Current account sustainability in SAARC economies: Evidence from combined cointegration approach

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Current account sustainability in SAARC economies: Evidence from combined cointegration approach

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Abstract. *Majority of the South Asian economies are experiencing continuous deficits in their current account along with high external borrowing. This may question the sustainability of their external obligation in the long run. Therefore, this study examines the long run sustainability of current account imbalances of Seven South Asian economies for the period 1980 to 2014. By applying the recently developed econometric methods, we found that the current account of Maldives and Sri Lanka is sustainable in the long run, while for the rest of the South Asian economies the current account is not sustainable. This results have important policy implications. In particular, the South Asian economies should increase their cooperation with each other in terms of trade and investment to minimize the external sector imbalances and to achieve an increasing growth momentum in the future.*

Keywords: Current account deficit; Intertemporal budget constraint; Sustainability; South Asian Economies.

JEL Classification: F30, F32, Q56.

1. Introduction

Trade is considered as an engine of growth in developing economies (Lewis, 1980; Riedel, 1984). In the process of trade, an economy may incur deficit in its current account[(1)] which can mainly occur due to increasing domestic consumption and investment demand. Such deficit can be financed by the external borrowing or by cutting down the foreign exchange reserves in the short run. However, if the deficit continues for the longer period of time it may question the ability of an economy to finance it. In this case it is important to test whether such deficit is sustainable in the long run or not. As explained by Lanzafame (2014), "sustainable hypothesis" defines the condition that current account dynamics are consistent with a country's intertemporal budget constraint (IBC), in the sense that this can be met in the long run without the need for drastic correction.

The South Asian economies, also called as SAARC (South Asian Association for Regional Cooperation), consist of eight south Asian nations such as Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. All these economies, except Bangladesh and Nepal, are facing continuous deficits in their current account for a long period of time. Though the deficits of majority of such economies has decreased in the recent years, still the economy like Bhutan is facing a deficit of more than 20 per cent of its GDP. Recently, the Indian economy also faced serious problems in its external sector balances when its current account deficit (CAD) increased from 0.65 per cent of GDP in 2006-2007 to 4.84 per cent of GDP in 2012-13. This led to sharp depreciation of Indian rupee and rising domestic inflation.

After several years of relative stability the price of oil declined steeply in 2014. Since then oil importing economies including the South Asian economies have been enjoying the fruits of plummeting crude oil prices globally. This can help in restoring their external sector balances and moderate inflation as the prices of goods and services do not increase because of lower energy prices and transportation cost. Moreover, a reduction in the oil prices can reduce the import bills for these economies, which will have a favourable impact on the trade and current account balances. Falling oil prices also can help to reduce the subsidy burden of the government and thereby lead to cutting down the fiscal deficit, as oil is subsidised in developing economies. Thus, this episode of decline in oil prices raises two important questions. First, whether the effects of falling oil prices are temporary or permanent. Second, if it is temporary, can any long term macroeconomic policy help in mitigating the cyclical effects which gets transmitted globally due to fluctuations in oil prices?

One of the major objective of formation of SAARC forum was to accelerate the process of economic and social development in the member states (Jain and Singh, 2009). Slowly, trade promotion was given major priority for economic co-operation. Still, all the south Asian economies, except Nepal and Bangladesh, are facing persistent deficits in their current account. Countries such as Bhutan, Maldives and Sri Lanka are having a high CAD as per cent of GDP of 24.69, 4.07 and 2.56, while Pakistan, India and Bangladesh are having a deficit of 1.45, 1.34 and 0.97 in 2014, respectively. On the other hand, only Nepal is having a surplus of 2.47 in the same year. At present, the intra-SAARC trade is

also found to be quite low as compared with that of other regional forums such as European Union (EU) and Association of South East Asian Nations (ASEAN). Therefore, an important question arises regarding the long run sustainability of the current account imbalances in the SAARC economies.

Given the above background, the rest of the paper is structured as follows. Section 2 reviews the literature. Section 3 explains the over view of the SAARC economies. Section 4 describes the model, data and methodology. Section 5 presents the results and discussion. Section 6 concludes with policy prescriptions.

2. Literature review

The intertemporal approach, developed by Sachs (1981) and latter extended by Obstfeld and Rogoff (1996), has been considered as an important theoretical development to explain whether disequilibrium in an economy's current account is sustainable in the long run or not. This approach is based on the assumptions of perfect capital mobility and the consumption-smoothing behaviour. The "sustainability hypothesis" as elucidated in intertemporal approach defines the condition under which the current account imbalances are consistent with a country's intertemporal budget constraint (IBC), which can be met in the long run without any drastic corrections (Lanzafame, 2014). While non-stationary current account does not necessarily violate the IBC (Quintos, 1995; Bohn, 2007), stationarity can be considered as the sufficient condition for the sustainability of the current account.

