Research Article

Does Trade Liberalization Improve Trade Balance in Pakistan?

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Abstract

This article examines the impact of trade liberalization, that is, reduction of tariff and non-tariff barriers on trade balance, in Pakistan over the period 1982–2013. The results reveal that reduction of average effective tariff rate improves trade balance in the short run, while lowering of non-tariff barriers deteriorates trade balance in the long run as well as in the short run. The analysis also suggests that depreciation of real effective exchange rate and foreign income causes an improvement in the trade balance, whereas domestic income deteriorates it. The negative association between the reduction in non-tariff barriers and trade balance worsens sustainability of current account of the balance of payments in Pakistan.

JEL: F10, F32, C22

Keywords

Trade liberalization, trade balance, real effective exchange rate, bounds test of co-integration

Introduction

During the 1950s, 1960s and 1970s, many countries incorporated tariffs and non-tariff barriers (NTBs) as integral part of their industrialization and development strategy (Mukherjee & Chand, 2016).[1] Santos-Paulino and Thirlwall (2004) noted

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that protected trade and anti-export bias will reduce growth of exports. Since the late 1980s and early 1990s, however, many developing countries have implemented trade reforms either unilaterally or as part of multilateral initiatives along with the General Agreement on Tariffs and Trade (GATT), World Bank and International Monetary Fund (IMF). This shift towards trade liberalization has generated substantial literature which explores the impact of trade reforms on volume of trade and economic growth. The proponents of free trade believed that trade liberalization would reduce distortions that protect uncompetitive sectors and reallocate resources to more competitive sectors, which enhance efficiency gains and lower prices for consumers. Free trade allows consumers to consume better quality products at cheaper prices and thus improves human welfare (Santos-Paulino & Thirlwall, 2004). Further, trade liberalization may promote economic growth from the supply side but, if the balance of payments worsens, growth may adversely affected from the demand side because the payments deficits resulting from liberalization are unsustainable and not easily rectified by relative price changes (Khan & Zahler, 1985). According to the endogenous growth and standard partial equilibrium trade theories, trade liberalization can play central role in accelerating exports through technology transfers. Under liberalization, increase in imports can promote technology advances through the purchase of capital goods from abroad. Technological advances in import-competing sector, on the other hand, could lead to overall reduction in the volume of trade in terms of reduction of imports and consequently an increase in the trade balance (Husted & Malvin, 2001). Several studies (e.g., Singh, 2001; Stiglitz, 2000, among others) noted that implementation of trade liberalization policy can boost exports relative to imports, and reduce the negative effect of net exports on GDP. The implications of trade liberalization for the trade balance, however, are uncertain due to its dependence on the growth of exports and imports as well as the prices of traded goods (Santos-Paulino & Thirlwall, 2004). The opponents of trade liberalization believed that reduction of import duties contributes to an excess of imports over exports and hence the trade deficit. Furthermore, trade liberalization can raise unemployment and wage inequality in developed countries, whereas it may increase exploitations of workers, poverty and global inequality, and degradation of the environment in low income countries (Froyen, 1996). Despite the benefits of trade liberalization, developing countries are reluctant to liberalize their trade regime as it will worsening their trade balance because imports will increase more than exports after trade liberalization. Krueger (1978) argued that import flows respond more rapidly than exports to trade liberalization, causing temporary trade imbalances.

Limited literature is available on the relationship between trade liberalization and trade balance or balance of payments with mixed results. For example, Khan and Zahler (1985) found that the volume of trade increased but the current account of the balance of payments went into severe deficit following the trade liberalization, and that capital flows generated by interest rate differentials were insufficient to finance deficit without adjustment. Ostry and Rose (1992) found insignificant relationship between tariff changes and trade balance, while UNCTAD (1999) obtained a significant negative relationship between trade

liberalization and trade balance. Santos-Paulino and Thirlwall (2004) found that trade liberalization stimulated exports but raised import growth by more, leading to a worsening of the trade balance. However, Ju, Wu and Zeng (2010) found mixed results with regard to trade liberalization and trade balance.

Pakistan is facing recurring trade and current account deficits over the past four decades. The main problem is likely to come from under-performance in the growth of exports. This has led to serious implications for balance of payments.[2] In order to avoid recurrent trade and current account deficits, the Government of Pakistan (GoP) embarked on extensive measures to liberalize its trade and investment regimes in the late 1980s. The main objective of liberalization was to enhance industrial efficiency, attract foreign direct investment and stimulate exports growth through a gradual reduction in tariff and NTBs.[3]

A small number of empirical studies are available with reference to Pakistan that have investigated the impact of trade liberalization on trade balance or current account of the balance of payments (e.g., Jaffari, 2006; Yasmin, 2012, among others). The main drawback of these studies is that they used sum of exports plus imports as a percentage of the GDP to measure trade liberalization. Both exports and imports, however, are directly impacted by trade openness, meaning that lowering import duties results in a more trade.[4] This creates potential problem of endogeneity, which was not addressed by previous studies.

The main objective of this article is to examine the impact of trade liberalization on trade balance in Pakistan for the period 1982–2013. The present article contributes to the existing literature in two ways: first, it uses average effective tariff rate as an indicator of trade liberalization rather than sum of exports and imports as a percentage of GDP. This has the benefit of being a direct measure of trade liberalization and more relevant than sum of exports and imports relative to GDP. Further, simplification of NTBs is also incorporated as another measure of trade liberalization. Second, it applies the ARDL technique, which is applicable whether variables under study are integrated of I(0), I(1) or mixed integration.

The rest of the article is organized as follows. The next section provides an overview of Pakistan's trade policy. The third section reviews empirical literature. The fourth section deals with econometric model, data and estimation methodology. Empirical findings are discussed in the fifth section, while concluding remarks are given in the last section.

An Overview of Trade Policy Regime in Pakistan

There is general consensus among the policymakers that economies with liberal trade policies show stronger economic growth. Trade liberalization increases trade openness; brings domestic prices closer with international prices; foster domestic market competition; facilitates technology diffusion and upgradation and boosts exports performance and economic growth. The theoretical justification of free trade and benefits of international specialization have been discussed

by Bhagwati (1978) and Krueger (1978). From 1950s to 1980s, many developing countries pursued inward-looking trade policies as an integral part of their development strategy. The main features of this policy regime was high tariff and a range of NTBs such as industrial licensing and controls at home coupled with import and exchange controls externally (McCartney, 2015). However, import substitution policy regime was an unsuccessful across developing countries. This evidence provided justification for outward-looking trade policies in many developing countries including Pakistan in the late 1980s and early 1990s. The main objective of outward-looking policies was to increase competitive pressure on incumbents by easing the entry of new producers; encourage more imports of inputs and intermediate goods; transfer of know-how; and increase positive externalities in the form of technology transfer and productivity improvements (Mukherjee & Chanda, 2016). To achieve greater openness through import liberalization, export promotion and competitive exchange rate policies, Pakistan has rationalized tariff structure, tariff level and tariff dispersion, and removed quantitative and administrative restrictions. Under World Trade Organization (WTO) regime, Pakistan abolished import licensing regimes, import quotas and used tariff as main instrument of trade policy.

Over the years, Pakistan has made a significant progress in liberalizing its trade and investment regime through gradual reduction of tariff rates, number of tariff lines and removal of NTBs. For instance, the maximum tariff rate on imports fell from 225 per cent to 34 per cent in 2014. The average most favoured nations (MFN) applied tariff rate was cut down from 66 per cent in 1991 to 13.62 per cent in 2014. All but 45 tariff lines are ad valorem. Average effective tariff rate has fallen from 52.4 per cent in 1984 to 13.4 per cent in 2014, which was 50 per cent in early 1980s and around 40 per cent in the beginning of 1998 (see Figure 1).

