Identifying the Relationships between Budget Deficit and Selected Macroeconomic Variables: A Study of Sri Lanka during the Post-liberalization Era

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Abstract

A sustained sizeable deficit budget is problematic for Sri Lanka. Since 1980 to 2014, the Sri Lankan government budget deficit averaged 8.75% of GDP, and recorded the highest ratio of 19.2% of GDP in 1980 (Central Bank Annual reports, 1980-2014). This study examines the association with budget deficit and selected macroeconomic variables in Sri Lanka, using annual time series data for post-liberalization period; 1980-2014. The selected explanatory macroeconomic variables are inflation, interest rate, exchange rate, debt, and real GDP growth rate. Specifically, the study seeks to ascertain the relation-ship between selected macroeconomic variables and the budget deficit with a view to making appropriate recommendations to curb its negative effect to economy.

The study carried 210 samples, and for examination of long-run relationship ARDL bounds test technique is applied, and short-run dynamic was examined using the ARDL Granger-Causality test. Further, Granger Causality test was carried out to determine the causality between selected variables and budget deficit, whether the impact were uni or bi- directional.

The results revealed that there is a long-run relationship between budget deficit, inflation, interest rate, exchange rate, debts and real GDP growth rate in Sri Lanka. Further, in this study uni-directional relationship was confirmed between budget deficit and debts. The budget deficit cause debt. Additionally, a uni-directional relationship was also identified between budget deficit and inflation. The budget deficit cause inflation. Moreover, this study confirmed there were no uni or bi direction causality between other selected variables; Interest rate, Exchange, Real GDP growth rate and Budget deficit.

Furthermore, the findings show that budget deficit has a meaningful effect on inflation, and debts. The paper recommended that the Sri Lankan government should take actions to control inflation to maintain price stability and to minimize the debts because the government is maintaining a sizable deficit budget since 1957. This research contributes to the idea that there are dimensional and dynamic factors involved between budget deficit and macroeconomic variables that require comprehensive knowledge to increase productivity, improve living standards, and ensure stability of the economic system.

Keyword: Budget Deficit, Macroeconomic Variables, Granger Causality Test

INTRODUCTION

Year to year striving for a balanced budget is a thorny for nationally. Generally countries need to reduce budget deficit in long run, and strive for such a trend. Striving for a diminishing budget deficit despite unfavourable welfare trends and the associated contrary: budget deficit are contentious particularly in the political arena .The government budget balance is used to assess the fiscal health of a country. It is further differentiated by closely related terms such as primary balance and structural balance (also known as cyclically-adjusted balance) of the general government. The primary budget balance equals the government budget balance before interest payments. The structural budget balances attempts to adjust for the impacts of the real GDP changes in the national economy. Such factors than are crucial in determining for sinking budget deficit.

Economic thoughts which relate to Keynesian argues, when a country not in recession reducing the size of the budget deficit would reduce the government borrowings, decrease interest rates, increase private investments, more exports, ebb trade deficits. Consequently, shrink budget deficit leads private sector to reduce its tax liabilities, providing further boost in private investment and consumption. This circumstance help the economy grow faster over a longer period of time. It also argues that macroeconomic stability is a crucial component in harnessing long run growth, with reducing deficit as shown above being a major determinant of fiscal stability.

Empirically however, budget deficits are more common than trend to a balanced budget internationally and locally, and this makes it is important to study the central issues identified above: identifying the factors that could contribute and detrimental to deficit budget, and determine the potential of countries to achieve macroeconomic stability in long-standing.

Sri Lankan Government Budget Deficit Records

Sri Lanka reported a government budget deficit equal to 6% of the country's gross domestic product (GDP) in 2014. Historically, from 1980 until 2014 the Sri Lankan government budget deficit averaged 8.75% of GDP, reaching an all time low of 5.90% of GDP in 2013 and a record high of 19.20% of GDP in 1980 (Central Bank annual reports, 1980-2014).

In August 2014, Standard & Poor's Ratings Services has confirmed its 'B+' long-term and 'B' short-term sovereign credit ratings on Sri Lanka and the outlook remain stable. Moody's rating for Sri Lanka, sovereign debt is B1. Fitch's credit rating for Sri Lanka is BB-. The ratings on Sri Lanka reflects the country's relatively low levels of wealth, improving but still moderately weak external liquidity, and a sizable government debt and interest burden.

Rationale

Macroeconomic stability of a country is highly dependent on government budget strategies. But reducing budget deficit is a complex process being dependent on a large number of economic interactions, including external factors. Dissecting the budgetary process to identify the factors that are contributory or detrimental to budget deficit, in line with economic theories and international empirical observations is of crucial importance.

To maintain macroeconomic stability in a country, economic policy makers need to consider current economic issues, historical trends as well as potential threats and benefits in future. The budgetary process is a multi-dimensional process with many economic variables affecting the outcome. For example, one issue of relevance linked to growth strategy is whether the rapid development of one or two sectors would be sufficient to ensure budgetary balance. Such issues make the selected problem given below of importance to policy makers.

The major issues for the policy makers need to adhere in the context of reducing budget deficit are listed here. They are as follows. How to stimulate investment? How to bring about an increase in the level of savings to fund increased investment needs? How to attract foreign flows and maintain bilateral investment? How to manage international trade and the issues related to international trade? How to maintain optimal level of interest rates? How to maintain optimal level of exchange rates? How to control inflation to maintain price stability? How to minimize the debts? How to achieved sustained high economic growth? And finally in Sri Lanka, how to improve the quality of life of the poor?

Research Question

The research question is how the government budget deficit influences to create macroeconomic instability (selected macroeconomic variables; inflation, interest rate, exchange rate, real GDP growth rate, and Debts) in Sri Lanka?

Objectives

- To identify the factors that contributed to budget deficit during post liberalization era;
- To analyze the selected variables which work jointly or individually in affecting the budget deficit;
- To examine is budget deficit affect to selected variables during post liberalization era;

Conceptualization

The following flow chart is to identify the relationship between selected variables and the budget deficit. These multi-faceted variables may work jointly or separately in determining the final outcome of the budget deficit. Likewise, larger and constant budget deficit could have repercussions on macroeconomic variables, and hence the stable economic environment.

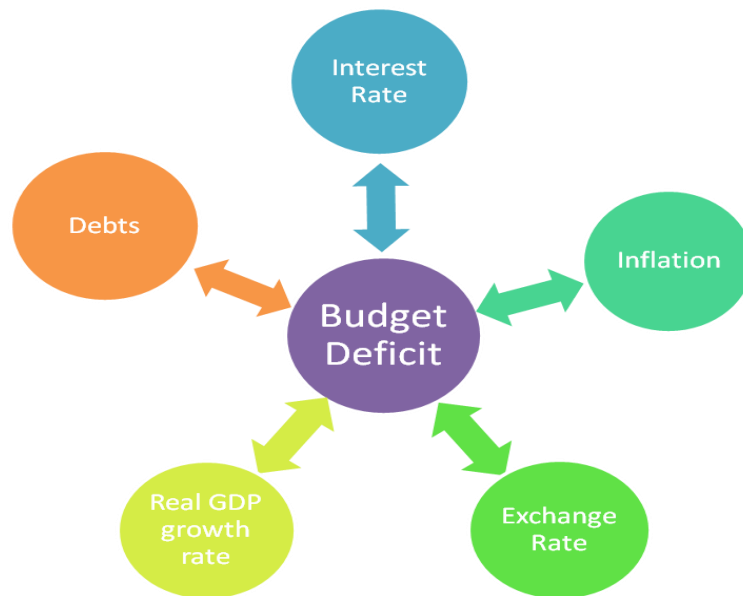**Relation-ship between Budget deficit and selected variables**

Figure-1: Relation-ship between Budget deficit and selected variables

Limitations

The study will involve a very complex array of relationships and as the study progresses it will probably be necessary to narrow down the focus to work with only a limited number of macroeconomic determinants to budget deficit. The literatures implied that Inflation, Interest Rate, Exchange Rate, Real GDP growth rate and debts have closer cause to budget deficit, when compare to other macro economic variables. The paper will not discuss explanatory variables interrelation-ship also. Further, initially researcher decided to consider variables annual data to identify such behaviors to economic environment.

METHODOLOGY

Data collection

The secondary data used in the time series analysis study will be obtained from Central Bank annual reports for the period 1980-2014. The economic inter-relationship studied will be grounded in theories, extracted from journals and text-books.

Sample

This study of Sri Lanka with 210 samples, focusing especially on the budget deficit and related macroeconomic factors such as inflation, interest rate, exchange rate, real GDP growth rate and debt will concentrate on the period post-liberalization: 1980-2014.

Model Specification

The proposed multiple regressions model is to learn more about the relationship between several independent variables; inflation (*Inf*), interest rate (*r*), exchange rate (*ER*), Real GDP growth rate (y^g), Debts (*debt*) and a dependent variable budget deficit (B*d*).

$$Bd = f(\inf, r, ER, y^g, debt, ...)$$

Incorporating these explanatory variables, the budget deficit model specified in linear form becomes:

$$Bd_t = \chi_0 + \chi_1 \inf_t + \chi_2 r_t + \chi_3 ER_t + \chi_4 y^g{}_t + \chi_5 debt_t + \varphi_t \tag{1}$$

Where Bd   = Budget Deficit as a % of GDP

     Inf   = rate of inflation; Annual average price change % (CCPI as 1952=100, 2002=100, 2006/7=100)

     r   = 91 days T' bill rate, %.

