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RESEARCH PAPER

The Analysis of Asymmetries in the Nexus between Tourism and Balance of Payments Deficit: An Updated Evidence from Pakistan

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Abstract

The current study intends to securitize the asymmetric link between tourism and the deficit in the balance of payments of Pakistan. To this end, the study deploys the annual data from 1976 to 2019, applying a novel cointegrating approach, viz, asymmetric Autoregressive-Distributed Lag technique. The findings confirm the non-linear cointegration among the selected series. Additionally, the results reveal that the deficit in the balance of payment responds to the positive and negative changes in tourism atypically. Besides, the balance of trade deficit, real effective exchange rate, and fiscal balance deficit exhibit a direct association with a balance of payments deficit. Based on the outcomes, the study recommends some crucial policies to encourage the tourism sector in Pakistan as it has significant potential to reduce the deficit in the balance of payments.

Keywords: Asymmetric ARDL, Balance of Payment Deficit, Pakistan, Tourism.
JEL Classification: F1, F14, Q27, Z32.

1. Introduction

In contemporary times, tourism, being an efficient engine for economic development, has been attaining noteworthy importance (Chai-sumpunsakul and Pholphirul, 2017; Pablo-Romero and Molina, 2013). The notion of modern society's welfare incurred a tremendous change on account of the current tendency of globalization. An economy, having a scarcity of capital and technology; however, with the abundance of the labor force, thrives due to tourism since it plays a vital role as a labor-intensive industry (Alp and Genc, 2015).

The entire previous literature relevant to the current study proposes that tourism boosts the economic development process through various channels[1]. Firstly, tourism generates revenues that can be invested in purchasing capital commodities. Secondly, it potentially intends to enhance the investment level, infrastructure, and competition. Thirdly, through its spillover effects, the other sectors of the economy, also enjoy direct and indirect benefits. Fourthly, through producing economies of scale, it creates employment opportunities (Siddiqui and Siddiqui, 2019; Jalil et al., 2013). Lastly, as it promotes research, unfolds technological knowledge, and improves human capital, it may be deemed as a notable sector (Brida and Risso, 2009).

According to the World Travel and Tourism Council (WTTC), tourism contributes to the growth of the global economy by generating revenue of $8.8 trillion and 319 million jobs in 2018. Further, in the context of Pakistan, Table 1 presents the contribution of tourism to the economy. Also, the most frequently visited places in Pakistan are highlighted in the map of Pakistan as Figure 1 shows. Although the tourism sector is not technology-intensive, it possesses the potential to spur economic growth. For instance, Shan and Wilson (2001), Durbarry (2002), Croes (2003), Kim et al. (2006), Steiner (2006), Khalil et al. (2007), Adnan and Khan (2013), Ohlan (2017), and Muhtaseb and Daoud (2017) deduce that Spain, Mauritius, Pakistan, China, Egypt, Pakistan, Taiwan, India, and Jordan, respectively, flourish as the more tourists visit these economies[2] (Rasheed et al., 2019).

Table 1. Indicators of the Tourism Sector to The Pakistan Economy

Indicators	2013	2014	2015	2016	2017	2018
Gross Contribution to GDP (billions of US$)	16.2	16.6	17.1	17.7	18.9	20.1
Contribution to GDP (%)	9.25	2.13	3.27	3.20	7	7.1
Contribution to employment (thousands of full-time equivalent workers)	3571.9	3624.2	3608.5	3727.1	3894.6	3855.2

Source: World Travel and Tourism Council Database (2019).

[1]. Apparently, Mun (1713) was the first who gathers that balance of trade gets improvement due to the expenses of travelers.

[2]. However, Dritsakis (2004) does not find any significant association between tourism and economic growth in the case study of South Korea.

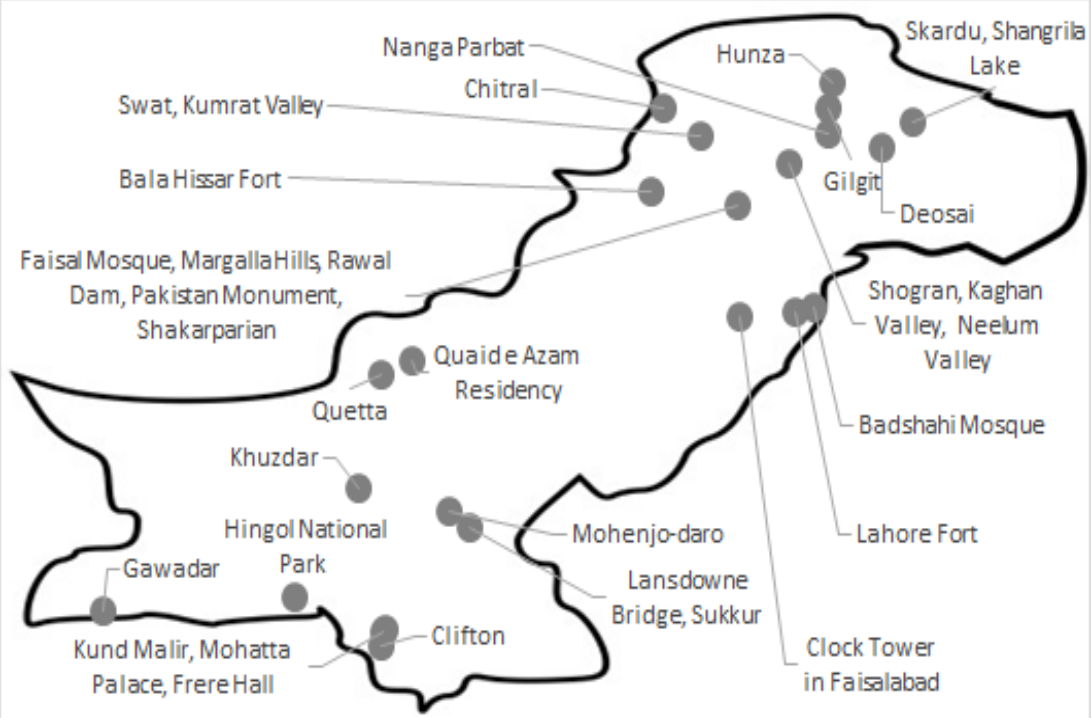

Figure 1. The Dots Highlight the Most Frequently Visited Places in Pakistan.
Source: Research finding.

