost the economy and to deal with a situation of under employment and underutilization of resources. Therefore the applicability of the Keynesian theory for an equilibrium level of the economy on the long run is a questionable matter. It reveals the inadequacy of the Keynesian theory to handle the fiscal policy and debt finance for a general economic condition on the long run.

**Conventional View on Public Debt**

The Elmendorf & Mankiw (1999) proposes the conventional view of public debt. It is basically a combination of the Keynesian view and the neoclassical view on public debt. According to the conventional theory of public debt it is assumed that the economy is Keynesian in the short run and thus changes in government debt would have positive consequences to the economy\(^3\). Meanwhile it is assumed that the economy is neoclassical on the long run. Therefore, changes in public debt and the high level of public debt would have negative consequences on the economy in the long run. Accordingly, the conventional view suggests that changes in public debt positively affect the economic growth in the short term and negatively affect the total output and economic growth in the long run.

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\(^3\) Since it has been discussed in the section of Keynesian view of public debt in a detailed manner, the positive relationship has not been discussed here.
However, the conventional view in relation to public debt mainly discusses its arguments and suggestions consistent with the neoclassical assumptions and economic conditions. The Elmendorf and Mankiw (1998) mentioned that most of the economists and policy makers accept the conventional view on public debt. Therefore, it is a generally accepted theory on the relationship between public debt and economic growth.

**Non-linear Relationship between debt and growth**

As confirmed by Greiner, 2012 and Panizza & Presbitero, 2013, theoretical literature that directly articulates the inverted U-shaped nonlinear relationship between government debt and economic growth has not been made available for review. However, when examining the negative consequences of government debt on output level, it was also noted that the reverse of the negative consequences of debt on growth hold in the long run i.e. in case of a reduction in government debt tend to generate a positive impact on the long run (Saint-Paul, 1992). The debt hang theories also emphasize the non-linearity and debt threshold effect for debt (Krugman, 1988 and Sachs, 1989)\(^4\). Furthermore, the empirical studies widely confirm the inverted U-shaped nonlinear relationship between public debt and economic growth. Therefore, it can be articulated that a low debt level has a positive impact on growth, however when it increases to a substantial level of debt stock, it has negative consequences on the economic growth.

**The Channels Through Which Debt Affect Growth – Theoretical Backgrounds**

The existing studies on budget deficit and public debt mainly focus on determining what type of relationship can exist between government debt and economic growth. However, only few studies examine what are the channels through which debt affect growth in an economy. It is very difficult to identify a single study that explores all the possible channels through which public debt can impact economic growth\(^5\). In order to maintain a balance in the key macro-economic variables, it is important for policy makers to understand the chain of consequences arising from high public debt and identify all the possible macro-economic channels through which public debt influences the real

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\(^4\) The above debt overhang theories are mostly applicable for external debt of an economy, but we can’t deny the applicability for a nation’s total debt including domestic debt.

\(^5\) Partillo et al. 2004, an IMF working paper discussed on the channels from external debt that impact economic growth and it however doesn’t consider the public debt.
sector of economy. Meanwhile, there is a considerable gap existing among available literature that
does not address the channels from public debt to economic growth in a detailed manner.

The available studies on the channels from public debt to economic growth mainly suggest two
channels. The first channel conveying that government borrowing would affect consumption and it
decreases national saving and crowd out private capital accumulation which in turn will affect
economic growth on the long run (Barro, 1979 and Blanchard, 1985). The second channel is that
when there is a high level of public debt, the government needs to increase tax rates for the purpose
of debt repayments. The increased taxes would reduce the private investment levels and that would
negatively impact on capital accumulation and economic growth (Modigliani, 1961 and Diamond,
1965). In both type of studies, the commonly identified channels from public debt to economic
growth are consumption, savings, interest rate, investments, capital accumulation, tax rates and debt
repayments.

Meanwhile, research studies on fiscal policy, budget deficit and public debt individually and
separately suggest various channels through which government debt would affect the different key
macro-economic variables. As already suggested in the existing studies, some of the above
identified key micro-economic variables determinate the extent of economic growth. Therefore, one
could establish the ultimate channels from public debt to economic growth by establishing the link
between the channels from public debt to key macro-economic variables and subsequently the
channels from the above key macro-economic variables to economic growth.