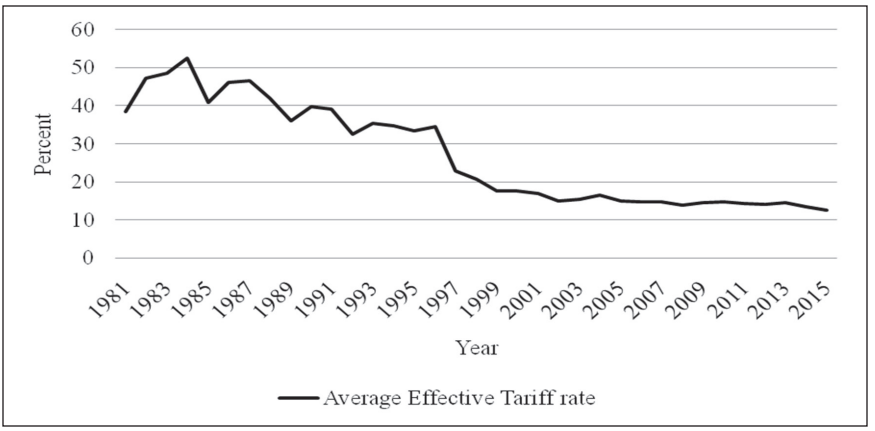

Figure 1. Average Effective Tariff Rate in Pakistan

Source: CBR/FBR Yearbook (various issues), Federal Board of Revenue, Government of Pakistan.

The number of custom duty slabs fell from 14 in 1996–1997 to 5 (i.e., 5, 10, 15, 20 and 25 per cent) in 2008, while other quantitative restrictions on imports were lifted except for those items related to security, health, public morals, religion and culture. The simple average tariff rate (unweighted) on industrial products decreased from 20.62 per cent in 2001 to 13.9 per cent in 2014, while the number of SROs has fallen from 35 in 2002 to 14 in 2008.[5] All the para-tariffs were merged in to the statutory tariff regime and import duties on 4,000 items were reduced. Besides, a number of laws were promulgated to bring trade regime in line with the WTO regulations.[6] Furthermore, the government trading monopolies and interventions were eliminated in the agriculture sector to boost exports.

Besides, Pakistan liberalized its exchange rate and investment regime to integrate domestic economy with the rest of the global economy. For example, restrictions on the capital transactions were partially relaxed and foreign borrowing and outward investments were allowed in 1994. Full convertibility of Pak-Rupee was established on current international transactions in 1994. Exchange rate system was unified in 1999, interbank foreign exchange market was established in 2000 and shifted over form managed to free floating exchange rate system in July 2000. In 2013, the GoP launched Strategic Trade Policy Framework (STPF) 2012–2015 to enhance Pakistan's export competitiveness and to increase Pakistan's cumulative exports to US$95 billion during the period 2012–2015. Furthermore, in STPF the GoP is committed to strengthen trade sector regulations, governance and institutional capacity and to enhance exports competitiveness. Despite these measures, the growth of exports in 2000s was only 9.9 per cent as compared to 8.5 per cent in the 1980s. This reveals weak performance of Pakistan's trade as compared to other developing countries.[7] The main reason of low level of Pakistan's exports could be that Pakistan is still pursuing some form of inward-looking trade policy.

Unfortunately, the reform process backtracked after the onset of global financial crisis (GFC) in 2008.[8] For example, maximum tariff rate increased from 25 per cent in 2009 to 35 per cent in 2013; average effective tariff rate increased from 14 per cent in 2008 to 14.8 per cent in 2010, and thereafter it showed declining trend and reached to 14.64 per cent by 2014. Number of custom duty slabs increased from 5 to 9 in 2010. These trade-reducing measures reversed trade to GDP ratio from 35.59 per cent in 2008 to 30.90 per cent by 2014.

Besides, Pakistan has been facing persistent trade and current account deficits for last four decades with an exception of 2001–2004 and 2011. In 2008, the current account deficit rose to a record high level of 8.2 per cent of the GDP and it turns into surplus (0.1 per cent of the GDP) in 2011. The improvement in current account deficit can be attributed to a more than halving of services deficit, considerable increase in worker remittances and higher growth of exports than imports (WTO, 2015). Thereafter, it turns into deficit and reached to 1.3 per cent of the GDP in 2014. The trade deficit as percentage of GDP fell from 12.3 per cent in 2008 to 8.2 per cent in 2014. This situation has become alarming because the costs associated with large trade and current account deficits are much severe. Figure 2 depicts the trend of trade and current account deficits over the period 1982–2014.

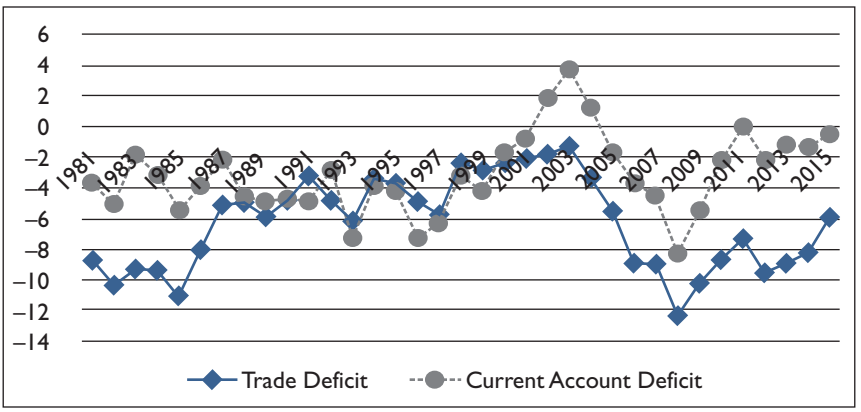

Figure 2. Trade Deficit and Current Account Deficit of Pakistan (Share in GDP)

Source: Pakistan Economic Survey-Supplement (2008) and Pakistan Economic Survey (2013–14), Government of Pakistan.

Table 1. Comparison of Average MFN Tariff Duties on Industrial Goods (2015)

Commodity Group	China	India	Indonesia	Malaysia	Sri Lanka	Pakistan
Fish and fish products	10.6	29.9	5.9	0.7	15.1	10.7
Mineral and metals	7.8	7.9	6.4	7.6	7.7	11.5
Chemicals	6.7	7.9	5.1	2.7	3.0	9.0
Wood papers, etc.	4.5	9.0	4.4	10.18	11.7	13.9
Textiles	9.6	11.8	9.2	8.8	3.3	14.7
Clothing	16.0	12.3	14.4	0.2	14.7	19.9
Leather, footwear, etc.	13.5	10.1	8.6	10.7	15.0	13.7
Non-electrical machinery	8.2	7.1	4.8	3.5	3.0	8.6
Electrical machinery	9.0	7.2	5.7	4.3	7.1	13.6
Transport equipments	11.4	9.4	9.8	11.1	6.2	24.1
Manufactures, n.e.s.	11.6	8.8	6.7	4.5	9.1	11.9

Source: WTO (2016).
Note: n.e.s. = not elsewhere specialized.

In 2012, Pakistan re-started trade liberalization but many restrictions are still in place, particularly, tariff rates on key exports of Pakistan's competitors are significantly low (Table 1).

Besides, import tariff in developed countries are lowest as compared to Pakistan. For example, simple average MFN applied tariff rates in China, Australia, New Zealand, Indonesia, Malaysia, Turkey and Sri Lanka are below 11 per cent, while imports are duty free in Singapore (Table 2). In contrast, simple average MFN applied tariff rate was 13.9 per cent in Bangladesh, India (13.4 per cent) and Pakistan (12.3 per cent) in 2015.

Table 2. Import Tariffs in Selected Asia-Pacific Countries (2015)

Country	Year	Average MFN Tariff			Binding Coverage
		Agriculture	Non-agriculture	Total	
China	2015	15.6	9.0	10.0	100.0
Australia	2014	2.4	4.1	2.5	97.1
New Zealand	2015	1.4	2.2	2.0	100.0
Indonesia	2014	7.6	6.7	6.9	96.3
Malaysia	2014	9.4	5.5	6.1	84.3
Philippines	2015	9.9	5.7	6.3	67.0
Turkey	2015	42.7	5.5	10.8	50.3
Singapore	2015	1.1	0.0	0.2	69.6
Bangladesh	2015	16.9	13.4	13.9	15.5
India	2015	32.7	10.1	13.4	74.4
Pakistan	2015	13.3	13.2	12.3	98.7
Sri Lanka	2015	23.7	6.9	9.3	38.3

Source: WTO (2016), World Tariff Profile 2016.