     ER   = US Dollar exchange rate index.

     y^g = Real GDP growth rate

     debt   = sum of cumulative domestic debt and foreign debt as a % of GDP

     t   = time (starting from 1980 to 2014)

     x_0 = intercept term

     φ_t = error term

The Granger Causality test will be carried out under VAR (Vector Auto Regression) environment to determine whether the variables impacts are uni or bi- direction. To determine the direction of causation between both series, the paper specifies regression models which may be written more compactly as follow;

$$Bd_t = \alpha_1 + \sum_{i=1}^{k} \beta_{1i} Bd_{t-i} + \sum_{i=1}^{k} \lambda_{1i} \inf_{t-i} + \sum_{i=1}^{k} \mu_{1i} r_{t-i} + \sum_{i=1}^{k} \delta_{1i} ER_{t-i} + \sum_{i=1}^{k} \rho_{1i} y^g{}_{t-i} + \sum_{i=1}^{k} \sigma_{1i} debt_{t-i} + \varepsilon_{1i} \tag{2}$$

$$\inf_t = \alpha_2 + \sum_{i=1}^{k} \beta_{2i} Bd_{t-i} + \sum_{i=1}^{k} \lambda_{2i} \inf_{t-i} + \sum_{i=1}^{k} \mu_{2i} r_{t-i} + \sum_{i=1}^{k} \delta_{2i} ER_{t-i} + \sum_{i=1}^{k} \rho_{2i} y^g{}_{t-i} + \sum_{i=1}^{k} \sigma_{2i} debt_{t-i} + \varepsilon_{2i} \tag{3}$$

If $\sum_{i=1}^{k}\lambda_{1i}=0$ then inflation does not Granger cause budget deficit as in equation (2) and

when $\sum_{i=1}^{k}\beta_{2i}=0$ budget deficit does not Granger cause inflation as in equation (3). It then

follows that causality was then examined between budget deficit and component of inflation using equations (2) and (3). If inflation Granger caused budget deficit, then budget deficit becomes dependent variable. As well, if budget deficit Granger caused inflation, then inflation becomes dependent variable and following Bandiera (2008), and Sinha *et al* (2011). The nature of causal relationship was used in the specification of budget deficit and inflation models as well as its components. If both series cause each other, then each of them becomes the variable to be explained while the other, with control variables, become explanatory variables. Likewise, could be able to express the above models for the other variables also, such as interest rate, exchange rate, real GDP growth rate and debts to identify the causality. The results of causality test carried out to determine whether the variables impacts are uni or bi- directional.

$$r_t = \alpha_3 + \sum_{i=1}^{k}\beta_{3i}Bd_{t-i} + \sum_{i=1}^{k}\lambda_{3i}\inf_{t-i} + \sum_{i=1}^{k}\mu_{3i}r_{t-i} + \sum_{i=1}^{k}\delta_{3i}ER_{t-i} + \sum_{i=1}^{k}\rho_{3i}y^g_{t-i} + \sum_{i=1}^{k}\sigma_{3i}debt_{t-i} + \varepsilon_{3i} \quad (4)$$

$$ER_t = \alpha_4 + \sum_{i=1}^{k}\beta_{4i}Bd_{t-i} + \sum_{i=1}^{k}\lambda_{4i}\inf_{t-i} + \sum_{i=1}^{k}\mu_{4i}r_{t-i} + \sum_{i=1}^{k}\delta_{4i}ER_{t-i} + \sum_{i=1}^{k}\rho_{4i}y^g_{t-i} + \sum_{i=1}^{k}\sigma_{4i}debt_{t-i} + \varepsilon_{4i} \quad (5)$$

$$y^g_t = \alpha_5 + \sum_{i=1}^{k}\beta_{5i}Bd_{t-i} + \sum_{i=1}^{k}\lambda_{5i}\inf_{t-i} + \sum_{i=1}^{k}\mu_{5i}r_{t-i} + \sum_{i=1}^{k}\delta_{5i}ER_{t-i} + \sum_{i=1}^{k}\rho_{5i}y^g_{t-i} + \sum_{i=1}^{k}\sigma_{5i}debt_{t-i} + \varepsilon_{5i} \quad (6)$$

$$debt_t = \alpha_6 + \sum_{i=1}^{k}\beta_{6i}Bd_{t-i} + \sum_{i=1}^{k}\lambda_{6i}\inf_{t-i} + \sum_{i=1}^{k}\mu_{6i}r_{t-i} + \sum_{i=1}^{k}\delta_{6i}ER_{t-i} + \sum_{i=1}^{k}\rho_{6i}y^g_{t-i} + \sum_{i=1}^{k}\sigma_{6i}debt_{t-i} + \varepsilon_{6i} \quad (7)$$

Data for estimating equations (2) to (7) were collected mainly from statistical bulletin of the Central Bank of Sri Lanka from 1980 to 2014. To identify the long run relationships between variables, the Bound Test was adopted. If budget deficit shares a long-run relationship with other macroeconomic variables that we are studying, the next step is to examine causality,

since if two or more variables are co-integrated; there is causality in no less than one direction (Engel and Granger, 1987). We tried to determine whether the budget deficit Granger cause Inflation (utilized the same scenario for other selected macroeconomic variables also) or vice-versa, using Granger causality test under VAR (Vector Auto Regression) environment.

LITERATURE REVIEW

Introduction

In Sri Lanka, since independence in 1948, almost every year except in 1954 and 1955 budget deficits were experienced. In 1948, the deficit was only 1.7 per cent of GDP. By 1980, it went up to a massive 23.1 per cent of GDP. In the last decade, since 2003, the deficit has averaged around 7.0 per cent of GDP (Central Bank annual reports, 1980- 2014).

Continuous budget deficits for the last so many decades have created a "debt trap" for Sri Lanka. As the statistics show, the expenditure over revenue during the last ten years was a massive Rs. 4,418,815 millions! It is not a secret that such deficits were mainly financed from borrowings within, and outside Sri Lanka. The outstanding Government debt as at 31.12.2012 was a surprising Rs. 6,000,112 million compared to only Rs. 2,585,648 million as at 31.12.2006 (Central Bank annual report, 2014).

Government deficit spending is at the heart of debate in Economics, with famous economists holding differing views. Keynesian Economics position is that deficit spending is popular and necessary as part of countercyclical fiscal policy, but that there should not be a structural deficit (i.e., permanent deficit). The government should run deficits during recessions to compensate for the shortfall in aggregate demand, but should run surpluses in boom times so that there is no net deficit over an economic cycle (i.e. only run cyclical deficits and not structural deficits). This concept originated in Keynesian economics, and gained acceptance during the periods between the Great Depression in the 1930s and post-WWII in the 1950s. According to most economists, during recessions, the government can stimulate the economy by intentionally running a deficit.

This section discloses the theoretical framework relating to budget deficit and selected macroeconomic variables. Some economists of the Keynesian, Neoclassical and Ricardian schools of thought had different views that resulted in their giving positive or negative support to the association between macroeconomic variables and budget deficit.

Theoretical Background

The Neo-Classical View of Budget deficit: The neoclassical school suggests a negative relationship between macroeconomic variables and budget deficits. They argue that government budget deficits lead to higher interest rates, discourage the issue of private bonds, private spending, and private investments, increase the inflation level, and cause similar increases in the current account deficits and finally result in slower growth in the economy as a result of crowding out resources. When the government sector expands, the private sector will contract due to the increase in prices of resources due to an excess demand by the government, hence this leads to a fall in investment and consumption by the private sector. Thus the government sector's expansion crowds out the private sector. Further, resource crowding out is an important issue in developing countries where resources are scarce even sometimes to the private sector, so any excess demand for resources by the government will severely impose on private sector productivity.

The standard neoclassical model has three fundamental features. First, both borrowing and lending occur at the market rate of interest. Second, individuals have limited life spans. Each consumer belongs to a specific group or generation, and the lifespan of successive generations overlap. Finally, market clearing is generally assumed in all periods (Barro, 1989).

Hubbard and Judd (1986) introduce an exogenous constraint on borrowings, which would be binding for some fraction of the population. This would not alter the conclusion that a permanent increase in the ratio of debt to national income depresses capital accumulation. In Diamond's model, unconstrained consumers would not be willing to hold the original volume of capital and bonds, plus the new bonds, at the original rate of interest. As one increases the fraction of consumers who are liquidity constrained, the interest sensitivity of saving falls, and larger increases in interest rates are required to equilibrate capital markets.

Accordingly, the introduction of liquidity constrained consumers might well strengthen the conclusion that permanent deficits depress capital accumulation.

Models using in liquidity constraints result from problems of adverse selection, Hayashi (1985) and Yotsuzuka (1986) have argued that consumption should be insensitive to the distribution of taxes over an individual's lifetime, even if that individual is apparently constrained in certain periods. They suggested the introduction of liquidity constraints would not significantly alter the short-run effects of temporary deficits in neoclassical models. If future taxes are positively related to future income, then the short run effect of temporary budget deficits should be to stimulate consumption, as when these constraints are specified exogenously. Moreover, Hayashi-Yotsuzuka result effectively depends upon the ability of consumers to use future after-tax income as collateral against loans.

It is useful to summarize the main empirical implications of Neoclassicism. If consumers are rational, and have access to perfect capital markets, then permanent deficits significantly depress capital accumulation, and temporary deficits have either a negligible or perverse effect on most economic variables (interest rates, saving, and consumption). If many consumers are either liquidity constrained or myopic, the impact of permanent deficits remains qualitatively unchanged. Nevertheless, temporary deficits should lower savings and raise interest rates in the short run. Thus, the neoclassical paradigm does not tie down the effects of temporary deficits, and evidence on the effects of temporary deficits is not useful for testing this paradigm. The fundamental lesson of the neoclassical framework concerns the effect of permanent deficits.

Keynesian View of Budget Deficits: Keynes (1936) popularized use of fiscal policy as a stabilization tool. During the Great Depression of the 1930s, Keynes argued that lower output and employment than their potential occur because of insufficient total demand. If demand could be increased, output and employment also could be expanded to meet its economy's full employment potential. Further, Keynes believed this level could be achieved through expansionary fiscal policy.

During a recession period, Keynes argued that, rather than maintaining a balanced budget, the government should increase its' spending, reduce taxes, and run the budget towards a deficit. Keynes says, higher levels of government spending would directly increase total demand and imposing lower tax rates would increase the real incomes of households who will tend spend most of that additional income, which would leads stimulate total demand. Therefore, the Keynesian recommendation to overcome a recession was a larger budget deficit.

Keynes opposed the balancing of the government's budget and argued that appropriate budgetary policy was dependent on economic conditions. According to his view, governments should run a deficit budget during recession and surpluses during periods when inflation was a problem because of excessive demand or a boom period.

There are two main reasons why Keynesian expansionary fiscal policy is not popular or very effective. First, is the interest rate effect. When deficits are financed by borrowings, government's need to borrow more in loanable funds market, and this will lead to an increase in the interest rates. The higher interest rates will "crowd out" private investment and consumption and this reduction in private spending will largely, if not entirely, offset the stimulus effects of the increase in government spending. Second, the wider deficit budget will result in a larger government debt and higher taxes to cover the interest costs. Other non-Keynesian economists believe that the expectation of the higher future taxes will reduce private spending and thereby offset the stimulus effects of deficit spending. However, modern Keynesians believe that increased government spending and enlarged budget deficits will help promote recovery from a serious recession like 2008-2009 global financial crisis.