**Savings and Investments Channel**

The discussions on the existing studies largely deliberate on savings and investment channels
(Elmendorf and Mankiw, 1999, Schclarek, 2004, Kumar & Woo, 2010 and Checherita & Rother,
2012). They advocate that while a government is holding its spending constant, postponement of
taxes to subsequent generations and the use of debt finance to fuel the deficit would increase the
disposable income of individuals in a short space. The increased disposable income would therefore
raise marginal propensity to consumption and thus stimulate the total consumption of individuals.
Moreover, the increased consumption obviously decreases the savings of individuals and
investments as well as crowd out total capital accumulation. All these consequences would
negatively impact the output of an economy on the long run (Bernheim, 1989).
The conventional view of public debt explains the savings and investment channel in the following manner. Let’s consider a closed economy and the private sector budget constraint would be equal to private consumption (C), private savings (S) and Tax payment (T).

\[ Y = C + S + T \]  

(1)

Meanwhile the budget constraint for National income would be equal to private consumption I, investments (I) and government expenditure (G).

\[ Y = C + I + G \]  

(2)

By combining the above two identities, it could be derived that the national savings equals to investments.

\[ C + S + T = C + I + G \]

\[ S + (T - G) = I \]  

(3)

According to the above identities, national savings is the combination of private savings (s) and public savings (T – G) and that jointly contributes towards the total investment. Meanwhile, when there is a budget deficit, the government makes negative savings and that affects national savings and thereby the total investments of the economy.

This channel shows that government borrowings affect the economic growth through a channel of government savings, aggregate consumption, national savings, investments and capital stock accumulation. Eventually the reduced capital stock would negatively affect the economic growth on the long run.

**Interest Rate Channel**

Diamond (1965), Blanchard (1985), Bernheim (1989) Elmendorf and Mankiw (1999) and a dozen other studies discuss the consequences from government debt on interest rate. This channel is established from the influence of the previous channel, the savings and investment channel. Accordingly, government borrowings reduce private investments and the reduced private investments will result in lower capital stock of economy on the long run. As a result, marginal product of capital (MPK) will increase in the economy. Resultantly, individuals will not accept the
previous interest rate for their savings and will demand a higher interest rate equal to the new MPK. Eventually, when there is change in public debt it raises the interest rate. Diamond (1965) argued that increased interest rates reduce private investments and thus crowd out capital accumulation in the economy on the long run. This effect will continue to repeat, until the equilibrium is re-established.

Engen and Hubbard (2004) suggest a model based on Cobb-Douglas production function to understand the impact of government debt on interest rate ($r$) and subsequent effects. Accordingly, let’s assume a basic Cobb-Douglas production function with two factors namely capital and labour

$$Y = AK^\alpha L^{1-\alpha}$$

(4)

Where, $Y$, $A$, $K$ and $L$ denote as customary total output, productivity, capital and labour respectively. Furthermore, $\alpha$ is a coefficient of factor productivity and the total return to capital would be $\text{MPK} \times K$. As $\alpha$ equal capital output ratio, it could be write as follows

$$\alpha = \frac{\text{MPK} \times K}{Y}$$

(5)

It implies that the interest rate is determined by

$$r = \text{MPK} = \alpha \times \frac{Y}{K} = \alpha \times A \times \frac{L}{K}^{1-\alpha}$$

(6)

If government debt completely crowd out capital, so that

$$\frac{\partial K}{\partial D} = -1,$$

(7)

In this case, by holding other variables constant if government increases its debt that causes to increases interest rate in the economy.

$$\frac{\partial r}{\partial D} = \left(\frac{\partial r}{\partial K}\right) \left(\frac{\partial K}{\partial D}\right) = \alpha \times (1-\alpha) \times \frac{(Y/K)^2}{K^2} > 0$$

(8)

The above identities explain the impact of government debt on interest rate through the provision of capital stock available in the economy. Therefore, it could be summarized that when the government resorts to borrowing from the domestic market this initiative is likely to create an upward pressure on interest rate and thus reduce private investments resulting in capital stock accumulation. Eventually these consequences would negatively impact the output of economy.
Meanwhile, increased interest rate will eventually increase the interest payments on the government debt. Resultantly, this will lead to two consequences impacting on the economy. Initially, in order to source the finance for increased interest payment, the government need to increase the tax rate which will eventually curtail private investments, crowd out capital accumulation and negatively affect the total output of the economy (Diamond, 1965) and the second consequence being, due to incurring of additional interest payments, the government is compelled to curtail its expenditure especially capital expenditure which would harm economic growth on the long run.