High tariff would reduce the demand for Pakistani products relative to its competitors which eventually results in a persistent trade deficit.

Overall, to contain trade deficit and increase value of exports relative to imports, Pakistan must learn from the trade policies adopted by Turkey, Indonesia and Malaysia to achieve the same levels of trade and development.

Literature Review

Over the past three decades, global trade liberalization has generated ample evidence associated with its impact on economic growth. For example, Dollar (1992), Sachs and Warner (1995), Edwards (1998) and Yanikkaya (2003) found positive association between trade liberalization and productivity growth. In contrast, Rodriguez and Rodrik (2001) showed that trade openness does not guarantee the faster growth. They concluded that lowering of trade barriers coupled with non-discriminatory exchange rate system, prudent monetary and fiscal policies and corruption-free economic policies promoted economic growth.

With regard to the impact of trade liberalization on trade balance, current account balance and balance of payments, a few studies are available. For instance, Khan and Zahler (1985) concluded that following trade liberalization the volume of trade increased but current account and balance of payments went into deficit. Hence, capital flows generated by interest rate differentials were insufficient to finance deficits without adjustment. Khan and Knight (1988) concluded that import compression is harmful for export performance in developing countries, leading to low level of foreign exchange availability which leads to further imports compression.[9]

Ostry and Rose (1992) found insignificant effect of tariff changes on trade balance. Studies, inter alia, UNCTAD (1999), Parikh (2004) and Tokarick (2006) found negative effect of trade liberalization on trade balance, current account balance and export performance, while Santos-Paulino and Thirlwall (2004) and Ju, Wu & Zeng (2010) found that trade liberalization stimulated export growth but raised import growth by more than export growth, leading to worsen overall trade balance.

The empirical literature with regard to Pakistan can be divided into two groups: the first group of studies has tested Marshall-Lerner (ML) condition and J-curve phenomenon and found mixed results. For example, Bahmani-Oskooee (1992) examined the J-curve phenomenon and found inconclusive evidence. Hasan and Khan (1994) found supportive evidence for ML condition, while Akhtar and Malik (2000) reported that real devaluation worsen trade balance with respect to the United States and Germany, and favour trade balance with UK and Japan. Aftab and Aurangzeb (2002) found supportive evidence for ML condition in the long run and the J-curve phenomenon in the short run, while Bahmani-Oskooee and Cheema (2009) and Shahbaz, Awan and Ahmad (2011) found no evidence of J-curve phenomenon in Pakistan.

The second group of studies, inter alia, by Jaffari (2006), Yasmin (2012) and Zakaria (2014) have tested the impact of trade liberalization on trade balance and found mixed results. For instance, Jaffari (2006) and Zakaria (2014) concluded that trade openness deteriorates current account of the balance payments in Pakistan, while Yasmin (2012) found positive long-run relationship between trade liberalization and trade balance.

Majority of above cited studies used sum of exports and imports relative to GDP as a measure of trade liberalization. To the best of our knowledge, none of these studies used average effective tariff rate and relaxation of NTBs as an instrument of trade liberalization.

Model Specification, Data and Methodology

The Model

Ostry and Rose (1992) provide theoretical literature on the macroeconomic effects of tariffs on trade balance or current account of the balance of payments. They argued that increase in tariff rate cannot unambiguously associated with the movements in the trade balance because trade balance may rise, fall or remain unchanged after an exogenous tariff changes. Branson (1987) pointed out that tariff increases reduce the size of American trade deficit. The theoretical literature identified three approaches viz. the elasticity approach (Robinson, 1937), absorption approach (Alexander, 1952) and the monetary approach (Johnson, 1972). The elasticity approach hypothesized that the effect of trade liberalization on trade balance depends on the extent to which import and export duties change and on the price elasticities of imports and exports. Measuring trade balance in terms of foreign currency, export earnings will increase if the price elasticity of demand is greater than unity and import payments will decrease if the price elasticity is greater than

zero (Santos-Paulino & Thirlwall, 2004).[10] This approach, however, ignores some important features of trade liberalization that do not involve price changes. The absorption approach argued that the effect of trade liberalization on trade balance depends on how real income is affected relative to real absorption. In the monetary approach, the outcome of liberalization depends on how the real demand for money changes relative to the real supply. Besides, intertemporal approach can also be used to determine the effect of tariff changes on trade balance. This approach analyzes the temporary and permanent effect of import and export tariffs on trade balance. The main drawback of this approach, however, is that it is based on some restrictive assumptions. Overall, the effect of tariff liberalization on trade balance depends on the behaviour of exchange rates, values of various elasticities, the degree of capital mobility and whether the tariff shock perceived as temporary or permanent.

Following Santos-Paulino and Thirlwall (2004), we specify the following model to study the impact of trade liberalization on trade balance in Pakistan:[11]

$$TB_t = c_0 + c_1 LREER_t + c_2 LY_t + c_3 LY_t^f + c_4 LTOT_t + c_5 LETR_t + c_6 LIB_t + e_t \quad (1)$$

where L stands for logarithmic value, TB_t denotes trade balance relative to the GDP; Y_t and Y_t^f are the domestic and foreign real incomes, respectively; $REER_t$ is the trade weighted real effective exchange rate wherein an increase implies depreciation. TOT_t and ETR_t are the terms of trade and average effective tariff rate that measures the impact of relative price changes and trade liberalization on trade balance respectively, while LIB_t is a dummy variable that capture the effect of simplification of NTBs on trade balance. As pointed out by Wacziarg and Welch (2008) that Pakistan enforced WTO regulations in 2001. Therefore, LIB_t was assigned value 1 for the period 2001–2013 and zero for 1982–2000, while e_t is error term. Balassa (1982) showed that anti-export bias can be reduced by eliminating both tariff and NTBs. Therefore, in order to measure trade liberalization, the present study uses both ETR_t and LIB_t.

Equation (1) predicts that depreciation of $REER_t$ would improve the competitiveness of domestic exports in the international market and lower import values thus improving trade balance. However, the effect of exchange rate depreciation on trade balance depends on the ML condition which implies that unless the sum of the demand elasticities of exports and imports are greater than unity, the currency depreciation may or may not boost trade and current account balance. Furthermore, the sign of $REER_t$ depends on the nature of exports to and imports from the trade partners. Therefore, c_1 can either take positive or negative value.

An increase in Y_t is expected to deteriorate trade deficit as high income requires greater investment and inputs such as machinery and energy. An increase in Y_t prompt demand for imports of consumer and capital goods, which would deteriorate trade and current account balances (Jaffari, 2006). Hence, the expected sign of c_2 would be negative. Similarly, Y_t^f plays an opposite role to its domestic counterpart in the adjustment process of trade balance. Therefore, c_3 could take positive value. TOT_t could affect trade balance positively or negatively. An improvements in TOT_t causes larger earnings for the same level of exports, thus

affecting trade balance and current account balance positively. On the other hand, TOT_t could influence trade balance negatively if rise in price of exports could shrink demand for exports and expand demand for imports. Hence, the expected sign of c_4 is either positive or negative. Reduction of ETR_t may improve or deteriorate trade balance, depending whether the tariff reduction has increased the volume of exports or imports. In other words, trade balance may rise, fall or remains unchanged after exogenous tariff changes (Ostry & Rose, 1992). Hence, the expected sign of c_5 is negative, positive or insignificant. Finally, it is expected that LIB_t deteriorate the trade balance because lowering of NTBs increases the value of imports. Hence c_6 is expected to be negative.