A deficit does not just stimulate demand. If private investment is stimulated, that increases the supply of output in the long run. As well, government's deficit spending on infrastructure developments, basic research, public health, and education can increase potential output in the long run. Finally, the high demand that a government deficit provides may actually allow greater growth of potential supply, following Verdoorn's law.

The Keynesians imagine a positive relationship between budget deficits and macroeconomic variables. According to Keynesian absorptive theory an increase of budget deficits would

bring about domestic absorption and import expansion, more so leading to current account deficit. These will in turn bring an increase in the budget deficit, causing upward pressure on interest rate, capital inflows, and an appreciation of the exchange rate, and increase the current account balance. Many traditional Keynesians argue that deficits need not crowd out private investment. Eisner (1989) proposes that increased aggregate demand raises profitability of private investments and this high profit leads to a high level of investment at any given rate of interest.

The Ricardian View of Budget Deficits: Governments may finance their spending either by taxing, or they might go for borrowings. However, they must ultimately repay this borrowing by increasing taxes. The lower taxation in the present is offset by higher taxation in the future, meaning that budget deficits do not influence the macroeconomic variables. An increase in government budget deficit is effectively equivalent to a future increase in tax liabilities. Economists such as Robert Barro have developed more complicated variations on the same idea, particularly using the theory of rational expectations. Ricardian Equivalence suggests that government attempts to influence demand using fiscal policy will prove unsuccessful. He argues that an increase in budget deficits, due to an increase in government spending, must be paid for either now or later, with total present value of receipts fixed by the total present value of spending. The central Ricardian observation is that deficits merely postpone taxes.

The significance of the Ricardian observation depends upon the length of consumer's planning horizons. If fiscal policy postpones tax collections until after current taxpayers have died, then it may well alter real economic decisions. Barro's (1974) central insight was that intergenerational altruism may act to extend the planning horizons of individuals, thereby reinstating strong versions of Ricardian equivalence.

Fiscal Conservatism: Fiscal conservatism advocates reject Keynesianism, by arguing that government should always maintain a balanced budget (and a surplus to pay if any outstanding debts), and that deficit spending is a bad policy for all time.

Fiscal conservatism has mainly been associated with the neoclassicism ideals and is attributed to the Chicago school of economics. Adam Smith, the founder of modern economics is considered as a proponent of fiscal conservatism. The usual argument against deficit spending dating to Adam Smith was that households should always maintain a balanced budget or surplus. No running on deficits, and what is correct for a household is correct for its government. A further argument was that debts must be repaid and to run deficits today is to burden future generations.

The argument associated with the Austrian school of economics was that government deficits are inflationary. In practice when governments pay off debts by printing money, increasing the money supply it creates inflation. Fiscal conservatism associated with the gold standard and expressed in the now as outdated Treasury View, held a dominant position until the Great Depression. The United States except Vermont having a balanced budget amendment to their state constitution, and the Stability and Growth Pact of the European Monetary Union punishing government deficits of 3% of GDP or greater are practical illustrations of this ideal.

Determinants of Inflation: In Sri Lanka empirical evidence suggests the existence of a long run dynamic relationship between inflation and its determinants. In the long run changes in the broad money supply, exchange rate depreciation, budged deficit and interest rate have significant positive impacts on inflation. The research findings also reflect that an increase in the budget deficit could also contribute to long run inflation.

During the last decade, the trend of inflation recorded in Sri Lanka has been highly unstable. According to the Colombo Consumer Price Index, inflation increased from 16.6 percent in 1984 to 21.5 percent in 1990. Since 1990, the rate decreased gradually until 1995. From 1995 to 2002 the inflation rate was low. However, after 2003, the inflation rate has been increasing gradually again until 2008. In year 2008, the inflation rate recorded was at a peak at 22.6 percent. Then from 2009 to 2013 the index averaged to 6.18. During the above periods, various factors contributed to this highly volatile situation. Particularly the growth of money supply, interest rate, budget deficit and depreciation of the Sri Lankan currency against the dollar have contributed to this outcome.

Ratnasiri (2006) investigated money supply growth and rice price increases as the main determinants of inflation in Sri Lanka in the long run. In contrast, it is apparent that exchange rate depreciation and output gap have no significant effect on inflation. In the short run, rice price was the main and totally endogenous variable. However, money growth and exchange rate were not so important variables as they were weakly exogenous in the adjustment process. In both the long run and the short run, output gap does not have a statistically significant effect on inflation.

Determinants of Interest Rate: Interest rate objectives are an important tool of monetary policy, as it is considered most when dealing with variables such as inflation, investment, and unemployment. The Central Bank of a country generally tends to reduce the interest rate when a country's economy needs to increase investment and consumption. But, introducing a low interest rate as a macro-economic policy can be risky, and may lead to the creation of an economic bubble, in which large amounts of investments flow into the real-estate market and stock market.

In Classical theory, when savings are equal to investment (S=I), the equilibrium rate of interest is determined. The theory assumes a positive relationship between interest rate and savings and a reciprocal (negative) relationship between the interest rate and investment. Interest rate is one of the major policy instruments in Classical theory.

According to Keynesian theory, the interest rate is not a determinant of the equilibrium level of savings and investment. The interest rate is purely a monetary phenomenon in Keynesian's theory. The theory says, low interest rates are advocated to raise income. A large number of developing countries followed these policies until the findings of McKinnon and Shaw in 1973, questioned such an action.

McKinnon and Shaw argue against the low interest rate policy advocated by Neoclassical and Keynesian paradigms. According to the McKinnon and Shaw framework, the interest rate is positively associated with savings, investment and economic growth. Moreover, they said an increase of interest rates encourage savings, especially bank deposits, and advocated the

removal of interest rate ceilings.

Prior to 2003, the use of interest rate as a monetary policy instrument of the Central Bank was the Bank Rate, Statutory Reserve Requirement (SRR) and moral suasion. Then in 2003, the use of interest rate as a monetary policy instrument was intensified along with active open market operations (OMO) in Sri Lanka. The interest rate at OMO is a short-term policy instrument, which is used to achieve monetary policy targets, although the behaviour of interest rate has long-term repercussions on macroeconomic variables such as inflation, economic growth, savings, and investment.

Determinants of Exchange Rate: In general, when inflation is relatively lower than in other countries, then exports will become more competitive and foreign goods will be less competitive. So citizens will buy less imported goods. So countries with lower inflation rates tend to see an appreciation in the value of their currency.

Similarly, when Sri Lankan bank interest rates rise relative to elsewhere, it will become more attractive to deposit money and so get a better rate of return on savings in Sri Lankan banks. Then more foreign currency will flow in and this is known as "hot money flows". Higher interest rates cause an appreciation of exchange rate.

A current account deficit means that the value of imports is greater than the value of exports. If this deficit cannot be financed by a surplus in the capital account, this will lead to a depreciation in the currency. Under some circumstances, the value of government debt can influence the exchange rate. When investors fear a government may default on its debt, then they will tend to sell their bonds causing a fall in the value of the exchange rate.

Samarasiri (2008) in "How do Central Banks manage the interest rate", investigates that, the inflation differential, economic growth differential, differential in money supply growth and interest rate differential between the trade-partner countries are some of the factors that could influence the exchange rate.

Determinants of Government Debt: Determinants of sovereign credit ratings of a country are assigned by the two leading credit rating agencies, Moody and Standard and Poor, using both a linear and a logistic transformation of the rating scales. The following six variables appear to be the most relevant in determining a country's credit rating: GDP per capita, external debt, level of economic development, default history, real growth rate and inflation rate.

Sri Lanka recorded a Government Debt to GDP ratio of 75.50 in 2014. Government Debt to GDP in Sri Lanka averaged 90.0 percent from 1980 until 2013, reaching an all time high of 103.20 percent in 2001 and a record low of 75.50 percent in 2014. Government Debt to GDP in Sri Lanka is reported by the Central Bank of Sri Lanka.

Deficit financing possibly through foreign borrowing, domestic borrowing, printing money (borrowing from the Central Bank) or depleting assets, all have their own repercussions on macroeconomic stability and economic growth in the future. In theory, financing by external debt would lead to pressure on the exchange rate. Financing domestic debt by monetisation would put pressure on inflation and that by domestic borrowing, on interest rates. For example, Moorthy *et.al*., (2000), while examining the issue of bond-financing versus monetisation, in the context of debt stabilisation, conclude that the emphasis on market borrowing rather than borrowing from the RBI (Reserve Bank of India) as part of economic reforms in India in the nineties has proved to be beneficial. In Rangarajan, Basu, and Jhadav (1994), the budget constraint was used to study the dynamic inter-linkages between government deficits and alternative modes of financing these deficits. In particular, given the set of revenue and expenditure parameters, relevant to the late eighties, it was shown that the bond-financing scenario led to an explosive growth in the debt-GDP ratio, and the monetary-financing scenario led to an unacceptably high inflation rate within a short span of time.

Review of former research articles

Budget deficit and Inflation: Printing money is argued to be a popular way to finance deficits. So long as the demand for base money is growing as in a growing economy, the governments can print money without raising inflation. Increasing base money at a higher

rate however can spur inflation. Secondly, the governments can raise money either through taxes or by issuing bonds. Since bonds are loans, they must eventually be repaid-presumably by raising taxes in the future (Ricardian equivalence presumption). Further imposing higher taxes could lead to price increases given the dependence in developing countries, resulting in rising inflation.

Today, monetary policy is applied in making decisions about the appropriate amount of money or the appropriate rate of money growth to influence economic activities (e.g production, employment, …) (Moraseli, 2005, p189-193). Friedman says: 'inflation is basically a monetary phenomenon which is created by increasing money volume faster than production volume. Outstanding changes in prices or nominal income are the most likely reasons for change in the nominal money supply. (Ahmadi Kashani, 2010, 12) Based on a dynamic systematic analysis, the relation between budget deficit, money supply, and inflation can be analyzed as follows: increase in government budget deficit leads to more debt in the public sector, and further increase in monetary base balance, and finally more money supply. Now, considering the positive relationship between general inflation and liquidity, the money supply increase will result in more general inflation. On the other hand, price growth also decreases actual value of state expenditure in the next run, and forces the state to compensate such a decrease by increasing the figurative expenditure increase (budget deficit) and inflation (Piontkivsky, 2001). Inflation is a situation where general level of prices is continuously growing. An important point in inflation is time and continuation of rise general price level (Tafazoli, 1997, p.431).