A number of studies have attempted to examine the issue of the sustainability of the current account both at the individual country level (Karunaratne, 2010; Apergis et al., 2000; Stilianos and Wu, 1999) as well as for a cross section of countries (Gnimassoun and Coulibaly, 2014; Baharumshah et al., 2005; Kim et al., 2009). Plethora of studies have argued that a stationary current account balance can be considered as sustainable (Christopoulos and León-Ledesma, 2010; Chen, 2011). This is because a stationary current account is consistent with the accumulation and sustainability of external debts (indicating that there is less probability of a country defaulting its debts) as well as an indicator of potential exchange rate realignment (Richard and Tiwari, 2014). Further, the stationarity of current account concurs with the implication of the modern intertemporal model of current account, and hence supports its validity (Obstfeld and Rogoff, 1996). However, Bohn (2007) argues that the stationarity of current account balance is sufficient but not the necessary condition for the sustainability of external debt. In this case the long run equilibrium relationship between exports and imports are nonetheless more informative. In this regard, Husted (1992) shows that under the null hypothesis that the economy satisfies its inter-temporal budget constraint, we expect exports and imports have a cointegrating relationship with cointerating vector (1, -1), granted that they are $I(1)$. Thus, the existence of the long run relationship between exports and imports of an economy is a necessary condition to be satisfied for balancing an economy's intertemporal budget constraint.

While there is a bulk of studies available to explain the current account sustainability in the developed economies, the literature in the case of developing economies are sparse. To the best of our knowledge, there is no study to have a comparative analysis of the current account sustainability in the SAARC economies. As the majority of these economies are facing the problems of large CAD along with high external debt, this study is an attempt to examine the long run sustainability of the current account imbalances in the South Asian economies for the period of 1980 to 2014.

3. Overview of the SAARC economies

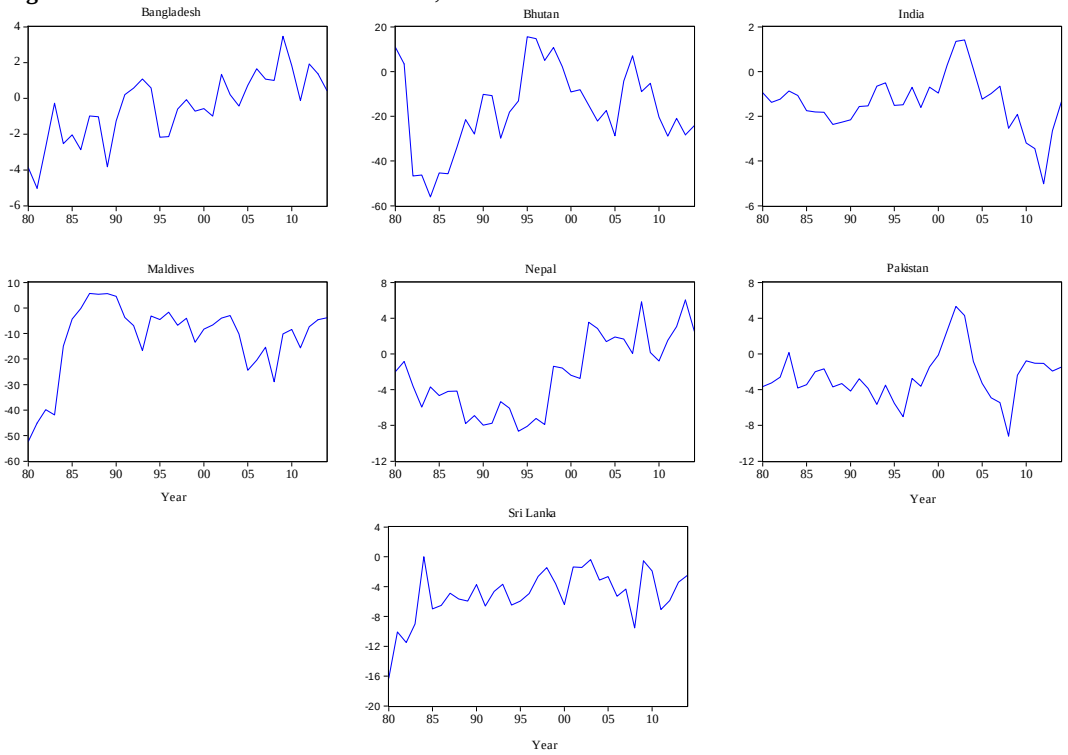
The South Asian region (as defined by SAARC) constitutes about 23 per cent of the world's population and has 15 per cent of the world's arable land, but only 6.0 per cent of purposing power parity (PPP) based global gross domestic product (GDP) and account for around 2.0 percent of world goods trade, and around 3.0 per cent of world foreign direct investment (Jain and Singh, 2009). The south Asian economies are highly diverse in terms of country size, geography, social and political system, culture and language. While some countries like Afghanistan, Nepal and Bhutan are landlocked and mountainous; the other such as Sri Lanka is an island whereas the Maldives is an archipelago of low-lying coral islands in the Indian Ocean.

The SAARC region which was considered as the slowest growing region during the 1960s and the 1970s, became the fastest growing region after 1980. The growth performance of such region is considerably robust over the time among the low income countries. The average GDP growth of the SAARC economies which was lower than the world output growth before 1980s, it significantly improved and crossed the global growth after 1980s (see Appendix A). Although the average GDP growth rate of all the member countries of SAARC improved after 1990s, it further deteriorated for most of the economies except Bangladesh, Nepal and Sri Lanka during the recent years. On the other hand, the average growth of the Bangladesh, Nepal and Sri Lanka improved significantly during the post crisis period. Further, the overall growth rate of the South Asian region which was sustained at an average of 5.36 per cent during 1981-2000, it improved to an average of 7.23 per cent during 2001-2007 and further slightly deteriorated to 6.06 per cent during 2008-2014.

