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TRADE BALANCE AND TERMS OF TRADE RELATIONSHIP: Evidence from Pakistan

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Abstract

The terms of trade (TOT) have an important role in determining direction of the trade which finally transmits into trade balance. The current study is an effort to seek the effect of TOT on the trade balance. The short and long-estimates are computed through Autoregressive Distributed Lag (ARDL) methodology; the results reveal that in the case of Pakistan, there is no significant relationship between TOT and trade balance. Furthermore, the estimated Marshall Lerner (ML) condition is calculated by addition of the absolute values of import and export demand elasticities. The study shows that it does not hold for Pakistan, neither in the short-run, nor in the long-run. The computed ML condition, evidently infers that price have negative impact on trade balance. The demand for exports and imports are price inelastic; thus, to curtail trade balance the government should take measures to increase exports and limit the unnecessary imports.

Key Words: Trade Balance, Terms of Trade, Marshall Lerner Condition, ARDL, DOLS.
JEL Classification: F1, F13, F14, C32, C30.

I. Introduction

Trade balance is one of the crucial instruments in macro-economic policies to provide information about the economic behavior and policy decisions. It also measures a country's net income received on the worldwide assets. The most popular trade balance theories, such as Harberger-Laursen and Metzler (HLM effect) suggest an improvement in terms of trade (export price to import price ratio) has direct impact on a country's trade balance [Harberger (1950), Laursen and Metzler (1950) and Afza, et al. (2016)]. A higher increase in export prices than the import prices, results in a reinforced inflow of foreign exchange leading to a beneficial trade balance [Laursen and Metzler (1950)].

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An array of empirical literature has studied the linkage between terms of trade (TOT) and the trade balance (TB). The well-known study regarding TOT and TB is Harberger (1950) e.g., (HLM effect); huge part of literature is based on its argument [Afza, et al. (2016)]. According to HLM effect, which is based on the Keynes consumption function, an increase in TOT will lead to improve country's trade balance. Many empirical studies have found an evidence of existence of HLM effect and logical trend in response to it, i.e., TOT is directly linked with trade balance in developing as well as in developed countries [Backus, et al. (1992), Arize (1996), Otto (2003), Zortuk and Durman (2008), Wong (2006), Islam, et al. (2013), and Afza, et al. (2016)]. In contrast, Idrees and Tufail (2012) could not find any positive role of TOT to increase the trade balance. Similarly, another study for G-7 countries found that there is no long run linkage among trade balance and the TOT [Hamori (2008)]. However, Wong (2009) explored mixed results for five Asian countries except for Indonesian and Singapore, results which affirmed the link between TOT and the trade balance. Thus, it can be decided from the previously discussed studies that a consistent relationship could not be found between the TOT and trade balance.

Some parts of the literature, limit their studies to import demand elasticities. However, advance literature concerning TOT and trade balance developed a reduced form model to evaluate the long-run relation [Afza, et. al. (2016)]. Export and import demand functions, as well as, export and import elasticities are important to look into for comprehensive analysis amid the trade balance and the TOT for Pakistan. Since common consensus has emerged that net effect of trade balance depends on price elasticities; therefore this paper focuses not only on the impact of TOT on trade balance, but also on evaluating the import and export demand functions, individually; as well as under the Marshall Lerner (ML) condition. ML condition demonstrates that trade balance is expected to improve if the sum of absolute values of import and export demand price elasticities are higher than one. If price elasticities are separately high-elastic, devaluation of a currency will increase the exports and will decline imports of a country; and ultimately trade balance will improve. When ML conditions holds through currency devaluation (which means that exports are cheaper than imports in the world trade), trade balance may improve [Hasan and Khan (1994), Khan (1974), Afzal (2004) and Hafeez, et al. (2017)]. Despite the continued trade liberalization, Pakistan is still lagging behind in foreign trade sector and facing severe trade deficit which was 14.75 billion US$ in 2007 and reached to 36.18 billion US$ in 2017-18. Meanwhile, the current account deficit has reached at 8.2 per cent of the GDP. Pakistan had to face the consistent trade deficit due to the falling trend of exports and higher volume of imports from 2003 to 2017. The widening trade deficit indicates the performance of economy in TOT which is considered a vital feature in trade sector for an economy. These reasons reinforce us to compute the impact of TOT on trade balance of Pakistan.