Jafari Samimi etal (2006) found la long term negative relation between budget deficit and economic growth and between inflation and economic growth, while a positive meaningful relation exists between inflation and growth in money volume and oil income-Bonato (2007) concluded that money growth rate leads to inflation even in short term. Monjazeb (2006) emphasizes neutral effect of money on production in long term. It is also focused that inflation has a neutral affect on production as a nominal variable, and short term money growth really affects inflation.

Harberger (1963) starts in his research on Chil'e economy that a direct relation exists

between general price level and production level, and money growth increases general price level. Aghevli and Mohsinkhan's survey (1987) on Indonesia economy indicates that money extension is affected by inflation, rate through cabinet budget, and a cause-effect relation between money supply and price level is acknowledged Vamvoukas (2000) states there is a positive meaningful relation between actual GDP, money demand, budget deficit, money demand, budget deficit, and inflation rate in Greece economy. The findings of Salman Saleh (2003) show that according to Keynzian model there is a positive meaningful relation between budget deficit and interest rate, and budget deficit may lead to inflation because of national income deficit and money supply increase. Boariu and Bilan (2007) state in their research on the effect of financing budget deficit in contemporary economy that if governments seek supplying their budget deficit through increasing money supply, the reason will be higher inflation rate.

Makochekanwa's survey on Zimbabwae economy (2008) reveals a positive relation between budget deficit and inflation because of increase in monetary base. Gherghina et.al (2010) compares Romanian economy with other members of EU and finds a decrease of budget deficit policy in 2000 which has led to inflation rate reduction proper with budget deficit reduction.

Keynes believes inflation takes place when consumables demand is more than their supply. This exceeding demand makes an inflation gap so that the price goes up to the level of filling the gap. The distinctive point between classic economists (advocates of money value theory) and Keynzians changes have no effect on real economic variables; production is placed in full employment level. So, production is determined according to real economic factors. But in Keynzian model, money can affect production (Tashkini, 2004. P.10). its supply as an inflation reason has drawn a great attention since freedman's approach (1968). In the literature, the relation between budget deficit and inflation is important in many respects: budget deficit increases total expenditure and price level because economy involves in full employment. (Dwyer, Gerald P. 1982, 315-329) Keynzian approach supports the positive relation between budget deficit and actual demand.

Evans (1986) has found "no evidence of the presence of any relationship between budget deficit and the value of domestic currency and suggests that budget deficits are a sign of weakness in the economy (and quite possibly a signal of future inflation)". Another paper by Evans (1987) proposes that "high budget deficits resulting in high interest rates and capital inflows do not necessarily lead to a strong currency. If the budget deficit affects aggregate demand, it might result in higher price levels and in turn lead to domestic currency losing its value".

There have been other studies on the impact of budget deficits on other macroeconomic variables such as inflation and money supply. McMillin (1986) finds evidence that "budget deficits cause inflation". Karras (1994) studies refute this finding and suggest that "budget deficits do not contribute significantly to higher inflation". Sargent and Wallace (1981) stated that "depending on the degree of independence the Central bank enjoys, it may resort to monetize the deficit in the current period or in future periods".

In terms of the relationship between budget deficits and money supply, Allen and Smith (1983) studies have found evidence in favor of the debt monetization hypothesis, while Niskanen (1978) have reached the opposite results. Inflationary conditions could be made worse through printing more money; crowding out effect, resulting from excessive issue of government bonds, since they constitute a substantial part of money supply. Therefore, higher budget deficits could aggravate the inflationary conditions in the economy, contributing to the presence of a depreciated domestic currency.

The findings of Saleh (2003) show that "according to Keynesian model there is a positive meaningful relationship between budget deficit and interest rate, and budget deficit may lead to inflation because of aggregate supply deficits and money supply increases". Boariu and Bilan (2007) state in their research on the "effect of financing budget deficit in contemporary economy through increasing money supply will result in higher inflation rates". Gherghina (2010) compares Romanian economy with other members of the EU and finds a "decrease of budget deficit policy in 2000 which has led to inflation rate reduction in line with budget deficit reduction".

Shojai (1999) puts it that deficit spending that is financed by the central bank can also lead to inefficiencies in financial markets and cause high inflation in the developing countries. In addition budget deficits distort real exchange rates and the interest rate, which in turn undermines the international competitiveness of the economy.

In the case of Nigeria, Onwioduokit (n. d) studied the causal relationship between inflation and fiscal deficits in Nigeria using annual data from 1970 to 1994. He employed Granger Causality Test. The variables in his model were ratio of fiscal deficit to gross domestic product, level of fiscal deficit and inflation rate. He found evidence that fiscal deficit caused inflation without a feedback effect but however feedback existed between inflation and the ratio of fiscal deficit to gross domestic product. Karras (1994) studied the relationship between budget deficits and macroeconomic variables in a Cross-sectional study involving 32 countries for the period 1950-1980, using OLS and GLS. He found out that Deficits do not lead to inflation, they are negatively correlated with the rate of growth of real output and increased deficits appear to retard investment. Al-Khedir (1996) studied the relationship between budget deficits and macroeconomic performance of the G-7 countries for the period 1964-1993 using VAR. He found out that budget deficits led to higher short-term interest rates in the seven countries. However, the deficits did not manifest any impact on the long-term interest rates. The trade balance was worsened by the budget deficit and economic growth improved in all seven countries studied. Obi and Nuruden (2008) and Chimobi and Igwe (2010) studied the relationship between budget deficit and macroeconomic variables such as inflation and money supply in Nigeria, using causality and co-integration test and the result revealed a positive relationship between budget deficit and macroeconomic variables.

Guess and Koford (1984) used the Granger Causality test to find the causal relationship between budget deficits and inflation, GNP and private investment using annual data for seventeen OECD countries for the period 1949 to 1981. They concluded that budget deficits do not cause changes in these variables. Haan and Zelhorst (1990) analyzed the relationship between budget deficit and money growth in the developing countries. The overall conclusion of their study did not provide much support for the hypothesis that government budget deficit influences monetary expansion and therefore create inflation.

Goharian and Nazari's survey (2002) reveals a controversial relation between liquidity and employment in Iran economy. Jafari Samimi etal (2006) found la long term negative relation between budget deficit and economic growth and between inflation and economic growth, while a positive meaningful relation exists between inflation and growth in money volume and oil income-Bonato (2007) concluded that money growth rate leads to inflation even in short term. Monjazeb (2006) emphasizes neutral effect of money on production in long term. It is also focused that inflation has a neutral affect on production as a nominal variable, and short term   money growth really affects inflation.

Harberger (1963) starts in his research on Chil'e economy that a direct relation exists between general price level and production level, and money growth increases general price level. Aghevli and Mohsinkhan's survey (1987) on Indonesia economy indicates that money extension is affected by inflation, rate through cabinet budget, and a cause-effect relation between money supply and price level is acknowledged Vamvoukas (2000) states there is a positive meaningful relation between actual GDP, money demand, budget deficit, money demand, budget deficit, and inflation rate in Greece economy. The findings of Salman Saleh (2003) show that according to Keynzian model there is a positive meaningful relation between budget deficit and interest rate, and budget deficit may lead to inflation because of national income deficit and money supply increase. Boariu and Bilan (2007) state in their research on the effect of financing budget deficit in contemporary economy that if governments seek supplying their budget deficit through increasing money supply, the reason will be higher inflation rate.

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increased inflation due to budget deficit reduction. Titan et.al (2011) state in their survey on Romania economy that budget deficit or economic activities reduction is associated with more inflation and unemployment, and public income reduction causes more, inflation unemployment.

There have been other studies on the impact of budget deficits on other macroeconomic variables such as inflation and money supply. McMillin (1986) find evidence that budget deficits cause inflation. Other studies refute this finding and suggest that budget deficits do not contribute significantly to higher inflation (Karras,1994). It has also been stated that depending on the degree of independence the Central bank enjoys, it may resort to monetize the deficit in the current period or in future periods (Sargent and Wallace,1981). Turnovsky and Wohar (1987) have argued that the empirical results depend on the exchange rate regime under which the economies operate.

In terms of the relationship between budget deficits and money supply, some studies have found evidence in favor of the debt- monetisation hypothesis (Allen and Smith, 1983), while others have reached the opposite results (Niskanen, 1978). Inflationary conditions could be made worse through printing more money; crowding out effect, which tends to and excessive issue of government bonds, since they constitute a substantial part of money supply. Therefore, higher budget deficits could aggravate the inflationary conditions in the economy, contributing to the presence of a depreciated domestic currency.

Budget deficit and Interest rate: Economic theory in particular argues that budget deficits invoke interest rate increases, due to government's penchant to finance deficits through domestic bonds. Particularly in developing countries where funding sources are limited, governments that wish to raise funding through domestic bonds may manipulate interest rates. This causes crowding out of private investment that clearly can have adverse impacts on economic growth, particularly depending on the final use of the borrowed funds. Persistent budget deficits and permanent growth of public debt also causes a decrease in public confidence about the economy that could induce decreases in the demand for governmental bonds and result in the need to increase interest rates, in turn adversely impacting private investment. With increasing interest rates, the government must also pay

higher interest on the issued government debt. Consequently higher debt service increases state budget expenditure that will further worsen budgetary balance.

Aisen and Hauner (2008) explored how the budget deficit negatively affects the interest rate. The results were taken from the study of the period 1985-1994 for different countries. However, the effect is positive after the year 1995. They further argued that there is a positive effect of budget deficit on interest rate though the effect varies from state to state. This impact is because of the high prices of the bonds. The study was conducted considering the period from 1973 to 1996 to explore the relationship between the budget deficit and the real interest rate, using an error correction model (Cebula, 2003).

There have been conflicting and inconsistent empirical findings about the relationship between budget deficits and interest rates. Evans (1985, 1987) and Barro (1987) found "no causal relationship between budget deficits and the interest rates in the US". On the other hand Hoelscher (1986) and Cebula and Koch (1989) found that "federal budget deficits have contributed to higher levels of interest rate yields". Knoester and Mak (1994) showed that "only in Germany (among eight OECD economies) does the government budget deficit contribute significantly to the explanation of higher interest rates".

The Congressional Budget Office (1987) has recently summarized the methods and results of some two dozen studies that analyze the relationships between budget deficits and interest rates. The evidence is extremely mixed, and it is easy to cite a large number of studies that support any conceivable position.