Though, there is a significant improvement in the savings and investment in the SAARC region in recent years, still some of the economies of the region, *viz.*, Afghanistan, Nepal, Bhutan and Bangladesh still depend on the foreign savings/aid for financing their resource gap (Jain and Singh, 2009). In terms of the fiscal position, all the South Asian economies are incurring fiscal deficit (FD) which is a great challenge for most of the economies in this region for the long run fiscal and growth sustainability. Further, majority of these economies are sensitive to the external and natural shocks. For instance, Maldives got severely affected by the 2004 tsunami which put huge pressure on the government for the reconstruction and development of the economy. The countries like India, Pakistan and Afghanistan are having continuous cross border problems with each other as well as with their neighbouring countries. This makes them to spend large

resources on the imports of defence equipment and thereby creating burden on the government by raising FD (Dash et al., 2016). Though the FD of Sri Lanka increased after the 2008 Global financial crisis, in recent years it reduced due to modernisation of the revenue administration and thereby broadening of the tax base.

Figure 1. *Trend in current account balances, 1980-2014*



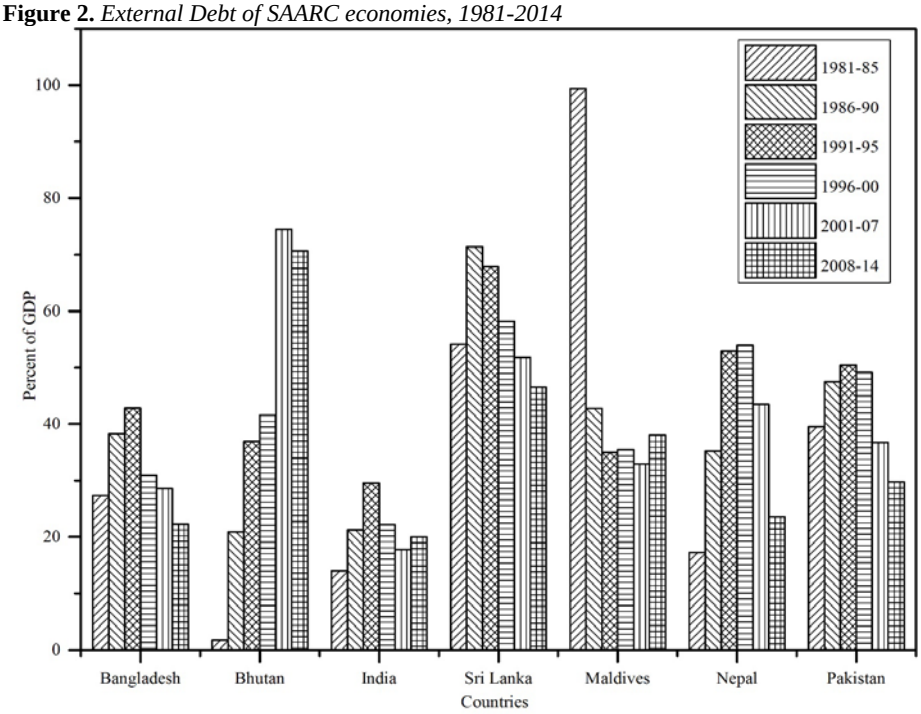
Source: World Development Indicators (WDI) of World Bank.

All the South Asian economies, except Nepal and Bangladesh, have been incurring large CAD over the years. Figure 1 presents the trend in the current account for the South Asian economies. This shows that for Maldives the CAD as a ratio to GDP is the highest in the region. A major portion of such deficit is being financed by the net surplus in the services trade, which mostly comes from the tourism. Further it also can be seen that all the South Asian economies experienced a sharp deterioration in their current account after the Global financial crisis. Recently, due the lower international crude oil prices, the current account of these economies are seen to be improved. The CAD of Bhutan decreased from 28.91 per cent of GDP in 2011 to 24.14 per cent of GDP in 2014. The external sector balance of Sri Lanka also got affected badly after the global financial crisis due to the widening trade deficit and sharp fall in the remittances inflows. The CAD increased from 0.37 per cent of GDP in 2003 to 9.54 per cent of GDP in 2008, though during the latter period it decreased to 2.48 per cent of GDP in 2014. In case of Maldives also the CAD significantly reduced from 15.65 per cent of GDP in 2011 to a lower level of 3.85 per cent of GDP in 2014. In India the increasing trade deficit during 2008-09 was mostly offset by a steady remittance inflows and a rising surplus in the net service

exports. Due to the rising imports, CAD increased to around 5 per cent during 2012-13 though it fell to a 1.34 per cent of GDP during 2014-15. Further, in the past few years the current account of Nepal and Bangladesh is showing surplus which is mainly because of the narrowing trade deficit and higher remittances inflows.

The rising CAD in the South Asian economies is mainly financed through net surplus in the service exports, remittances inflows and external debt. The average trend in the external debt of these economies is presented in the Figure 2. This shows that all the South Asian economies are the net borrowers in the international market.

Figure 2. *External Debt of SAARC economies, 1981-2014*



Source: World Development Indicators (WDI) of World Bank.

In Maldives, there is a significant improvement in the external debt situation as compared to the early 1980s. The average external debt which was 99.41 per cent of GDP during 1981-1985 sharply deteriorated to 32.92 per cent of GDP during 2001-2007, although it further increased after the Global financial crisis to 38 per cent of GDP during 2008-2014. This shows that in the recent years there is a significant reduction in the external debt burden on the Maldives government as compared to the early 1980s. In Bhutan, the average external debt burden increased from 1.76 per cent of GDP in 1981-85 to 70.70 per cent of GDP in 2008-14. The major proportion of the external debt utilised for the growth oriented investment purpose, such as the rapidly expanding power sector. India is considered as the largest trading partner for Bhutan and rupee debt constitutes 61 per cent of external debt of Bhutan (IMF, 2014). For all other South Asian economies like Bangladesh, India, Sri Lanka, Nepal and Pakistan the average external debt has decreased

significantly after 1990s. Further, although the average external debt of all the SAARC economies reduced significantly during the post Global financial crisis periods, for India and Maldives it increased from 17.78 and 32.92 per cent of GDP during 2001-07 to 20.05 and 38.00 per cent of GDP during 2008-14, respectively.