Various common factors result in poor economic development in the least developed countries (LDCs). One of the most significant factors is the deficit in BOPs, defined as the record of all economic transactions of an economy with the rest of the world's economies during a specific period, which is one year here (Thirwall, 2012), as numerous empirical studies report. The BOPs are strongly related to the path of economic and technological development and advancement of the countries. Further, the BOPs equilibrium reflects robust economic status. However, the deficit in BOPs signifies weak economic growth.

Nowadays, there are many countries around the world, which are enduring the distress of the BOPs deficit. Likewise, Pakistan is also facing the problem of a deficit in BOPs on account of specific causes since its independence. Further, Pakistan's export side is suffering from the problem of instability, since its export function consists of primary products that earn a meager amount of foreign exchange comparatively due to unstable markets. Besides, the agriculture sector which substantially contributes to Pakistan's exports has to face unfavorable environmental conditions. Consequently, export share reduces. On the contrary, being a developing economy, Pakistan's imports comprise heavy pieces of machinery for the developmental process.

Accordingly, the BOPs deficit raises (Rehman and Rashid, 2006). For instance, the economy of Pakistan had to observe the most massive trade deficit of $37.7 billion ($60.9 imports and $23.2 billion exports) during the fiscal year of 2017-18 (Pakistan Bureau of Statistics, 2018).

The overall trend of Pakistan's BOPs deficit from 1976 to 2019 is depicted in Figure 2. It demonstrates that Pakistan has been going through the BOPs deficit consistently. Pakistan faces a deficit of 8.7 billion which was brought down in 2000 to 0.38 billion. Further, Pakistan enjoys favorable BOPs during 2000-04. However, on account of enormous imports of machinery and crude oil, etc., it slips into a vicious circle of deficit. In 2006. 2007, 2008, 2017, and 2018, Pakistan endures an extreme BOP deficit. The second-highest deficit in BOPs was observed in 2008 which was recovered by a loan of $11 billion from the IMF (Umer et al., 2010). While Pakistan tolerated the highest level of deficit in 2018 which was countered by borrowing $6 billion from the IMF (State Bank of Pakistan, 2019).

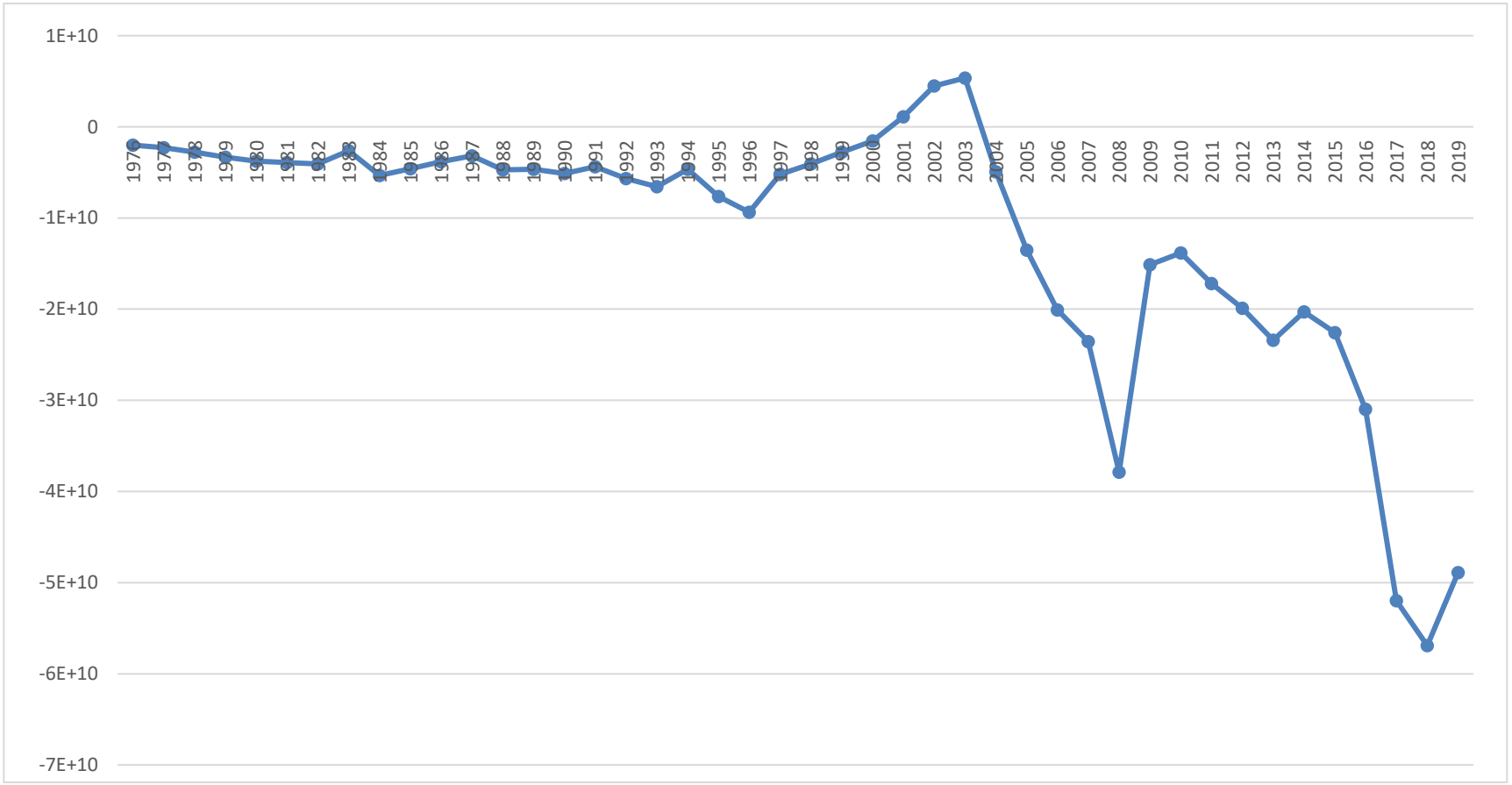

Figure 2. The Overall Outline of BOPs (in Billions of US$).

Source: Pakistan Economic Survey.