Most of the existing studies estimate unrestricted reduced form relationships between interest rates and budget deficits. Others impose very restrictive models of interest rate determination (Plosser, 1986). The latter class of studies typically finds no relationship between deficits and interest rates, or a perverse one. It is therefore important to bear in mind that these studies test the alternative paradigms jointly with some very strong maintained hypotheses, and that the results may say very little about the effects of deficits. For example, while Plosser finds that deficits depress interest rates, he also finds that these rates are essentially independent of government spending and monetary policy.

It is also important to emphasize that when estimating consumption functions, one has both a pure Ricardian and pure Keynesian benchmark. But in the case of interest rate equations, we have only a Ricardian benchmark: deficits do not alter interest rates. Since the empirical model is intended to represent a reduced form rather than a behavioral relationship, one can't, in the absence of extensive information about various elasticities, construct a natural Keynesian benchmark. Thus, studies which do not reject the Ricardian implication may also fail to reject any other hypothesis of interest.

Studies on budget deficits in literature have largely focused on the interaction of deficits with interest rates. We briefly look at some of these studies before proceeding to studies dealing with relationships with other macroeconomic variables.

There have been conflicting and inconsistent empirical findings about the relationship between budget deficits and interest rates. Evans (1985, 1987) and Barro (1987) found no causal relationship between budget deficits and interest rates in the US. On the other hand, Hoelscher (1986) and Cebula and Koch (1989), found that federal budget deficits have contributed to higher levels of interest rate. Knoester and Mak (1994) showed that only in Germany (among eight OECD economies) does the government budget deficit contribute significantly to the explanation of higher interest rates.

Evans (1985) suggests that federal deficits affect consumption and interest rates whereas Bernheim (1989) finds evidence to the contrary. Regardless of various studies, the reality is that the presence of large budget deficits in both developed and developing countries has adversely affected economic growth.

Budget deficit and the Exchange rate: Increasing the balance of payments deficit is also another way of deficit financing, through foreign borrowing or depleting assets. Running down foreign exchange reserves or other assets (privatization of public enterprise assets or depletion of oil reserves for example) influence the budget. Reducing reserves and decreasing the trade account deficit may cause the local currency to depreciate.

It has been largely held that the short run impact of budget deficits on exchange rate have led to uncertainty in the nature of the relationship between the two variables. Krugman (1995) and Sachs (1985) argued that lower budget deficit lowers the value of the dollar. Many economists hold this opinion, mostly in the case of the US (Mundell, 1963; Fleming, 1962; Dornbusch, 1976). Other economists including Evans (1986) argue that a lower deficit might actually appreciate the dollar in the short run.

In an important paper, Feldstein (1986) points out that appreciation of the dollar in the 1980s coincided with high budget deficits (This study started debate on the efficacy of cutting budget deficit in the US to strengthen the dollar). A few more studies arrived at a similar conclusion using empirical analysis (Alse and Bahmani-Oskooee, 1992; Bahmani- Oskooee and Payesteh, 1993). A similar phenomenon has been found in Canada by Wijnbergen (1987) where "budget deficits contributed to appreciation of the Canadian dollar".

Gulcan and Bilman (2005) used co-integration method and causality test and applied ADF, PP and RPSS unit root test to investigate the stationarity of the individual time series. They considered data of Turkey for the period 1960 to 2003 and proved there is a strong impact of budget deficit on the real exchange rate. The study shows that the role of the budget deficit to maintain the real exchange rate is very crucial. They suggested that government must focus to stable the budget because the trade balance is significantly affected by the real exchange rates. Hakkio (1996) collected data of USA, Finland, Sweden and Germany for the period of 1979-1995, but could not explore any empirical association between the economies of United States of America (USA) and Germany. However, by applying simple regression technique and considering data from Sweden and Finland, he was successful in exploring negative relationship between the budget deficit and the exchange rate.

Beck (1993) tests the significance of budget deficit and government spending changes on exchange rates in five industrialized countries: U.S., Germany, Japan, U.K., and Canada and finds that there exists a negative relationship between budget deficit and exchange rates in all the cases except Japan.

Not many studies have explored the impact of budget deficits on the value of the domestic currency, though there is some literature on relationship between current account deficit and government deficit (e.g. Abell, 1990). It has been largely held that the short run impact of budget deficits on exchange rates has led to the uncertainty in the nature of the relationship between the two variables. Krugman (1995) and Sachs (1985) argued that lower budget deficit lowers the value of the dollar. There is a lot of literature that contributed too many economists holding this opinion, mostly in the case of the US (Mundell, 1963; Fleming, 1962; Dornbusch 1976). Other economists including Evans (1986) argue that lower deficit might actually appreciate the dollar in the short run. Cantor and Driskill (1995) suggest that the possibility of both short run and long run appreciation of a currency to fiscal contraction hinges on domestic country being a large debtor.

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Evans (1986) has found no evidence of the presence of any relationship between budget deficit and value of domestic currency and suggests that budget deficits are a sign of weakness in the economy (and quite possibly a signal of future inflation). Another paper by Evans (1987) proposes that high budget deficits do not necessarily lead to a strong currency. He argues that if the budget deficit affects aggregate demand, it might result in higher price levels and in turn lead to domestic currency losing its value. Beck (1993) tests the significance of budget deficit and government spending changes on exchange rates in five industrialized countries: U.S., Germany, Japan, U.K., and Canada and finds that there exists a negative relationship between budget deficit and exchange rates in all the cases except Japan.

Budget deficit and real GDP growth rate: Most early theoretical studies on this subject employ models with-out capital accumulation and derive conditions under which government deficits are sustainable (Domer (1944), Turnovsky (1977) and Christ (1979)).

In these models, the interaction between budget deficits and economic growth cannot be analyzed, and thus several authors reexamine this issue with explicit consideration of capital accumulation and transitional processes. The model developed by Weil (1989) show that, if the growth rate of an economy is high, the subjective discount rate is low and the size of the public sector is modest, then there exist economically meaningful steady-growth equilibrium with deficits, which can be financed by rolling over public debts forever.

Stanley Fisher (1993), in his paper presented international cross-sectional regression evidence that supports the view that growth is negatively associated with inflation, and positively associated with good fiscal performance and undistorted foreign exchange markets. Koichi Futagami and Akihisa Shibata (2003), "Budget deficit and Economic growth". This paper investigates the growth sustainability and welfare effects of government budget deficits by using a simple endogenous growth model with overlapping generations. It is shown that, if the initial volume of government debt and the ratio of primary budget deficits to GDP are not large, then there can exists two steady-growth equilibriums, one of which is associated with a higher growth rate and the other of which is associated with a lower growth rate.

G Fatima ,M Ahamed, and W Rehman (2003) "Consequential Effects of Budget deficit on Economic Growth of Pakistan. This research aims at investigating the true impact of the budget deficit on the economic growth of Pakistan. The sample taken for the current study comprises of time-series considering period of 1978-2009. Regression analysis is conducted to ascertain the impact of BD on the GDP, and explored a negative impact of budget deficit on the economic growth. Some policies are suggested for the government to avoid certain levels of the budget deficit to achieve desired level of growth.

According to Al-Khedar (1996) interest rates increases in short run due to budget deficit, but in long run there is not impact explored. He studied taking VAR model by selecting data of G-7 countries for the period 1964-1993. He also explored that the deficit negatively affects the trade balance. However the budget deficit has a positive and significant impact on the economic growth of the country. Barro (1979) explored a positive and significant

impact of budget deficit on the growth. This impact is due to the positive relationship between the budget deficit and the inflation.

However, according to Ghali and Al-shamsi (1997) an increase in investment leads to increase in the economic growth of the country. The results were explored by taking quarterly data from oil producing country i.e. United Arab Emirates (UAE) for the period of 1973 to 1995.

Huynh (2007) conducted his study while collecting data from the developing Asian Countries for the period of 1990 to 2006. He concluded that there is negative impact of the budget deficit on the GDP growth of the country while simply analyzing the trends in Vietnam. Furthermore, he concluded the crowding-out effect surfaces as the budget deficit burden increases.

Saleh (2003) on the basis of previous researches, which are conducted by economists regarding the impact of budget deficit on different economic variables, concluded that budget deficit has diverse impact on different economic variables. The diversity in the impact varied from country to country but could not ascertain the true impact on the economic growth. He used IS-LM model, while exploring the impact of budget deficit on different variables; interest rate using simultaneous equations model for trade deficit and used simple equation model in to assess the impact on the GDP. Sill (2005) also adopted the methodology of Saleh (2003) by taking sample of 94 countries and explored a positive relationship between the budget deficit and inflation. According to a study conducted by Vit (2004) the budget deficit resulted in some hurdles inflation, deficit in current account and subsequently these hurdles impeded the economy. The results were based on the quarterly data collected from Czech Republic's economy for the period of 1995 to 2002.

Budget deficit and debts: The national debt is the total amount of money payable by the government for goods and services brought but never paid for. Interestingly, deficit spending tends to increase both real GDP and the price level.

As with the budget deficit, there are a number of different views with regards to national debt. Some believes, national debt will significantly damage on economic growth, while others minimize the possible effects of the national debt.

The most important effects of a national debt are on the supply side of the economy. That is, because a large national debt increases the interest rate, investment falls as the national debt increases. As results, future generations are burdened by low productivity as a result of decreased investment created by the national debt.

On other hand, when government runs a budget deficit, meaning that it spends more than it receives, in order to fund this spending government needs to go for loans. Generally, this is done by selling government bonds. To sell bonds, government must offer an interest rate that is attractive to investors. When government increase the interest rate to fund a budget deficit the investment funds takes away from the private sector, which is called crowding out. However, there is a force that works in opposite direction, which is called crowding in. According to this theory, private industry must be prepared to provide good & services, where the demand created by the government. To do this private sector must invest to increase their productivity. This is an effect of government spending where actually stimulates investments.

Contentious, literature on the nexus between fiscal deficit and public debt with its outcomes. Some authors discourse that the level of public debt depends strongly on the magnitude of the fiscal deficit and the direction of causation runs from fiscal deficit to public debt (Kruger, 1987; Noll, 2004; Michael, 2011). It has also been observed in the literature that the level of debt is preceding cause of fiscal deficit in developing countries (Klein, 1994 and Ariyo, 1993) But some authors found no strict causal relationship exists between the variable public debt and fiscal deficit (Ogunmuyiwa, 2011). Therefore, the issue of the direction of causation between fiscal deficit and public debt is yet to be resolved in the literature. In addition, the component of debt that has causal relationship and their relative impact on fiscal deficit has also not been addressed. Moreover, domestic debt may lead to credit squeeze through higher interest rates leads to crowding out private investment and consumption (Onwioduokit, 1999) which may eventually direct to further deficit. As well,

external debt may also lead to a current account deficit; appreciation of the real exchange rate, balance of payments crisis (Easterly and Schmidt-Hebbel, 1993 and 2003) may result into further fiscal deficit.