In view of above, it can be suggested that the interest rate channel works in both circumstances, i.e. at the point of new borrowing as well as at the time of repaying existing debt. Accordingly, the borrowing time channel commences with lower level of capital stock and move to increasing of MPK, increased interest rates, lower private investments and crowd out capital accumulation. The Repaying time channel commences with a high interest rate and move either towards high debt repayments, high tax charges, decreased private investments and crowd out capital accumulation or towards high debt repayments, less government’s capital expenditure and lower government capital stock found in the economy. Eventually these consequences would negatively impact on the output of the economy.

**Expansionary Consumption and National Output Channel**

Keynesian (1936), Bernheim (1989), Elmendorf and Mankiw (1999) and Aloui (2013) discuss on the basic principles of expansionary consumption and national output channel. Keynesian economists suggest that an increase in government debt increases the disposable income of households which results in stimulating the consumption level of individuals and thus increase the aggregate demand of the economy. According to the Keynesian view this increased aggregate demand would expand total economic activities and national output in a short space. It is however a contradiction to the neo-classists’ view of the long run impact of public debt where an increase in government debt raise interest rate, decrease private investments, crowd out capital accumulation and slow down the economy over a long period. Therefore, the expansionary consumption and national output channel could be used to capture the shorter period impact of public debt on the macro economic variables though the long run impact which could be captured through the first two channels explained above.
The Keynesian analysts advocate the budgetary multiplier effect under two assumptions. First, resources are under-utilized in the economy and secondly there are liquidity constrained individuals existing in the economy. The second assumption along with the sticky price condition confirms that the expansion of the fiscal policy would increase the individuals’ consumption level and aggregate demand of the economy which would eventually boost the economic growth in the short term. Furthermore, the sticky price condition is more important to this channel. If the price level of goods and services increases with the increasing of aggregate demands, this channel will not work as expected.

According to the sticky price model, government debt has a positive effect on economic growth through the channel of disposable income, individuals’ consumption levels, aggregate demand and economic activity. Eventually, these consequences would boost the total output of the economy.

**Price Level Channel**

Fiscal policy has influenced monetary policy through several transmission mechanisms. The first mechanism is through the interest rate, which was already discussed above under interest rate channel. The second is through the seignorage effect\(^6\). Elmendorf and Mankiw (1998) discuss the second mechanism in their conventional view of public debt and argue that in a high debt level scenario the government may face difficulties to finance the debt service payments through reissuing debt instruments. As a result, the Treasury, the institution which is in-charge of fiscal policy can pressure the Central Bank, the institution which is in-charge of monetary policy to issue new currency for the purpose of debt service payments. This debt monetisation would create inflationary effect to the economy and harm the economic growth on the long run.

The third mechanism is achieved through the price level of goods and services. Elmendorf and Mankiw (1999), Cochrane (2001), Kwon et. al (2006) and several other studies discuss the third transmission channel. The fiscal theory on the price level (FTPL) explains the links between budget deficit and economic growth (Leeper 2001, Sims 1994 and Woodford, 1994). The FTPL suggest

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\(^6\) Seignorage effect in relation to public debt means the government meets its debt obligations through issuing new currency.
that fiscal policy is a determinant of the price level and thus inflation of an economy. Accordingly, when a government has a deficit budget and incurs more expenses, individuals try to consume more and thus the aggregate demand would increase in the economy. Eventually upward pressure on aggregate demand creates inflationary effect on the economy.

The above discussed literature suggest that fiscal policy is a determinant of inflation and an increase in public debt creates an inflationary effect on the economy especially at a high level of debt stock. Therefore it could be suggested that public debt affects the economic growth through the price level channel in two ways. The first manner comprises of debt service payments, money supply, inflation and economic growth, whilst the second encompasses consumption, aggregate demand, price level, inflation and economic growth.

**Debt Repayment Channel**

The debt repayment channel comes to the forefront at a time when an economy experiences increased debt repayments and its consequences on the long run. The theories which deal with short term impact on public debt to the economy (Keynesian view on public debt) may not capture this channel. The debt repayment channel is one of the places where the David Ricardo’s invariance theorem takes an opposite view to the neoclassical view on public debt. The Ricardian equivalence theorem argues that individuals are more rational and they would consider the consequences from the point of future debt repayments at the time of enjoying current tax reductions. However neoclassicists argue that individuals are not rational and therefore repayment consequences would affect the economy. The debt repayment channel becomes a reality under the assumption of the neoclassical view only.

