Causal nexus between fiscal deficit and economic growth: Empirical evidence from South Asia

Ravinthirakumaran Navaratnam
Business School, Department of Accounting, Finance and Economics,
Griffith University, Australia

Kasavarajah Mayandy
Central Bank of Sri Lanka
Sri Lanka

Abstract

The impact of fiscal deficit on economic growth is one of the most widely debated issues among economists and policy makers in both developed and developing countries in the recent period. This paper seeks to examine the impact of fiscal deficit on economic growth in selected South Asian countries, namely, Bangladesh, India, Nepal, Pakistan and Sri Lanka using time series annual data over the period 1980 to 2014. The paper uses cointegration analysis, error correction modelling and Granger causality test under a Vector Autoregression (VAR) framework. The results from this study confirmed that the fiscal deficit has a negative impact on economic growth in the South Asian countries considered in this study except Nepal, which confirmed the positive impact. The results also highlighted that the direction of causality for the SAARC countries is mixed where fiscal deficit causes economic growth for Bangladesh, Nepal and Pakistan, but the reverse is true for India and Sri Lanka.

Key Words: Fiscal Deficit; Economic Growth; Granger Causality; South Asia

JEL Codes: H62, O40, C32.

1. Introduction

Over the decades, the impact of fiscal deficit on economic growth has generated considerable interest among economists and policy makers and acknowledged to hold forefront of policy debate in both developed and developing economies including South Asia. It is also broadly established in the literature that rising fiscal deficit could be considered as one of the key constraints which hinder the growth performance of many developing economies[1]. Meanwhile, Fisher also argued that large fiscal deficit is simply an indicator of general macroeconomic instability which is injurious to economic growth (Fisher, 1993). The importance of fiscal deficit as an instrument of economic growth was first envisaged by Keynes

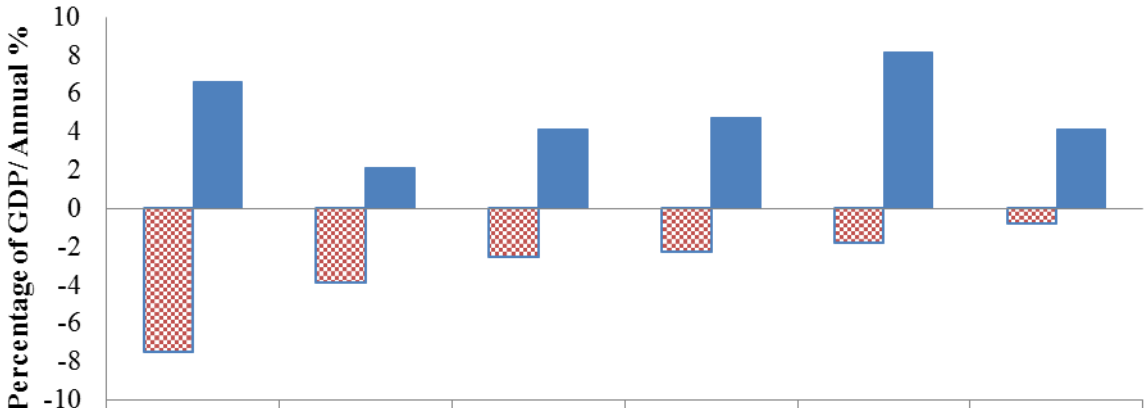
[1] The Fiscal deficit arises when the demand for government expenditure far exceeds government revenue that needs to be financed by net lending.

in his General Theory (Keynes, 1936). He proposed that fiscal deficit can contribute to growth in times of recession. In a recession, private sector spending falls, and saving rises which in turn leads to unused resources. Government borrowing is a way of utilizing these unused savings and 'kick starting' the economy. The deficit spending can help to promote higher growth, which will enable to generate higher tax revenue and thereby to reduce the fiscal deficit over time.

While the impact of fiscal deficit on economic growth is a highly debated issue among economists and policy makers, there is no consensus among them whether fiscal deficit is good, bad, or neutral in terms of its real effects on economic growth. Increasing fiscal deficit is a paramount issue in maintaining macroeconomic stability. In this context, examining the impact of fiscal deficit on economic growth has much more implications from the policy-makers view about the appropriate strategies and policies which required to be adopted to promote sustainable growth and development. Though many empirical studies have shed some lights and brought the relationship of fiscal deficit and economic growth to the fore of academic discussion, the literature still remains limited in scope and the empirical results remain inconclusive. Thus, the objective of this paper is to fill the existing gap in the empirical literature via re-investigating the relationship between fiscal deficit and economic growth mainly focusing on selected South Asian countries over the period from 1980 to 2014, and to enhance the strength of the results via employing more appropriate econometric techniques.

Among the South Asian economies, there have been persistent tendency towards fiscal deficit since their independence due to continually expanding government expenditure (such as fuel and fertilizer subsidies and social welfare programs) and inadequate revenue generation capacity of government (*World Bank*, 2013a). Notably, since early 1980s, the South Asia witnessed an unprecedented increase in fiscal deficit (Ravinthirakumaran et al., 2016). Figure 1 shows the average fiscal deficit as a percentage of GDP and economic growth for six developing regions, including the South Asia, over the period 2000 to 2013. Considering the fiscal position, the SAARC region, on average, has the highest fiscal deficit (7.52 per cent) among the six developing regions (*World Bank*, 2013a). During this period, the economic growth in South Asian was 6.6 percent, which is the second highest rate compared with other developing regions except the East Asia and Pacific region which had highest economic growth (8.2 per cent).

Figure 1: Average Fiscal Deficit and Economic Growth in Selected Region, 2000-2013



	South Asia	Middle East & North Africa	Latin America & Caribbean	Sub-Saharan Africa	East Asia & Pacific	Europe & Central Asia
FD	-7.52	-3.9	-2.56	-2.28	-1.8	-0.82
EG	6.64	2.1	4.15	4.75	8.18	4.14

Source: World Bank, 2013a.

High fiscal deficit in the SAARC countries compared to other developing countries are likely to crowd out productive investment and eroding future growth potential. In light of this, an empirical investigation of the impact of fiscal deficit on economic growth in the case of South Asian countries are playing a crucial to both policy makers in these countries and international agencies such as the World Bank who provide the financial assistance.

With this brief introduction, the remainder of this paper is structured as follows. Section two presents the relevant theoretical and empirical literature on the nexus between fiscal deficit and economic growth. While fiscal deficit and growth performance of South Asian countries are discussed in section three, the section four presents the empirical analysis and estimation results. The final section provides the concluding remarks and policy implications.

2. Literature review

2.1 Theoretical exposition

Theoretically, there are three schools of thought regarding the impact of fiscal deficit on economic growth; the Keynesian perspective, the Neo-classical perspective and the Ricardian Equivalence Hypothesis (REH). Among the mainstream analytical perspectives, while Keynesian economies claimed that there is a positive impact of fiscal deficit on economic growth, the Neo-classical paradigm considers fiscal deficit detrimental to economic growth. Meanwhile, the Ricardian equivalence hypothesis asserts that fiscal deficit does not really matter and confirmed that there is neutral relationship between these two variables (Barro, 1989).