Although a number of measures are being under taken for the economic growth and development of the South Asian region, still the per capita income is very low which is a matter of concern. In the field of infrastructure, social provisions and working of the institutional set up the region is lagging behind. Among all the South Asian economies, the Sri Lankan economy is quite exceptional not only in the SAARC region but also in the developing world in terms of education, health and other social development. It has achieved high literacy and low infant and adult mortality rates and continues to provide universal health and education coverage and in its commitment to gender equality and social development (Jain and Singh, 2009). Its current levels of human development indicators are comparable to those of the high income countries (Srinivasan, 2004).

4. Model, data and methodology

4.1. The model

Assessing the sustainability of current account has been a debatable issue in literature **(**Holman, 2001; Mann, 2002). Widely employed tests exploit the recent developments in time series econometrics for testing the sustainability hypothesis. These tests rely on stationarity of current account which has implications for the intertemporal approach. According to the intertemporal approach, current account acts as a buffer to smooth consumption implying that typically it behaves like a stationary variable. However, employing conventional unit root test have yielded non-stationarity of current account in its level (Shibata and Shintani, 1998) and the lack of power of conventional tests for stationarity is well known (Shiller and Perron, 1985). Husted (1992) proves that the mean reversion in current account can be explained by examining the cointegration properties between exports and imports, and that current account is sustainable if exports and imports are cointegrated with the cointegrating vector being (1,-1). This enables us to examine the long run relationships between the variables using the most recent test of combined cointegration of Bayer and Hanck (B-H) (2013). We follow Husted (1992) to determine the sustainability of current account in the South Asian economies. This approach uses a model of budget constraint at an individual level, which can be extended to an economy. We discuss the approach below:

The current period budget constraint for an economy can be expressed as

$$C_0 = Y_0 + B_0 - I_0 - (1+ir_0)B_{-1} \quad (1)$$

Where C_0 denotes current consumption, Y_0 current output, I_0 is investment expenditure, ir_0 is world interest rate B_0 is international borrowing and $(1+ir_0)B_{-1}$ is external debt. As equation (1) must hold good for every time period intertemporal budget constraint

(IBC) can be arrived as the summation of period by period budget constraint, which can be expressed as equation (2).

$$B_0 = \sum_{t-1}^{\infty} \delta_t TB + \lim_{n\to\infty} \delta_n B_n \qquad (2)$$

Where $\mathrm{TB_t} = \mathrm{X_t} - \mathrm{M_t} = \mathrm{Y_t} - \mathrm{C_t} - \mathrm{I_t}$ which is the trade balance in period t, that is, income-absorption. $\mathrm{X_t}$ and $\mathrm{M_t}$ are exports and imports, respectively and δ_t is the discount factor. The last term in Equation 2 implies that when limit term equals zero the amount a country borrows is equal to the present value of future trade surpluses. Assuming that the world interest rate is stationary with unconditional mean ir , equation (1) can be expressed as

$$Z_t + (1+ir)B_{t\text{-}1} = X_t + B_t \qquad (3)$$

Where $Z_t = M_t + (ir_t - ir)B_{t-1}$

Solving Equation (3), Husted (1992) arrives at

$$M_t + ir_t B_{t-1} = X_t + \sum_{j=0}^{\infty} \phi^{j-1}(\Delta X_{t+j} - \Delta Z_{t+j}) + \lim_{j\to\infty} \phi^{t+j} B_{t+j} \qquad (4)$$

Where $\phi = 1/(1+r)$ and Δ is the first difference operator. It can be seen from equation (4) that payments on imports as well as interests on foreign debt is represented on the left hand side. To arrive at the current account of an economy we subtract $\mathrm{X_t}$ from both sides of equation (4) and multiply the result by (-1). In order to convert Equation 4 to a regression model we assume that the limit term is zero and a residual term is added. This yields the following equation:

$$X_t = a + bM_t^* + \mu_t \qquad (5)$$

It should be noted that $\mathrm{M_t^*}$ measures imports of goods and services plus unilateral transfers. In order to satisfy IBC the necessary condition is the existence of a stationary error structure. This implies that μ_t in equation (5) should be an I(0) process. The necessary and sufficient condition for IBC is the existence of a vector (a, b) such that (a, b) = (0, 1) and the process is stationary. Two intuitive implications can be arrived from equation (5). First, Failure to detect co-movements between exports and imports implies that the economy fails to satisfy its budget constraint resulting in default of its debt. Second, if exports and imports are cointegrated with a vector $\beta = (1, -1)$ then the economy satisfies IBC in the long run and the two series would never drift too far apart. We use the above framework for testing the sustainability of current account of the South Asian economies.

4.2. Data

Following the earlier literature (such as Kalyoncu and Ozturk, 2010; Husted, 1992)[(2)] on testing current account sustainability, we use annual data for exports of goods and services (as percent of GDP) and imports of goods and services plus interest payments on the external debt (as percentage of GDP) for seven SAARC economies, such as, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. We have not included Afghanistan in our study due to unavailability of data for most of the study periods. Further, Afghanistan is also a new member of SAARC and it joined recently in 2005. The data are sourced from the World Bank's World Development Indicators (WDI) database. The study period consists of from 1980 to 2014.