In the context of Pakistan, as an additional benefit to improving, sustaining, and accelerating economic growth, an increase in the tourism sector potentially can curb the rate of unemployment by absorbing the excess labor force. It can present its significant contribution by helping in importing the heavy machines and equipment, etc. Also, it can help in mitigating the harmful repercussions of the BOPs deficit by generating more foreign exchange. Indeed, several empirical studies on the economies of Barbados and Turkey concluded that tourism played a vital role in reducing the BOPs deficit (Ongan, 2008; Lorde et al., 2012; Celik et al., 2013; Alp and Genc, 2015). Notwithstanding a significant contribution in accelerating economic development as well as challenging an urgent economic issue like diminishing the deficits in BOPs and current accounts, limited attention is given to the tourism sector in Pakistan. From the analytic perspective, it should be noted that all the previous studies on the subject focus on symmetric modeling to analyze the dynamic effects of tourism. Hence the current article contributes to the existing literature in the following ways. First, to the best of our knowledge, there is not a single study published yet that has investigated the asymmetric association between tourism and the BOPs deficit in Pakistan to explore the plausible asymmetries among the selected series that compute the more explanatory results as compared to symmetric ARDL approach by decomposing the series into positive and negative shocks (Rehman et al., 2021; Chishti et al., 2020; Usman et al., 2020). Second, refining the approach to the analysis is even more useful since the worsening of the BOPs deficit has been experienced by Pakistan, specifically during the last few years. Lastly, we deploy Zivot and Andrews (1992) test to capture the effects of potential structural break and to attain robust findings. Hence, keeping in view the importance of tourism, our study inspects the asymmetric effects of the tourism sector on the BOPs deficit in Pakistan.

The remainder of the study is arranged as follows: section 2 contains a review of available literature relevant to the area of interest. In section 3, data sources and methodology are presented, whilst section 4 includes a discussion of the empirical findings. Finally, the conclusion and policy recommendations are reported in section 5.

2. Literature Review

An insightful reappraisal of the available literature pertinent to the area of the current study reveals the several determinants of the BOPs deficit issue. The list includes, but not limited to, domestic output, economic growth, exports, exchange rate, private saving, public saving, real effective exchange rate, and terms of trade.

As far as the empirical literature on tourism-BOPs deficit nexus is concerned, a few studies focus on this area. As Lorde et al. (2012) investigate the dynamic effects of tourism on the BOPs deficit in Barbados by employing the data for 1990-2006. The study concludes that the BOPs deficit shrinks as the tourism industry thrives since it contributes a lion's share of earnings to GDP. Likewise, Adnan and Khan (2013) take the data for 1971-2008 and apply the ARDL technique. The evidence confirms the long-run positive association between tourism and per capita income, which leads to boost economic growth in Pakistan. However, the impact of tourism during the years of 2006, 2007, and 2008 becomes insignificant.

Furthermore, Celik et al. (2013), employing the data from 1984 to 2012, explore the nexus between the tourism industry and the deficit in BOPs in Turkey. They assert the significant association between tourism and BOPs deficit exigency: the detrimental repercussions of the BOPs deficit face the downfall as more tourist groups visit Turkey and vice versa. Taking the data from 1970 to 2010, Ajayi (2014) aims to find the determinants of the BOPs deficit in the Nigerian economy. The findings exhibit that an increase in the exchange rate, higher rate of private investment, lower money supply, and the decrease in trade openness expand the ratio of BOPs deficit in Nigeria. Moreover, Hatemi-J et al. (2014), using panel data for 1995-2012, examine the causal relationship between tourism and economic growth in G-7 economies. Applying asymmetric panela causality test (Hatemi-J, 2011), the results confirm the asymmetric causal link only in three economies. i.e., the USA, France, and Germany. Besides, the negative trend in tourism affects the economic output of Italy and Germany adversely. However, not a single economy gets the gain on account of positive shocks in the tourism ratio. Hence, the findings deduce that the tourism-led growth hypothesis (TLGH) remains invalid for G-7 economies. In the context of Costa Rica and Nicaragua, Croes (2014) analyzes the effects of tourism on poverty alleviation using the data for 1980-2010.

Taking the monthly data for 2003-2013, Alp and Genc (2015) checked the link between tourism and the current account deficit (DCA) in Turkey. In the short run, DCA shows no response to tourism. In the long run, however, the tourism industry demonstrates significantly favorable effects on DCA. Similarly, Panahi et al. (2015) inquire about the tourism and economic growth nexus in Turkey, applying the Kalman filter and the time-varying parameter techniques. The evidence affirms that the Turkish economy flourishes as a higher number of tourists visit. Likewise, Ahad (2016) testifies the TLGH in the context of Pakistan, using the time series data from 1988 to 2014. The findings conclude that, in the long run, Pakistan's economy enjoys the benefits as the tourism ratio increases, which validates the TLGH in Pakistan.

Another study by Fareed et al. (2018) examines the TLGH in the context of Thailand, employing the data for 1990-2017. Applying the non-linear ARDL approach, the results support the TLGH as the positive trend in tourism activities leads to enhanced economic growth. Interestingly, the negative trend in the tourism sector also creates a positive impact on Thailand's economy. Suresh et al. (2018) deduce that the Indian exports side enjoys the gains as more tourists visit India. Also, Rasheed et al. (2019) apply the ARDL technique and confirm that tourism plays an essential role in decreasing the harmful effects of BOP deficits in Pakistan

Summing up, a critical review of the ample body of relevant literature reveals that there are many significant determinants of DBOP, such as domestic output, economic growth, exports, exchange rate, private saving, public saving, real effective exchange rate, and terms of trade. However, only a few studies focus on investigating the dynamic association between tourism and the BOPs deficit. Also, no study deploys asymmetric modeling, which provides more detailed and reliable findings as compared to symmetric modeling (Anoruo, 2011; Bildirici and Turkmen, 2015; Freed et al., 2018; Meo et al., 2018). In particular, no study may seek the non-linear link between tourism and DBOP in the context of Pakistan. Hence, the current study presents the contribution to the literature by exploring the asymmetric impact of tourism on the BOPs deficit in Pakistan.