The high value of public debt stock would eventually increase the debt service payments of the government in the long run. This would give rise to two consequences to the economy. The first, in order to raise the finance for the increased interest payment, the government need to increase the tax rate and this would curtail private investments, crowd out capital accumulation and thus negatively affect the total output of the economy (Diamond, 1965). The second consequence arises as a result of incurring additional interest payments, when the government is compelled curtail its expenditures

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Although it looks that price level channel contradicts to expansionary consumption channel, the economic conditions, time space and assumptions are different in both channels. Therefore both channels could be applied simultaneously.
especially capital expenditure and this would harm the government capital accumulation as well as economic growth on the long run.

In view of above, it can be concluded that a high level of public debt increases debt repayment of the government and that can affect either private capital accumulation or government capital accumulation. As a result, the capital stock of the economy decreases in the long run and that affects the total economic output. Therefore, debt repayment affects economic growth through two channels. The first channel comprises of debt repayments, tax rates, private investments and capital accumulation, whilst the second channel encompasses debt repayment, government expenditure, and government capital stock.

**Risk Premium Channel**

The risk premium channel is more relevant to foreign currency debt of an economy. When a government borrows heavily from foreign sources, it exposes itself to several additional risks such as foreign exchange risk, country risk, political risk etc. As a result, the risk premium of the country will inevitably increase in the case of a high level of foreign debt. The increased risk premium will result in the government having to pay additional interest rates on its foreign currency borrowings. This increases interest payments on foreign currency debt and thus increases the risk premium which would eventually have consequences on interest payments, tax rates, private investments, capital accumulations and government’s capital expenditure. Available existing studies do not suggest by theory that there is a relationship between high foreign debt and risk premium of country, but conventional wisdom theory is used to establish the relationship between the above two variables. Eventually it can be concluded that public debt affect economic growth through the channels of risk premium, interest rates, interest payments, tax rates, private investments and capital accumulations.

**Nexus Between Public Debt and Economic Growth: The Empirical Evidences**

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8 Country risk premium means “the additional risk associated with investing in an international company rather than the domestic market”. When a country borrow from international capital market, the interest rate will be determined based on certain benchmark rate plus a markup for country risk premium. Therefore the country risk premium will influence the interest cost of the government foreign borrowings.

9 Pattillo (2004) discuss about this channel. However, it deals with foreign debt not the external public debt.
Empirical studies on the relationship between public debt and economic growth have not been discussed extensively in comparison to the theoretical literature available on the same subject. Conventionally, empirical findings on the relationship between public debt and economic growth are mostly consistent with the theoretical findings and suggest a negative relationship between public debt and economic growth. However, the latest empirical studies widely suggest a nonlinear relationship between public debt and economic growth which is not supported by theory (Reinhart & Rogoff, 2012 and Checherita & Rother, 2012).

The existing empirical studies on the relationship between public debt and economic growth propose various conclusions and suggestions. Based on the findings discussed in the empirical studies, public debt and economic growth could be divided into two categories. The first type of empirical studies suggest an inverse relationship between public debt and economic growth (Kumar & Woo, 2010) while, the second type of empirical studies suggest a nonlinear relationship between the above two variables (Checherita & Rother, 2012 and Reinhart & Rogoff, 2012). As discussed in the theoretical literature section, empirically very few studies suggest the neutrality and positive relationship between public debt and economic growth (Drakos, 2001 and Singh 1999).

**Empirical studies on the non-linear Relationship Between Debt and Growth**

The latest empirical studies highlight a non-linear relationship between government debt and economic growth (Reinhart and Rogoff, 2010 and Checherita & Rother, 2012). A large volume of panel data sets confirm the existence of a nonlinear relationship which highlights a new paradigm for the existing literature on the relationship between government debt and economic growth. According to the nonlinear relationship, public debt has a positive relationship up to a certain threshold and beyond that point, the impact on economic growth becomes negative (Cohen, 1997, Parttillo, 2002, Checherita & Rother, 2012 and Reinhart & Rogoff, 2012).

Reinhart & Rogoff, 2012 in their influential paper discusses that when public debt goes beyond the 90 per cent level debt become negatively correlated to the economic growth and a link could not be identified, below the 90 per cent of GDP and therefore they concluded that the optimum debt level would be 90 per cent of the GDP. The above paper used comprehensive databases for the analysis including more than 200 years observations from developed as well as developing countries. They further argue that when the debt goes beyond the 90 per cent level it affects the economic growth by
one (01) per cent. However, these findings were challenged and counter argued by “Reinhart and Rogoff who made significant errors in reaching the conclusion that countries facing public debt to GDP ratios above 90 per cent will experience a major decline in GDP Growth” (Herndon, Ash & Pollin, 2013).