Keynesian economies argue that high fiscal deficit accelerate capital accumulation and hence economic growth. Keynesians provided an argument in favor of crowding-in effect by making reference to the expansionary effects of fiscal deficit. In this respect, an increase in fiscal deficit due to public sector investment, especially in infrastructure, which makes private investors more optimistic about the future course of the economy encourages the private sector investments and thereby eventually results to an improvement in the overall economic growth. This is generally referred to as the positive "crowding in" impact of fiscal deficit. Therefore, Keynesian view advocates the active role of government due to its multiplier effects (Fazzari, 1994).

Conversely, Neo-classical model believes that government economic involvement may "crowd out" private sector economic activities (Buiter, 1977). Neo-classicalist argues that an increase in the fiscal deficit will significantly affect the economy in the long term. They emphasized when the government runs fiscal deficit, it is spending more than it is taking in. In this way, the government's savings decreases. A reduction in government saving or an increase in government dis-saving[2] could have a negative impact on economic growth if the reduction in government saving is not fully offset by a rise in private saving, thereby resulting in a fall in the overall saving rate. This situation not only put some pressure on the interest rate but it has also some adverse impact on output growth. Therefore, it has been widely emphasized by many economists that the government should limit its intervention in the economic activities.

In the perspective of Ricardian, a decrease in government saving which is implied by the fiscal deficit may be accompanied by an offsetting increase in private saving, leaving the national saving and, therefore, investment unchanged. Then, there is no impact on the real interest rate. Supporters of this view believe that a fiscal deficit represents trading taxes in the future for taxes today. That is, if the government spends more than it taxes today, then it must tax more than it spends tomorrow. Since people understand this, they will spend and save accordingly. As a result, the fiscal deficit have little or no long-term impact on economic growth. Considering the different role of the above different approaches in the literature, some of the empirical studies in these areas have been highlighted below.

2.2 Empirical literature

Despite the fact that several studies covering different groups of countries and different periods have found that fiscal deficit is an important determinant of economic growth, the empirical studies reveal ambiguous results upon this topic. While some empirical studies (e.g. Gupta et al., 2005; Bose, Haque and Osborn, 2007; Buscemi and Yallwe, 2012; Taylor et al., 2012) indicated that there is a positive impact of fiscal deficit on economic growth, some other studies (e.g. Cebula, 1995; Brender and Drazen, 2008; Ghosh and Hendrik, 2009; Avila, 2011; Fatima, Ahmed and Rehman, 2011 and 2012) confirmed the opposite outcome. At the same time, another group of studies (e.g. Nelson and Singh, 1994; Tan, 2006; Dalyop, 2010; Rahman, 2012) revealed no underlying impact of fiscal deficit on economic growth. Given the

[2]The fiscal deficit implies a reduction in government saving or an increase in government dis-saving.

number of literatures, we have limited our empirical literature via referring to selected highly influential studies upon this topic.

Gupta et al. (2005) examined the impact of fiscal consolidation and expenditure composition on economic growth in a sample of 39 low-income countries during the 1990s. The result confirmed that the strong fiscal positions are generally associated with higher economic growth in both short term and long term. Bose, Haque and Osborn (2007) examined the relationship between fiscal deficit and economic growth for a panel of 30 developing countries over the period 1970 to 1990. They identified that fiscal deficit had a positive impact on economic growth, particularly they highlighted that it was mainly as a result of increased productive expenditure such as education, health and capital expenditure. Meanwhile, Buscemi and Yallwe (2012) examined the effects of fiscal deficit on saving and sustainability of economic growth for three emerging countries namely China, India and South Africa using the reduced form of Generalized Method of Moment's (GMM) method for dynamic panel data over the period 1990 to 2009. They found that the coefficient for fiscal deficits significant and positively correlated to economic growth. Taylor et al. (2012) examined the relationship between the fiscal deficit, economic growth and debt over the period 1961 to 2011 focusing on the USA economy via employing cointegration analysis and Vector Autoregression framework. The result confirmed a strong positive effect of fiscal deficit on economic growth.

On the other hand, Cebula (1995) investigated the impact of federal fiscal deficit on per capita real economic growth in USA with quarterly data over the period 1955 to1992. The empirical findings confirmed that federal fiscal deficit, over time, reduces the rate of economic growth. Meanwhile, Brender and Drazen (2008) investigate the effects of fiscal performance and economic growth on reelection in a sample of 74 countries over the period 1960-2003. They found that high fiscal deficit recorded by a country will give a negative signal to the citizens saying that the government authorities did not perform well in managing the funds of a country. As a result, there is a probability of re-election process to be conducted in order to replace the authorities. Indirectly, the authorities who did not perform well may not be able to bring the country to the upper level. Hence, it will not contribute to high economic growth due to lack of confidence among citizens, investors and other neighboring countries. Ghosh and Hendrik (2009) examined the impact of fiscal deficit on economic growth by using the time series annual data from 1973 to 2004 on the USA economy. Their results indicate that an increase in fiscal deficit slows growth. Avila (2011) analyzed the relationship between fiscal deficit, macroeconomic uncertainty and growth of Argentina for the period 1915 to 2006. The study found that the fiscal deficit hampered on per capita income growth in Argentina through the volatility in relative prices. Fatima, Ahmed and Rehman (2011) examined the effects of fiscal deficit on investment and economic growth using time series data from 1980 and 2009 in Pakistan. The study showed the negative impacts of fiscal deficit on economic growth. More recently, Fatima, Ahmed and Rehman (2012) reexamined the effects of the fiscal deficit on economic growth in Pakistan using time series data over the period 1978 to 2009. The findings of the study explored

a negative impact of fiscal deficit on economic growth and suggested that the government requires to avoid certain levels of fiscal deficit in order to achieve the desired level of economic growth.

To investigate the effect of fiscal deficit on GDP growth, Nelson and Singh (1994) used data on 70 developing countries during two time periods, 1970-1979 and 1980-1989. The empirical results showed that the fiscal deficit had no significant effect on economic growth of these countries in both periods. Tan (2006) examined both the short term and long term relationship between fiscal deficit, inflation and economic growth in Malaysian economy during 1966 to 2003. The study found the absence of long term relationship among these variables and also found that fiscal deficit appeared to have neither short term nor long term links with income. Dalyop (2010) investigated the impact of fiscal deficit on GDP growth in Nigeria. The study confirmed that the fiscal deficit had little effect on the level of economic activity and supported the Ricardian Equivalence Hypothesis. Keho (2010) examined the causal relationship between fiscal deficit and economic growth for seven West African countries over the period 1980 to 2005. The empirical evidence showed mixed results. The study found while there is no causality between fiscal deficit and economic growth in three countries, the remaining four countries, and the deficit had adverse effects on economic growth. More recently, Rahman (2012) investigated the relationship between fiscal deficit and economic growth from Malaysia's perspective by using quarterly data from 2000 to 2011. By using ARDL approach the study confirmed that there is no long term relationship between fiscal deficit and economic growth in Malaysia which confirmed the Ricardian equivalence hypothesis. Table 1 presents a summary review of a literature.