3. Data and Econometric Methodology

A careful review of the relevant literature exhibits that there are several determinants of BOP deficit such as domestic output, economic growth, exports, exchange rate, private saving, public saving, real effective exchange rate, and terms of trade (Panahi et al., 2016; Ahad, 2016). Another essential determinant of the BOPs deficit is tourism (Lorde et al., 2012; Rasheed et al., 2019). Further, the enhancement in the tourism sector increases the number of foreign visitors in the local economy which does expenditures on transportation, accommodation, eating and drinking, etc. All these expenditures are made in globally acceptable currencies that lead to an increase in the earnings of foreign exchange in the local economy. Accordingly, it boosts the level of exports which improves the BOPs by shrinking the deficit in BOPs in the host economy (Yildirim, 2013; Alp and Genc, 2015). Beyond that, we assume the potential asymmetries in the tourism-BOPs deficit; hence we decompose the series of tourism receipts into positive and negative shocks which may affect the BOPs deficit atypically. Similarly, trade balance (BOT) is the crucial component of BOP, and a deficit in BOT brings BOP deficit. In a similar vein, an increase in the real effective

exchange rate makes the exports and imports expensive and cheap, respectively. Consequently, it results in a wider current account deficit that again creates detrimental effects on BOPs (Müller-Plantenberg, 2010). Also, the deficit in fiscal balance generates an inflationary gap in the economy by increasing government expenditures as compared to its revenues. It leads to contracting the exports and escalating the imports; as a result, the economy has to endure the BOPs deficit by increasing payments and decreasing receipts of the country (Bernheim, 1988). Thereby, based on this empirical background, the current study inspects the asymmetric impact of tourism on the BOPs deficit, taking the data for the period of 1980-2019. Further, the data on tourism is extracted from the Pakistan Tourism Development Corporation (PTDC). While the data on real deficit in the balance of payment (RDBOP), real tourism receipts (RTR), deficit in the real balance of trade (RDBOT), the real effective exchange rate (REER), and real deficit in fiscal balance (RDFB) are gathered from the various issues of the Pakistan Economic Survey.

Considering the variables that possess the dynamic association with RDBOP indicated by the ample body of the literature, we formulate the initial form of the model as follows:

$$RDBOP_t = f(RTR_t, RDBOT_t, REER_t, RDFB_t) \quad (1)$$

where $RDBOP$, RTR, $RDBOT$, $REER$, & $RDFB$ represent the real deficit in the balance of payment, real tourism receipts, the deficit in the real balance of trade, real effective exchange rate, and real deficit in fiscal balance, respectively. Further, all the variables are deflated by CPI to attain the variables in the real term.

3.1 Econometric Modeling

To compute the findings and to obtain the proposed aim of the study, we formulate the following equation:

$$RDBOP_t = \theta_0 + \theta_1 RTR_t + \theta_2\, RDBOT_t + \theta_3 REER_t + \theta_4\, RDFB_t + \mu \quad (2)$$

In Equation 2, $\theta_1, \theta_2, \theta_3, \& \theta_4$ are the long-run parameters of the chosen variables, i.e., RTR, $DRBOT$, $REER$, & $RDFB$ respectively. Although, to investigate the potential nonlinear relationship among variables, various methodologies propounded by Engle and Granger (1987), Johansen (1988), and Johansen & Juselius (1990) are being deployed to date. However, all these approaches endure some technical impediments. Firstly, these techniques are unable to estimate relevant findings if all the modeled

variables are $I(0)$ or $I(0)$ & $I(1)$. Secondly, these methodologies do not produce systematic findings if the sample size is small. Lastly, the results may suffer from an additive error due to having more than one step in the estimation procedures of these methods (Chishti, Ullah, et al., 2020; Chista, Iqbal, et al., 2020; Ullah et al., 2020; Fareed et al., 2018).

To tackle all these impediments of previous mythologies, Shin et al. (2014) extend the ARDL techniques developed by Pesaran and Shin (1999) and Pesaran et al. (2001) to the Non-linear ARDL (NARDL) approach. Further, the notable benefits of this approach are: NARDL technique produces efficient outcomes in the case that all the modeled variables are $I(0)$ or $I(0)$ or $I(0)$ & $I(1)$ (Chishti et al., 2021; Chishti, 2021; Arif and Chishti, 2020; Teng et al., 2020). Another advantage is that the NARDL method is a one-step approach that explores more reliable and efficient results and offers another substantial advantage concerning the former versions (Pesaran and Shin, 1999; Pesaran et al., 2001) since it works appropriately in the case of small sample size.

Although the NARDL approach is more valuable than the other techniques of cointegration; however, it is not applicable in the presence of $I(2)$ variable (Ibrahim, 2015; Meo, Chowdhury, et al., 2018; Meo, Khan, et al., 2018). Thereby, we apply Augmented Dickey-Fuller (ADF), Phillips Perron (PP) and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) unit root tests developed by Dickey and Fuller (1979), Phillips and Perron (1988) and Kwiatkowski et al. (1992), respectively, to confirm whether any modeled variable is I(2) or not. These tests, however, cannot aptly cope with the structural breaks, while the datasets with long time periods carry the structural breaks, as several pieces of research have pointed out. Consequently, we drop these methods to avoid any misleading findings. Hence, to handle the possible exigency of structural breaks, we deploy the Zivot-Andrews (ZA) unit root test by Zivot and Andrews (1992).

To the best of our knowledge, all the prior studies on the tourism-RDBOP nexus employ linear models. While the current research deploys a non-linear framework since the asymmetric modeling can explore the possible hidden cointegration among selected series (Granger and Yoon, 2002). Since, equation 2 estimates only long-run nexus, we aim to analyze long as well as short-run impacts. Hence, we alter equation 2 as propounded by Pesaran et al. (2001) by incorporating the error correction model (ECM):

$$\Delta RDBOP_t = \varphi_0 + \sum_{i=1}^{n} \varphi_1 \Delta RDBOP_{t-k} + \sum_{i=0}^{n} \varphi_2 \Delta RTR_{t-k} + \sum_{i=0}^{n} \varphi_3 \Delta RDBOT_{t-k} + \sum_{i=0}^{n} \varphi_4 \Delta REER_{t-k} + \sum_{i=0}^{n} \varphi_5 \Delta RDFB_{t-k} + \theta_1 RDBOP_{t-1} + \theta_2 RTR_{t-1} + \theta_3 RDBOT_{t-1} + \theta_4 REER_{t-1} + \theta_5 RDFB_{t-1} + \mu_t \quad (3)$$

In Equation 6, φ_1, φ_2, φ_3, φ_4, & φ_5 with the sign of summation are the short-run coefficients, while θ_1, θ_2, θ_3, θ_4, θ_5, & μ_t exhibit the long-run coefficients and error term, respectively. Furthermore, to identify cointegration among modelled series, we deploy bound F test, as suggested by Pesaran et al. (2001).