Checheritta and Rother (2012) and Baum et. al., 2013 are other studies which have been undertaken on public debt and economic growth, which similarly found an inverted U-shaped non-linear impact of public debt on economic growth for advanced economics, European and OECD countries. However, public debt threshold limit beyond which debt poses negative consequences to the economic growth differ from study to study. Checherita and Rother (2012) concluded that the turning point at 90 – 100 per cent of GDP beyond which public debt is associated with the lower long term economic growth.

In addition to the above two studies, Baum et al (2013) also found similar results with a slightly higher threshold point. The results of Baum et al (2013) are consistent with the conventional theory of public debt and identified that the short term impact of debt on GDP growth is positive and debt level goes beyond 95 per cent of GDP, whilst additional debts have a negative impact on economic growth. The interesting finding of this study concludes that the correlation between debt and growth are statistically significant where the debt levels are below 67 per cent or beyond the 95 per cent and the debt levels are between the 67 – 95 per cent whilst the correlation between debt and growth are insignificant. One more study, Cecchetti et. al. (2011) found nonlinearity as well as a threshold level at 85 per cent of GDP. Caner, Grennes and Koehler - Gieb (2010) used panel data from several countries and found that the threshold level remains at 77 per cent of GDP beyond which public debt becomes damaging to economic growth.

Although the different studies found similar relationships between public debt and economic growth the turning point is identified as the threshold limit beyond which debt becomes negative to the growth would differ from study to study. This highlights heterogeneity effect of public debt on economic growth.

**Negative Correlation between Debt and Growth**
The negative relationship between public debt and economic growth is a long before accepted concept and economists and policy makers continue to widely accept the negative relationship between debt and growth in the long run. Theoretically proved negative relationship between public debt and economic growth has been successfully evidenced in empirically as well. Afonso & Jalles (2013), Kumar & Woo (2010), Panizza and Presbitero (2012) and Sen et. al. (2006) discusses negative consequences of public debt on economic growth in the long run. Sample data of these studies are well diversified including developed countries as well as developing countries in the African and Asian Region.

In certain circumstances, new borrowings and high public debt severely affect the economic growth of a country. For instance, when a government borrow externally and make the repayments to parties outside the country, the negative consequences would be more than the domestic borrowings of the government (Panizza, 2008; Putunoi & Mutuku, 2012 and Tsintzos & Efthimiadis, 2011). Furthermore, an increase in public debt during a recession period would have much more consequences to the GDP than the public borrowing in expansionary periods (Taylor et. al., 2012). During an expansionary period, government and economy grow at a higher rate; therefore increase in public debt would have less response to GDP as debt-to-GDP ratio is reduced during an expansionary period in comparison to a recession period.

The Channels Through Which Debt Impacts Growth – The Empirical Evidences

Similar to theoretical literature, the empirical literature on identifying the channels through which debt affects economic growth is also a rarely discussed area and only a few empirical studies are available for review (Checherita and Rother, 2012). None of the empirical studies made available that make an attempt to mainly engage and focus on identifying and estimating all possible channels from government debt to economic growth. However, a few empirical studies examine debt channels as a part of their main study on public debt. As a result, strong empirical background for identifying and estimating the above said debt channels have not been made available for review. However, it has been brought to notice of the availability of empirical studies which examine the relationship between the public debt and key macroeconomic variables such as interest rate, national savings, consumption, inflation, investment, fertility rate and etc (Major et. al, 2013, Ismihan & Ozhan, 2012, Hubbard (2012) and Bohn, 2011). However, the purpose of these studies
does not attempt to identify the channels from debt to economic growth, but rather empirical studies undertaken to explore the empirical evidence for debt channels.

**Savings and investment Channel**

Reinhart & Rogoff (2012) mentioned that there are two identified potential channels through which public debt lead to low growth rate. The first channel is operated through private investments and savings and it works through two different channels; 1) when government heavily borrows for its expenditures, it will dry out the availability of resources for private sector and curtail the private investments and 2) Meanwhile, if the government increases taxes to meet the additional debt service payments as well as reduce new debt burden, it will negatively affect the private investment through unexpected inflation and other financial implications. The second channel is the risk premium on the borrowing cost for government debt.

Checherita & Rother, (2012) find an interesting relationship between public debt and private savings. Discussions are undertaken on the nonlinear impact of public debt on private savings. Accordingly at the initial stage, when public debt increases, private savings would also increase and when debt-to-GDP ratio goes beyond a certain level (from 82 per cent to 91 per cent) individuals are likely to reduce savings. Therefore, suggest a nonlinear relationship between public debt and private savings. Meanwhile, the above study could not identify any direct impact of public debt on private investments and the results were not robust in the case of investments. Checherita & Rother, (2012) however highlighted that the public debt indirectly affect investment only through various channels such as interest rate.