The summary statistics of the variables for all the countries are presented in Table 1. This shows that in all the South Asian economies the average of imports is higher than the average of exports. This implies that the South Asian economies are the net importers of goods and services in the international market. The average gap between the exports and imports is found to be higher for Bhutan, Nepal and Sri Lanka which is more than 10, as compared to the other member nations of SAARC. Further, one of the interesting result we can find that while for all the economies the correlation between the exports and imports is positive implying exports and imports move in the same direction, in the case of Pakistan, the correlation is found to be negative. This may indicate that Pakistan's rising import demand as well as huge burden of external debt may lead to fall in its efficiency to exports.

Table 1. *Descriptive statistics and correlation matrix*

Country	Variables	Mean	S.D.	Min.	Max.		Correlation	
							Exports	Imports
Bangladesh	Exports	10.91	5.17	3.4	20.16		1	
	Imports	17.89	4.74	12.43	28.15		0.93	1
Bhutan	Exports	30.97	11.17	12.06	54.97		1	
	Imports	51.41	10.14	31.41	73.31		0.59	1
India	Exports	12.85	6.82	5.11	25.16		1	
	Imports	15.88	7.87	7.72	31.64		0.99	1
Maldives	Exports	88.38	29.01	43.27	166.36		1	
	Imports	90.74	41.69	50.67	214.2		0.90	1
Nepal	Exports	14.93	5.09	8.9	26.33		1	
	Imports	29.07	6.47	18.99	41.48		0.44	1
Pakistan	Exports	14.11	2.03	9.95	17.36		1	
	Imports	21.39	2.85	15.41	25.69		-0.35	1
Sri Lanka	Exports	28.99	6.57	15.47	39.02		1	
	Imports	40.82	7.24	24.33	56.93		0.84	1

Note: Exports imply the exports of goods and services as percentage of GDP; Imports imply imports of goods and services plus the interest payments on the external debt as percentage of GDP. Both the variables have taken as percentage of GDP.

4.3. The Bayer-Hanck cointegration approach

For testing the sustainability hypothesis we apply the combined cointegration test developed by Bayer and Hanck (2013). There are several tests that have been developed to examine the long run relationship among variables. The residual based test of Engle and Granger (1987), the system based test of Johansen (1988) and the error correction based test of Boswijk (1994) and Banerjee et al. (1998) are the most commonly used.

Engle-Granger test involves a two-step testing procedure. The major limitation of this test is that if an error arises in the first step it carries over and feeds into the second step and ultimately gives biased results. Further, the results of the long run regression may provide inefficient estimates if the residuals are not normally distributed. However, Engle and Yoo (1991) cointegration test solved the issues of Engle and Granger (1987) test by providing efficient results even if the distribution of estimators from the cointegrating vector is not normally distributed.

Johansen and Juselius (1990) developed the maximum likelihood cointegration test which can be applied to examine cointegration between variables when the variables are non-stationary at levels but integrated of the same order. However, this is a single equation model and is not applicable when the variables are integrated of mixed order. The results are also sensitive to the incorporation of exogenous and endogenous variables in the model. While the test indicates the presence of cointegration among the variables or not, it does not give any information about the short run dynamics. Further, Pesaran et al. (2001) suggested a bounds testing cointegration approach using an autoregressive distributed lag (ARDL) model which can deal with some of the issues arising out of the Johansen and Juselius (1990) approach. This approach is applicable even if the series are $I(0)$, $I(1)$ or a mix of $I(0)/I(1)$. Unlike Johansen and Juselius (1990) cointegration test, the ARDL model shows both the short run and the long run relationship between the variables. The demerit of this method is that, it is not applicable if any of the variable is integrated of order two [$I(2)$] Pesaran et al. (2001).

As discussed above there exists various methods to test long run relationship between a set of variables. However, in practice it is possible that different methods may give different results making it difficult to conclude whether the series are cointegrated or not. In order to overcome this, Bayer and Hanck (2013) developed a new dynamic cointegration technique by combining several popular tests such as Engle and Granger (1987), Johansen (1988), Boswijk (1994) and Banerjee et al. (1998) to obtain uniform and reliable results. This test gives efficient estimates by ignoring the nature of multiple testing procedure which gives robust and better results as compared to the individual t-test or the system based test.

The B-H cointegration test follows Fisher's (1932) critical tabulated values formula to combine the statistical significance level i.e. p-values of single cointegration test. Following Shahbaz et al. (2016), the formula is given below:

$$EG - JOH = -2[\ln(P_{EG}) + \ln(P_{JOH})] \quad (6)$$

$$EG - JOH - BO - BDM = -2[\ln(P_{EG}) + \ln(P_{JOH}) + \ln(P_{BO}) + \ln(P_{BDM})] \quad (7)$$

The notations such as P_{EG}, P_{JOH}, P_{BO} and P_{BDM} represent the probability values for the individual cointegration tests such as Engle and Granger (1987), Johansen (1991), Boswijk (1994) and Banerjee et al. (1998), respectively. We follow the critical values of Fisher (1932) to decide whether there is cointegration between the variables or not by rejecting the null hypothesis of no cointegration when the calculated Fisher (1932) statistic value is greater than the critical values generated by B-H (2013).