Other factors that affect to Budget deficit:

In economic literature there is a theory called demand management policies about unemployment which is mainly based on keynz theory. It states that unemployment can be effected by increasing total production demand or increasing money supply many economists believe when economy confronts high rate of unemployment and capital exploitation is low, growth in total production demand usually leads to unemployment reduction, and decrease in demand usually leads to higher unemployment. (World Economic Outlook, 1995, 74–75) Low inflation rate is an objective of economic poly like low unemployment rate.

Goharian and Nazari's survey (2002) reveals a controversial relation between liquidity and employment in Iran economy. Carp and Vasiliu's experimental study throughout Europe (2010) shows if investment rate is fixed, and average budget deficit decrease of 0.673 percent will lead to one percent increase in unemployment rate.

In Keynzian model, money can affect production (Tashkini, 2004: P.10), its supply as an inflation reason has drawn a great attention since freedman's approach (1968). Dwyer Gerald P. (1982: 315-329) states that "relation between budget deficit and inflation is important in many aspects: budget deficit increases with total expenditure and price level because economy involves in full employment". Keynzian approach supports the positive relation between budget deficit and actual demand. In economic literature there is a theory called demand management policies about unemployment which is mainly based on keynz theory. It states that unemployment can be affected by increasing total production demand or increasing money supply. Many economists believe when growth in total production demand usually leads to unemployment reduction, and decrease in demand usually leads to higher unemployment.

Rana Ejaz Ali Khan et al (2011) survey on Pakistan economy reveals more unemployment, unbalanced income and increased inflation due to budget deficit reduction. Titan et.al (2011) state in their survey on Romania economy that budget deficit or economic activities reduction is associated with more inflation and unemployment, and public income reduction causes more, inflation unemployment.

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There are two types of analysis used to examine the sustainability of fiscal policy; time series and panel data analysis. Studies using time series analysis (e.g. Quintos 1995, Hamilton, Flavin 1986, Papadopoulos, Sidiropoulos 1999, Cipollini 2001, Qin et al. 2006) examined the long run relationship between government spending and revenues for a particular country over time. The panel data analysis (e.g. Prohl, Schneider 2006, Llorca, Redzepagic 2008, Ehrhart, Llorca 2008, Westerlund, Prohl 2010) investigated the relationship between revenues and spending across different countries at the same point in time (year). The majority of studies which used time series data have tested the sustainability for a single country, Olekalns (2000) examined the case of Australia, Hatemi-J (2002) tested the case of Sweden, while Davig (2005) examined the case of U.S.A. Only a small number of studies have examined a group of countries; Prohl and Schneider (2006) examined the EU15 countries, Westerlund and Prohl (2010) investigated the case of 8 OECD countries.

Ahmed and Miller (2000) in a cross-sectional study of thirty nine states considering the data for period of 1975-1984, while using Ordinary Least Squares model (OLS), fixed effect and random effect methods apprised that government spending can be segregated into two parts. First is the spending on social security and welfare of its people and due to which it reduces the investment. Secondly, the spending on communication sector, including transport, increases investment by the private sector less developed countries (LDCs). He

suggested that reduction in investment leads to less revenue generation hence causing deficit, and vice-versa when spending in transport and communication.

In a study conducted by Bahmani (1999), with the help of Johansen Juselius co integration technique, the association between the budget deficit and investment while using quarterly data for the period of 1947-1992. There is a crowding in impact of the budget deficit on the real investment, which is validation of the arguments of Keynesian regarding the expansionary effect of the budget deficit on the investment.

The majority of previous studies used post World-War II data and tested periods less than 50 years. However there are studies (e.g. Olekalns 2000, Bohn 2005, Trehan, Walsh 1988, Marinheiro 2006, Correia et al., 2008) which examined long data sets for single countries. Focusing on the empirical results of studies using long series, we can conclude that results are mixed and do not follow any common pattern. For instance, some of them found support of a sustainable budget deficits, Bohn (2005) found that the fiscal policy in U.S.A. was sustainable during 1792-2003, Kirchgaessner and Prohl (2006) found that Swedish deficits were sustainable during 1900-2002. On the other hand, studies such as Olekans (2000), Jha and Sharma (2004), Araoz et al. (2009) found evidence of unsustainable deficits for the cases of Australia, India and Argentina respectively. Finally, Correia et al. (2008) found that Portuguese deficits were sustainable only for some periods.

DATA ANALYSIS

Behavior of the variables: 1980-2014

Budget deficit and Inflation: The figure-2 shows the behavior of budget deficit (as a percentage of GDP), and the inflation in Sri Lanka since 1980 to 2014. In the axis border it shows the Kernel density approach. According to Kernel density approach, distribution of budget deficit represent the shape of positive skew (right-skewed) and inflation signify the shape of negative skew (left-skewed).
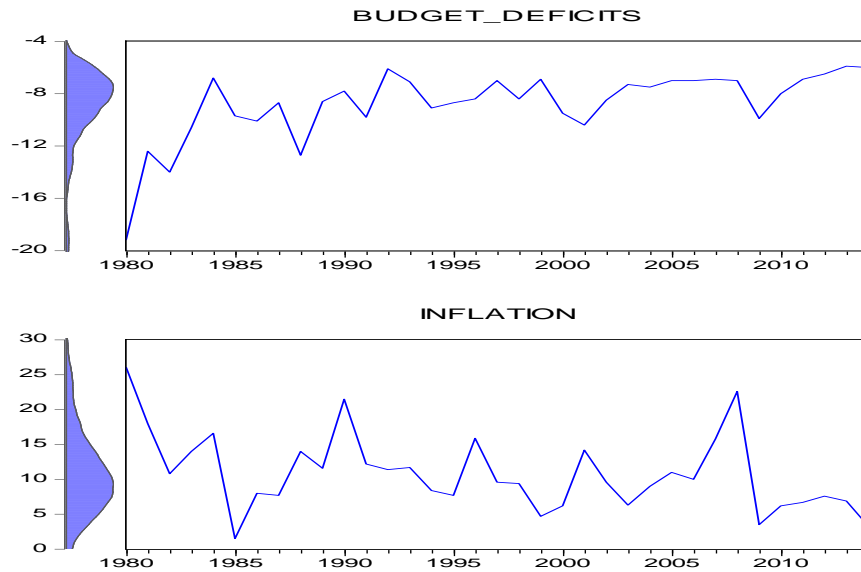
Budget deficit and inflation

Figure-2: Budget deficit and inflation

Budget deficit and Interest rate: The figure-3 represents the relationship between budget deficit (as a percentage of GDP) and the interest rate in Sri Lanka since 1980 to 2014. The relationship between said variables is in line with economic theories, as shows in the figure. In the axis border it shows the Kernel density approach. According to Kernel density approach, distribution of budget deficit represent the shape of positive skew (right-skewed) and Interest rate curve is very flat, or plateau-like. This distribution of Interest rate shows a shape of platykurtic distribution.
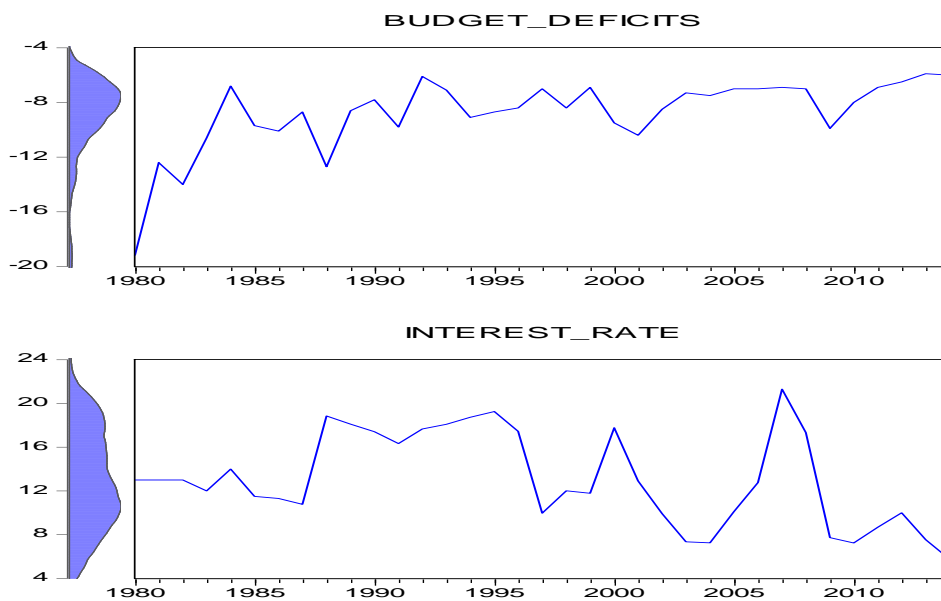
Budget deficit and Interest rate

Figure -3: Budget deficit and Interest rate

Budget deficit and Exchange rate: The figure-4 represents the behavior of Budget deficit (as a percentage of GDP), and the Exchange rate in Sri Lanka since 1980 to 2014. In the axis border it shows the Kernel density approach. According to Kernel density approach, distribution of Budget deficit represent the shape of positive skew (right-skewed) and the Exchange rate curve is very flat, or plateau-like. Distribution of Exchange rate indicates a shape of a platykurtic distribution.
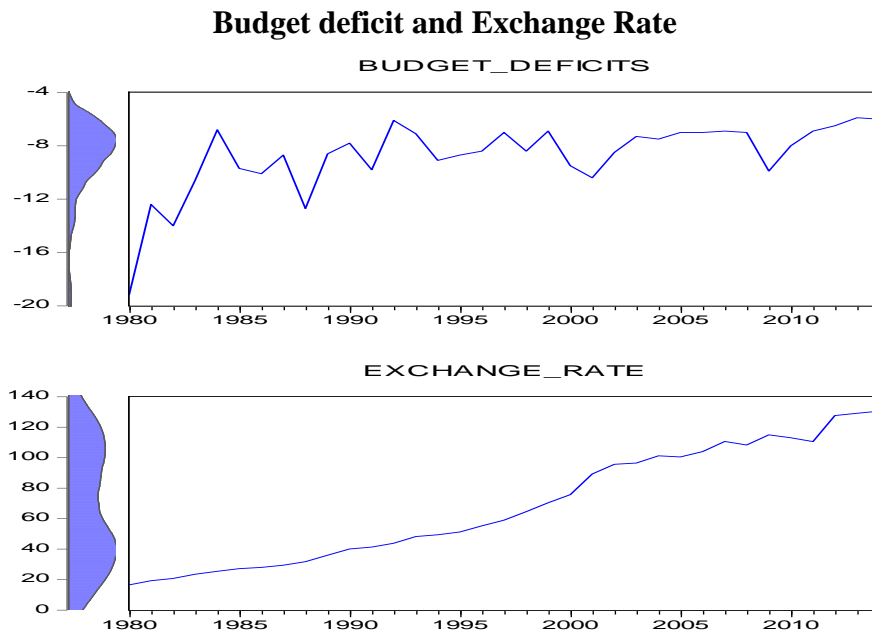
Budget deficit and Exchange Rate