The prevailing theoretical literature argues a direct link among TOT and the trade balance but still some studies could not find such relationship. The current study can

be valuable in addition to the existing empirical literature in many ways. First, the study revisits the TOT and trade balance linkage with latest dataset ranging from 1980 to 2016. Secondly, it estimates the export and import demand elasticities to elaborate the impact of TOT on the trade balance through ML conditions. Furthermore, ARDL technique is used to estimate the long-run and short-run elasticities. Along with the ARDL approach, dynamic ordinary least square (DOLS) is also taken into account for sensitivity analysis and robustness. The remaining structure of the paper is stated as follows: Section II contains the theoretical model and methodology applied in the analysis. Section III consists of estimation and results interpretation. Finally, Section IV presents the concluding remarks and implications of the study.

II. Theoretical Framework

TOT is a key to determine trade balance especially for developing countries because they have limited access to the world capital markets [Senhadji (1998)]. To investigate the direct long-run impacts of TOT on trade balance, export and import elasticities are estimated. The elasticities provide basic insights to understand the net effect of TOT on trade balance. In the empirical model, balance of trade is a function of TOT, where nature of relationship can be positive or negative. Following the literature [Hamori (2008), and Wong (2006), (2009)] and some other studies the functional form of TOT and trade balance relationship are presented below:

$$TB = f(TOT) \tag{1}$$

Trade balance (TB) is considered the major part of a country's balance of payments. Trade balance helps to understand the relative position and measured trade performance of an economy; while, higher TOT means that there is more inflow of capital than the outflow which leaves the trade balance surplus. Empirical form of Equation (1) can be rewritten in the following form:

$$TB_t = \alpha_0 + \alpha_1 TOT_t + \mu_{1t} \tag{2}$$

Export demand is a function of export prices (PX), world income (WI) and the real effective exchange rate (REER) [Hasan and Khan (1994), Afzal (2004) and Hafeez, et al. (2017)]. While import demand of a country depends on exchange rate, import prices, as well as the domestic output activity [Afzal (2004), Safdar and Padda (2017)]. Real effective exchange rate is more important for balance of trade because, it is a proper measure of the value of a currency against a weighted average of several foreign currency prices of exports and imports. Therefore, it is imperative to include the real effective exchange rate regarding foreign trade regime and exchange rate policy, i.e., (appreciation and depreciation, etc). Furthermore, net effect of trade balance

depends on export demand and the import demand elasticities. Keeping in view this importance and by following previous literature [Afzal (2001), (2004)] this study includes export price (PX), import prices (PM) and the real effective exchange rate (REER) together in the model. Following are the functional forms of export demand and import functions:

$$X = f(PX, WI, REER) \tag{3}$$

$$M = f(PX, G, REER) \tag{4}$$

where, X and M are real demand for exports and imports. PX and PM refer to prices of exports and imports, respectively, while REER in both equations indicates a real effective exchange rate. For export and import-functions, it is expected that depreciation of currency results in an increase in value of exports and decrease in value of imports. However, prices in both functions expected to be negatively related with respective demands. Gross domestic income (G) is used for home country income in import equation, whereas the world GDP (WI) is taken for foreign income. Following, Equations (5) and (6), the empirical forms of models 3 and 4, are respectively:

$$\ln X_t = \beta_0 + \beta_1 \ln PX + \beta_2 \ln WI + \beta_3 REER + \mu_{2t} \tag{5}$$

$$\ln M_t = \lambda_0 + \lambda_1 \ln PM + \lambda_2 \ln G + \lambda_3 REER + \mu_{3t} \tag{6}$$

Marshall Lerner condition can be measured by adding up the import demand and export demand price elasticities in absolutes forms and recommends that if $|\beta_1 + \lambda_1| < 1$ balance of trade will improve.

1. Econometric Techniques and Data Sources

Previous studies have used different econometric techniques; but the current study uses the Augmented Dicky Fuller (ADF) and unit root test is applied to examine the order of integration. Furthermore, based on the results of unit root test, Autoregressive Distributive Lag (ARDL) approach [by Pesaran, et al. (2001)] is used to identify the long-run and short-run results. This estimation technique is superior to other conventional co-integration procedures due to some advantages. First, in order to capture the short- and long-term dynamics, ARDL technique allows to test a model having variables of mix-combinations of order of integrations, i.e., I(1) and I(0). Second, the ARDL bound testing approach proposes an adequate amount of numbers of lags to analyse data generating process in a general-to-specific modelling framework. Third, this method seems to be appropriate for a limited sample size. These characteristics motivated (authors of this study) to use the ARDL approach for co-integration analysis.