Equation 3 allows to capture only symmetric nexus among selected series, while our study aims to assess the asymmetric effects of tourism on the balance of payment deficit in Pakistan. To expose the modeling approach sustaining the findings of the present study adopted to attain the proposed aim, we move from the simple linear model to the non-linear model. Shin et al. (2014) developed an asymmetric ARDL cointegration methodology, which uses positive and negative partial sum decompositions, allowing for the detection of asymmetric effects both in the long- and the short-run. The specification of the asymmetric ARDL allows the joint analysis of the issues of non-stationarity and non-linearity in the context of an unrestricted error correction model. (Katrakilidis and Trachanas, 2012). To this end, we split the prime regressor of the model, viz, RTR into positive and negative partial sums which demonstrate the positive and negative changes in tourism that are shown as:

$$RTR^+ = \sum_{i=1}^{t} \Delta RTR_i^+ = \sum_{i=1}^{t} max(\Delta RTR_i, 0) \quad (4)$$

$$RTR^- = \sum_{i=1}^{t} \Delta RTR_i^- = \sum_{i=1}^{t} min(\Delta RTR_i, 0) \quad (5)$$

Equations 7 and 8 show the positive and negative trends in tourism. By putting these equations in Equation 3, we get NARDL model that can explore the non-linear impact of tourism on RDBOP, and the final equation is as follows:

$$\Delta RDBOP_t = \varphi_0 + \sum_{i=1}^{n} \varphi_1 \Delta RDBOP_{t-k} + \sum_{i=0}^{n} \varphi_2 \Delta RTR_{t-k}^+ + \sum_{i=0}^{n} \varphi_3 \Delta RTR_{t-k}^- + \sum_{i=0}^{n} \varphi_4 \Delta RDBOT_{t-k} + \sum_{i=0}^{n} \varphi_5 \Delta REER_{t-k} + \sum_{i=0}^{n} \varphi_6 \Delta RDFB_{t-k} + \theta_1 RDBOP_{t-1} + \theta_2 RTR_{t-1}^+ + \theta_3 RTR_{t-1}^- + \theta_4 RDBOT_{t-1} + \theta_5 REER_{t-1} + \theta_6 RDFB_{t-1} + \mu_t \quad (6)$$

Equation 9 is the final version of our econometric model to capture the asymmetric association between RDBOP and tourism and other modeled series for both short as well as long-run periods. Moreover, RTR^+ and $RTR^-$are partial sums of the tourism series that indicate the positive and negative changes in the tourism sector of Pakistan.

Also, to inspect the long-run dynamic association, a bound testing approach by Pesaran et al. (2001) is utilized that can produce reliable outcomes even for equation 9, as pointed out by Shin et al. (2014).

Beyond that, another characteristic of the NARDL approach is that it allows the estimation of asymmetric dynamic multiplier effects for both periods. To this end, we estimate the multiplier effects response of deficit in BOPs to tourism as follows:

$$m_h^+ = \sum_{j=0}^{h} \frac{\partial RDBOP_{t+j}}{\partial RTR_j^+},\ m_h^- = \sum_{j=0}^{h} \frac{\partial RDBOP_{t+j}}{\partial RTR_j^-} \text{ for h=1, 2, 3….}$$

where $m_h^+ \to L_{mi^+}$ as $h \to \infty$, and $m_h^- \to L_{mi^-}$.

With the help of multiplier effects, we can observe how a unit shock in tourism receipts to the deficit in the balance of payments bring an adjustment to new equilibrium from initial equilibrium (Usman et al., 2020).

In order to inspect the asymmetric effects of tourism on the BOPs deficit, we perform the following steps. Firstly, we develop the correlation matrix to confirm the absence of the issue of multicollinearity among the proposed variables. Secondly, apply many traditional unit root tests (Augmented Dickey-Fuller, Phillips Perron, and Kwiatkowski–Phillips–Schmidt–Shin tests) to verify that there is no I (2) variable in our selected model. However, these unit-roots tests possess the low power to detect the possible structural break; therefore, we employ Zivot and Andrews (1992) unit-root test. Thirdly, the F-test is applied to check the exitance of cointegration by using the new small sample critical values. Fourthly, to explore the possible asymmetries in the Tourism-BOPs deficit nexus, we deploy the asymmetric ARDL approach for the proposed model. Additionally, we also derive the asymmetric dynamic multiplier effects of tourism on the deficit in BOPs in this step. Lastly, we perform several diagnostics tests to check whether any econometric issue exists or not.

4. Estimation, Results, and Discussion

The proceeding of the current section is threefold: in the first step, pre-estimation tests; results and discussion in the second step, and in the third step, post-estimation tests are presented.

4.1 Pre-estimation Tests

Table 2 depicts the descriptive characteristics of the modeled series. The notable variation between maximum and minimum values manifests the significant

vicissitudes in the trend of all selected series. Further, the Kurtosis values of RTR, REER, and RDFB are 1.71, 1.90, and 2.19, respectively which are smaller than 3. Therefore, these series are platykurtic. On the other hand, RDBOP and RDBOT carry the 7.60 & 5.47 Kurtosis values which are greater than 3; hence, these series are leptokurtic.

Table 2. Descriptive Statistics

	RDBOP	RTR	RDBOT	REER	RDFB
Mean	-5.009	4.788	-5.809	11.946	-3.237
Median	-4.079	4.928	-3.110	12.335	-3.392
Maximum	5.369	1.139	4.829	23.324	2.991
Minimum	-5.690	0.008	-3.770	5.262	-3.273
Std. Dev.	1.270	3.428	9.319	1.659	1.098
Skewness	-2.108	0.161	-1.656	0.542	-1.008
Kurtosis	7.606	1.715	5.475	1.908	2.198
Jarque-Bera	9.406	4.153	4.567	5.642	2.730
Probability	0	0.125	0	0.059	0.003

Source: Research finding.

Besides, we develop the table of correlation to explore the level of multicollinearity among the modelled series. Table 3 illustrates that all the series in the model carry a modest multicollinearity ratio.

Table 3. Correlation Matrix

	RTR	RDBOT	REER	RDFB
RTR	1.0000			
RDBOT	-0.223	1.0000		
REER	0.3972	-0.4629	1.0000	
RDFB	-0.3301	0.4891	-0.1194	1.0000

Source: Research finding.