Figure-4: Budget deficit and Exchange Rate

Budget deficit and Real GDP growth rate: The figure-5 represents the behavior of budget deficit (as a percentage of GDP), and the Real GDP growth rate in Sri Lanka since 1980 to 2014. In the axis border it shows the Kernel density approach. According to Kernel density approach, distribution of budget deficit signifies the shape of positive skew (right-skewed) and Real GDP growth rate shows the shape of a normal distribution.
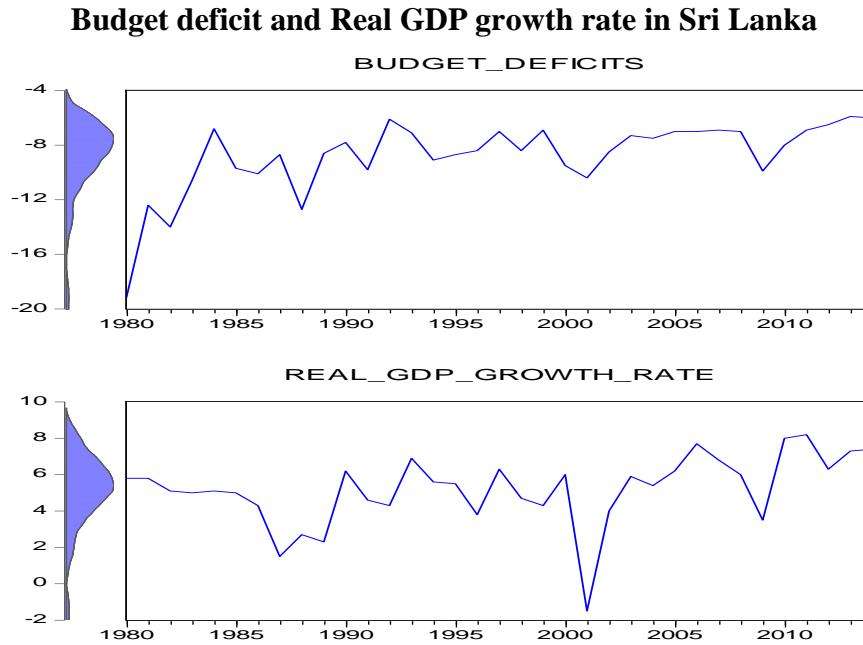
Budget deficit and Real GDP growth rate in Sri Lanka

Figure-5: Budget deficit and Real GDP growth rate

Budget deficit and Debts: The figure-6 represents the behavior of budget deficit (as a percentage of GDP), and the debts in Sri Lanka as 1980 to 2014. In the axis border it shows the Kernel density approach. According to Kernel density approach, distribution of budget deficit symbolizes the shape of positive skew (right-skewed) and the debts curve is very flat, or plateau-like. Distribution of debts indicates a shape of a platykurtic distribution.
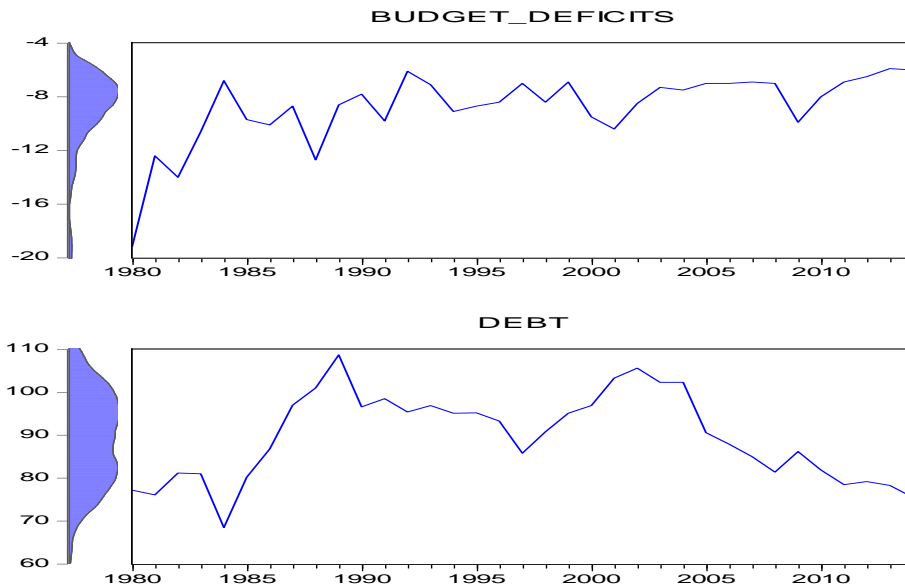
Budget deficit and Debts

Figure-6: Budget deficit and Debts

The Six-Variable Model

The multiple regression model was six-variable regression, with one dependent variable and five explanatory variables.

$$Bd_t = \chi_0 + \chi_1 \inf_t + \chi_2 r_t + \chi_3 ER_t + \chi_4 y^g_t + \chi_5 debt_t + \varphi_t \qquad (1)$$

$$\text{Where} \quad \chi_0 < o, \chi_1 < 0, \chi_2 > 0, \chi_3 > 0, \chi_4 > 0, \chi_5 > 0$$

Run a Multiple regression

When we run a multiple regression for the data selected during 1980 to 2014, the regression was as follows according to Table-1.

$$Bd_t = -15.039 - 0.157 \inf_t + 0.164 r_t + 0.039 ER_t + 0.232 y^g_t + 0.023 debt_t \qquad (8)$$

$$\quad (4.814) \quad (0.0475) \quad (0.0120) \quad (0.0802) \quad (0.1147) \quad (0.2430)$$

$$R^2 = 0.4528$$

The multiple regressions equation (8) is to describe the relationship between budget deficit, and its potential predicators as Inflation, Interest rate, Exchange rate, Real GDP growth rate, Debt. As per the equation, Budget deficit shows positive relationship between debt, exchange rate, interest rate and real GDP growth rate. Interest rate and real GDP growth rate show higher relationship than exchange rate and debt to budget deficit. Consecutively, when deficit increase by 1% interest rate and GDP growth rate increase by 16.42% and 23.22%. Contrary,

inflation signifies negative relationship to budget deficit. Moreover, when deficit increase by 1%, inflation decrease by 15.75%. Further, R-squared value (goodness of fit) of the regression is 0.4528(45.28%) and this value indicates moderate relation-ship between the budget deficit and the selected macroeconomics variables. Further, the goodness of fit represents the proportion of the variation in budget deficit that is explained by the independent (explanatory) variables.

Developing Autoregressive Distributed Lag (ARDL) model

$$Bd_t = \chi_0 + \chi_1 \inf_t + \chi_2 r_t + \chi_3 ER_t + \chi_4 y^g_t + \chi_5 debt_t + \varphi_t \qquad (1)$$

The variables taken here such as budget_deficits(-1) debt(-1) exchange_rate(-1) inflation(-1) interest_rate (-1) real_gdp_growth_rate(-1) are to identify whether the six variables have long run association-ship or not. That's why here taken as lag one, and no first difference but other taken first difference data. The existing study would use ARDL testing technique to estimate long-run relationship between budget deficits, debt, exchange rate, inflation, interest rate and real GDP growth rate.

For short-run dynamics, Engle- Granger causality test has been used. Further, this study would also investigate the direction of causal relationship between variables.

For this ARDL model need to select the optimum number of lags, which is more suitable for this test. Testing the model for lag two and lag three variables and then compare the Akaike Info Criterion (AIC) and Schwarz Criterion (SIC) criterion. The model having lowest AIC and SIC values is the best model. According to comparison of lag (2) and lag (3) criterions as at table-1   lag (3) model is the best among these selected two models. Hence, we tend to utilize lag (3) model for further testing.

	AIC (Akaike info criterion)	SIC (Schwarz criterion)
Lag 2	3.46	4.34

Lag 3	2.49	3.66

Table-1: Comparison of Lag two and Lag three criterions

Bound Testing

The Bound testing is to test the all six variables; Budget deficit, Inflation, Interest rate, Exchange rate, Real GDP growth rate, and Debts having long run association-ship or not using Wald Test. In this testing Null hypothesis (Ho) is whether budget_deficits(-1), debt(-1), exchange_rate(-1), inflation(-1), interest_rate(-1), real_gdp_growth_rate(-1) are jointly zero or not. These said lag (1) variables coefficients take as $C_{20}, C_{21}, C_{22}, C_{23}, C_{24}, and C_{25}$ The null hypothesis is considered $(H_0) = C_{20} = C_{21} = C_{22} = C_{23} = C_{24} = C_{25} = 0$ and the alternative hypothesis considered as not equal to zero. The rejection of Ho concludes the said variable have long run association ship to dependent variable. Hence the Wald test results are as per table-2.

The Wald test for lag (3) variables

Null Hypothesis $(H_0) = C_{20} = C_{21} = C_{22} = C_{23} = C_{24} = C_{25} = 0$

Alternative Hypothesis $(H_1) = C_{20} = C_{21} = C_{22} = C_{23} = C_{24} = C_{25} \neq 0$

Table-2: Wald Test results for lag (3) variables

Wald Test:

Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	4.640713	(6, 5)	0.0566
Chi-square	27.84428	6	0.0001

Null Hypothesis:

C(20)=C(21)=C(22)=C(23)=C(24)=C(25)=0

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(20)	-1.758796	0.651103
C(21)	0.017866	0.083294
C(22)	0.047896	0.021928
C(23)	-0.144535	0.191039
C(24)	0.328856	0.237624
C(25)	-0.687625	0.896660

Source: Estimates from E-Views Econometric package

In the table-2, the probability value is 0.001 and the said value is less than 0.05 (1% < 5%). Hence we reject the null hypothesis and be able to conclude **C(20)=C(21)=C(22)=C(23)=C(24)=C(25)** are not equal to zero jointly. Further, we can say the six variables; budget deficits, inflation, interest rate, exchange rate, real GDP growth rate, and debts have long run association ship, meaning that the said variables are moving jointly in the long-run.