Furthermore, along with the ARDL approach, dynamic ordinary least square (DOLS) is also taken into account for sensitivity analysis and robustness. Equations (2), (5) and (6) can be written in the following standard linear ARDL (p, q) form:

$$\Delta \ln TB_t = \alpha_0 + \alpha_1 \ln TOT_{t-1} + \sum_{i=1}^{p} \phi_i \Delta \ln TB_{t-i} + \sum_{j=0}^{p} \phi_j \Delta \ln TOT_{t-i} + \mu_{1t} \quad (7)$$

$$\Delta \ln X_t = \beta_0 + \beta_1 \ln PX_{t-1} + \beta_2 \ln WI_{t-1} + \beta_3 \ln REER_{t-1} + \sum_{j=1}^{p} \psi_i \Delta \ln X_{t-i} + \sum_{j=0}^{p} \psi_j \Delta \ln PX_{t-i} + \sum_{j=0}^{p} \psi_p \Delta \ln WI_{t-i} + \sum_{j=0}^{p} \psi_q \Delta \ln REER_{t-i} + \mu_{2t} \quad (8)$$

$$\Delta \ln M_t = \lambda_0 + \lambda_1 \ln PM_{t-1} + \lambda_2 \ln G_{t-1} + \lambda_3 \ln REER_{t-1} + \sum_{j=1}^{p} \omega_i \Delta \ln M_{t-i} + \sum_{j=0}^{p} \omega_j \Delta \ln PM_{t-i} + \sum_{j=0}^{p} \omega_p \Delta \ln G_{t-i} + \sum_{j=0}^{p} \omega_q \Delta \ln REER_{t-i} + \mu_{3t} \quad (9)$$

In case of Equation (7), the null hypothesis ($H_0 = \phi_1 \neq \phi_2 \neq 0$) shows that there is no long-run; and, it is to be tested against the alternate hypothesis as there are co-integration among the variables. In case of Equation (8), the null hypothesis ($H_0 = \psi_i \neq \psi_j \neq \psi_q \neq \psi_p \neq 0$) is to be tested against the alternate hypothesis, and that there are co-integration among variables. Similarly, in Equation (9) the null hypothesis ($H_0 = \omega_i \neq \omega_j \neq \omega_p \neq \omega_q \neq 0$) is to be tested against the alternate hypothesis and that there are co-integration among the considered variables. Subsequently, Pesaran, et al. (2001) F-statistics are calculated. If calculated F-statistic value exists above the upper bound critical values, then the null hypothesis of no co-integration will reject and determine the long-run relationship among the variables. In contrast, if calculated F-statistical value is lower than the critical values, then null of no co-integration would not be rejected. Likewise, if computed F-statistic fall between the upper and lower bounds, the result is indecisive. The ARDL propose symmetric adjustments, both in the long- and short-runs of stochastic regressors. To capture the short-run behavior among variables, the standard ARDL error correction form can be written in the following representation:

$$\ln TB_t = \varphi_1 + \sum_{i=1}^{p} \varphi_2 \Delta \ln TOT_{t-i} + \delta ECM_{t-1} + \mu_{4t} \quad (10)$$

$$\ln X_t = \psi_1 + \sum_{i=1}^{p} \psi_2 \Delta \ln PX_{t-i} + \sum_{i=1}^{p} \psi_3 \Delta \ln WI_{t-i} + \sum_{i=1}^{p} \psi_4 \Delta \ln REER_{t-i} + \delta ECM_{t-1} + \mu_{2t} \quad (11)$$

$$\ln M_t = \omega_1 + \sum_{i=1}^{p} \omega_2 \Delta \ln PM_{t-i} + \sum_{i=1}^{p} \omega_3 \Delta \ln G_{t-i} + \sum_{i=1}^{p} \omega_4 \Delta \ln REER_{t-i} + \delta ECM_{t-1} + \mu_{3t} \quad (12)$$

where, Δ is the sign of difference operators and δ is the estimator of short-run error correction term which shows the speed of adjustment back to long-run equilibrium, after a short-run shock.