Although the NARDL technique produces efficient outcomes, even the modelled variables are $I(0)$ or $I(1)$ or $I(0)$ & $I(1)$. However, the NARDL approach presents misleading outcomes in the case of $I(2)$ variable. Therefore, to avoid this exigency, we apply ADF, PP, and KPSS unit root tests, and the results are presented in Table 4. Further, all the selected series are stationary at I(0) or I(1), and fortunately, not a single series is I(2).

Table 4. Outcome of Unit Root Tests

Tests	RDBOP	RTR	RDBOT	REER	RDFB
ADF Test Statistic					
I(0)	-3.68**	-5.97*	-2.101	-2.511	-2.610
I(1)			-5.89*	-6.14*	-8.19*
PP Test Statistic					
I(0)	-3.68**	-5.91*			
I(1)			-5.88*	-6.17*	-8.53*
KPSS Test Statistic					
I(0)	0.129	0.362***			
I(1)	0.359***		0.963*	0.901*	0.890*

Source: Research finding.

Note: *, **, and *** signify the significance level and the rejection of H_0 at 1%, 5%, and 10%, respectively.

Although, ADF, PP, and KPSS tests are widely employed by researchers to inspect the stationarity of the chosen series, however, the performance of these tests becomes impoverished in the presence of structural breaks (Diebold and Kilian, 2000). To overcome this deficiency, we also deploy Zivot and Andrews (1992) unit root test, and Table 5 provides the details. The findings confirm that there is no I(2) series in the model. Hence, we confidently employ NARDL to model and estimate the dependency of BOPS deficit from tourism.

Bahmani-Oskooee and Bohl (2000) report that the selection of optimal lags results in an accurate long-run association. Furthermore, deploying fewer lags or too many lags may cause invalid estimation or may omit the most relevant information of the model (Stock and Watson, 2012). Therefore, considering the significance of optimal lags, we use only 2 lags, following the SIC information criteria. The outcome of the bounds test, as Table 6 shows, confirms the asymmetric cointegration among the series as the calculated F-value is higher than the critical value of upper bounds at a 1% significance level. Hence, we can estimate the model using the NARDL approach.

Table 5. The Findings of Zivot and Andrews (1992) Test

Tests	**RDBOP**	**RTR**	**RDBOT**	**REER**	**RDFB**
ADF Test Statistic					
I(0)	-1.51	6.73*	-5.31*	-4.31*	-4.37*
I(1)	-4.39*				
Breaks year	2008	1993	2008	2008	1998

Source: Research finding.

Note: * signifies the significance level at 1%.

Table 6. Bound Testing for Nonlinear Cointegration

Model	F-Statistic	Lower bound (95%)	Upper bound (95%)	Decision
In RDBOP/ln (RTR, RDBOT, REER, RDFB)	14.16*	3.17	4.42	Cointegration

Source: Research finding.

Note: * denotes the rejection of H_0, viz, $\rho = 0^+ = 0^- = 0$ at the significance level of 5%. In addition, the bound testing technique by Shin et al. (2014) is employed to calculate the F-statistic values.

4.2 Estimation, Results, and Discussion

After pre-estimation tests, we move towards the estimation of Equation 9. To this end, employing p=q=2 as optimal lags, we apply "general to specific approach" to achieve the final specification of the NARDL technique. Also, Shin et al. (2014) follow this procedure. Moreover, on account of creating the noise in dynamic multipliers, as pointed out by Katrakilidis and Trachanas (2012), we drop the insignificant lagged regressors according to the general to specific approach.

Whereas the short-run findings are concerned as Table 7 reports, we find that the impact of positive shocks in RTR on RDBOP remains insignificant. However, after capturing the structural break impact by a dummy variable, the insignificant impact turns into significant effects. It indicates that a 1% rise in tourism receipts reduces the vicious circle of the deficit by 0.571%. Although Rasheed et al. (2019) investigate the RDBOP-tourism nexus for Pakistan, applying a symmetric ARDL approach, and infer the same finding, our outcome signifies that without integrating the structural break effect, the results of the prior study are not reliable. Hence, the current article presents more reliable findings on account of capturing the effect of a structural break. These results are supported by the economic theory as well as consistent findings reported by Alp and Genc (2015) and Celik et al. (2013). The possible reason is when more international tourists visit the host country and spend money on shopping, traveling, accommodation, etc., it results in an increase in the number of RTRs (classified as exports by Mihalic, 2015); subsequently, bringing improvement in the balance of trade that reduces the RDBOP (Lim, 1997; Toh et al., 2006; Suresh et al., 2018). Further, tourist arrivals may upsurge the probability of trading between economies since tourism flows reduce trade costs. Also, tourism increases the market size which is helpful in the reduction of the trade deficit.

Conversely, the negative shocks in tourism receipts exhibit a positive link with the BOPS deficit after capturing the impact of a structural break, implying a downfall in

tourism receipts by 1% leads to an increase in the deficit in BOPS by 0.363%. It appears due to a decreasing ratio in RTRs when the tourism industry endures downturns which is followed by the issue of deficit in BOPs. Hence, this is the unique finding of our study that indicates the significance of dummy variables to capture the effects of a structural break.

Moreover, RDBOT and REER show significant positive effects on the RDBOP in the short run, implying that a 1% increase in RDBOT and REER generates a deficit in BOPs by 0.020% and 0.110% which turns to 0.137% and 0.221%, respectively, after D-2008. These findings are consistent with the studies by Alp and Gence, 2015; Panahi et al., 2015; Suresh et al., 2018; and Rasheed et al., 2019. Since BOT is a part of the BOPs; therefore, the ratio of RDBOP expands as RDBOT rises. Similarly, an increase in REER makes the exports expensive; consequently, the economy of Pakistan has to face the harmful repercussions of RDBOP. Besides, the dynamic short-run impact of fiscal deficit remains insignificant.

Moreover, the results reveal a structural break in 2008 that had a significantly positive impact on RDBOP. It may be on account of the world financial crisis (2008), which affected the world economy adversely. Further, the significance of all the regressors remains the same after the structural break except RDFB which demonstrates a significantly positive association with the deficit in the BOPs. It signifies that a deficit in FB by 1% deteriorates the BOPs by 0.100%. The value of the ECM is -0.55 which indicates that the speed of adjustment over each year towards the long-run equilibrium is 55%.