5. Empirical results and discussions

Testing of the unit root properties of the variables is considered as the necessary precondition for examining the cointegrating relationship among them. We use the Ng and Perron (N-P) (2001) unit root test to investigate the order of integration of the variables. This test is prefered over the other unit root tests because it is suitable and also gives efficient results for the small sample case. Further, as compared to the ADF, PP and DF-GLS unit root tests, the N-P (2001) test is more preferable due to its explanatory power. The results are reported in Table 2, which indicate that for all the countries, both exports and imports have unit root problem, while both of them are stationary at first difference. However, in the case of Sri Lanka, the exports is stationary at level or I(0) while the imports is stationary at first difference or I(1).

Table 2. *Ng and Perron (2001) unit root test results*

Countries	Variables	MZa	MZt	MSb	MPt
Bangladesh	Exports	0.616	0.418	0.679	33.223
	Imports	-1.447	-0.630	0.435	12.353
	ΔExports	-16.414*	-2.854	0.174	1.532
	ΔImports	-15.350*	-2.770	0.180	1.596
Bhutan	Exports	-1.711	-0.836	0.488	12.940
	Imports	-12.849	-2.518	0.196	7.184
	ΔExports	-15.321*	-2.712	0.177	1.805
	ΔImports	-29.893*	-3.860	0.129	3.084
India	Exports	0.884	0.744	0.842	50.097
	Imports	0.283	0.216	0.765	37.731
	ΔExports	-7.304***	-1.764	0.242	3.862
	ΔImports	-15.894*	-2.732	0.172	1.861
Maldives	Exports	-3.246	-1.273	0.392	7.546
	Imports	-1.493	-0.800	0.536	15.049
	ΔExports	-15.481*	-2.782	0.180	1.583
	ΔImports	-16.752*	-2.893	0.173	1.466
Nepal	Exports	-2.462	-1.095	0.445	9.870
	Imports	0.647	0.322	0.497	21.092
	ΔExports	-16.318*	-2.855	0.175	1.508
	ΔImports	-15.945*	-2.750	0.172	1.808
Pakistan	Exports	-4.1273	-1.412	0.342	5.966
	Imports	-5.995	-1.644	0.274	4.353
	ΔExports	-16.477*	-2.844	0.173	1.583
	ΔImports	-15.476*	-2.777	0.179	1.600
Sri Lanka	Exports	-39.024*	-4.366	0.112	2.607
	Imports	-4.833	-4.741	0.105	2.040
	ΔExports	-45.019*	-1.171	0.405	8.383
	ΔImports	-15.525*	-2.785	0.179	5.878

The lag length is shown in parentheses. For details of these notations including MZa, MZt, MSB and MPT, please see the study by Ng and Perron (2001).
*, ** and *** represent significance at 1%, 5% and 10% levels, respectively.

The N-P (2001) unit root test provides biased results in the presence of any structural break in the data (Shahbaz et al., 2016). For this reason, we employed Zivot and Andrews (ZA) (1992) structural break test. The ZA (1992) unit root test accommodates the information about the single structural break present in the data. The results of ZA test are reported in Table 3. The results indicate that both the exports and imports for all the South Asian economies are non-stationary at their levels in the presence of a single

structural break and stationary at first difference. In other words, all the variables are integrated of *I*(1).

Table 3. *Zivot and Andrews (1992) unit root test*

Countries	Variable		Level				1st difference		
			T-statistic	Time break	Decision		T-statistic	Time break	Decision
Bangladesh	Exports		-4.427 (0)	2005	Unit root		-6.386* (0)	2005	Stationary
	Imports		-3.829 (0)	2003	Unit root		-6.655* (0)	2009	Stationary
Bhutan	Exports		-3.089 (1)	1992	Unit root		-4.409** (0)	2007	Stationary
	Imports		-4.490 (0)	1991	Unit root		-6.396* (1)	2009	Stationary
India	Exports		-4.742 (1)	2004	Unit root		--9.008* (0)	2009	Stationary
	Imports		-2.265 (0)	1987	Unit root		-6.354* (0)	2009	Stationary
Maldives	Exports		-3.092 (0)	2007	Unit root		-5.899* (0)	1986	Stationary
	Imports		-4.067 (1)	2004	Unit root		-6.153* (0)	1986	Stationary
Nepal	Exports		-3.745 (2)	1992	Unit root		-7.852*(0)	1998	Stationary
	Imports		-3.195 (0)	2002	Unit root		-6.374*(0)	1998	Stationary
Pakistan	Exports		-3.279 (0)	1987	Unit root		-8.028* (0)	2005	Stationary
	Imports		-3.821 (0)	2002	Unit root		-7.543* (0)	2007	Stationary
Sri Lanka	Exports		-3.240 (4)	2005	Unit root		-10.223* (1)	2009	Stationary
	Imports		-4.532 (0)	2009	Unit root		-7.161* (0)	1991	Stationary

Lag order is shown in parenthesis.
*, ** and *** represent significance at 1%, 5% and 10% levels, respectively.

From the unit root test results as we found that both exports and imports are integrated of the same order i.e. *I*(1), in such case the B-H (2013) combined cointegration approach is a suitable empirical method to test the cointegrating relationship among the variables. The B-H (2013) cointegration test is sensitive to the lag order selection (Satti et al., 2014) which implies that appropriate lag length selection is necessary before applying this test. Therefore, we used the Akaike information criterion to select an appropriate lag length. The results are reported in Appendix B. Given the lag length we applied the B-H (2013) combined cointegration approach to our data and the results are reported in Table 4.