For the present study, annual time series data was acquired from the International Financial Statistic (2016) and World Development Indicators (2016), ranging from 1980 to 2016. The trade balance trade is used as percentage of gross domestic product (GDP). To measure the impact of TOT on balance of trade, net barter TOT is used. In trade elasticities; export demand is taken as exports, and import demand is measured by imports, of goods and services at constant 2010 US$. The ratio of unit value of export index to unit value of world export index are taken as proxy for export prices; while, for import prices unit value of import index to the wholesale price index, have been used. The real effective exchange rate is used to quantify the exchange rate. The World (GDP) is used to capture the impact of world income in export demand functions; while, to capture the impact of domestic income, gross domestic product (G) is used. For detail, variables description is reported in Table 1.

III. Empirical Findings

Table 2 illustrates the descriptive statistics of variables; the summary statistics of which indicate that TB ranges from -12.39 per cent to 1.03 per cent of GDP while TOT index ranges from 87.33 per cent to 231.76 over the period of study. It indicates that Pakistan economy performance is low and unstable. Standard deviation revealed that TOT is more volatile as compared to TB. The summary statistics also point out that PX is more impulsive

TABLE 1

Variables Description

Variables	Definition	Measure	Data Sources
TB	Balance of trade	% of gross domestic product (GDP).	WDI
TOT	Net barter TOT	Unit value of export index (2010=100)/ Unit value of import index (2010=100) * 100.	IFS
X	Demand of exports	Exports of goods and services (constant 2010 US $).	WDI
PX	Export prices	Unit value of exports index (2010=100)/ Unit value of world export index (2010 = 100).	IFS
WI	World GDP	World GDP (constant 2010 US$).	WDI
M	Demand of imports	Imports of goods and services (constant 2010 US$).	WDI
PM	Imports prices	Unit value of imports index (2010=100) / Wholesale price index (2010 = 100).	IFS
G	Gross domestic product	Gross domestic product (G) (constant prices of 2010 US $).	WDI
REER	Real effective exchange rate	Real effective exchange rate index (2010 = 100).	WDI

Note: WDI = World development indicator, IFS= International Financial Statistic.
Source: WDI (2016); IFS (2016).

TABLE 2

Descriptive Statistics

Variables	Obs.	Mean	Median	Maximum	Minimum	Std. dev	Skewness	Kurtosis	j-bera (prob)
TB	36	-5.95	-6.29	1.03	-12.39	3.89	0.05	1.96	1.63 (0.44)
TOT	36	154.24	163.98	231.77	87.33	40.66	-0.29	1.97	2.12 (0.34)
X	36	23.14	23.18	23.92	21.97	0.59	-0.39	2.04	2.28 (0.31)
PX	36	-0.82	-0.71	0.29	-2	0.67	-0.11	1.79	2.26 (0.32)
WI	36	31.44	31.44	31.92	30.95	0.29	-0.03	1.83	2.04 (0.36)
M	36	23.86	23.85	24.39	23.32	0.31	0.13	1.94	1.77 (0.41)
PM	36	-0.25	-0.33	0.14	-0.54	0.2	0.6	2.03	3.59 (0.16)
G	36	25.36	25.38	26.05	24.49	0.44	-0.24	2.04	1.73 (0.42)
REER	36	4.8	4.73	5.43	4.54	0.27	1.16	3.02	8.13 (0.02)

Source: Authors' own calculations.

as compared to PM and REER with higher range and standard deviation. J-Bera test for normality affirmed that no discrepancy evidence is found in data for further investigation.

Using the ARDL, this section provides empirical findings and possible explanation about the impact of TOT on the trade balance of Pakistan. However, prerequisite for this approach is to find the integration order of each series. To determine the integration order of each series, unit root test has been performed [Dickey and Fuller (1979)] for which the lag length criteria is based on Schwarz Bayesian [Dickey and Fuller (1979)]. Table 3 indicates that the world income (WI) imports demand (M) and the export prices (PX) are stationary at level (I(0)). All other variables are integrated at order one (I(1)). Results of stationarity test are mixture of I(0) and I(1), which implies that it is effective to apply the ARDL approach.