Table 1: A review of empirical studies on Fiscal deficit and Economic growth

Author/ Year	Country(ies)	Period	Methodology	Conclusion
Gupta et al. (2005)	39 Low-income countries	1990-2000	Generalized Method of Moments, A pooled mean-group estimator	Strong budgetary positions are generally associated with higher economic growth
Bose et al. (2007)	30 Developing countries	1970-1990	Panel Data Analysis	Fiscal deficit had a positive impact on economic growth
Buscemi and Yallwe (2012)	China, India and South Africa	1990-2009	A dynamic GMM panel data approach	Fiscal deficits has a significant and positively correlated to economic growth
Taylor et al. (2012)	USA	196-2011	Cointegration analysis, Vector Autoregression Framework	A strong positive effect of fiscal deficit on economic growth
Cebula (1995)	76 Developed and Developing	1955-1992	Instrumental Variables (IV) estimate	Federal fiscal deficit reduces the rate of

	countries.			economic growth
Brender and Drazen (2008)	74 countries	1960-2003	Panel Data,	
Ghosh and Hendrik (2009)	USA	1973-2004	simultaneous equation model	An increase in fiscal deficit slows growth
Avila (2011)	Argentina	191 2006	Correlation and regression	The fiscal deficit hampered on per capita income growth
Fatima et al. (2011)	Pakistan	1980-2009	The two-stage least squares method	The negative impacts of fiscal deficit on economic growth
Fatima et al. (2012)	Pakistan	1978-2009	OLS model	A negative impact of fiscal deficit on economic growth
Nelson and Singh (1994)	70 Developing countries	1970-1979 1980-1989	OLS model	The fiscal deficit had no significant effect on economic growth
Tan (2006)	Malaysia	1966-2003	Johansen cointegration and Granger causality	Fiscal deficit appeared to have neither short term nor long term links with income
Dalyop (2010)	Nigeria	1982-2008	OLS model	Supported the Ricardian Equivalence Hypothesis
Keho (2010)	7 West African countries	1980-2005	Granger causality test developed by Toda and Yamamoto	No causality between fiscal deficit and economic growth in three countries
Rahman (2012)	Malaysia	2000-2011	An ARDL approach	No long term relationship between fiscal deficit and economic growth

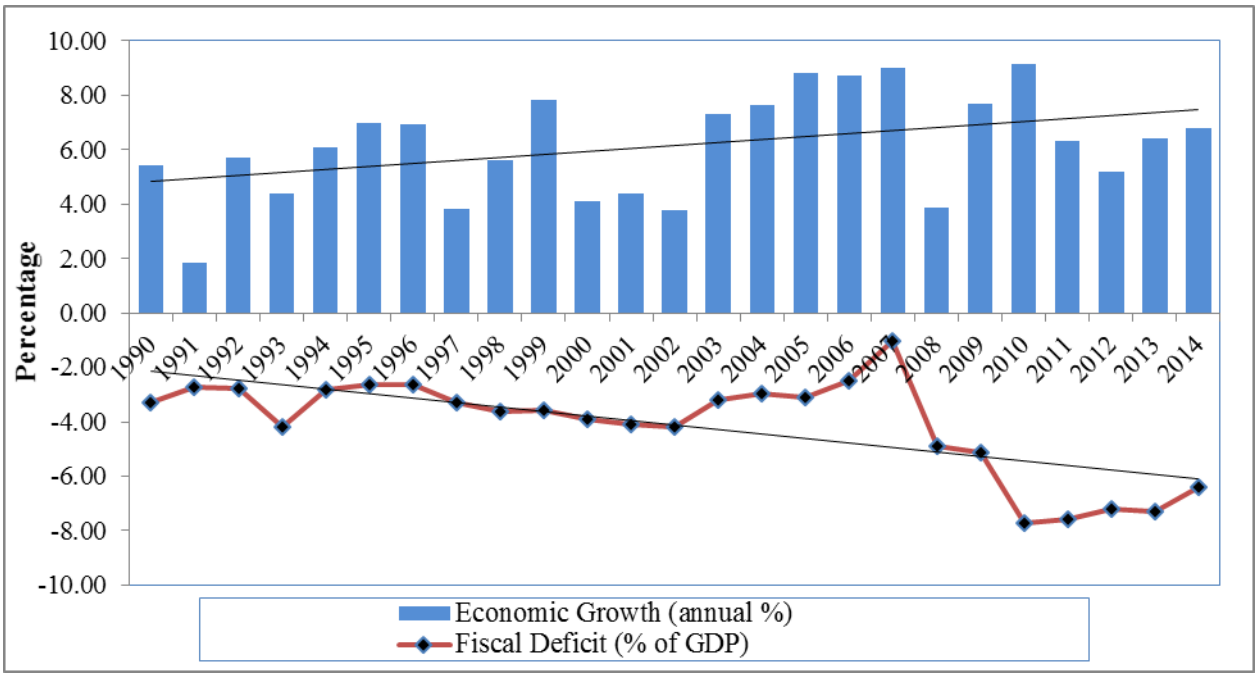
The above reviews of the empirical findings confirmed that though the relationship between fiscal deficit and economic growth has mostly supported that fiscal deficit has a negative impact on economic growth, the evidence on the relationship is mainly suggests a mixed findings. This inconclusive results arises due to the types of data, time periods that was considered, the alternative econometric methods, and the characteristics of various countries.

3. Economic Growth and Fiscal Deficit in South Asia

Considering the availability of data, five south Asian countries namely, Bangladesh, India, Nepal, Pakistan and Sri Lanka were included in the analysis. Despite the fact that most of the countries experienced sluggish growth rates throughout the seventies, they have undergone structural reforms during 1980s. As a result, the region has translated itself from a position of slowest growing region during the 1970s to one of the fastest growing regions in the world since 1980s (Jain and Singh, 2009 and Radha, 2011).

Figure 2 illustrates the trend of fiscal deficit and economic growth in the SARRC region in the last two decades. It can be seen that the trend of fiscal deficit in the SARRC region has continuously increased from 1990 to 2014 while the actual rate varies substantially over time. Conversely, the trend of economic growth in the region gradually increases while the actual growth rate fluctuates significantly over time. The South Asia's average economic growth was around 5.5 per cent in the period from 1990 to 1999, 6.5 per cent in the period from 2000 to 2009, and 6.8 per cent in the period from 2010 to 2014. Economic growth in South Asian region decelerated sharply during 2012, extending a slowing trend following the rapid recovery from the financial crisis in 2008. The slowdown in 2012 mainly reflects a continuing steep deceleration in India, which represents about four-fifth of the region's GDP, to 5.0 percent in the 2012 from 6.2 percent in 2011 and 9.3 percent in 2010. At the same time, growth in other regional economies also slowed. In this regard, growth in Sri Lanka slowed sharply, by almost 2 percentage points in 2012 (World Bank, 2013a).