Table 4. *The results of Bayer and Hanck (2013) cointegration analysis.*

Country	Estimated Models	EG – JOH	EG – JOH – BO – BDM	Lag	Cointegration
Bangladesh	Ex = *f* (Im)	1.926	2.403	1	NO
	Im = *f* (Ex)	1.586	3.205	1	NO
Bhutan	Ex = *f* (Im)	4.406	7.474	1	NO
	Im = *f* (Ex)	4.730	11.264	1	NO
India	Ex = *f* (Im)	5.569	7.866	3	NO
	Im = *f* (Ex)	5.843	14.764	3	NO
Maldives	Ex = *f* (Im)	56.483**	61.053**	3	YES
	Im = *f* (Ex)	57.877**	168.401**	3	YES
Nepal	Ex = *f* (Im)	2.568	3.342	3	NO
	Im = *f* (Ex)	2.225	3.619	3	NO
Pakistan	Ex = *f* (Im)	0.707	1.964	1	NO
	Im = *f* (Ex)	1.106	3.570	1	NO
Sri Lanka	Ex = *f* (Im)	12.385**	27.919**	3	YES
	Im = *f* (Ex)	17.636**	54.477**	3	YES

Critical values at 5% level are 11.229 (EG-JOH) and 21.931 (EG-JOH-BO-BDM), respectively. Lag length is based on minimum value of AIC.
** Represents significance at 5% level.

We find that Fisher statistics for EG-JOH and EG-JOH-BO-BDM tests exceeds the critical values at 5% level of significance for Maldives and Sri Lanka when exports was

used as the dependent variable and import was used as the independent variable, and vice versa. On the other hand, for the all other economies it fails below the critical values. This implies that while two cointegrating vectors found between exports and imports for Maldives and Sri Lanka, no cointegrating relationship found between the variables for rest of the South Asian economies. This indicates that, except Maldives and Sri Lanka, there is no long run equilibrium relationship between exports and imports for the South Asian Economies during 1980 to 2014.

Though the B-H (2013) approach gives efficient results, at the same time it does not accommodate structural breaks in the model (Shahbaz et al., 2016). Therefore, for the robustness of our results we further applied the ARDL bounds testing cointegrating approach developed by Pesaran et al. (2001)(3) to accommodate the structural break in the model. As it is well known that the ARDL approach is sensitive to the lag length selection in the model, we use the Akaike Information Criteria (AIC) to select the appropriate lag length. As reported by Lütkepohl (2006) the dynamic link between the series can be well captured with the appropriate selection of the lag length. The optimum lags are given in the column 2 of Table 5. For testing the existence of cointegration in different models, we used Narayan (2005) critical values. The results show that, except Maldives and Sri Lanka, the null hypothesis of no cointegration cannot be rejected for both the models. Further, while for Maldives we reject the null hypothesis of no cointegration as both exports and imports were used as dependent variables, for Sri Lanka we can only reject the null hypothesis only for the model where imports is used as the dependent variable. This shows the presence of two cointegrating vectors for Maldives and one cointegrating vector for Sri Lanka which validate the existence of long run equilibrium relationship between exports and imports for both the economies.

Table 5. *Results of ARDL model*

Bound testing approach to cointegration					Diagnostic tests			
1	2	3	4	5	6	7	8	9
Country	Equation	Optimal lag	Structural break	F-statistics	χ^2_{Normal}	χ^2_{ARCH}	χ^2_{RESET}	χ^2_{SERIAL}
Bangladesh	Ex = *f* (Im)	(1,1)	2005	1.794	3.005	2.817	0.038	1.520
	Im = *f* (Ex)	(6,6)	2003	2.679	0.278	0.986	1.149	1.706
Bhutan	Ex = *f* (Im)	(2,4)	1992	4.878	0.492	0.334	0.877	0.512
	Im = *f* (Ex)	(1,0)	1991	3.657	0.636	0.997	1.961	1.102
India	Ex = *f* (Im)	(5,1)	2004	1.331	0.183	1.490	0.078	1.264
	Im = *f* (Ex)	(5,1)	1987	4.943	0.673	0.798	1.159	0.202
Maldives	Ex = *f* (Im)	(1,1)	2007	5.427***	17.31	0.053	0.051	0.279
	Im = *f* (Ex)	(1,2)	2004	5.616***	2.412	0.029	4.024	1.119
Nepal	Ex = *f* (Im)	(1,1)	1992	0.469	4.041	0.195	1.344	1.664
	Im = *f* (Ex)	(1,2)	2002	1.308	1.039	2.648	0.974	2.870
Pakistan	Ex = *f* (Im)	(1,0)	1987	2.739	1.177	0.228	2.198	0.102
	Im = *f* (Ex)	(1,0)	2002	4.268	0.728	0.003	1.780	1.184
Sri Lanka	Ex = *f* (Im)	(1,0)	2005	2.563	0.476	0.718	0.877	0.157
	Im = *f* (Ex)	(2,0)	2009	10.694*	2.284	0.126	0.971	0.136
		Critical values (T = 35)[a]						
		Lower bound I(0)	Upper bound I(1)					
		7.870	8.960					
		5.290	6.175					
		4.225	5.050					

The optimal lag length is determined by AIC. T is the total number of observations used in the empirical analysis. *, **, and *** denote significance at 1%, 5% and 10% levels, respectively.
[a] Critical lower and upper bounds values are collected from Narayan (2005) including unrestricted intercept and no trend.