Data Sources

The present study uses annual data over the period 1982–2013.[12] Trade balance is defined as the difference between merchandised exports (free on board—fob) and imports (cost, insurance, fright—cif), and deflated by nominal gross domestic product (GDP).[13] Real income is proxied by GDP at constant factor cost.[14] Data on trade balance, nominal GDP and real GDP are taken from the Pakistan Economic Survey-Supplement (GoP 2008) and Pakistan Economic Survey (2013–2014, GoP, 2014). Data on $REER_t$ with 2005 as base year and US GDP are collected from the International Financial Statistics, *IFS-CD ROM* (2013) and updated from the Monthly IFS Bulletins. An increase in $REER_t$ indicates a real depreciation.[15] Finally, data on ETR_t are collected from the Federal Board of Revenues, GoP. All the variables are expressed in logarithmic form except for trade balance relative to GDP.

Unit Root Tests

To examine the stationarity properties of each variable, we employed the Augmented Dickey-Fuller (ADF) and Phillips–Perron (PP) unit root tests at levels and first differenced variables. If both tests reinforce each other, then one can have confidence on the results. The optimal lag was selected on the basis of Schwartz Information Criterion (SIC) as suggested by Pesaran and Shin (1997). Table 3 reports the results.

It is evident from the ADF test that all the variables are non-stationary at levels and stationary at first difference except for the $REER_t$, which is levels stationary. The PP test is consistent with the results of ADF test; the only difference is that according to the PP test $REER_t$ and Y_t are levels stationary. The results from the ADF-GLS test, however, reveal that all the variables are non-stationary at levels and stationary at first difference. This inconsistency in the results cast doubts on the suitability of unit root tests. Perron (1989) showed that conventional unit root tests lacks power to reject the null hypothesis of unit root in the presence of structural breaks. To account for structural breaks, we apply Vogelsang and Perron (1998) minimum ADF t-statistic for the level of the variables. Table 4 reports the results.

Table 3. Unit Root Tests for Stationarity

	Panel A: Unit Root Tests at Log Levels of the Variables							
	ADF Test			DF-GLS Test			PP Test	
Variables	SIC Lag	t-Stat	Critical Values at 5 Per cent	SIC Lag	t-Stat	Critical Values at 5 Per cent	t-Stat	Critical Values at 5 Per cent
TB_t	0	–1.82[a]	–2.96	1	–1.72[a]	–2.43	–1.60[a]	–2.93
LREER	0	–3.63[a]	–2.93	0	–0.92[a]	–2.47	–6.48[a]	–2.93
LY_t	0	–2.53[a]	–2.93	1	–1.76[b]	–3.39	–3.24[a]	–2.93
LY_t^f	0	–2.76[a]	–2.93	0	–1.38[b]	–3.33	–4.80[a]	–2.93
$LETR_t$	0	–0.27[a]	–2.93	0	–1.68[c]	–2.00	–0.11[a]	–2.93
$LTOT_t$	0	–0.99[c]	–2.00	0	–0.99[c]	–2.00	–0.99[c]	–2.00
	Panel B: Unit Root Tests at First Differenced of the Variables							
ΔTB_t	1	–5.89[a]	–2.93	0	–4.96[a]	–2.39	–5.46[a]	–2.96
$\Delta LREER$	1	–3.82[a]	–2.96	0	–2.61[a]	–2.34	–5.31[a]	–2.91
ΔLY_t	0	–3.96[a]	–2.93	0	–3.59[a]	–2.47	–3.80[a]	–2.93
ΔLY_t^f	1	–5.64[a]	–2.93	0	–3.77[a]	–2.47	–5.74[a]	–2.93
$\Delta LETR_t$	0	–6.20[a]	–2.93	0	–5.75[c]	–2.00	–6.25[a]	–2.93
$\Delta LTOT_t$	0	–5.16[c]	–1.91	0	–5.16[c]	–1.91	–5.25[ac]	–1.96

Source: Authors' own calculation.

Notes: [a]Model without intercept. [b]Model with intercept and trend. [c]Model with no intercept and trend. The 95 per cent critical values are simulated using 1,000 replications.

Table 4. Unit Root with Structural Break

	Model 1: Trending Data with Intercept Break		Model 2: Trending Data with Intercept and Trend Break	
Series	Test statistic	TB	Test statistic	TB
TB_t	–3.22 (0)	1993	–3.54 (0)	2005
LREER	–3.63 (0)	2012	–2.04 (0)	2004
LY_t	–4.93 (0)**	2003	–2.99 (1)	1984
LY_t^f	–3.53 (6)	1988	–2.96 (0)	1992
$LETR_t$	–4.46 (1)**	1996	–8.30 (0)*	1996
$LTOT_t$	–2.73 (0)	1998	–3.66 (3)	2004
Critical values				
Model 1: Trending data with intercept break		1 per cent	5 per cent	10 per cent
		–4.95	–4.44	–4.19
Model 2: Trending data with intercept and trend break		–5.72	–5.18	–4.89

Source: Authors' own calculation.

Note: * indicates significant at 1 per cent and ** at 5 per cent level of significance. Critical values are tabulated by Vogelsang and Perron (1998). The optimal lag length is determined by SIC with maximum number of lag is 4 years.

The results suggest that Y_t appears to be levels stationary in the presence of intercept break with breaking date was 2003. ETR_t also levels stationary when intercept break and intercept and trend breaks are considered in the specification with breaking date was 1996. These structural breaks may coincide with current account surplus in the balance of payments during 2001–2004, and trade policy reforms respectively. Thus, we concluded that Y_t, $REER_t$ and ETR_t are integrated of order I(0), while rests are I(1).

Methodology: ARDL-Bounds Testing Approach to Cointegration

The Engle–Granger cointegration test (Engle & Granger, 1987) and multivariate cointegration test (Johansen, 1988) require that variables included in the system be of same order of integration. However, results of unit root tests exhibited that the variables under study have different orders of integration. To overcome this problem, we have employed the ARDL-bounds test of cointegration developed by Pesaran, Shin and Smith (2001). This test allows for the analysis of long-run levels relationship when regressors are I(0), I(1) or fractionally integrated. Other virtues of the ARDL are: first, the Engle–Granger (1987) and Johansen (1988) cointegration tests require large sample size, whereas ARDL is more efficient in small samples. Second, ARDL estimates long-run and short-run parameters simultaneously and addresses potential problem of endogeneity, while simultaneously correcting residuals serial correlation. Third, this method permits the inclusion of dummy variables in the cointegration test, which is difficult in Johansen's method. It also permits a diverse number of lags for different variables, while Johansen's (1988) method requires a uniform number of optimal lags. Assume a general vector autoregressive (VAR) model of order p in Z_t, where Z_t = (TB_t, $LREER_t$ LY_t, LY_t^f, $LTOT_t$, $LETR_t$) and a dummy variable representing relaxation of NTBs (LIB_t) enters in the VAR model as exogenous variable. For the presence of long-run relationship and short-run dynamic interactions, an unrestricted error correction model (UECM) can be derived from the ARDL specification through a simple linear transformation. Assume that:

$$Z_t = (TB_t, LREER_t\ LY_t, LY_t^f, LTOT_t, LETR_t)' \tag{2}$$

An ARDL representation of the bounds test is estimated in terms of following UECM:

$$\Delta Z_t = \gamma_0 + \gamma_1 t + \delta_{0i} Z_{t-1} + \sum_{i=1}^{p} \pi_{1i} \Delta Z_{t-i} + \pi_{2i} \Delta Z_t + \kappa LIB_t + u_{zt} \tag{3}$$

where Δ is difference operator, p is lag length, γ_0 is an intercept, t is time trend and u_{zt} is a stationary error term. The parameters δ_{0i} are the long-run multipliers, while current and lagged values of $\varnothing TB_t, \varnothing LREER_t, \varnothing LY_t, \varnothing LY_t^f, \varnothing LTOT_t$ and $\Delta LETR_t$ are used for short-run dynamics.