Figure 2: Fiscal Deficit and Economic Growth in South Asia

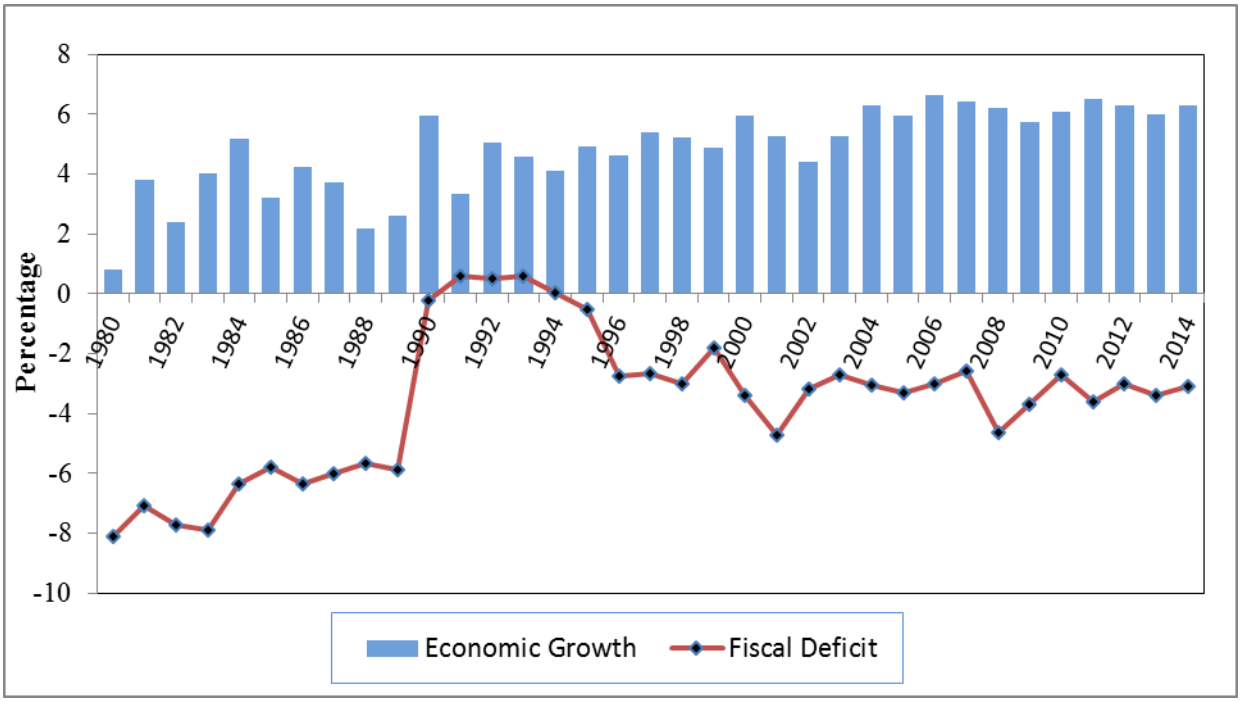


Source: World Bank (2013a), Global Economics Prospects (2016)

However, in order to gain a clear understanding on the existing relationship, the trend of growth and deficit are individually plotted over the period 1990 to 2014. Figures from 3 to 7 illustrate the time series plots of the fiscal balance and economic growth in the selected South Asian countries.

As can be seen from figure 3, the fiscal balance in Bangladesh was high during the 1980s but managed to record a surplus in the first half of the 1990s. Since then, the fiscal balance has deficit and remained steady, except 2001 and 2008. When looking at the economic growth, it has continuously increased during 1990 to 2014 period. The country's average economic growth was around 3.2 per cent in the period from 1980 to 1989, 4.8 per cent in the period from 1990 to1999, 5.8 per cent in the period from 2000 to 2009 and 6.2 per cent in the period from 2010 to 2012. Thus the economic growth was very impressive but it was adversely affected by rapid population growth.

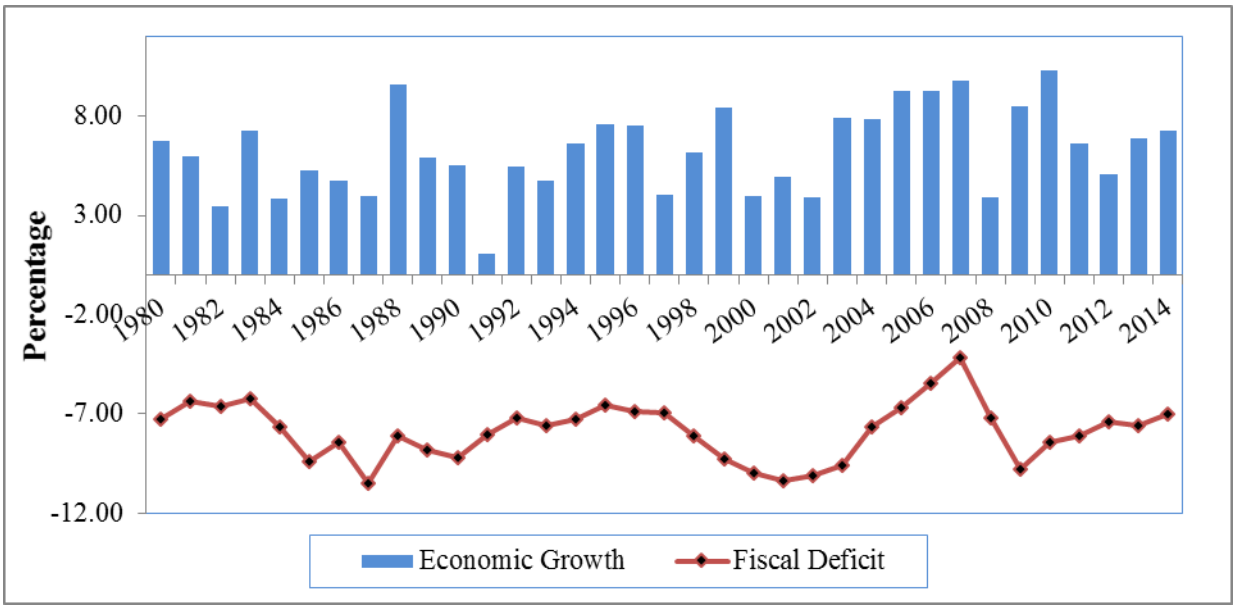
Figure 3: Fiscal deficit and economic growth in Bangladesh, 1980-2014



Source: World Bank (2013b), Global Economics Prospects (2016)

Figure 4 depicts the trend of fiscal deficit and economic growth in India over the last three decades, which span both the pre-and post-reform period, helps to understand the relationship between fiscal expansion and economic growth in the Indian economy. During this period, the country's average fiscal deficit was around 8.0 per cent of GDP and it has increased continuously except the first half of the 1990s and mid of 2000s.On the other hand, India has maintained a high level of average economic growth rate of 6.3 per cent during the period 1980 to 2014. While the growth rate improved since 1980s, the economy grew at an annual rate of 5.7 percent and from 2000 to 2010 it was 6.8 percent.