The results of both the B-H (2013) and ARDL bounds testing approaches showed that only in the case of Maldives and Sri Lanka the exports and imports are cointegrated, while in case of the other South Asian economies we did not get any cointegration between the variables. Given the studies of Husted (1992) and Kalyoncu and Ozturk (2010), our results confirm the sustainability of the current account of Maldives and Sri Lanka. On the other hand, for the other South Asian economies such as Bangladesh, Bhutan, India, Nepal and Pakistan, the current account was found to be unsustainable in the long run.

6. Conclusion and policy implications

An economy, due to increasing domestic consumption and investment demand, may incur deficit in its current account. Such deficit can be financed by external borrowing in the short run. However, if the deficit continues for the longer time period it may question the ability of an economy to service such obligations. In this case it is very much important to test the sustainability of such deficit in the long run.

This study investigated the long run sustainability of the current account imbalances in the South Asian economies by using the annual data for the period of 1980 to 2014. Based on the studies of Husted (1992) and Kalyoncu and Ozturk (2010), we examine the sustainability of the current account imbalances by testing the long run equilibrium relationship between exports of goods and services, and imports of goods and services plus interest payments of the respective economies.

The recently developed Bayer and Hanck (2013) cointegration test is employed to test the long run equilibrium relationship between the variables. The integrating properties of the variables are tested using the Ng and Perron (2001) and Zivot and Andrews (1992) unit root tests. While the former test does not control for the possible structural breaks in the model, the latter test controls for a single unknown structural break in the model. The results of both the models are consistent and also shows that all the variables under study are integrated of order one or $I(1)$. We further applied the autoregressive and distributed lag (ARDL) bounds testing approach of Pesaran et al. (2001) by accommodating single structural break in the model to test the robustness of our long run estimates. The long run estimates obtained from both B-H (2013) and Pesaran et al. (2001) bounds test approach showed that there exist long run equilibrium relationship between exports and imports only for Maldives and Sri Lanka, while we did not get any cointegration between the variables for the other South Asian economies. Therefore, we concluded that the current account imbalances of all the South Asian economies, except Maldives and Sri Lanka, is unsustainable in the long run. In other words, in the case of the Maldives and Sri Lanka, the intertemporal budget constraint is not violated, while for the rest of the economies it is violated. This results indicate that for most of the economies in the SAARC region the

international indebtedness may not be sustainable, and over time the discrepancy between the exports and imports as a share of GDP would grow without bounds.

Overall, the findings of this paper conveys some important messages. It found that majority of the south Asian economies are running deficit in their current account and this deficit is not sustainable in the long run. As these economies are depending on the external borrowings to finance such deficits, a sharp rise in the CAD may put the economies into debt trap in the long run. Further, the intra-SAARC trade is also found to be quite low as compared with that of regional forums such as European Union (EU) and Association of South East Asian Nations (ASEAN). So policies are needed to increase the trade cooperation among these economies which can be helpful in improving their external sector positions. Though in the recent years due to the fall in the global crude oil prices there is a temporary significant improvement in the current account position in the regions, there exists an imperative to increase the exports of goods and services through raising the productivity and gaining competitive advantage. In the long run this can be helpful to bridge the gap between the exports and the imports and will push the current account towards sustainable region in the South Asian economies.

Notes

(1) Current account is the sum of net exports of goods and services, net primary income and net secondary income. It can also be defined as the difference between exports and imports or saving and investment of an economy Sachs (1981).

(2) Kalyoncu and Ozturk (2010) and Husted (1992) showed that in the presence of the cointegrating relationship between exports and imports, the CAD of an economy can be considered as sustainable in the long run.

(3) The ARDL model is chosen over the alternative traditional models such Engel and Granger (1987) and Johansen and Juselius (1990) because of the superiority over the others; (i) the ARDL model can be applied even if the variables are mixed order integrated; (ii) It also produces robust results even if the sample size is small. Further, we use the critical values of Narayan (2005) which is specially created for sample size ranging from 30 to 80; (iii) the ARDL technique also solves the issue of endogeneity in the model estimation due to the incorporation of lagged values of the dependent variable in the model.

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Appendix A. *Annual GDP growth of SAARC and world economy, 1971-2014*

GDP Growth	1971-1980	1981-1990	1991-2000	2001-2007	2008-2014
World	3.814	3.18	2.784	3.237	1.901
SAARC	2.975	5.568	5.148	7.233	6.06
Afghanistan	-0.059	-1.453	-3.191	15.007	7.835
Bangladesh	1.041	3.851	4.726	5.782	6.172
Bhutan	4.094	10.441	5.417	9.203	6.233
India	3.062	5.868	5.493	7.714	6.348
Maldives	6.272	11.742	7.560	8.986	5.965
Nepal	2.111	4.789	5.015	3.519	4.693
Pakistan	4.802	6.190	3.956	5.157	3.489
Sri Lanka	4.335	4.244	5.250	4.963	6.678

Source: World Development Indicators (WDI) of World Bank.

Appendix B. *AIC lag selection results for B-H (2013) test*

Country	LAG	AIC
Bangladesh	1	5.5933[b]
Bhutan	1	12.6459[b]
India	3	5.8988[b]
Maldives	3	15.1075[b]
Nepal	3	8.5923[b]
Pakistan	1	7.3063[b]
Sri Lanka	3	8.7992[b]

AIC: Akaike Information Criteria.

[b] Indicates lag order selected by the criterion.