Furthermore, Gale and Orzag (2003) suggest that whilst holding other factors constant changes in government borrowings reduces private savings as well as national savings and the reduction in national savings would reduce total output of the economy through the reduction of investments. It is revealed that the theoretically proved savings and investment channel is confirmed by the empirical studies as well.

**Interest Rate Channel**

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10 It has been discussed in the previous sections of the literature review chapter. Therefore, it has not been discussed in detail here.
Consequences of public debt on interest rate are widely discussed issue. Several empirical studies estimate the impact of budget deficit and public debt on interest rate and suggest that changes in government borrowings increase the interest rates of the economy (Gale and Orzag, 2003, Baldacci and Kumar, 2010 and Checherita & Rother, 2012). Gale and Orzag (2003) by referring to the report released by the “American president’s council of economic advices” concluded that an increase in deficit by one percent of GDP increases the interest rate by about 22 basis points.

Checherita & Rother, (2012) suggest based on their sample that the change in public debt has a significant impact on long term as well as short term interest rates. Furthermore, they have also identified that the level of public debt does not have a correlation with long term interest rates. It also reveals that rather than debt levels, the new borrowings have more influence on interest rates. Meanwhile, Baldacci and Kumar (2010) also confirm the above findings with large panel data and suggest that a large fiscal deficit and public debt increases the interest rates of the economy through the reduction in national savings. However economists argue that foreign capital flow such as foreign debt and foreign direct investments (FDI) may weaken the relationship between borrowing and interest rate (Baldacci and Kumar, 2010).

The above discussions reveal the empirical support available for the relationship between public debt and interest rates. Further, it confirms the theoretical finding that changes in government debt influences the interest rate which would negatively impact the total output and economic growth of a country.

**Methodology**

**Estimation Models and Control Variables**

The empirical studies widely use either a neo-classical growth model or endogenous growth model to construct the estimation model. Generally they use the following type of single equation model to estimate the impact of public debt on economic growth.

\[ \text{Growth}_t = \alpha + \beta_2 \text{Debt Indicator}_t + \beta_3 \text{Control Variables}_t + \epsilon_t \]  \hspace{1cm} (9)
Accordingly, conditional convergence between the per capita growth rate and the debt indicators would be the main dynamics of the equation. The above type of estimation model is used to measure linear relationship between debt and growth. If a study assumes negative relationship between public debt and economic growth, it uses the above type of equation for the estimation. On the other hand if a study assumes nonlinear relationship between external debt and economic growth, quadratic model is used as a basic estimation to check the impact of public debt on economic growth. The model would be as follows.

$$\text{Growth}_t = \alpha + \beta_2 \text{Debt Indicator}_t + \beta_3 (\text{Debt Indicator}_t)^2 + \beta_3 \text{Control Variables}_t + \epsilon_t \quad (10)$$

For the left hand side of the equation, the dependent variable “\(\text{Growth}_t\)” is explained by the per capita income growth rate of the country. The right hand side of the equation consists of two fundamental variables: 1) debt indicator; and 2) control variables. The variable “\(\beta_2 \text{Debt Indicator}_t\)” represents the outstanding public debt of the country as a percentage of GDP. The variable “\(\beta_3 (\text{Debt Indicator}_t)^2\)” is a quadratic form of the “\(\beta_2 \text{Debt Indicator}_t\)” variable.

The control variables were another main factor where the analysts placed most of their concentration. Initial per capita income, population growth, trade openness, gross fixed capital formation, secondary school education as a proxy for human capital, government investment rate and debt service ratio are used as some of the control variables to estimate the model (Checherita & Rother, 2012; Afonso, 2013). Growth theories especially endogenous growth theories suggest that more than one variable such as physical capital, human capital and technology, contribute towards the economic growth rate of a country (Rebelo, 1991, Romer, 1989 and Lucas, 1988). The existing empirical studies have considered these growth determinant variables based on the selected growth theory and include them as control variables in the estimation. Therefore, it is important for a study to choose upfront the growth theory that will be adopting along with the control variables which will be utilized in arriving at the estimation.