The bound testing results for co-integration of all models are presented in Table 4. F-statistics for TOT and trade balance model is lower than the upper bound limit (5 per cent); and thus, it is concluded that there is no long-run relationship between[1] TOT and trade balance, in case of Pakistan. The computed empirical outcome of this study is quite similar to Hamori (2008), Bahmani and Alse (1995) and Senhadji (1998). Results of co-integration motivated us further to find the long- run elasticities of the export and import demand. As trade balance is affected by price elasticities [Hamori (2008) and Bahmani and Alse (1995)], it is to be seen whether trade elasticities statistically[2] insignificant re-

TABLE 3

ADF Unit Root Test

Variables	Level		First-difference		
	t-State	p-value	t-state	p-value	Deduction
TB	-2.05	0.26	-6.33	0.00[x]	1st difference
TOT	-0.78	0.81	-6.08	0.00[x]	1st difference
X	-1.72	0.41	-6.25	0.00[x]	1st difference
PX	-3.75	0.03[y]	-	-	Level
WI	-3.39	0.06[z]	-	-	Level
REER	-2.06	0.25	-3.48	0.02[y]	1st difference
M	-3.29	0.08[z]	-	-	Level
PM	-0.50	0.87	-6.19	0.00[x]	1st difference
G	-1.63	0.45	-3.48	0.02[y]	1st difference

Note: [x]significance level at 1%, [y]significance level at 5%, [z]significance level at 10%.
Source: Authors' own calculations.

[1] We also applied Johnson co-integration and did not find the long run evidence between terms of trade and trade balance.

[2] Although there is no need to estimate long run coefficients of terms of trade and trade balance. But for cross checking we estimated long run co-efficient. Although the results of TOT and TB have the expected positive sign, the findings imply that terms of trade has no significant impact on Pakistan trade balance. Findings can be underpinned by Bouakez and Kano (2008) and Hasan and Khan (1994) studies. One possible explanation of insignificant impact of terms of trade on trade balance is price elasticities.

lationship of TOT and trade balance in Pakistan? Therefore, the study is extended further, with estimation of trade elasticities. Export elasticity is significantly lower than the import elasticity with respect to income, signifying that Pakistan economy can pull the other economies out of a recession [Mohsen and Brooks (1999)]. In line with literature considerations, the basic response of a change in TOT (to trade balance) depends upon price elasticities which reflect the country's export and import demand performance. Nevertheless, the ARDL results of co-integration support the long-run relationship in both, the export demand and import demand functions. The values of F-statistic for export demand function and import demand function are greater than the upper critical bounds.

1. Trade Elasticities

In this section, export demand and import demand based analysis is taken to check the price elasticities. Results of export and import demand functions are reported in Table 5. In the ARDL statistical analysis, it is found that export prices have a negative impact on export demand. These results imply that, as the price of export tends to decrease the demand for export will increase. On the other side, world income has a positive impact on export demand; and the exchange rate coefficient sign in export demand is not according to the traditional economic theory. It means that with

TABLE 4

Bound Testing for Co-integration

Estimated econometric models	F-value	Results
Trade balance model	1.05	Long run not exists
Export demand model	5.15	Long run exists
Import demand model	5.49	Long run exists
Critical Value Bounds		
Significance level at K=1	I0 Bound	I1 Bound
10%	3.02	3.51
5%	3.62	4.16
2.50%	4.18	4.79
1%	4.94	5.58
Significance level at K=3	I0 Bound	I1 Bound
10%	2.37	3.20
5%	2.79	3.67
2.50%	3.15	4.08
1%	3.65	4.66

Note: F-statistic values are satisfied at significance level 1%, 5% and 10%, respectively.
Source: Lower and upper bound values are taken from Peasaran, et al. (2001).

TABLE 5

Short and Long Run Estimates

Trade balance model				Export demand function				Import demand function			
Variables	Coef	t-stat	Prob.	Variables	Coef	t-stat	Prob.	Variables	Coef	t-stat	Prob.
Long run											
TOT	0.056	0.82	0.41	PX	-0.44[x]	-3.25	0.00	PM	-0.37	-0.89	0.38
				WI	2.23[x]	6.85	0.00	G	1.13[x]	3.72	0.00
				REER	-0.80[x]	-4.33	0.00	REER	0.23	0.76	0.45
Cons	-13.70	-1.31	0.19	Cons	-43.54[x]	-4.06	0.00	Cons	-6.47	-0.71	0.48
Short run											
ECM(-1)	-0.162[y]	-2.21	0.03	ECM(-1)	-0.59[x]	-4.84	0.00	ECM(-1)	-0.48[x]	-5.26	0.00
D(TOT)	0.023	1.18	0.24	D(PX)	-0.29[z]	-1.97	0.06	D(PM)	-0.16		0.40
				D(WI)	2.00[x]	5.5	0.00	D[(PM)(-1)]	-0.44[y]	-2.35	0.02
				D[(WI)(-1)]	-3.02[x]	-4.41	0.00	D(G)	0.89[x]	6.42	0.00
10%	10%			D(REER)	-0.59[y]	-2.18	0.04	D[(G)(-1)]	3.17[x]	5.91	0.00
								D(REER)	0.29	1.19	0.243
Diagnostic tests											
R-squared	0.82			R-squared	0.98			R-squared	0.95		
F-statistics	47.7			F-statistics	246.4			F-statistics	67.51		
Prb(F-statistics)	0.00			Prb(F-statistics)	0.00			Prb(F-statistics)	0.00		
D-watson	1.65			D-watson	2.23			D-watson	2.46		
Ramsey RESET	0.13			Ramsey RESET	0.66			Ramsey RESET	0.98		
ARCH test	0.70			ARCH test	0.32			ARCH test	0.74		
Lm test	0.98			Lm test	0.67			Lm test	0.11		