We estimated Equation (3) by ordinary least squares (OLS) and test for the presence of cointegration between $TB_t, LREER_t, LY_t, LY_t^f, LTOT_t$ and $LETR_t$ using the modified F-statistic (F_{PSS}) and a Wald-statistic (W_{PSS}) for the joint null hypothesis of no cointegration $H_0 : \delta_{0i} = 0$, against the alternative hypothesis of cointegration, $H_1 : \delta_{0i} \neq 0$. Pesaran, Shin and Smith, (2001) have generated upper and lower critical bounds. If the values of F_{PSS} and W_{PSS} statistics exceeds the upper bound, the null hypothesis is rejected, supporting the presence of cointegration. If they lie below the lower critical bound, the null hypothesis cannot be rejected, indicating the absence of cointegration and if they lie within the critical bounds, the test is inconclusive.

Long-run and Short-run Behaviour of Trade Balance

Having found an evidence of cointegration among variables included in Equation (1), in the second step, we estimated following *ARDL* (*m*, *n*, *p*, *q*, *r*, *s*) model:

$$TB_t = b_0 + \sum_{i=0}^{m} b_{1i} TB_{t-i} + \sum_{i=0}^{n} b_{2i} LREER_{t-i} + \sum_{i=0}^{p} b_{3i} LY_{t-i} + \sum_{i=0}^{q} b_{4i} LY_{t-i}^f + \sum_{i=0}^{r} b_{5i} LTOT_{t-i} + \sum_{i=0}^{s} b_{6i} \Delta LETR_{t-i} + \eta LIB_t + \zeta_t \quad (4)$$

The long-run multiplier can be obtained as:

$$c_0 = \left(b_0 \Big/ 1 - \sum_{i=1}^{m} b_{1i} \right) \text{ and } c_k = \left(b_n \Big/ 1 - \sum_{i=1}^{m} b_{1i} \right)$$

with $k = 1, ..., 5$ and $n = 2, ..., 6$.

Short-run Error Correction Model

Once cointegration is established, an error-correction (EC_t) model is estimated in the third stage of ARDL method. The long-run relationship between variables indicates the presence of short-run causality at least in one direction and the lagged EC_t term. The short-run causality is represented the significance of explanatory variables in difference form and the long-run causality is represented by the significance of coefficient associated with EC_{t-1} term. We estimated the following EC_t model:

$$\Delta TB_t = \beta_{01} + \sum_{i=1}^{m} \beta_{1i} \Delta TB_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta LREER_{t-i} + \sum_{i=0}^{p} \beta_{3i} \Delta LY_{t-i} + \sum_{i=0}^{q} \beta_{4i} \Delta LY_{t-i}^f + \sum_{i=0}^{r} \beta_{5i} \Delta LTOT_{t-i} + \sum_{i=0}^{s} \beta_{6i} \Delta LETR_{t-i} + \psi LIB_t + \lambda EC_{t-1} + \zeta_t \quad (5)$$

where EC denotes the error-correction and λ shows the speed of convergence towards the long-run equilibrium after a shock, while β_{1i}, β_{2i}, β_{3i}, β_{4i}, β_{5i}, and β_{6i}, are the short-run parameters.

The Granger Causality Test

The Granger representation theorem suggests the presence of short-run Granger causality in one direction if variables included in Equation (1) are cointegrated. According to Halicioglu (2008), the Granger causality test based on first differenced VAR will be misleading in the presence of cointegration. Inclusion of error-correction term in the VAR system, therefore, would help to capture long-run relationships. To this end, an augmented vector error correction model (VECM) is formulated to examine the long-run as well as short-run Granger causality. Additionally, the specification where null hypothesis of no cointegration is rejected (Table 5) is estimated with error-correction term. However, the specification where null hypothesis of no cointegration is not rejected is estimated without error-correction terms to determine the direction and sources of short-run causality between the variables. For causality analysis, we specify the following VECM:

$$\begin{bmatrix} \Delta TB_t \\ \Delta LREER_t \\ \Delta LY_t \\ \Delta LY_t^f \\ \Delta LTOT_t \\ \Delta LETR_t \end{bmatrix} = \begin{bmatrix} d_{01} \\ d_{02} \\ d_{03} \\ d_{04} \\ d_{05} \\ d_{06} \end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix} d_{11} & d_{12} & d_{13} & d_{14} & d_{15} & d_{16} \\ d_{21} & d_{22} & d_{23} & d_{24} & d_{25} & d_{26} \\ d_{31} & d_{32} & d_{33} & d_{34} & d_{35} & d_{36} \\ d_{41} & d_{42} & d_{43} & d_{44} & d_{45} & d_{46} \\ d_{51} & d_{52} & d_{53} & d_{54} & d_{55} & d_{56} \\ d_{61} & d_{62} & d_{63} & d_{64} & d_{65} & d_{66} \end{bmatrix} \begin{bmatrix} \Delta TB_{t-1} \\ \Delta LREER_{t-i} \\ \Delta LY_{t-i} \\ \Delta LY_{t-i}^f \\ \Delta LTOT_{t-i} \\ \Delta LETR_{t-i} \end{bmatrix}$$
$$+ \begin{bmatrix} \psi_1 \\ \psi_2 \\ \psi_3 \\ \psi_4 \\ \psi_5 \\ \psi_6 \end{bmatrix} LIB_t + \begin{bmatrix} \lambda_1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} \left[EC_{t-1} \right] + \begin{bmatrix} \zeta_{1t} \\ \zeta_{2t} \\ \zeta_{3t} \\ \zeta_{4t} \\ \zeta_{5t} \\ \zeta_{6t} \end{bmatrix} \quad (6)$$

Empirical Results and Discussion

We estimated Equation (1) to determine the presence of cointegration between $TB_t, REER_t, LY_t, LY_t^f$, $LTOT_t$ and ETR_t by controlling the effect of simplification of NTBs. The optimal lag length of order 1 is selected on the basis of SIC.

Table 5. Results of the ARDL-Bounds Cointegration Test

Model Specification	SIC Lag	F_{PSS}	W_{PSS}	Outcome
$F_{TB}(TB_t \mid LREER_t, LY_t, LY_t^f, LTOT_t, LETR_t)$	2	7.32**	43.91**	Cointegration
$F_{REER}(LREER_t \mid TB_t, LY_t, LY_t^f, LTOT_t, LETR_t)$	2	1.68	10.07	No cointegration
$F_Y(LY_t \mid LREER_t, TB_t, LY_t^f, LTOT_t, LETR_t)$	2	2.26	13.61	No cointegration
$F_{Y^f}(LY_t^f \mid LREER_t, TB_t, LY_t, LTOT_t, LETR_t)$	2	1.00	6.01	No cointegration
$F_{TOT}(LTOT_t \mid LREER_t, TB_t, LY_t^f, LY_t, ETR_t)$	1	1.36	8.15	No cointegration
$F_{ETR}(LETR_t \mid LREER_t, TB_t, LY_t, LY_t^f, LTOT_t)$	2	3.51	20.97	No cointegration
Critical values		F_{PSS}	W_{PSS}	
Lower Bound critical values	5 per cent	3.63	21.76	
Upper Bound critical values	5 per cent	4.94	29.61	

Source: Authors' own calculation.

Note: The critical value bounds are computed by stochastic simulations using 20000 replications. The estimated models include unrestricted intercept, NTBs liberalization dummy (LIB_t) and no trend.

The calculated F_{PSS} and W_{PSS} statistics are reported in Table 5 when each variable in Equation (1) is taken as dependent variable.

When trade balance relative to GDP is consider as dependent variable (Table 5), the calculated F_{PSS} and W_{PSS} for $F_{TB}(TB_t \mid LREER_t, LY_t, LY_t^f, LTOT_t, LETR_t)$, respectively, are 5.89 and 35.33, higher than the upper bound critical values of 4.94 and 29.68 at the 5 per cent level of significance, supporting the presence of cointegration between the variables entered in Equation (1).[16] However, when $LREER_t$, LY_t, LY_t^f, $LTOT_t$ and ETR_t is treated as dependent variables; the null hypothesis of no cointegration is not rejected at the 5 per cent level of significance. To ascertain the robustness of the bounds test, Johansen's (1988) cointegration test was applied. Table 6 reports the results.