**Nexus between Debt and Growth for Developed and Developing Countries**

Based on the assumptions and the data sample, the existing studies can be divided into two namely, the studies related to developed countries and developing countries. Meanwhile, the theoretical literature that analyses the relationship between public debt and economic growth focus on the
macro economic conditions of developed countries. Most of the existing empirical studies also mainly examined the relationship between debt and growth in the United States of America (USA), European countries and other developed countries and only a handful of studies focus on the debt growth relationship in developing countries\textsuperscript{11}. However, the macro economic circumstances of a developed country are totally different to that of a developing country. For example basis of fiscal policy, pattern of budget deficit, the level of government expenditure and the government’s ability to borrow from domestic as well as international sources largely differ between a developed country and a developing country.

When the relationship of public debt and economic growth in an advanced economy are scrutinized, it is evident that the assumptions are different to that of a developing country’s analyses. It is generally assumed that the level of government expenditure is fixed in a developed country, except during war and public debt is used to postpone the tax between two periods or across the generations and to minimize the dead weight losses of taxation (Alesina & Tabellini, 1990). Further, it is assumed that in a developed country the government does not have any restriction on financing resources both tax and debt and therefore they can always maintain a fixed level of expenditure in terms of GDP whilst it is predictable for the future. However, due to political reasons and other monetary and fiscal policy decisions, the government reduces tax rates or postpones the tax revenue and use the debt finance for pre-determined expenditure (Barro, 1979).

Meanwhile, the macro economic circumstances of a developing country are totally different from the above, where government expenditures are higher than the revenues in most instances and the government continues to operate on a deficit budget. Meanwhile, the government has its own restrictions for collecting tax revenues as well as borrowing money from domestic and foreign sources. Therefore, public debt is used to increase the capacity of the government to meet its expenditures especially capital expenditure for development purposes (Aizenman et. al., 2007).

\textsuperscript{11} Several studies could be cited for developed countries for ex. Barro, 1979; Checheritta and Rother, 2012 and Ceccheitti 2011. Panizza, 2008 and Presbitero 2012 were only available for reviewing developing countries.
Likewise, the main difference between the analysis of a developed country and developing country is the level of government expenditure. When an analysis is undertaken for a developed country it is assumed, throughout the analysis, that government expenditure is fixed and what are the consequences if the government postponed the tax and use the debt finance for fiscal deficit (Panizza & Presbitero, 2013). However, in a developing country it is not the case and therefore the estimation would be different for a developing country than that of a developed country. As Bernheim (1989) mention there are two types of budget deficits which exist, first being a temporary budget deficit and the second type is a permanent budget deficit. Meanwhile, the consequences of both types of budget deficits are different. In general developing countries have permanent budget deficits; therefore its consequences would be different compared to a developed country that has temporary budget deficits for a shorter period.

**Existing Studies on Public Debt for Sri Lanka**

As mentioned in the introduction minimal research work has been undertaken to examine the economic consequences of high public debt in Sri Lanka and there are very few studies which examine the public debt of Sri Lanka in relation to various single aspects of the economy in the past. Kumara and Cooray, 2013 is a more recent study which empirically analyses the relationship existing between public debt and economic growth in Sri Lanka. It suggests a nonlinear relationship between public debt and economic growth in Sri Lanka and further suggests that the public debt has a positive consequence on economic growth up to 59.4 per cent of debt to GDP level and beyond that point debt becomes a negative consequence to the economy. The study uses annual data and two years non overlapping averages for the analyses and it poses certain concerns on the results derived from the study. In general, five years averages or at least three years averages are taken for the analysis (Pattillo, 2004, Reinhart & Rogoff, 2012 and Checherita & Rother, 2012) and it is doubtful whether the annual data and two years averages are adequate to capture the short term fluctuation. Further, the optimal debt thresholds are fluctuated by nine percent between the annual data and two year’s averages. The annual data confirms the optimal point of 68.2 percent of debt-to-GDP, whereas the average of the two years data depicts the optimal point of 59.4 per cent of debt-to-GDP. These aspects have raised concerns of the necessity to undertake fresh analysis to identify the relationship between public debt and economic growth in Sri Lanka.
Meanwhile, the debt sustainability analysis and the debt threshold analysis are broadly relevant concepts. However, the debt sustainability studies analyses the extreme consequences (the default) of the debt and examine whether the government or the county has the ability to repay its entire debt. International agencies such as IMF and World Bank have introduced special models to analyze foreign debt sustainability. In the case of Sri Lanka for instance, the empirical studies conducted namely by Banda and Priyadarshanee (2014), Deyshappiriya (2012) and Fonseka (2008) examine the sustainability of the Sri Lankan fiscal policy and public debt. These studies conclude that the Sri Lankan public debt is not sustainable.