As for the long-run outcome, Table 8 reports that the economy of Pakistan enjoys an improvement in BOPs as more international tourists visit. It indicates that the deleterious repercussions of a deficit in BOPs reduce by 1.631% as tourism receipts increase by 1%. However, the downward trend in tourism exacerbates the problem of BOPs deficit, implying that the negative shocks from tourism receipts increase the deficit by 0.431%. Furthermore, all the other regressors, i.e., RDBOT, REER, and RDFB have a significantly positive asymmetric association with the deficit in BOPs. It indicates that a 1% rise in RDBOT, REER, and RDFB leads to an increase in the exigency of BOPs deficit by 0.392%, 0.454%, and 0.091%, respectively. Again, the long-run positive and negative of tourism receipts carry significant impacts on RDBOP. Also, the variables of REER and RDFB significantly explain the dependent variable, which remains insignificant in the study by Rasheed et al. (2019). Therefore, the findings of the NARDL approach in the current article are more explanatory as compared to the outcome of symmetric ARDL in a study by Rasheed et al. (2019).

Summing up, the results from the NARDL model confirm that asymmetries exist in the relationships between tourism and RDBOP in Pakistan in the long run; the impact of positive shocks is stronger than that of negative shocks from tourism.

Table 7. Short-run Estimates

Variables	Coefficients	Std. error	T-ratio	Prob
RDBOP_{t-1}	0.791	0.129	6.114	0.000
RTR_t^{+}	-0.411	0.260	-1.580	0.137
RTR_t^{-}	-0.231	0.166	-1.391	0.163
RDBOT_{t-1}	0.020	0.005	3.890	0.000
REER_{t-1}	0.110	0.023	4.712	0.000
RDFB_{t-1}	0.098	0.089	1.100	0.261
D-2008	0.209	0.102	2.049	0.062
$D\text{RTR}_t^{+}$	-0.571	0.080	-7.100	0.000
$DRTR_t^{-}$	0.363	0.154	2.357	0.000
$D\text{RDBOT}_{t-1}$	0.137	0.065	2.100	0.054
$D\text{REER}_{t-1}$	0.221	0.049	4.442	0.000
DRDFB_{t-1}	0.100	0.053	1.881	0.090
ECM_{t-1}	-0.551	0.090	-6.112	0.000

Source: Research finding.

Note: + & - indicate the partial sum of positive and negative trends in the series.

Table 8. Long-run Estimates

Variables	Coefficients	Std. error	T-ratio	Prob
RTR_t^{+}	-1.631	0.450	-3.621	0.000
RTR_t^{-}	0.431	0.216	1.990	0.053
RDBOT_t	0.392	0.093	4.177	0.000
REER_t	0.454	0.231	1.960	0.050
RDFB_t	0.091	0.018	4.880	0.000
C	-9.105	1.284	-7.091	0.000
R^2	0.81	F-statistic	7.991	0.000

Source: Research finding.

Note: + & - signify the partial sum of positive and negative trends in the series.

4.3 Diagnostic Tests

To check the significance and credibility of our findings, we also perform various diagnostic tests, and the outcome is documented in Table 10. As the p-values of B-P

Godfrey, LM, Ramsey RESET, and Jarque-Bera are 0.682, 0.391, 0.593, and 0.436, respectively; it means that our model is free of autocorrelation & heteroscedasticity, correctly specified and has normally distributed error terms, respectively. Additionally, we deploy the CUSUM and CUSUMQ tests that report the stability of parameters in the model (See Figures 1 and 2). Besides, Figure 4 exhibits the multipliers effects of tourism receipts on the balance of payment deficit.

Table 9. Outcome of Diagnostic Tests

Test	**Econometric Issue**	**P-value**	**Decision**
B-P Godfrey test	Heteroscedasticity	0.682	No
LM test	Autocorrelation	0.391	No
Ramsey RESET test	Model Specification	0.593	Correct
Jarque- Bera test	Normality	0.436	OK
CUSUM	Stability	-	Stable
CUSUMQ	Stability	-	Stable

Source: Research finding.

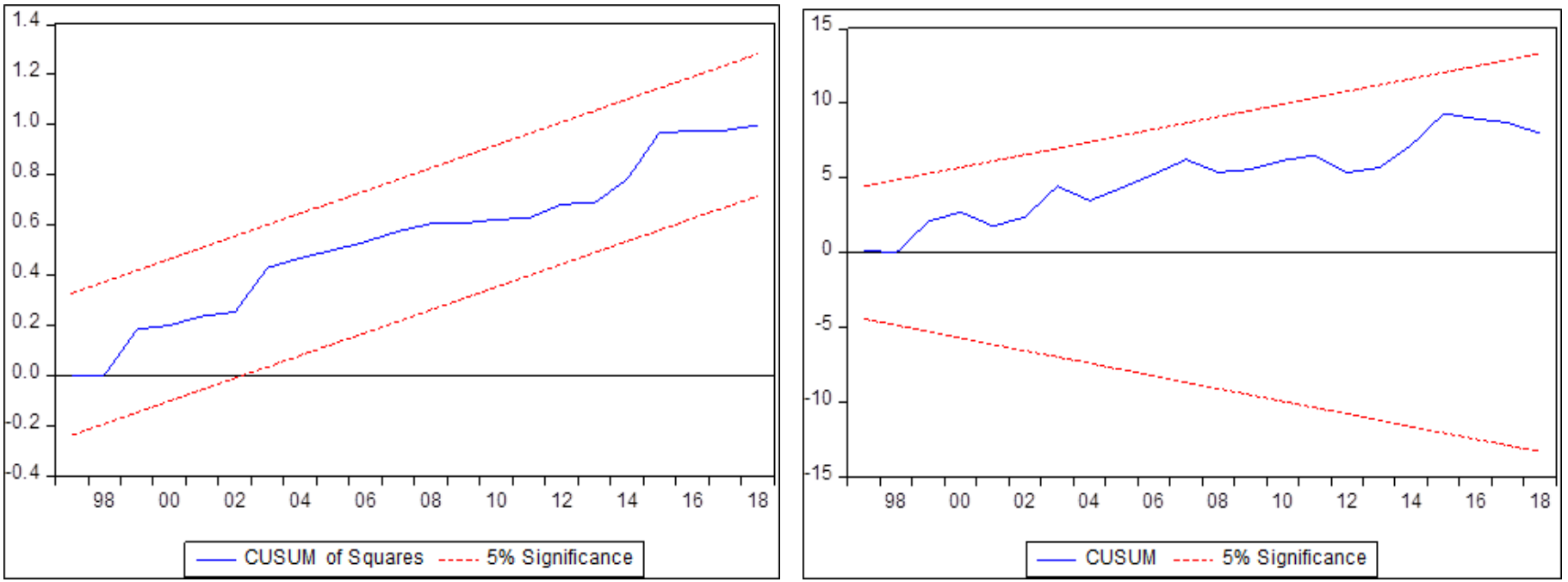

Figure 3. Plots of CUSUM & CUSUMQ Tests
Source: Research finding.