Table 6 (panels A and B) indicates that both trace and maximum eigenvalue tests supports the presence of one significant cointegration relationship among the variables. The existence of one cointegration relationship is in line with the bounds test. An evidence of unique cointegration relationship among TB_t, $LREER_t$, LY_t, LY_t^f, $LTOT_t$ and ETR_t implies that these variables move jointly in a single direction in the long run. Furthermore, $LREER_t$, LY_t, LY_t^f, $LTOT_t$ and ETR_t are long-run forcing variables in determining the TB_t trade balance in Pakistan. Equation (7) yields the results of the ARDL model (*t*-values are in parentheses).[17]

Table 6. Results of Multivariate Cointegration Test

Null	Alternative	Eigenvalue	Test Statistic	95 per cent Critical Value
Panel A: Trace Test (λ – *Trace*)				
$r = 0$	$r \geq 1$	0.799	135.08**	102.56
$r \leq 1$	$r \geq 2$	0.662	85.36	75.98
$r \leq 2$	$r \geq 3$	0.514	51.70	53.48
$r \leq 3$	$r \geq 4$	0.407	29.39	34.87
$r \leq 4$	$r \geq 0$	0.259	13.19	20.18
$r \leq 5$	$r \geq 0$	0.118	3.88	9.16
Panel B: Maximum Eigenvalue Test (λ – max)				
$r = 0$	$r = 1$	0.799	49.73**	40.53
$r \leq 1$	$r = 2$	0.662	33.66	34.40
$r \leq 2$	$r = 3$	0.514	22.31	28.27
$r \leq 3$	$r = 4$	0.407	16.20	22.04
$r \leq 4$	$r = 5$	0.259	9.31	15.87
$r \leq 5$	$r = 6$	0.118	3.88	9.16

Source: Authors' own calculation.

Note: Cointegration test is based on restricted intercept and no trend. The variable NTBs included in VAR as exogeneous variable. Critical values are taken from Mckinnon, Haug & Michelis, (1999).

$$TB_t = 1.43 + 0.48TB_{t-1} - 0.07LREER_t - 0.14LY_t - 0.12LY_t^f + 0.18LY_{t-1}^f$$
$$(2.30)^* \ (5.27)^* \quad (-2.68)^* \quad (-2.58)^* \quad (-3.47)^* \quad (5.22)^*$$
$$+ 0.02LTOT_t + 0.05LETR_t - 0.04LETR_{t-1} - 0.03LIB_t$$
$$(0.80) \quad (2.58)^* \quad (-2.18)^* \quad (-2.16)^{**}$$
$$\bar{R}^2 = 0.91 \quad SER = 0.010 \quad DW = 2.53 \quad D-h = -1.77[0.077]$$
$$F = 36.49[0.000]^*$$
$$SC - F(1,21) = 2.89[0.104] \qquad FF - F(1,20) = 0.03[0.862]$$
$$NO - \chi^2(2) = 0.04[0.982] \qquad Het - F(1,30) = 0.17[0.684] \qquad (7)$$

It can be seen from Equation (7) that all the variables are statistically significant except for the terms of trade (TOT_t). The short-run coefficient of trade balance lagged by one year (TB_{t-1}) exerts significant positive effect on trade balance (TB_t) in current year. The estimated coefficient indicates that a one percentage point increase in trade deficit in previous year increases trade deficit by 0.48 percentage point in current year. This supports the presence of inertia in the adjustment process and takes two years for full convergence. This could be linked with the degree of mean reversion associated with narrow commodity-oriented export base. The real effective exchange rate ($REER_t$) is statistically significant with negative sign, implying that depreciation of $REER_t$ plays a significant role in improving TB_t. The estimated coefficient of –0.07 suggests that a 1 per cent depreciation of $REER_t$ leads to reduce trade deficit by 0.07 percentage point of the GDP. The reason could be that the depreciation of $REER_t$ increases cost of imported goods and decreases foreign price of domestic goods in international market. As a result, there is contraction in the demand for imports and expansion in the demand for exports, which eventually reduces trade deficit. The significance of $REER_t$ also signifies that the ML condition holds and depreciation could improve the TB_t.

Domestic real income (Y_t) carries negative sign, which suggest that an increase in Y_t stimulates the demand for imports and deteriorates TB_t because Y_t is transferred from home country to foreign country. This finding supports the Keynesian view that increase in Y_t would encourage domestic consumers to buy more imported goods and thus worsens TB_t. Our result reveals that a 1 per cent increase in Y_t could worsen TB_t by 0.14 percentage point of the GDP. Foreign real income (Y_t^f) is negatively related to TB_t on impact period; however, its effect turns to be positive and significant after one year. The cumulative effect of Y_t^f is positive and significant on TB_t which suggests that increase in Y_t^f generates more demand for Pakistani products in international market and, therefore, an improvement in TB_t. Terms of trade (TOT_t) appear to be positive but statistically insignificant, which implies that a rise in price of exports relative to price of imports has insignificanty influence on TB_t.

Since the major focus of this study is to examine the impact of liberalization in the form of tariff and NTBs reduction on trade balance in Pakistan. Accordingly, the estimation result indicates that average effective tariff rate

(ETR_t) has positive impact on TB_t on impact period and turns to be negative and significant after one year. However, the cumulative effect of ETR_t on TB_t is positive, which implies that tariff reduction would promote trade balance although the cumulative effect is too small. The reason could be that Pakistan imported machinery and other industrial equipments from the international market which accounting for 93 per cent of the total imports to produce more exportable. Thus, reduction in tariff lowers incentive structure for the production of import substitutes in the country. The resultant reduction in anti-export bias may lead to increase in the production of exportable and thus improves TB_t. However, loss of tariff revenues due to tariff reduction is crucial to financing trade and current account deficits in Pakistan.

The other variable of interest is the reduction in NTBs (LIB_t), which exerts negative impact on TB_t, suggesting that lowering of NTBs has worsening the TB_t due to increase in the monetary value of imports. The estimated impact of LIB_t suggests that a one percentage point reduction in NTBs would lead to deteriorate TB_t by 0.03 percentage point of the GDP.

The long-run solution can be expressed in Equation (8). The corresponding normalized long-run parameters are given as:

$$\begin{aligned} TB_t = {} & 3.76 - 0.14LREER_t - 0.26LY_t + 0.12LY_t^f + 0.05LTOT + 0.03LETR_t \\ & (2.61)^{*}\ (-3.52)^{*} \qquad (-2.64)^{*} \qquad (3.34)^{*} \qquad (0.80) \qquad (0.74) \\ & - 0.04LIB_t \\ & (-1.96)^{**} \end{aligned} \tag{8}$$[18]

As shown in Equation (8), $REER_t$, Y_t, Y_t^f and LIB_t are the significant determinants of TB_t in Pakistan in the long-run, whereas ETR_t and TOT_t have insignificant effect on TB_t in the long-run. The long-run coefficient of $REER_t$ carries negative sign, which implies that a 1 per cent depreciation of $REER_t$ could lead to improve TB_t by 0.14 percentage point of the GDP. The Y_t is negatively impacted TB_t, whereas Y_t^f is positively associated with TB_t in the long-run. However, the coefficient of Y_t (in absolute term) is larger than its foreign counterpart suggesting that in Pakistan demand for imported goods is relatively higher than its exports in the long run.

The long-run effect of TOT_t on TB_t is positive, but statistically insignificant. This implies that changes in the relative price of exports produce insignificant effect on TB_t in the long-run. The long-run coefficient of ETR_t is positive but statistically insignificant, which suggest that lowering of ETR_t exerts insignificant effect on TB_t in the long-run. The reason could be that Pakistan reduces import duties unilaterally and perhaps its trade partners may not reduce tariff on Pakistan's exports, which not only constraint Pakistan's exports but limit market access. The other implication could be that trade policy may not important determinant of TB_t in Pakistan. Finally, the effect of LIB_t on TB_t is negative, which implies that liberalizing of NTBs stimulates monetary value of imports relative to exports and worsens TB_t in the long-run. However, long-run impact of LIB_t on TB_t is very low (i.e., 0.04 per cent).