Granger Causality Testing

A Granger Causality test, in the case of six time-series variables; Budget deficit*(Bd)*, Debt*(debts),* Exchange rate*(ER),* Inflation*(inf),* Interest rate *(r),* and Real GDP growth rate(y^g).We can test for the absence of Granger causality by estimating the following VAR model:

$$Bd_t = \alpha_1 + \sum_{i=1}^{k}\beta_{1i}Bd_{t-i} + \sum_{i=1}^{k}\lambda_{1i}\inf_{t-i} + \sum_{i=1}^{k}\mu_{1i}r_{t-i} + \sum_{i=1}^{k}\delta_{1i}ER_{t-i} + \sum_{i=1}^{k}\rho_{1i}y^g_{t-i} + \sum_{i=1}^{k}\sigma_{1i}debt_{t-i} + \varepsilon_{1i} \quad (2)$$

$$\inf_t = \alpha_2 + \sum_{i=1}^{k}\beta_{2i}Bd_{t-i} + \sum_{i=1}^{k}\lambda_{2i}\inf_{t-i} + \sum_{i=1}^{k}\mu_{2i}r_{t-i} + \sum_{i=1}^{k}\delta_{2i}ER_{t-i} + \sum_{i=1}^{k}\rho_{2i}y^g_{t-i} + \sum_{i=1}^{k}\sigma_{2i}debt_{t-i} + \varepsilon_{2i} \quad (3)$$

When test $\lambda_{11} = \lambda_{12} = ... = \lambda_{1k} = 0$ then inflation does not Granger cause Budget deficit as in equation (2). Then null hypothesis (Ho) is a test that inflation does not Granger cause Budget deficit. Similarly, when $\beta_{11} = \beta_{12} = ... = \beta_{1k} = 0$ then Budget deficit does not Granger cause inflation as in equation (3). It then null hypothesis (Ho) is a test that Budget deficit does not Granger cause inflation.

Table-3: VAR Granger Causality test with a dependant variable Budget deficit

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 06/29/15   Time: 14:16

Sample: 1980-2014

Included observations: 32

Dependent variable: BUDGET_DEFICITS

Excluded	Chi-sq	df	Prob.
DEBT	2.557736	3	0.4649
EXCHANGE_RATE	4.149524	3	0.2458
INFLATION	0.930197	3	0.8181
INTEREST_RATE	2.528733	3	0.4701
REAL_GDP_GROWTH_RATE	2.312823	3	0.5101
All	19.14085	15	0.2074

Source: Estimates from E-Views Econometric package

Null hypothesis (Ho) = Independent variable (lag1+ lag2+ lag3) can't cause Budget deficit

Alternative hypo. (H1)= Independent variable (lag1+ lag2+ lag3) can cause Budget deficit

According to table-3, the probability values of all variables such as Debt, Exchange rate, Inflation, Interest rate and Real GDP growth rate are greater than 0.05 (5%). Hence, we don't

reject the null hypothesis of all said variables individually and conclude that all independent variables are individually can't cause to budget deficit. Finally, consider the all selected independent variables total probability value is equal to 0.2074 and could conclude all the independent variables are jointly also can't cause to budget deficit.

Table-4: VAR Granger Causality test with a dependant variable Debt

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 06/29/15   Time: 14:16

Sample: 1980-2014

Included observations: 32

Dependent variable: DEBT

Excluded	Chi-sq	df	Prob.
BUDGET_DEFICITS	11.81956	3	0.0080
EXCHANGE_RATE	1.247028	3	0.7417
INFLATION	0.845639	3	0.8385
INTEREST_RATE	1.066824	3	0.7851
REAL_GDP_GROWTH_ RATE	6.788335	3	0.0790
All	21.91790	15	0.1100

Source: Estimates from E-Views Econometric package

According to above table-4 is able to make conclusion as below; Ho is considered as null hypothesis and H1 as alternative hypothesis.

Ho= Budget deficit (lag1+ lag2+ lag3) can't cause Debt

H1= Budget Deficit (lag1+ lag2+ lag3) can cause Debt

Here the Budget Deficit probability is 0.0080 and it is less than 0.05. Hence, we reject the null hypothesis (Ho) and conclude budget deficit (lag1+ lag2+ lag3) can cause to debt. Further, above table shows the variables such as Exchange Rate (lag1+ lag2+ lag3), Inflation (lag1+ lag2+ lag3), Interest Rate (lag1+ lag2+ lag3) & Real GDP growth rate (lag1+ lag2+ lag3) variables probability is greater than 0.05. So the said variables are can't cause to budget deficit. Moreover, when consider the total value of all said independent variable is 0.1100 and could be able to conclude jointly all variables can't cause to Debt.

Table-5: VAR Granger Causality with a dependant variable inflation

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 06/29/15   Time: 14:16

Sample: 1980-2014

Included observations: 32

Dependent variable: INFLATION

Excluded	Chi-sq	df	Prob.
BUDGET_DEFICITS	7.878738	3	0.0486
DEBT	3.183749	3	0.3642
EXCHANGE_RATE	1.922959	3	0.5885
INTEREST_RATE	4.752391	3	0.1909
REAL_GDP_GROWTH_RATE	2.082482	3	0.5555
All	28.11859	15	0.0208

Source: Estimates from E-Views Econometric package

Null Hypothesis (Ho) = Inflation (lag1+ lag2+ lag3) can't cause Budget Deficit

Alternative Hypothesis (H1) = Inflation (lag1+ lag2+ lag3) can cause Budget Deficit

The table-5 represent the budget deficit probability is 0.0486 and that value is less than to 0.05. Hence, we reject the null hypothesis and conclude budget deficit (lag1+ lag2+ lag3) can cause to Inflation. Further, the other variables such as Exchange Rate (lag1+ lag2+ lag3),

Debt (lag1+ lag2+ lag3), Interest Rate (lag1+ lag2+ lag3) & Real GDP growth rate (lag1+ lag2+ lag3) variables probability value is more than 0.05 and be able to conclude the said variables can't cause to inflation individually. Moreover, the total probability values of all independent variables equal to 0.0208 and this value is less than 0.05. Hence, we can conclude the said all independent variables such as budget deficit, debts, exchange rate, interest rate and real GDP growth rate are jointly can cause to inflation.

Table-6: VAR Granger Causality with a dependant variable Interest rate

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 06/29/15   Time: 14:16

Sample: 1980-2014

Included observations: 32

Dependent variable: INTEREST_RATE

Excluded	Chi-sq	df	Prob.
BUDGET_DEFICITS	2.683685	3	0.4430
DEBT	4.499116	3	0.2124
EXCHANGE_RATE	11.09871	3	0.0112
INFLATION	2.179143	3	0.5361
REAL_GDP_GROWTH_RATE	2.147149	3	0.5424
All	19.95108	15	0.1738

Source: Estimates from E-Views Econometric package

Ho= Independent variable (lag1+ lag2+ lag3) can't cause Interest rate
H1= Independent variable (lag1+ lag2+ lag3) can cause Interest rate

The table-6 shows the probability values of all variables such as budget deficit, Debt, Exchange rate, Inflation, and Real GDP growth rate are greater than 0.05 (5%). Hence, we don't reject the null hypothesis of all said variables and conclude that all independent variables are individually can't cause to Interest rate. Finally, all said independent variables

total probability value is equal to 0.1738, which is more than 5% and could be able to conclude all independent variables are jointly also can't cause to interest rate.

Table-7: VAR Granger Causality with a dependant variable Real GDP growth rate

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 06/29/15   Time: 14:16

Sample: 1980-2014

Included observations: 32

Dependent variable: REAL_GDP_GROWTH_RATE

Excluded	Chi-sq	df	Prob.
BUDGET_DEFICITS	3.707264	3	0.2949
DEBT	1.023892	3	0.7955
EXCHANGE_RATE	1.463834	3	0.6906
INFLATION	2.179512	3	0.5360
INTEREST_RATE	0.423927	3	0.9353
All	16.01101	15	0.3813

Source: Estimates from E-Views Econometric package

Ho= Independent variables (lag1+ lag2+ lag3) can't cause Real GDP growth rate
H1= Independent variables (lag1+ lag2+ lag3) can cause Real GDP growth rate

The table-7 represent the probability values of all independent variables such as budget deficit, Debt, Exchange rate, Inflation, and Interest rate are greater than 0.05 (5%). Hence, we don't reject the null hypothesis of all said variables and conclude that all the said independent variables are individually can't cause to Real GDP growth rate. Finally, when consider the total probability value of all independent variables are equal to 0.3813 and conclude that all the independent variables are jointly also can't cause to Real GDP growth rate.

CONCLUSION

The paper examined the nexus between Budget deficit with inflation, Interest rate, Exchange rate, debt and Real GDP growth rate in Sri Lanka by using annual time series data from 1980-2014. . For the robustness of long-run rapport ARDL bound testing technique is applied, and short-run dynamics are confined through ARDL Granger-Causality test.

Our findings suggested that there was a long-run relationship between budget deficits, debt, exchange rate, inflation, interest rate, and real GDP growth rate in Sri Lanka. Further, the Granger Causality test carried out to determine whether the variables impacts are uni or bi-direction. In this study uni-direction causality was confirmed between Budget deficit and debt as well between budget deficit and inflation. Budget deficit causes to debt, and Budget deficit causes to inflation. In addition, cluster of variables; Budget deficit, interest rate, exchange rate, debts and real GDP growth rate all were caused to inflation. Further, this study confirmed there were no any uni or bi direction causality from budget deficit to interest rate or to exchange rate or to real GDP growth rate and also didn't represent any causality from these variables to budget deficit.

Furthermore, the findings show that budget deficit has a meaningful effect on inflation, and Debts. The paper recommended that the Sri Lankan government should take actions to control inflation to maintain price stability and to minimize the debts because the government is maintaining a sizable deficit budget since 1957. This research contributes the idea that there are dimensional and dynamic factors involved between budget deficit and macroeconomic variables that require comprehensive knowledge to increase productivity, improve living standards, and ensure stability of the economic system.

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