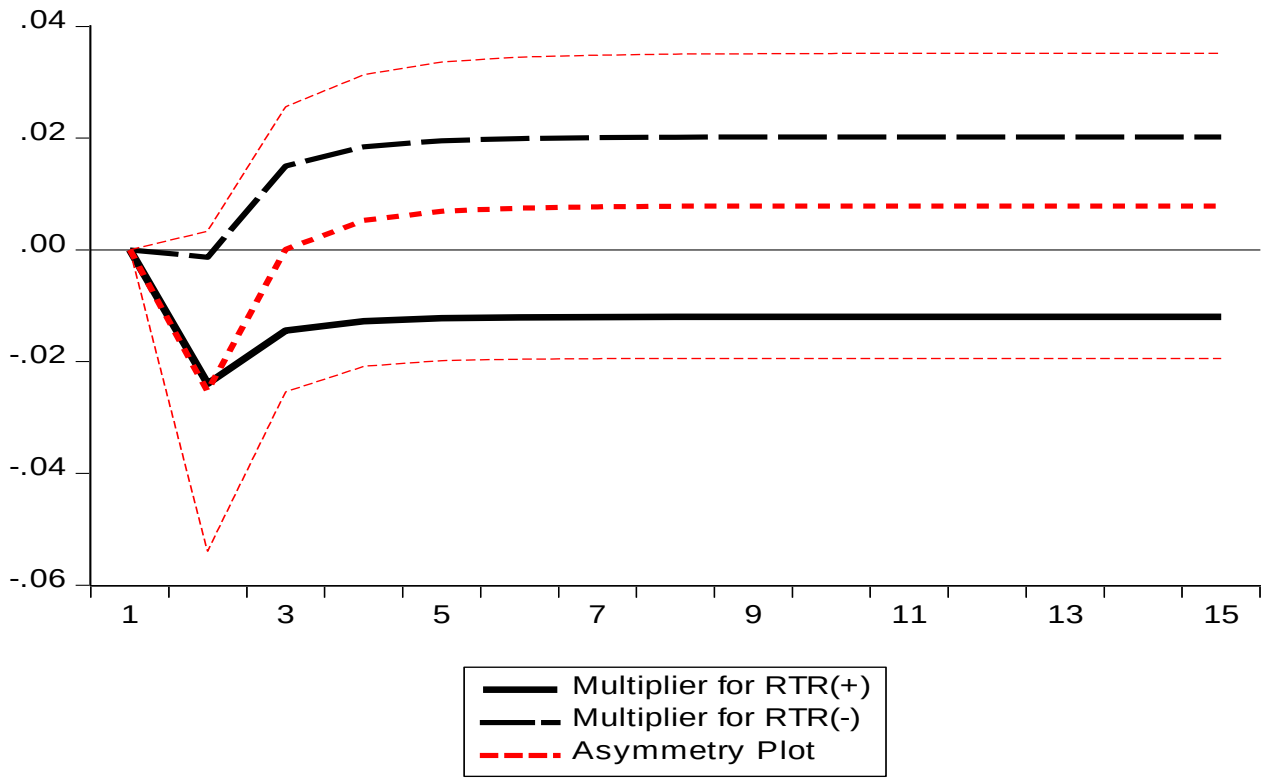

Figure 4. The Multiplier Effects of RTR (Tourism Receipts) on RDBOP (Deficit in Balance of Payment)
Source: Research finding.
Note: The magnitude of the effects is shown on the vertical axis, while the horizontal axis represents the years required to obtain the long-run equilibrium.

5. Conclusion

The current study endeavors to explore the asymmetric impact of tourism on the deficit in BOPs in the context of Pakistan, employing the NARDL technique. To this end, we use the data for 1976-2019 and infer the long-run dynamic association among the modeled series, deploying the bound testing approach. The results of Zivot and Andrews's (1992) test divulge the importance and significance of the structural break test to obtain robust results. Further, the study confirms that the positive trend in the tourism sector presents a significant contribution to the Pakistan economy by decreasing the deficit in the real BOPs in both periods. Conversely, the negative trend in tourism leads to an increase in the deficit in BOPs. Moreover, the study also reveals that, in the short run as well as in the long run, the deficit in the balance of trade, real effective exchange rate, and fiscal balance deficit carry a direct association with RDBOP.

Considering the results of the current study, we suggest the following steps that the government could take to ameliorate the dreadful condition of BOPs in Pakistan. As tourism plays a significant role in improving the worst conditions of BOPs, it is suggested that the government should consider implementing such measures that encourage the tourism sector in Pakistan. In this regard, the security of the tourists should be ensured, law and order should be improved, and better facilities of transportation, communication, and infrastructure, especially in the Northern areas of the country, should be provided to foster international tourism.

Besides, the deficit in balance also possesses notable importance since BOPs worsen on account of the deficit in the balance of trade. Therefore, it is needed to devise such policies that promote net exports. To achieve this target, the exchange rate and the import of luxurious products should be decreased. Also, domestic producers should be encouraged to produce competitive products to export to the international market and to substitute imports. The possible ways for this purpose are an export subsidy, production subsidy, tax breaks, etc.

As the real effective exchange rate has a direct relationship with RDBOP, it is recommended to adopt strategies to control the exchange rate in such a way that encourages net exports. Additionally, fiscal balance also plays a vital role in enhancing BOPs. However, it is facing the exigency of deficit for an extended period. Hence it is proposed to improve fiscal balance firstly by investing in socially attractive, profitable, and productive sectors and by balancing resources and expenditures. Consequently, the melioration in fiscal balance brings improvement in the BOPs.

Finally, our findings are followed by some limitations which may open multiple avenues for further research. First, although the current article inspects the asymmetric

effects of tourism on BOPs deficit, the model can be further developed by including some other regressors such as globalization, trade openness, and foreign direct investment. Second, Future research can be conducted for multiple economies for comparison purposes. Lastly, Quantile regression analysis can also be done to explore the effects of tourism and other regressors in different quantiles.

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