[x]level of significance at 1%, [y]level of significance at 5%, [z]level of significance at 10%. Cons= constant, Coef= Co-efficient.

Source: Authors' own calculations.

the devaluation of exchange rate, Pakistan export demands do not increase in a significant way. Results of the current study are justifiable as most of the Pakistan's export is based on agriculture; therefore, the need for primary export demand may be less sensitive, in term to its prices and the world income [Mohsen and Brooks (1999)].

Results of the import demand functions show that imports are not significantly affected by import prices; as mostly, Pakistan imports machinery, oil, and such goods which encourage the process of development. Therefore, Pakistan cannot decrease its imports even with the increasing trend of import prices. When a country is engaged in its development process, it will lead to increase in the growth of a country and the income as well. As a result, rise in domestic income causes to raise imports. Exchange rate sign is again positive in import demand function but, in implication it is different. Imports in terms of domestic currency will be expensive, leading to decrease in imports demand with a fall in exchange rate [Mohsen and Brooks (1999)]. The short-run values and significance level of co-efficient do not differ much from the long-run results. Table 5 indicates a valid short-run relationship among considering the variables. The coefficient of error correction term (ECM), which shows speed of adjustment procedure back to long run, is negative and statistically significant for trade balance model, export demand model and the import demand model, respectively. Furthermore, the value of ECM supports an effective short-run relation among the estimated variables in Pakistan.

2. Sensitivity Analysis and Robustness Check

To check robustness of the estimated variables, the Dynamic Ordinary Least Square (DOLS) test was applied. The results of trade balance model, export demand function and the import demand function are reported in Table 6. Results of trade balance model signify that the impact of TOT on the trade balance is again insignificant; and the results of dynamic OLS validate the results of ARDL approach for trade balance. Similarly, export prices show significantly negative relationship with export demand; while, the world income has a positive impact on export demand. In import demand function, it is found that import prices have insignificant impact on import demand. On the other side, domestic income has positive impact on increase in export demand. The results of dynamic OLS validate results of the ARDL approach for export, and the import demand function, as well.

3. Trade Balance, Terms of Ttrade, Marshall Lerner Condition

It is important to find the answers of the following questions: Why didn't the TOT of Pakistan affect the trade balance significantly even after devaluation of the currency; and why the exports of Pakistan did not improve much to increase the trade balance? As stated by Hamori (2008), Bahmani and Alse (1995) the trade bal-

TABLE 6

DOLS Results for Sensitivity and Robustness Check

Trade balance model					Export demand function					Import demand function				
Variables	Co-ef.	SE	t-stat.	Prob.	Variables	Co-ef.	SE	t-stat.	Prob.	Variables	Co-ef.	SE	t-stat.	Prob.
TOT	-1.64	3.04	-0.54	0.59	PX	-0.39[x]	0.120	-3.31	0.00	PM	-0.15	0.29	0.29	0.60
					WI	2.24[x]	0.288	7.76	0.00	G	0.90[x]	0.22	4.02	0.00
					RER	0.68[x]	0.145	-4.67	0.00	RER	0.28	0.22	1.26	0.21
Con	140.5[x]	21.00	6.68	0.00		-44.3[x]	9.426	-4.7	0.00		-0.56	6.74	-0.08	0.93
R^2	0.18					0.97					0.90			

[x]level of significance at 1%, Con= constant, Coef= Co-efficient.
Source: Authors' own calculations.