Finally, we obtained the short-run dynamic coefficients for TB_t by estimating an EC_t model associated with long-run ARDL estimates. Equation (9) reports the results.

$$\begin{aligned}
\Delta TB_t &= -0.07\Delta LREER_t - 0.14\Delta LY_t - 0.12\Delta LY_t^f + 0.02\Delta LTOT_t + 0.05\Delta LETR_t \\
&\quad (-2.68)^* \qquad (-2.58)^* \qquad (-3.47)^* \qquad (0.80) \qquad (2.58)^* \\
&\quad - 0.02\Delta TLIB_t - 0.52EC_{t-1} \\
&\quad (-2.16)^* \qquad (-2.76)^* \\
EC_t &= TB_t - 2.76 + 0.14LREER_t + 0.26LY_t - 0.12LY_t^f + 0.04LTOT_t \\
&\quad - 0.03LETR_t + 0.04LIB_t \\
\bar{R}^2 &= 0.74 \qquad SER = 0.009 \qquad F = 13.57[0.000]^* \qquad DW = 2.54
\end{aligned} \tag{9}$$[19]

Similar to the long-run, in the short run depreciation of $REER_t$ causes an improvement in TB_t. However, short-run impact of exchange rate depreciation is relatively small as compared to its long-run effect. The short-run growth in Y_t deteriorates TB_t through its positive effect on demand for imports. In contrast, Y_t^f has significant negative effect on TB_t in the short-run. The reason could be that as Y_t^f increases, foreign countries may increase production of export-substitutes or may substitute Pakistani products with its close competitors such as India, Bangladesh and Sri Lanka. Therefore, the substitution effect leads to worsen Pakistan's TB_t in the short-run. The other reason could be that Pakistan's exports losing their value in foreign market and hence its effect on TB_t is negative.

The result also reveals that TOT_t has insignificant effect on TB_t in the short-run. Furthermore, the reduction in ETR_t improves TB_t in the short-run through decrease in anti-export bias. This finding is consistent with the fact that Pakistan's exports are import-oriented. Finally, LIB_t causes negative effect on TB_t in the short-run. The overall impact of LIB_t on TB_t is negative with too small magnitude (i.e., 0.02 per cent). This implies that lowering of NTBs deteriorate TB_t in the short run. However, the short-run impact of LIB_t is minimal on TB_t. The lagged error-correction coefficient is negative and significant, and equal to –0.52, which implies that the speed of adjustment towards long-run equilibrium after a shock is high. Approximately 52 per cent of the previous period's deviations are eliminated in current year to achieve long-run equilibrium path. The significance of lagged error-correction coefficient signifies that $REER_t$, Y_t, Y_t^f, ETR_t and LIB_t Granger cause TB_t in the long-run. Furthermore, the long-run causality runs interactively through the error-correction term from $REER_t$, Y_t, Y_t^f and ETR_t to TB_t after controlling the effect of LIB_t, while $REER_t$, Y_t, Y_t^f and ETR_t are the significant derivers of TB_t in the short-run.

Finally, Cumulative Sum of Recursive Residuals (CUSUM) and CUSUM of squares of recursive residuals tests were performed for parameters stability. The plot of CUSUM and CUSUM of squares of recursive residuals do not violate the critical band (Figures 3 and 4) confirming no evidence of parameters instability.

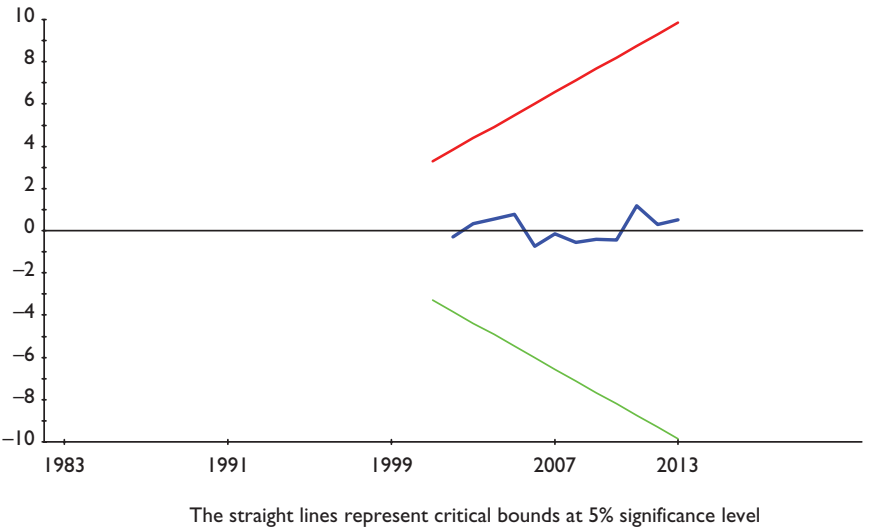

Figure 3. Plot of Cumulative Sum of Recursive Residuals

Source: Authors' own estimation.

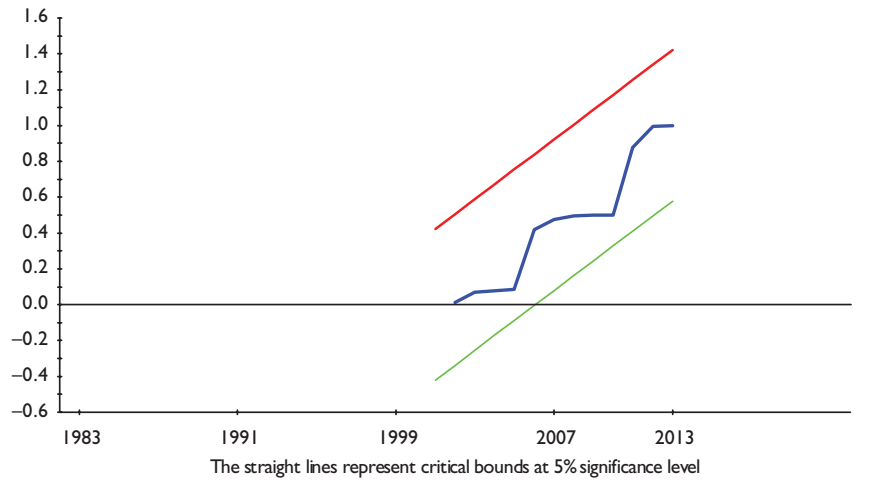

Figure 4. Plot of Cumulative Sum of Squares of Recursive Residuals

To determine the direction of short-run Granger causality among the non-cointegrated variables, we estimated Equation (6) and the results are given in Table 7.

Following Halicioglu (2008), the Granger causality is conducted and only TB_t equation is estimated with a EC_{t-1} term. The other equations are tested for Granger causality without EC_{t-1}.[20] The short-run Granger causality test (Table 7) suggests that $REER_t$, Y_t and Y_t^f Granger cause TB_t. The causality runs from Y_t^f to TB_t imply that Y_t^f influence TB_t through exports channel. The other source of causation is

Table 7. Results of Short-run Granger Causality Test

Dependent Variable	Panel A: F-statistics						
	ΔTB_t	$\Delta LREER_t$	ΔLY_t	ΔLY_t^f	$\Delta LTOT_t$	$\Delta LETR_t$	EC_{t-1}
ΔTB_t	–	4.64 [0.098]***	7.05 [0.006]*	3.93 [0.041]**	0.44 [0.651]	15.01 [0.001]**	–51.59 [0.000]*
$\Delta LREER_t$	0.01 [0.988]	–	1.52 [0.247]	0.005 [1.00]	0.10 [0.904]	1.38 [0.279]	–
ΔLY_t	4.08 [0.036]**	1.72 [0.208]	–	0.67 [0.522]	0.10 [0.908]	0.07 [0.934]	–
ΔLY_t^f	1.30 [0.300]	1.62 [0.229]	4.21 [0.034]**	–	0.09 [0.915]	0.05 [0.954]	–
$\Delta LTOT_t$	0.96 [0.403]	0.27 [0.770]	1.04 [0.373]	2.72 [0.096]***	–	3.54 [0.053]**	–
$\Delta LETR_t$	0.14 [0.872]	0.54 [0.554]	0.04 [0.965]	0.91 [0.424]	0.17 [0.842]	–	–