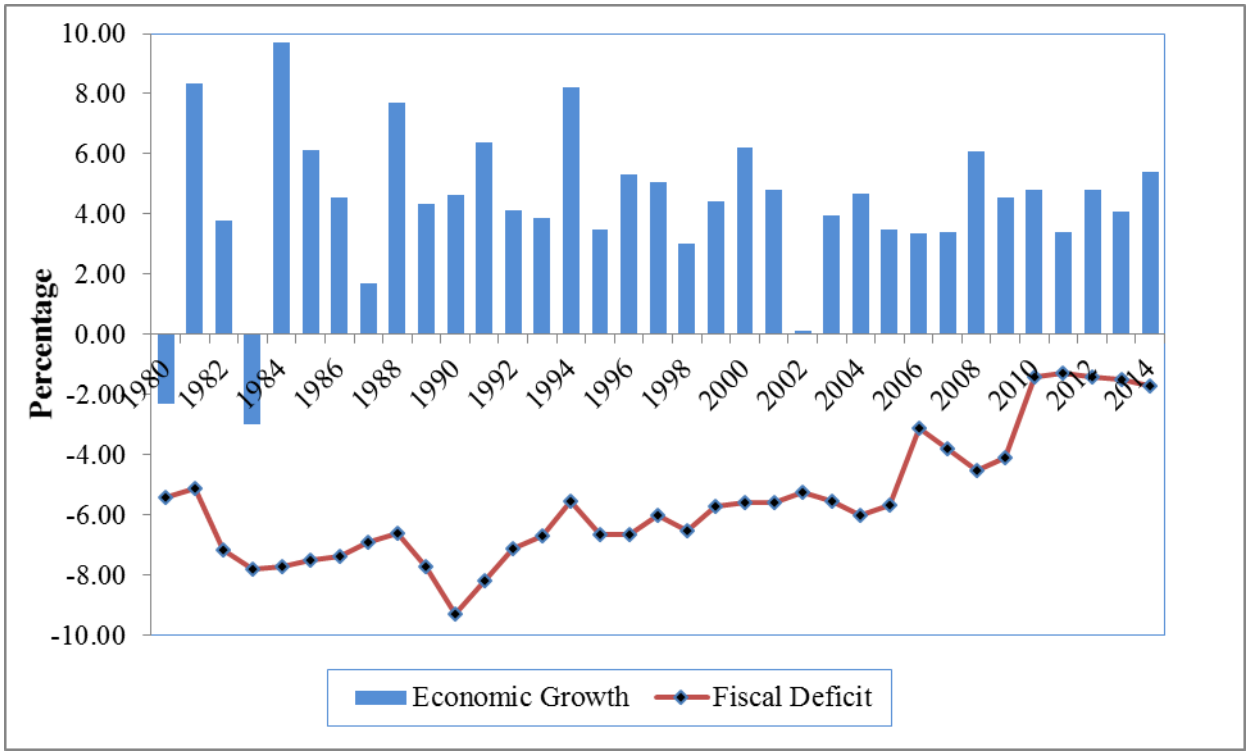
Figure 4: Fiscal deficit and economic growth in India, 1980-2014



Source: World Bank (2013b), Global Economics Prospects (2016)

Fiscal deficit in Nepal had a decreasing trend throughout 1980 to 2014 except the early 1990s. It can be seen from Figure 5 that the country's average fiscal deficit was around 5.5 per cent of GDP. In the meantime, economic growth was averaged at 4.4 percent during the period 1980 to 2014 and reached a historically high level of 9.7 percent in 1984 and recorded low level of -2.9 percent in 1983.

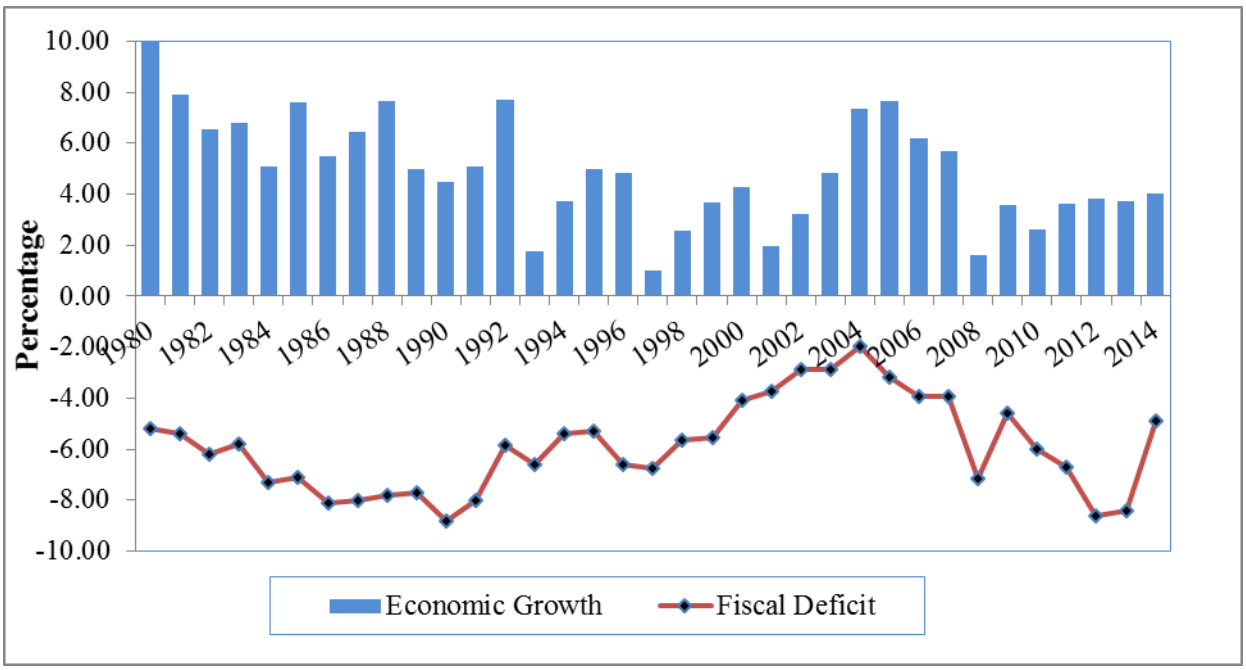
Figure 5: Fiscal deficit and economic growth in Nepal, 1980-2014



Source: World Bank (2013b), Global Economics Prospects (2016)

Meanwhile, fiscal deficit in Pakistan has continuously increased from 1980 to 1990 and then declined until 2004 and subsequently it increased again (Figure 6). It averaged 5.9 percent of GDP from 1980 to 2014, reaching an all-time high of 8.8 per cent of GDP in 1990 and a record low of -1.9 percent in 2004. Pakistan recorded fiscal deficit equal to 5 percent of the country's GDP in 2014. The average economic growth for Pakistan during the period 1980 to 2014 was 4.9 percent with a minimum of 1 per cent in 1997 and a maximum of 10.2 per cent in 1980.