ance is affected by price elasticities; therefore, this study is linked to trade elasticities. In addition, the fulfillment of ML condition is not sufficient to improve the balance of trade. The ML condition depends on magnitude of exports and imports demand elasticities. As per estimation of this study, elasticity of export demand is statistically significant (-0.44) while elasticity of import is statistically insignificant (-0.37). The Marshall Lerner condition can be measured by adding import demand and export demand price elasticities in absolutes form which recommends that if $|\beta_1 + \lambda_1| < 1$, the balance of trade will not improve. The sum of demand elasticities is 0.81 and 0.45 in the long-run and short-run respectively, which is less than one. Thus, the Marshall Lerner condition does not hold in case of Pakistan. Hence, currency devaluation is not much valuable to improve the trade balance in Pakistan. Along with findings of the present study, there are many other macro- and micro-forces due to which currency devaluation has not improved the trade balance in Pakistan [Afzal (2004) and Hafeez, et al. (2017)].

Empirical results of the present study reflect that demand of exports and imports is price inelastic. These outcomes make the important implications through TOT channel, on balance of trade. On one side, in spite of the rising trend in import, prices could not curtail the imports due to inability of domestic industry to provide import substitutes, and; on the other side, falling trend in exports implies that Pakistan's export markets are not sufficiently efficient. Even imports are more expensive than exports, as according to the development structure, the nature of imports do not allow much to be flexible in imports demand in Pakistan's economy. Stagnant exports growth is also another source to keep worsening the trade balance. In fiscal year 2017, Pakistan's export sector decreased 1.76 per cent as compared to 12.2 per cent negative growth in the former year (Pakistan Economic Survey 2017-18). The main reason for this slow export growth is not only due to the exports, based on narrow market access, but it is also due to high concentration in few items (69.3 per cent of total exports), like cotton manufactures and cotton, rice, leather, sports goods and pharmacy products (Pakistan Economic Survey 2014-15). On the other side of the trade coin, it shows that Pakistan's imports, namely, the machinery, petroleum products, technology, etc., have increased rapidly. These reasons of trade sector contribute to deteriorate the Pakistan's TOT index, which substantially leave a negative effect on Pakistan trade balance. To prevent deterioration in TOT and to improve the trade balance, export must grow in tandem with imports. In addition, Pakistan strongly needs to change its export basket, as it is essential to change the traditional export patterns, from primary products to the finish goods, brand development, and to improve competitiveness according to the international market demand [Ullah, et al., (2018)].

IV. Conclusion

This study scrutinizes the short- and long-run dynamics of trade balance-TOT nexus by utilizing the ARDL approach with time series data. The results depict that linkage between TOT and trade balance is statistically insignificant in long-run which is supported by various empirical studies [Hasan and Khan (1994), Mohsen and Brooks (1999) and Bouakez and Kano (2008)]. Price elasticities are also computed to dig more regarding trade-TOT nexus. It was also found that price elasticity is one of the possible reasons of insignificant impact of TOT on trade balance. The estimated Marshall Lerner (ML) condition does not hold for Pakistan, neither in the short-run, nor in the long-run. It points out that prices have an adverse effect on both, the export and import demands, but statistically insignificant in case of import demand.

The outcome of this empirical work also shows that the world income has positive linkage with the exports demand; while, exchange rate and price of exports are negatively linked with export demand along 71 per cent, convergence rate from short- to long-run equilibrium by incorporating all variables under-consideration. Lag of government expenditures and the exchange rate has positive linkage with import demand while prices have adverse effect on import demand along 48 per cent convergence rate from short- to long-run equilibrium due to under-considered variables. Non-existence of Marshall Lerner condition, both in short- and long-run drives the conclusion that currency devaluation is not a readymade solution to improve trade balance of Pakistan.

Although, after birth of the World Trade Organization (WTO), it is not easy for Pakistan to pursue the import substitution policy; as member countries of the WTO are obliged to reduce the tariff rates for getting access to the international market. Recently, in the wake of China-Pakistan Economic Corridor (CPEC), again Pakistan has huge scope to produce local consumer goods for import substitution [Ullah, et al. (2018)]. Additionally, local firms can easily make access to the required technology under the package of Special Economic Zones (SEZs) and start producing them locally. Therefore, due to significant export demand elasticity, it is proposed that policy makers should take necessary actions to export progression while, import elasticity is insignificant. Therefore, Pakistan should take into account the import substitution policies which may enhance stability in the trade balance.

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