The most recent study on Sri Lankan debt sustainability; undertaken by Banda and Priyadarshanee (2014) discuss that increasing commercial borrowing from foreign countries for development projects is one of the main reason for the government debt to be sustainable over the past years. Furthermore, it suggests that the government has to take steps to reduce the debt level or convert a certain amount of foreign debt into other sources of fund such as domestic debt. The Deyshappiriya (2012) while discussing the debt and fiscal sustainability position of Sri Lanka has strongly recommended to implement improved tax administration and collections and reduces government expenditure as these would be the main avenues to achieve sustainability in debt in Sri Lanka. However, there is a remarkable trend change in the Sri Lanka government debt situation from 2009 onwards. Where the government debt grows at a fast rate in comparison to the previous era and the government commences to borrow from the international capital market to facilitate budget deficits. Further, the government follows an expansionary fiscal policy and heavily invests in several infrastructure projects such as highways, airports, ports and etc. The above studies (Banda and Priyadarshanee, 2014 and Deyshappiriya, 2012) have not factored these new trend changes found in public debt and government expenditures into the analysis of the study. It might influence the conclusion of the study if one could include these factors into the analysis.

A time series data of Sri Lanka comprising of a period of 64 years from 1950 to 2013 have been used as annual data to identify the short term fluctuations and the same data have been averaged for overlapping five year periods (1950 – 54; 1951 – 55; etc.) to identify the long term trend. A basic trend analysis on “debt to GDP ratio” and “GDP growth rates” for short run as well as to long run
shows that trend line between debt-to-GDP ratio and growth rates on the long run are more compatible than the short run (Please refer Appendix figure 1 and 2). Furthermore, a trend analysis was conducted based on the method of Reinhart and Rogoff (2012) and it concludes that there is an inverted nonlinear relationship between debt and growth with a turning point for optimal debt level between 80 per cent and 90 per cent of Debt-to-GDP ratio (Please refer the Appendix figure 3)\textsuperscript{12}.

**Conclusion**

The existing literature discuss three types of theories with respect to the nexus between public debt and economic growth 1) the neutrality theory of public debt or Ricardian View; 2) the positive theory of public debt or Keynesian view 3) the neoclassical theory of public debt or negative consequences of public debt. Meanwhile, most of the existing empirical studies confirm the theoretically driven negative consequences that exist on public debt on economic growth for developed countries. The recent empirical studies conducted with large panel data of developed and emerging countries identify a nonlinear relationship and find the optimal level of public debt by regressing debt to GDP and growth rate variables. Although optimum debt levels are different from study to study it suggests that the debt has negative consequences beyond the threshold limit.

Additionally, the studies have observed that there is an inverted U-shaped nonlinear relationship between government and economic growth of Sri Lanka. However, debt threshold suggested by existing studies significantly vary. Therefore, a comprehensive analysis in this area has to be undertaken to identify a considerable accurate threshold that would assist to manage the fiscal policy more efficiently. Since Sri Lankan government debt has considerably increased in the recent past, undertaking of studies to capture the long term economic consequences of public debt is an essential research requirement for Sri Lanka.

Finally, the existing studies on the nexus between public debt and economic growth mainly focus to identify the relationship between debt and growth and identifying the channels through which government debt affect economic growth is a rarely discussed area. Meanwhile, existing theoretical as well as empirical studies directly and most of the times indirectly analyze only certain channels in an adhoc manner. Disappointingly, not a single study is available that evaluated all the possible

\textsuperscript{12} Although the relationship between debt and growth is in line with the finding of Kumara and Cooray (2013), the optimal debt level is far different from that study.
channels through which debt can affect economic growth. This has been identified as a literature gap in public debt literature and future studies are recommended to focus on this area.

**References**


Keynes, J. M. (1936). General theory of employment, interest, and money.


Appendix

Figure – 01: Public Debt-to-GDP Ratio and GDP Growth Rates in short run

![Graph showing Public Debt-to-GDP Ratio and GDP Growth Rates in short run.](image)

Source: Central Bank of Sri Lanka

Figure – 02: Public Debt-to-GDP Ratio and GDP Growth Rates in long run

![Graph showing Public Debt-to-GDP Ratio and GDP Growth Rates in long run.](image)

Source: Central Bank of Sri Lanka

Figure – 03: Average Growth Rates at different Debt to GDP Ratio.

![Bar chart showing Average Growth Rates at different Debt to GDP Ratio.](image)

Source: Central Bank of Sri Lanka