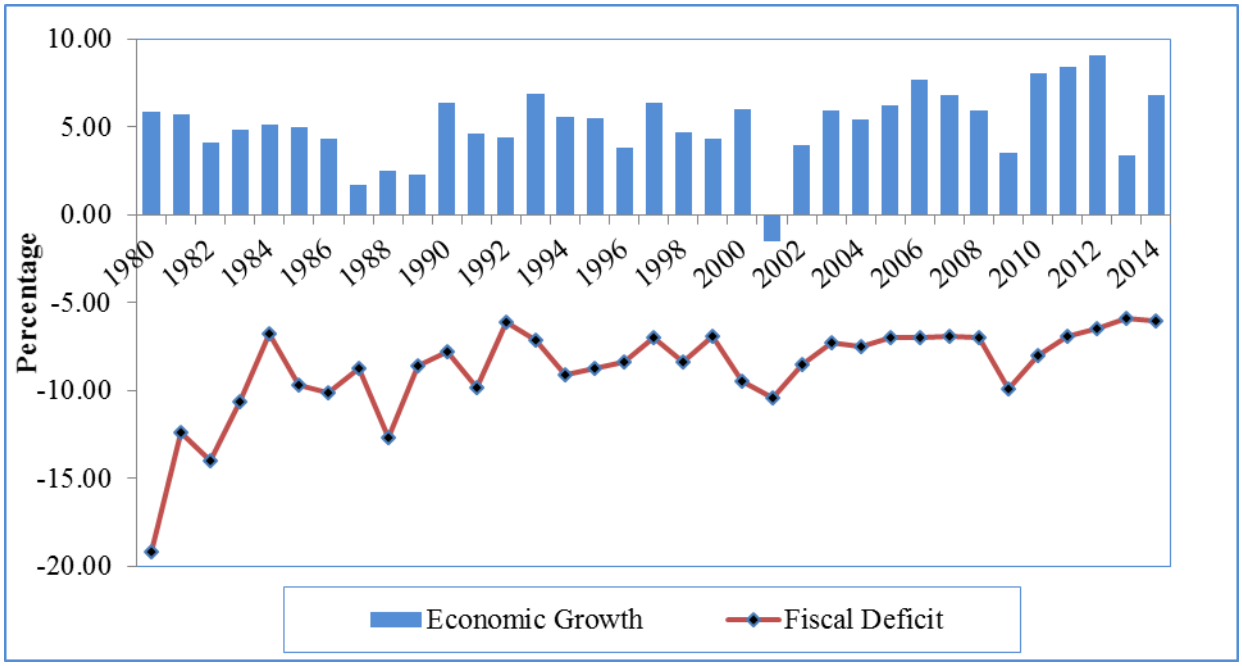
Figure 6: Fiscal deficit and economic growth in Pakistan, 1980-2014



Source: World Bank (2013b), Global Economics Prospects (2016)

Sri Lanka has managed to maintain a low level of fiscal deficit during the 1980s, however, it has continuously increased since 1990, possibly due to political instability and civil war (Figure 7). Following policy reforms in 1977, there was a considerable increase in the average growth rates to the level of about 5 percent from 1980 to 1986. In the latter half of the 1980s, however, the growth rate slowed down as a result of macroeconomic and political instability in the country. The average economic growth rate declined to 2.2 percent during the period 1987 to1989. Since then, the economy has been able to maintain its growth momentum at a moderate level of 5.2 per cent ranging from the highest of 8.3 per cent in 2011 to the lower of a negative 1.5 per cent in 2001. The long term growth performance is characterized by an increase in the share of manufacturing and service sectors with a decline in the share of the agriculture sector.

Figure 7: Fiscal deficit and economic growth in Sri Lanka, 1980-2014



Source: World Bank (2013b), Global Economics Prospects (2016)

The above time series trends are not sufficient for any valid inference to investigate the impact of fiscal deficit on economic growth for the countries under reviewed. Hence, the study would use the quantitative econometric techniques to examine the possible impact of fiscal deficit on economic growth in South Asian countries.

4. Empirical Analysis and Results

4.1 Data and Methodology

The main variables employed in this study include government fiscal deficit and real gross domestic product. Annual time series data on gross domestic product (proxy for economic growth) and fiscal deficit over the period 1980 to 2014 were used in this study for the analysis. Further, all the data were taken from the World Bank (2015) and International Monetary Fund (2015).

Furthermore, this study employs the econometric techniques of cointegration and Granger causality test to examine the dynamic relationship among the selected variables. This approach can capture the short run and long run equilibrium dynamics among the variables unlike a simple regression which only reveal the correlation between variables. As a first step towards analyzing the impacts of fiscal deficit on output growth, the estimation process started with the test of stationarity for all the variables included in this study. For the purpose of identifying the presence of unit roots in time series data, we applied both the Augmented Dickey-Fuller test (1979) and Phillips-Perron (1988) test procedure. This unit root test is conducted both at the levels and the first differences for each series.

The Johanson and Juseliues (1990) method was employed to test for cointegration. The Johanson (1988) cointegration methodology is a system method which allows determination of how many independent cointegration relationships exist among the set of variables being considered. The two likelihood test statistics known as trace and maximum Eigen value statistics that estimate the number of cointegrating vectors in Johansen's cointegration procedure will be applied to this study. Further, the optimal lag length choice was selected by examining the lag order selection criteria. Accordingly, AIC has been used which minimizes the overall sum of squared residuals or maximizes the likelihood ratio for the lag selection. This cointegration approach could be further extended with the Granger (1969) causality analysis to examine the causality among variables under reviewed.

5. Results and Discussions

5.1 Unit root Test

In general, as many macroeconomic variables are non-stationary (Nelson and Plosser, 1982), a standard regression with nonstationary data can lead to the problem of spurious. This problem can occur when two time series variables in a regression are highly correlated whereas there is no actual relationship between them. Hence, it is vital to include the stationery variables for the regression. The first step for cointegration test is to examine the stationery properties of all the variables. The Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests are employed to examine the properties of the time series variables and to determine the order of integration for each series in this study. If all the variables are found to be integrated of the same order, the Johanson cointegration approach will be applied to test the cointegration among the variables.

The results of the ADF and PP unit root tests are presented in Table 2. The results indicate while the series are unit roots in the level form for all countries, however, all the series are stationary at the first differences. This implies that all the variables are integrated with the order one, I (1).

Table 2: Results of ADF and PP tests

Country	Variable	Augmented Dickey-Fuller				Phillips-Perron			
		Level form		First differenced form		Level form		First differenced form	
		τ-statistic	p-value	τ-statistic	p-value	τ-statistic	p-value	τ-statistic	p-value
Bangladesh	*lnGDP*	-0.231	0.989	-6.214	0.000	-0.173	0.991	-6.579	0.000
	FD	-1.822	0.671	-6.182	0.001	-1.789	0.686	-6.287	0.000
India	*lnGDP*	-0.980	0.933	-5.357	0.001	-0.743	0.961	-6.811	0.000
	FD	-1.367	0.851	-6.281	0.000	-1.416	0.837	-6.297	0.000
Nepal	*lnGDP*	-2.564	0.298	-7.183	0.000	-2.528	0.314	-8.198	0.000

	FD	-3.279	0.088	-6.039	0.000	-3.158	0.111	-6.735	0.000
Pakistan	*lnGDP*	-2.059	0.547	-3.745	0.034	-2.141	0.505	-3.709	0.037
	FD	-0.758	0.959	-6.142	0.000	-0.763	0.959	-6.151	0.000
Sri Lanka	*lnGDP*	-0.281	0.988	-4.771	0.003	-0.460	0.981	-4.770	0.003
	FD	-2.551	0.304	-6.303	0.000	-2.543	0.307	-7.105	0.000

5.2 Cointegration test

As the above unit root results indicate that both the fiscal deficit and gross domestic product series for all the countries are I (1) process, the analysis will be extended to test the cointegrating relationship between these two variables. This is accomplished by using the Johansen (1988) and Johansen-Juselius (1990) cointegration technique which determines the number of cointegrating vectors for any set of I (1) variables based on both Trace test and Maximum Eigen values test.