Panel B: Summary of Causality Inference

Real effective exchange rate causes trade balance ($\Delta LREER_t \rightarrow \Delta TB_t$)	Yes
Domestic real income causes trade balance ($\Delta LY_t \rightarrow \Delta TB_t$)	Yes
Foreign real income causes trade balance ($\Delta LY_t^f \rightarrow \Delta TB_t$)	Yes
Trade balance causes domestic real income ($\Delta TB_t \rightarrow \Delta LY_t$)	Yes
Domestic real income causes foreign real income ($\Delta LY_t \rightarrow \Delta LY_t^f$)	Yes
Foreign real income causes terms of trade ($\Delta LY_t^f \rightarrow \Delta LTOT_t$)	Yes
Average effective tariff rate causes trade balance ($\Delta LETR_t \rightarrow \Delta TB_t$)	Yes
Average effective tariff rate causes terms of trade ($\Delta LETR_t \rightarrow \Delta LTOT_t$)	Yes

Source: Authors' own calculation.
Note: * indicates significant at 1 per cent, ** at 5 per cent and *** at 10 per cent level of significance.

depreciation of $REER_t$ that affects TB_t through the increase in competitiveness of exportable in the international market. We observed bidirectional causality between TB_t and Y_t. Similarly, Y_t also cause Y_t^f. This could be due to the increase in demand for imports. Furthermore, causal link running from Y_t^f and ETR_t to TOT_t was also observed. However, no evidence of causality between ETR_t and TB_t was observed. Finally, the Granger causality results confirm our finding that the effect of ETR_t on TB_t is almost insignificant as compared to $REER_t$, Y_t and Y_t^f in the short run.

Conclusion and Policy Implications

This study examines the impact of trade liberalization on trade balance in Pakistan over the period 1982–2013 using the ARDL-bounds test of cointegration. The results demonstrate that real effective exchange rate, domestic (foreign) real income, average effective tariff rate and NTBs liberalization are the

significant determinants of trade balance in Pakistan. The effective tariff rate shows significant positive impact on trade balance in the short-run, and insignificant in the long-run. The relaxation of NTBs shows minimal negative impact on trade balance in the long-run as well as in the short-run. The results further reveal that trade balance is highly sensitive to domestic income; foreign income and real effective exchange rate depreciation in the long-run and in the short-run. The Granger causality test indicates that foreign income; domestic income and real effective exchange rate are the main channels affecting trade balance in Pakistan in the short-run.

From the above findings we can deduce some important policy implications. First, increase in domestic income deteriorates trade balance. The reason could be that higher domestic income leads to higher consumption, which increases demand for imports rather than consumption and investment domestically. There is a need, therefore, to encourage consumption of domestically produced goods, encourage domestic investment and backward linkage industries to offset the adverse effects of domestic income on trade balance. In addition, higher domestic income may aggravate demand for imports due to supply-side constraints. Therefore, there is a need to enhance domestic production capacities and increase the proportion of exports relative to imports and tackle supply-side bottlenecks. Second, depreciation of real effective exchange rate has increased the competitiveness of Pakistan's exports and provides more room for improvement in trade balance in the short-run as well as in the long-run. Therefore, the authorities must concentrate on the exchange rate management to achieve maximum benefits out of currency depreciation. Third, lowering of NTBs increases trade deficit which, in turn, may affect the adequacy of foreign exchange reserves and sustainability of current account in Pakistan. This implies that in Pakistan liberalization of NTBs have not been complemented with exports promotion strategies. In Pakistan local industries are operating under heavy taxation which increases cost of production and causes loss of competition vis-à-vis their foreign competitors. In order to make tariff comparable with Pakistan's competitors, the authorities may revisit the trade policy and further rationalize tariff and non-tariff structure, and integrate Pakistan's economy with global supply chain. Furthermore, trade liberalization measures should be consistent and must complement exports promotion relative to imports.

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Notes

1. Non-tariff barriers (NTBs) include trade policy instrument other than tariffs. NTBs include quantitative limits on imports and exports, licensing requirements, product standard and technical regulation, customs (classification, valuation and clearance) and other administrative procedures.
2. Felipe and Lim (2008, p. 8) noted that balance of payment deficit is not necessarily a bad thing, if the capital flows is used for productive investment. Especially when fund

are used to improve export performance and enhance the competitiveness of import-competing industries, then this may sufficient to generate an improvement in the trade balance and current account.

3. Elimination of the Statutory Regulatory Orders (SROs), improving export promotion through the establishment of exports promotion zones (EPZs) and market information programmes, among others.
4. It is worth noting here that lowering of import duties stimulates trade only when a country reduces domestic resource costs on continuous basis.
5. Large number of SROs could distort the effectiveness and transparency of trade policy and promotes rent-seeking culture in Pakistan.
6. Such as anti-dumping, countervailing measures, intellectual property rights, etc.
7. During the 1960s Pakistan's economic activities are more integrated with the rest of the world. Its volume of manufacturing exports exceeded to the Philippines, Indonesia and Malaysia. However, in 2015 India ranked top position with US$264.4 billion exports, followed by Malaysia (US$200.2 billion), Indonesia (US$162.8 billion), Turkey (US$143.9 billion), the Philippines (US$58.6 billion), Bangladesh (US$35.2 billion) and Sri Lanka (US$10.4 billion), while Pakistan's exports were only US$22.1 billion.
8. In the wake of the GFC in 2008, over 30 per cent of tariff lines of WTO member countries were increased without provision of compensation to affected trade partners (Handley, 2014).
9. Import compression occurs when governments impose direct controls on imports through tariffs, quotas and licensing schemes; engage in deflationary policies; or depreciate the currency for the purpose of servicing external debt or rebuilding foreign exchange reserves.
10. The elasticity approach assumed exogenously determined capital movements and applies Marshallian partial equilibrium to separate markets for exports and imports, and shows that the effect of exchange rate depreciation depends on the elasticities of demand for and supply of exports and imports. The role of elasticities is formulized in a ML condition. The failure of ML condition in the short-run results in an initial deterioration followed by subsequent improvements in trade balance. The J-shaped time path of trade balance in response of exchange rate devaluation is termed as J-curve phenomenon.
11. Detailed derivation of Equation (1) can be seen in Santos-Paulino and Thirlwall (2004).
12. We consider only managed float and free floating flexible exchange rate regime.
13. To capture the price effect, we deflated trade balance by nominal GDP, which is proxied by GDP at current market prices.
14. We have adjusted GDP at constant factor prices with 2005 as base year using the splicing method.
15. We also used bilateral real exchange rate taking US, a foreign country, but there is no major change in results.
16. The critical values are based on unrestricted intercept with no trend.
17. Estimates are based on ARDL (1, 0, 0, 1, 0, 1). SC is Lagrange multiplier test of residual serial correlation, FF is Ramsey's functional form test using the square of the fitted values, NO is normality test based on a test of skewness and kurtosis of residuals' and Het is heteroscedasticity test based on the regression of squared residuals on squared fitted values. Values in [.] are the *p*-values. Figures in (.) are *t*-values, * and ** indicate significant at the 1 per cent and 5 per cent level of significance.
18. * and ** indicate significant at the 1 per cent and 5 per cent level of significance. Figures in parentheses are the *t*-values.

19. Values in [.] are the *p*-values. Figures in (.) are *t*-values, * and ** indicate significant at the 1 per cent and 5 per cent level of significance. SER = standard error of regression, DW = Durbin Watson statistic.
20. Other equations lack cointegration (see Table 5).

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