Table 3 provides the results of cointegration test. Results of both the Trace test and Maximum Eigenvalue test indicate the existence of a cointegrating relationship among the variables at the 5 percent level of significance for Bangladesh, Nepal and Pakistan, however, not for India and Sri Lanka. As the above results indicate that there no any long term equilibrium relationship between fiscal deficit and growth for India and Sri Lanka, the analysis will be extended to examine the causality direction between fiscal deficit and economic growth using VAR (vector autoregression) model in first difference form. For all other countries, the Granger causality test will be carried out.

Table 3: Results of Johanson cointegration test

Country	H_0	H_1	Trace value test		H_1	Maximum Eigen Value	
			Test statistic	p-value		Test statistic	p-value
Bangladesh	r = 0	r ≥ 1	21.691	0.005	r = 1	19.809	0.006
	r ≤1	r ≥ 2	1.882	0.170	r = 2	1.882	0.170
India	**r = 0**	**r ≥ 1**	**6.746**	**0.607**	**r = 1**	**6.241**	**0.582**
Nepal	r = 0	r ≥ 1	24.939	0.001	r = 1	24.035	0.001
	r ≤ 1	r ≥ 2	0.904	0.342	r = 2	0.904	0.342
Pakistan	r = 0	r ≥ 1	15.639	0.048	r = 1	14.505	0.046
	r ≤ 1	r ≥ 2	1.134	0.287	r = 2	1.134	0.287
Sri Lanka	**r = 0**	**r ≥ 1**	**9.407**	**0.329**	**r = 1**	**7.314**	**0.453**

5.3 Causality test

The Granger causality test is employed based on the following equations. Where Δ is first difference operator, ε_t and ν_t are serially uncorrelated white noise disturbance terms; and *k*, *l* , *m* and *n* are lag lengths for each variable in each equation.

$$\Delta \ln GDP_t = \delta_0 + \sum_{i=1}^{k} \delta_{1i} \Delta \ln GDP_{t-i} + \sum_{j=1}^{l} \delta_{2j} \Delta FD_{t-j} + \varepsilon_t \quad (1)$$

$$\Delta FD_t = \lambda_0 + \sum_{i=1}^{m} \lambda_{1i} \Delta FD_{t-i} + \sum_{j=1}^{n} \lambda_{2j} \Delta \ln GDP_{t-j} + \nu_t \quad (2)$$

For India and Sri Lanka, as FD and lnGDP were not cointegrated, we report the Granger causality test results in table 4. It could be seen for India and Sri Lanka that the null hypothesis of "FD does not Granger cause lnGDP" can't be rejected while the null hypothesis of "lnGDP does not Granger cause FD" could be rejected at five percent level. This implies that there is a unidirectional causality which is running from lnGDP to FD for India and Sri Lanka.

Table 4: Granger Causality test for India and Sri Lanka

Country	Null Hypothesis	χ^2 Test statistic	*p*-value	Decision at 5% level
India	H_o: FD does not Granger cause GDP	0.154	0.695	Do not reject H_o
	H_o: GDP does not Granger cause FD	4.272	0.039	Reject H_o
Sri Lanka	H_o: FD does not Granger cause GDP	4.309	0.116	Do not reject H_o
	H_o: GDP does not Granger cause FD	8.452	0.015	Reject H_o

When the variables are I(1) and cointegrated, we use the following vector error correction (VEC) model by incorporating the error correction term in the standard Granger causality procedure with the variables in first differenced form, which yields equations (3) and (4).

$$\Delta \ln GDP_t = \delta_0 + \sum_{i=1}^{m} \delta_{1i} \Delta \ln GDP_{t-i} + \sum_{j=1}^{n} \delta_{2j} \Delta FD_{t-j} + \alpha_1 \hat{e}_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta FD_t = \lambda_0 + \sum_{i=1}^{p} \lambda_{1i} \Delta FD_{t-i} + \sum_{j=1}^{q} \lambda_{2j} \Delta \ln GDP_{t-j} + \alpha_2 \hat{u}_{t-1} + \nu_t \quad (4)$$

Where Δ is first difference operator, ε_t and ν_t are white noise terms, and $\hat{e}_t$ and $\hat{u}_t$ are the error correction terms, which are the residuals from the long-run relationships of the form, $\ln GDP_t = \phi_0 + \phi_1 FD_t + e_t$ and $FD_t = \varphi_0 + \varphi_1 \ln GDP_t + u_t$, respectively. Now based on equation (3), we can test whether FD does not cause lnGDP in the *long run* by testing the null hypothesis H_o: $\alpha_1 = 0$, and whether FD does not cause lnGDP in the *short run* by testing the null hypothesis H_o: $\delta_{21} = \delta_{22} = \ldots = \delta_{2n} = 0$. Similarly, based on equation (4) we can test lnGDP does not cause FD in the *long run* by testing the null hypothesis H_o: $\alpha_2 = 0$, and whether lnGDP does not cause FD in the *short run* by testing the null hypothesis H_o: $\lambda_{21} = \lambda_{22} = \ldots = \lambda_{2q} = 0$.

Since for all the countries except India and Sri Lanka, we found that FD and lnGDP are cointegrated. Based on models (3) and (4), we use the above procedure to test for causality and the results are reported in table 5. In case of Bangladesh, the results show that there is an unidirectional causality which is running from fiscal deficit to economic growth in the long run at the 5 per cent significance level. In case of Nepal and Pakistan, there is bidirectional causality in the long run but unidirectional causality runs from economic growth to fiscal deficit in the short run at the 5 per cent level of significance. The diagnostics test results for serial correlation, heteroscedasticity and normality of the residuals are also presented in table 5 which indicates that there is no any evidence for serial correlation, heteroscedasticity and non-normality.

Table 5: Granger Causality test using Error Correction Model (ECM)

Country	Test (Direction of causality)	Short-run causality		Long-run causality		p-value of the test		
		p-value	Decision	*p*-value	Decision	Serial correlation B-G LM test	Heterosce-dasticity ARCH(1)	Normality J-B test
Bangladesh	FD ⇒ GDP	0.288	No	0.002	Yes	0.709	0.541	0.691
	GDP ⇒ FD	0.302	No	0.702	No	0.550	0.953	0.983
Nepal	FD ⇒ GDP	0.287	No	0.035	Yes	0.341	0.494	0.316
	GDP ⇒ FD	0.006	Yes	0.001	Yes	0.415	0.482	0.939
Pakistan	FD ⇒ GDP	0.535	No	0.456	Yes	0.332	0.695	0.582
	GDP ⇒ FD	0.002	Yes	0.002	Yes	0.329	0.617	0.448

6. Conclusion

This paper examined the impact of fiscal deficit on economic growth in major countries of South Asian region; Bangladesh, India, Nepal, Pakistan and Sri Lanka using annual time series data over the period 1980 to 2014. The empirical evidence in this study showed mixed results. In particular, while the fiscal deficit had a negative impact on economic growth for Bangladesh, India, Pakistan and Sri Lanka whereas the results found that there is a positive impact for Nepal. Further, it confirmed that the persistent increase in fiscal deficit hindered economic growth for most of the South Asian countries except Nepal and therefore the deficit targeting within the region becomes extremely important. Further, the negative impacts confirm the neoclassical view. In the meantime, the directions of causality for South Asian countries are mixed. The results confirmed that fiscal deficit cause economic growth for Bangladesh, Nepal and Pakistan whereas the reverse is true for India and Sri Lanka. Hence, it is vital that the policy makers need to make attempt to reduce the persistent high levels of fiscal deficit in these countries in order to achieve the desired levels of growth. A large fiscal deficit played as an important issue in the South Asian countries though it is not accompanied by an improvement in economic growth. Hence, it is recommended that the governments of many South Asian countries should undertake policy actions to control their fiscal deficit so that economic growth could be manageable. In this regard, governments could either decrease current expenditure by lowering its size or try to increase tax revenue. Since reduction in government

expenditure is not plausible, the tax net of South Asian countries should be expanded to capture all taxable individuals and firms. At the same time, attempt to maintain the trade balance at a sustainable level also could help to mitigate the exiting fiscal deficit in South Asia.

References

Avila, J. C. (2011). Fiscal Deficit, macro-uncertainty, and growth in Argentina, Serie Documentosde Trabajo, No. 456, available at http://ssrn.com/abstract=1898355 or http://dx.doi.org/10.2139/ssrn.1898355

Barro, R. J. (1989). The Ricardian approach to fiscal deficit, Journal *of Economic Prospect*, 3(2), 37-54.

Bose, N., Haque, M.E. and Osborn, D. R. (2007). Public expenditure and economic growth: A disaggregated analysis for developing countries, *The Manchester School*, 75(5), 533-556.

Brender, A. and Drazen, A. (2008). How do fiscal deficit and economic growth affect re-election prospects? Evidence from a large panel of countries, *The American Economic Review*, 98(5), 2203-2220.

Buiter, W. H. (1977). Crowding out and the effectiveness of fiscal policy, *Journal of Public Economics*, 7(3), 309-328.

Buscemi, A. and Yallwe, A. H. (2012). Fiscal deficit, national saving and sustainability of economic growth in emerging economies: A dynamic GMM panel data approach, *International Journal of Economics and Financial Issues*, 2(2), 126-140.

Cebula, R. J. (1995). The impact of federal government fiscal deficit on economic growth in the United States: An empirical investigation, 1955-1992**,** *International Review of Economics and Finance*, 4(3), 245-252.

Dalyop, G.T. (2010). Fiscal deficit and the growth of domestic output in Nigeria, *Jos Journal of Economics*, 4(1), 153-173.

Dickey, D. A., and Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root, J*ournal of the American Statistical Association*, 74(366), 427-431. http://www.deu.edu.tr/userweb/onder.hanedar/dosyalar/1979.pdf

Fatima, G., Ahmed, A. M. and Rehman, W.U. (2011). Fiscal deficit and economic growth: An analysis of Pakistan's economy, *International Journal of Trade, Economics and Finance*, 2(6), 501-504.

Fatima, G., Ahmed, A. M. and Rehman, W. U. (2012). Consequential effects of fiscal deficit on economic growth of Pakistan, *International Journal of Business and Social Science*, 3(7), 203-208.

Fazzari, S. M. (1994). Why doubt the effectiveness of Keynesian fiscal policy?, *Journal of Post Keynesian Economics*, 17(2), 231-248.

Fisher, S. (1993). The role of macroeconomic factors in growth, *Journal of Monetary Economics*, 32(3), 485-512.

Ghosh, R. and Hendrik, V. B. (2009). Budget deficit and US economic growth, *Economics Bulletin*, 29(14), 3015-3030.

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods, *Econometrica*, 37(3), 424-438.

Gupta, S., Benedict, C., Emanuele, B., and Carlos, M. (2005). Fiscal policy, expenditure composition, and growth in low income countries, *Journal of International Money and Finance*, 24(3), 441-463.

International Monetary Fund, (2015). World Economic Outlook Database, accessed 17 November 2015: http://www.imf.org/external/error.htm?URL=http://www.imf.org/%20external/pubs/ft/weo/2015/01/weodata/download.aspx

Jain, R. and Singh, J. B. (2009). Trade pattern in SAARC countries: Emerging trends and issues, Occasional Papers, Reserve Bank of India, 30.

Johansen, S. (1988). Statistical analysis of cointegration vectors, *Journal of Economic Dynamics and Control*, 12(2&3), 231-254.

Johansen, S. and Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money, *Oxford Bulletin of Economics and Statistics*, 52(2), 169-210.

Keho, Y. (2010). Fiscal deficit and economic growth: Causality evidence and policy implications for WEAEMU countries, *European Journal of Economics, Finance and administrative Sciences*, 18, 99–104.

Keynes, J.M. (1936). *The general theory of employment, interest, and money*, London: Macmillan.

Nelson, C. R. and Plosser, C. L. (1982). Trends and random walks in macroeconomic time series: Some evidence and implications, *Journal of Monetary Economics*, 10(2), 139-162.

Nelson, M. A. and Singh, R. D. (1994). The deficit-growth connection: Some recent evidence from developing countries, *Economic Development and Cultural Change*, 43(1), 167–191.

Phillips P.C.B., Perron P. (1988). Testing for a unit root in time series regression, *Biometrika*, 75(2), 335-346.

Radha, R. (2011). The experience of SAARC as a regional block and its future potentialities, *Indian Journal of Economics and Business*, 10(1), 57-72.

Rahman, N.H.A. (2012). The relationship between fiscal deficit and economic growth from Malaysia's perspective: An ARDL approach, International Conference on Economics, Business Innovation, International Proceedings of Economics Development and Research (IPEDR), 38, IACSIT Press, Singapore, available athttp://www.ipedr.com/vol38/011-ICEBI2012-A00020.pdf

Ravinthirakumarana, N., Selvanathan, S and Selvanathan, E.A. (2016). The twin deficits hypothesis in the SAARC countries: An empirical Investigation', *Journal of the Asia Pacific Economy*, 21(1), 77-90.

Tan, E. C., (2006). Fiscal deficit, inflation and economic growth in a successful open developing economy, *Review of Applied Economics*, 2(1), 129-139.

Taylor, L., Proano, C. R.,Laura de, C. and Barbosa, N. (2012). Fiscal deficit, economic growth and government debt in the USA, *Cambridge Journal of Economics*, 36(1), 189-204.

World Bank, (2013a). Less volatile, but slower growth, *Global Economic Prospects*, Volume 7, Washington, DC, available at https://openknowledge.worldbank.org/handle/10986/13892

World Bank, (2013b). World development indicators, Retrieved 01 December 2013, available from the World Bank,

http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators

World Bank, (2015). World development indicators, Retrieved 12 January 2015, available from the World Bank, http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators#