Zagreb International Review of Economics & Business, Vol. 15, No. 1, pp. 73-88, 2012

ISSN 1331-5609; UDC: 33+65

Impact of Trade Liberalization on Trade Balance in Pakistan: Cointegration and Error Correction Mechanism

***Bushra Yasmin* ***

Abstract: This study traces out the way trade liberalization process affects the trade balance keeping into view the stationary nature of data used. The cointegration techniques and the error correction mechanism allow us to establish both, the short-run and the long-run relationship among different measures of trade liberalization and trade balance. The findings suggest a significant positive long-run relationship between trade liberalization and real exchange rate with trade balance while a significant negative relationship with GDP for the time period 1970-2008 in Pakistan. Such results stress on to improve the trade balance through a pertinent change in trade composition by diversifying our export contents and enhanced competitiveness.

Keywords: Trade liberalization, trade balance, cointegration, Pakistan

JEL Classification: C22, F41, O53

Introduction

Background of the Study

The impact of trade liberalization on the trade balance is crucial one as the trade balance is a distinctive factor among few that can be affected diversely by trade liberalization either through exports or imports. Pakistan has substantially liberalized its trade over the past two decades, either unilaterally or as part of multilateral initiatives. Trade liberalization is favored on the ground of standard trade theory which postulates that a country (like Pakistan) with an abundant labor supply reallocates resources toward labor-intensive goods, leading to an increase in employment and hence production. Pakistan has a comparative advantage in agriculture, textiles and services and an overwhelming proportion of workers in Pakistan are engaged in these

* Dr. Bushra Yasmin is Assistant Professor, Economics Department at Fatima Jinnah Women University, The Mall, Rawalpindi.

sectors. From standard trade theory context, it is expected that trade liberalization cause a significant boost in employment and production, promotion of exports, and hence the improvements in trade balance.

Historically, trade has acted as an engine of growth for countries at different stages of development, not only by contributing to a more efficient resource allocation within the country, but also by transferring growth from one part of the world to another. Hence, it is widely acknowledged that trade plays a significant role in accelerating economic growth of the country. But the worsening of trade balance is a major hindrance in the way to adopt rapid trade liberalization. Pakistan has remained one of the fastest growing economies in Asia for last few years. The track record on trade liberalization reforms is being regarded one of the contributing factors of Pakistan's growth performance. Pakistan's trade reforms have been remained substantial and its trade regime is considered to be one of the more open in South Asia. The findings on major studies conducted on the trade liberalization concluded that, contrary to popular beliefs and perceptions, the process of trade liberalization in Pakistan does not appear to have a significant impact on socio-economic factors. One justification provided in literature is the weaknesses in the channels of trade liberalization to the economy.

Trade balance in Pakistan has remained in deficit for long and the extent to which trade liberalization generate imports growth in excess of exports, it can lead to the deterioration of trade balance. Pakistan has to rely on the expensive imports due to lack of self-reliance in the mechanism of Pakistan's trade. Comparatively, heavily priced imports mostly consist of manufactured goods, whereas exports of Pakistan in international market constitute primarily of raw materials or semi-manufactured goods that are a great deal cheaper and lesser in demand due to lack of competitiveness.

Trends in Trade Balance of Pakistan

A distinguish factor that intensifies Pakistan's trade deficit is the dearth of diversification in Pakistani exports. Textile sector constitutes a major part of our exports and although the exports of Pakistan have increased from its earlier level, it still contributes very little to overall Gross National Product (GNP) of the country. The country's trade deficit improved by 13.9 percent in July-April 2008-09 from $ 14,218 million to $ 12,238 million during July-April 2009-10. Unlike last year when the decline in trade deficit was mainly contributed by massive fall in import expenditures in the backdrop of reduction in international prices, this year's improvement in trade deficit remained broad based, with both exports and imports contributing to this decline. Exports recorded growth of 8.0 percent during July-April 2009-10 on the back of recovery in export markets of the country, exchange rate depreciation,

and improved production of crops. Moreover, during 2009-10, export receipts of the country surpassed the full year official target of 6.0 percent exports growth for 2009-10. Exchange rate depreciation, higher imports prices and slower domestic demand remained the major factors behind the decline in imports during the period. Textiles sector that is a major driver of the exports of Pakistan captured 53.3 percent share in total exports during current fiscal year and witnessed an absolute increase of $ 556.2 million during July-April 2009-10, according to Pakistan, government of (2009-10).

Table 1 provides the figures on exports, imports and trade balance for the current decade. The trend in trade balance shows a sharp decline of 1.3 % of GDP in year 2002-03 as compared with previous decade. However, this mounted subsequently and touched its peak value of 12.8 % of GDP in year 2007-08 and then again turn down to 7 % in last year, 2009-10.

Fig 1 shows the response of trade balance to GDP ratio (*TBGDP*), exports to GDP ratio *(XGDP*), imports to GDP ratio *(MGDP*) and trade openness (*open*) over time 1970-2008 in Pakistan. Overall exports, imports and trade openness show the positive and fluctuating trend when moving along the time path. Mostly, imports show higher trend as compared with exports in Pakistan, though for few years reached at steady points for 1992-1994 and than in 2000, subsequently. While the trade balance shows irregular trend with most data points unfavorable for Pakistan. It is said that world-over economic downturn is one reason for lesser exports, but it can be tackled through more value addition and exploring new markets. The economists are having the view that trade deficit could be narrowed down because of lesser imports but the lesser imports in turn may lead to lesser exports, as Pakistan's exports largely depend on imported components of technical machinery. It may be noted that most of the raw material of textiles and garments, which constitute over 50 percent of the total exports, is being imported.

Pakistan has been facing a continual trade deficit during the period of globalization which is ambiguous, as lowering tariff rates can lead to more exports and imports, where imports are positive contributor towards exports in Pakistan. The impact of trade liberalization on the trade balance, therefore, needs to be investigated using some more appropriate empirical technique that can help us working out possible links between trade balance and the trade liberalization. Our study is an attempt into that direction.

The review of previous studies postulate that due to trade liberalization, both exports and imports of a country increases but the trade balance get mixed results. The countries respond variedly to free trade, nevertheless developing countries observed the descending impact of trade liberalization on trade balance as imports tend to increase more then exports in a response to trade liberalization. But the major concern here is that generalizing the findings for a particular country, derived from the panel data, is far from precision and most of the empirical studies are based on the panel data studies on the selected issue.

Objective of the Study

This study traced out the path of cointegrating equations and short and long term relationship between the trade liberalization and trade deficit. The improvement in the study of trade liberalization has been related to the development of more appropriate econometric techniques in literature for developing countries. One of the most important advances of this decade is the application of techniques developed around the concepts of cointegration and the error correction mechanism for the process of trade liberalization, as also pointed out by Sanso and A. Montanes (2002). Mostly, traditional methods involve the use of nonstationary time series data and the standard estimation and inference methods are not to remain correct (see, for example, Stock (1987) or Park and Phillips (1988)), with it being necessary to resort to the use of Cointegration analysis. Because the variables appearing in the studies reviewed above are nonstationary, their results could be clearly improved by the use of recent techniques. The main variables used for analysis are trade openness, real exchange rate and real GDP as endogenous while terms of trade, fiscal deficit and dummy for trade liberalization are used as exogenous variables. This procedure allows to differentiate between the short-run impact (the impact that has really taken place) and the long-run impact, which is the limit to which the impact tends towards, *ceteris paribus*.

The rest of paper is organized as follows. Section II provides a review of literature. Section III provides the data and methodology. Section IV discusses the empirical findings in detail. And last section concludes the paper with some policy implications.

Literature Review

The available literature provides strong evidence of trade liberalization leading to faster import and export growth but the evidence on the overall trade balance is mixed in this regards. Here, a comprehensive review of literature is provided.

According to Jenkins (1997), Bolivia adopted drastic trade liberalization in 1985 as part of its neo liberal economic policy and for the time period 1978-1992 the trade liberalization not only lead to higher exports and imports but also yield favorable effects on economic growth and employment generation. They provided the justification that a country's move towards free trade is expected to lead the economy to more efficient allocation of resources, that turns into structural shifts taking the economy out of protected import-competing sectors to exportable sector. However, a number of factors including de-industrialization and structural rigidities may prevent the transfer of resources. UNCTAD (1999) studied the effect of trade liberalization on the trade balance for 15 developing countries over the period 1970 to 1995 and

found a significant negative relationship. Studies have also examined the impact of trade liberalization on imports and exports separately.

Bhattacharaya (2004) provided that removal of trade barriers expands the trade between India and Bangladesh but the increase in India's exports have been more than the increase in its imports from Bangladesh. He argued that non-tariff barriers are also a major restraint to Bangladesh's exports to India, as India's non tariff barriers coverage ratio is much higher than Bangladesh. Indo-Bangladesh trade has been unbalanced and tilted highly in favor of India over the years. He examined these effects over the time period 1996-2002, using panel data estimation technique and also yielded that India's exports to Bangladesh surpass its imports throughout the years. Free trade between India and Bangladesh leads to increase its imports more from India instead of exports to India. Though the trade balance has declined marginally still it is at a high level.

Parikh (2006) concludes that trade liberalization promotes growth in most cases, but the growth itself has a negative impact on the trade balance and this in turn could have negative impacts on growth through deterioration in the trade balance and adverse terms of trade. They studied the relationship between trade liberalization, economic growth and trade balance for a panel data of 42 developing countries of Asia, Africa and Latin America. This study uses the real GDP, growth rates of individual and advanced countries, trade liberalization, the exchange rate and the terms of trade on trade balance.

Paulino and Thirlwall (2004) examined the impact of trade liberalization on exports, imports and the balance of payments for 22 developing countries over the time period 1972-1997. The Fixed Effects Model and Generalized Method of Moments (GMM) for panel data is applied for estimation. They found that the impact of trade liberalization on import growth was greater than on export growth that leads to worsen the trade balance of developing countries. At the same time, they found income elasticity of import demand and export demand increased by the same amount, but the price elasticity of demand for imports was greater than for exports. Thereafter, concluding that the balance of trade deteriorated after trade liberalization.

According to Shafaeddin (2005) trade liberalization leads to increase in the exports of a country. He analyzed economic performance of a sample of developing countries that have undertaken trade liberalization and structural reforms since the early 1980s with the objective of expansion of exports and diversification in favor of manufacturing sector. He selected the sample of East Asian, Newly industrializing, Latten America, Middle Eastern, North African countries and little industrial base countries which are located mainly in Africa for the period 1989-2000, to analyse the performance of developing countries when the reform process was intensified in most countries. The results obtained are varied. A 40% of the sample countries experienced rapid expansion of exports of manufactured goods, and in most African and

Latin American countries, growth of exports of manufactures was slow, or moderate, and the structure of GDP has not changed in favor of the manufacturing sector.

Wu and Zeng (2008) showed for a sample of 39 developing countries over 1970-2004 that both the imports and the exports increased after trade liberalization, however, the evidence that trade liberalization worsens trade balance was not robust for the trade liberalization dates. This completes the review of relevant literature. Now we turn to the model specification and econometric technique.

Methodology and Data

Model Specifications and Data

Most of the studies conducted on the selected issue used various econometric techniques without considering the stochastic properties of the economic time series. Anyway, it seems appropriate to develop a framework for the study of trade liberalization process which allows for the presence of nonstationary variables.[1] The base model in this study is derived from Wu and Zeng (2008). Trade balance function is specified as;

$$TB_t = \alpha + \beta_1 drgdp_t + \beta_2 open_t + \beta_3 rer_t + \beta_4 TOT_t + \beta_5 fisr_t + \beta_6 tlib_t + \mu_t \quad (1)$$

Where TB_t denotes the trade balance as percentage of *GDP*. It is measured as the difference between exports and imports divided by *GDP*. $drgdp_t$ refers to domestic real GDP of Pakistan. Trade liberalization can be measured by various factors including outcome-based (trade openness; exports plus imports as percentage of GDP), incidence-based (tariff rates) and the event-based measure (using a dichotomous variable to differentiate between pre and post trade liberalization). Trade openness (*open*) is mostly used as it comprised both exports and imports. The dummy variable for trade liberalization takes the value zero before 1988 when trade liberalization initiated as a backdrop of Structural Adjustment Program (SAP) in Pakistan and assigning value 1 for post-trade liberalization period i.e., 1988 onward. Trade openness is used as endogenous variable in this model while the dummy variable (*tlib*) is used as exogenous factor as it is determined independently. Similarly, the variables rer_t *refers to* real exchange rate is used as endogenous variable in the model and is constructed by dividing the nominal exchange rate by *the ratio of domestic Consumer Price Index (CPI)* to foreign *CPI*. *TOT* refers to the terms of trade taken as exogenous variable and is defined as the relative prices of country's exports to its imports. This is measured by taking the unit value of exports divided by the unit value of imports for Pakistan. The variable *fisr* shows the fiscal balance to *GDP* ratio. Fiscal balance represents the difference between government revenues and expenditures, used to

control for the impact of fiscal policy on the trade balance, taken as another exogenous variable.

The data for this purpose is selected from the International Financial Statistics (IFS), publication of International Monetary Fund (IMF) for the time period 1970-2008 for Pakistan.

The theoretical justification of the model recommends the expected sign for rer is positive while for *drgdp;* negative as increase in real GDP lead to higher imports as compared with exports that further lead to deterioration of trade balance. Regarding real exchange rate when it rises, the exports go up, the imports fall down and it improves the overall trade balance. Trade liberalization is expected to have either a negative or positive effect on the overall trade balance. It is expected that trade liberalization would lead to higher imports and exports due to reduction in tariffs but the effect may be either way as it depends on the extent of changes in exports and imports. The previous studies conducted on the issue provided mixed evidence in this regards.

Econometric Methodology

Unit Root Test

This study, first of all, check the stationarity properties of the data as mostly macroeconomic time series data is nonstationary as pointed out in a seminal paper by Nelson and Plosser, 1982 and thus conducive to spurious regression. The most popular 'Augmented Dickey-Fuller' (ADF) test statistic for unit root is applied to determine the order of integration of each variable in the model. ADF is based on the t-ratio of the parameter in the following regression;

$$\Delta X_t = \kappa + \phi t + \Theta_t X_{t-1} + \sum_{i=1}^{n} \varphi_t \Delta X_{t-1} + \varepsilon_t \tag{2}$$

Where X is the variable under consideration, Δ is the first difference operator, t captures any time trend, t, ε is a random error, and n is the maximum lag length. The optimal lag length is identified to ensure that the error term remains white noise, while κ, ϕ, Θ*and* φ are the parameters to be estimated. If we cannot reject the null hypothesis $\Theta = 0$, we can conclude that the series under consideration has a unit root and is therefore nonstationary.

After confirming that all the variables are of the same order of integration, the study proceeds testing the long-run behavior of economic variables with the help of cointegration test. The selection of an optimal lag length is essential at the onset of cointegration analysis because multivariate cointegration analysis is very sensitive to lag length selection. Therefore, two most commonly used lag length selection criteria

are used namely; Akaike information criterion (AIC) and Schwarz Bayesian criterion (SBC), on the basis of Vector Autoregressive model (VAR) model of selected variables.

Johansen's Cointegration Test

We estimate the impact of trade liberalization, GDP, and real exchange rate on the trade balance in Pakistan for the long- and short-run. In order to estimate co-integration relationship two approaches are most commonly adopted, Engle-Granger or Johansen approaches. But it is emphasized by econometricians that application of Engle-Granger approach is not appropriate in the presence of more than two variables, as the Engle-Granger approach intends only one co-integrating equation between variables. And as ours is a multivariate model we carried out the Johansen (1998) maximum likelihood cointegration technique to test whether the trade liberalization process is co-integrated with the trade balance i.e., if there is a non-spurious long-term relationship between the two series along with other selected variables. Thus, in order to test for co-integration we use the Johansen (1988) and Johansen and Juselius (1990) full information maximum likelihood method.

This test yields both the existence and the number of cointegrating vectors. To determine the number of cointegrating vectors, Johansen developed two likelihood ratio tests: the trace test (λtrace) and the maximum eigenvalue test (λmax). If there is any divergence of results between these two tests, the λmax test is mostly recommended because it is more reliable in small samples (see Dutta & Ahmed, 1997, and Odhiambo, 2005). This multivariate cointegration test can be expressed as;

$$Z_t = K_1 Z_{t-1} + K_2 Z_{t-2} + \ldots + K_{k-1} Z_{t-k} + \mu + v_t \tag{3}$$

Where *Z* (TB, drgdp, open, TOT, rer, fisr, tlib) *t* = i.e., a 7 x 1 vector of variables that are integrated of order one [i.e. *I* (1)]. μ = a vector of constant and v_t *is* a vector of normally and independently distributed error term.

It is important to point out that the long-run effects should be considered with some caution, in that they are not the real measures of the trade impact. Rather, they can inform of what impact would be if economy had reached its equilibrium behaviour. Thus, these effects should only be considered as the limit to which the behaviour of dependent variable will tend towards, ceteris paribus [Sanso and Antonio (2002)]. To that end, all the cointegration relationship is related to an Error Correction Mechanism (ECM). It should be taken into account which, up to a certain point, is the regulator of the behaviour of the variable in the short run, as shown by Engle and Granger (1987).

Equation (3) can be reformulated in a Vector Error Correction Model (VECM) as follows:

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + ... + \Gamma_{k-1} \Delta Z_{t-k-1} + \Pi Z_{t-1} + \mu + \nu_t \quad (4)$$

where, $\Gamma_i = (I - A_1 - A_2 \ldots - A_i)$, i = 1, 2, 3…k – 1 and $\Pi = -(I - A_1 - A_2 - A_3 \ldots - A_k)$. The coefficient matrix Π provides information about the long-run relationships among the variables in the data. Π can be factored into α, β' where α will include the speed of adjustment to the equilibrium coefficients while the β' will be the long-run matrix of coefficients. The presence of *r* cointegrating vectors between the elements of *Z* implies that Π is of the rank *r*, $(0 < r < 3)$. Finally, the short and long-run response of balance of trade to trade liberalization is made by using the Impulse Response Function (IRF).

Empirical Results

Test for Order of Integration

Before estimating the cointegration and ECM, it is significant to examine the stationary of each individual series, trade balance (TB), real domestic GDP (rgdp), trade openness (open), real exchange rate (rer), terms of trade (TOT) and fiscal deficit (fisr) using Augmented Dicky Fuller (ADF) test. Unit root test yields the existence of unit roots at level and stationary at its first difference when ADF is used with the trend and intercept. So, the variables are found integrated at order one i.e., I (1).

After establishing that all the individual series under consideration are stationary, the traditional co-integration method is used to estimate the long-run relationship among the variables, particularly trade balance, real GDP, trade openness, and real exchange rate. As mentioned above, Johansen's maximum likelihood approach is applied for the co-integration test. The optimal lag length is 3, selected using Akakie's information criterion (AIC) and Schwartz criterion (SIC).

Cointegration Test

Table 3 yields the results for co-integration. Johansen-Juselius co-integration test indicates, using both the trace statistic (λ_{trace}) and maximal eigenvalue (λ_{max}), at least two cointegrating equations among the selected time series. We can reject the null hypothesis of no cointegrating equations in favor of two cointegrating vector under both test statistics at a 5 percent level of significance. This implies that the trade balance, real exchange rate, real GDP and trade openness establish a stable long-run relationship in Pakistan.

General-to-Specific Dynamic Model

The short-run dynamics of the trade balance was estimated following general-to-specific modeling approach. Given that all variables are in their first difference, the lag structure is restricted to two periods. The results for the error correction model for trade balance are reported in Table 4. The results postulate a long run significant association among variables. A number of diagnostic tests are applied to the error correction model. R^2 implies that model is a good fit. The serial correlation-*Lagrange Multiplier test* indicates no signs of autocorrelation in the model. Normality test is based on χ^2 statistic and cannot reject the null hypothesis of 'residuals contain all the properties of classical linear regression model'. All the variables appeared to be statistically significant. The real exchange rate is statistically significant at 5 % level of significance and has positive impact on trade balance of Pakistan. The positive effect of real exchange rate is also supported by Aziz (2008) for Bangladesh, and Mohammad (2010) for Pakistan in the studies of real exchange rate. This implies that real exchange rate depreciation tends to the improvement in trade balance. Mostly, this relationship is supported when the Marshall-Lerner condition holds. The study by F. Dong (2010) postulates that to improve the current account balance in the short run, one would expect that the Marshall-Lerner condition holds. That is, all else equal, a real depreciation improves the current account if export and import volumes are sufficiently elastic with respect to the real exchange rate change. Mohammad (2010) also verified that the Marshall Lerner condition holds in Pakistan over the time period1970-2008, with the help of Impulse Response Function (IRF). The results show that depreciation of domestic currency leads to unexpected falls in export earning in Pakistan and balance of trade started improving within 4 years. The elasticity model of the balance of trade Krueger (1983) has shown the existence of a theoretical relationship between exchange rate and the trade balance.

On the other hand, the effect of real GDP is negatively significant at 10 % level of significant on the trade balance. This effect is justified on the account of increased level of GDP leads to higher volume of exports and imports but imports grow more than exports that deteriorate the trade balance, subsequently. Parikh (2004) highlighted the phenomena where although trade liberalization promotes growth but the economic growth itself has a negative impact on trade balance. Regarding the trade openness measure it has statistically positive and significant effect on the trade balance in Pakistan. The trade openness along with depreciation of domestic currency is adopted in the hope of improved trade balance. Nevertheless, Wu and Zeng (2008) found little evidence for negative effect of trade openness on trade balance.

Enders (1995) points out a principal feature of cointegrated variables, that their time paths are influenced by the extent of any deviation from the long-run equilibrium The Error Correction Term (ECT) represents the percentage of correction to any deviation in the long-run equilibrium balance of trade in a single period and also

represents how fast the deviations in the long-run equilibrium are corrected. The coefficient of the ECT of trade balance that measures the speed of adjustment appears to be negative reflecting the model stability. The value (-0.36) implies a slow rate of convergence to equilibrium.

This means that, whenever there is any disturbance in the system in the long run, in every short-run period, a 36 percent correction to disequilibrium will take place. And this takes the time period more than 10 years.

Finally, we turn to the dynamics of trade balance based on Impulse Response Function (IRF).

Impulse Response Function

Impulse response function (IRF) tracks the impact of any variable on others in the system. It is an essential tool in empirical causal analysis and policy effectiveness analysis. Error correction model produces consistent IRF and optimal predictions. The graphs given below provide the result of IRF for trade balance to trade balance and real exchange rate, respectively. Graph 1 shows the time path of trade balance to the shocks from its own lagged values. Since the trend line (pointed out by blue-line) for trade balance converges to zero, this shows the stability of model. Graph 2 depicts the response of trade balance to real exchange rate and the trend shows Marshall-Lerner condition holds in the long-run in Pakistan. The IRF demonstrate that depreciation leads to an increase and then unexpected fall in exports earning and rise in imports cost after devaluation within 4 years. And until 10 years it goes eventually to the baseline.

Conclusions and Policy Recommendations

Overall, findings of this study confirm the presence of a long-run cointegration relationship among the trade balance, openness, GDP and real exchange rate. The error correction term yields the stability in trade balance but the disequilibrium in the short run takes a long time to adjust trade balance. The major findings postulate that devaluation and openness both improves the trade balance, while GDP leads to the deterioration of trade balance in Pakistan. The findings are consistent with Parikh (2006) and Mahmood (2010). Pakistan has opened up its economy in expectation of improvement in balance of trade but it still needs to have supporting policies along with exchange rate and liberalization measures that can lead to improve the trade balance. The major challenge in the way of improvement in trade balance is the trade pattern of our country that restricts the flow of potential benefits of trade liberalization on the trade balance specifically and on the economy, generally. As the process

is being hampered by the lack of exports diversification and competitiveness in the world market. In this regards, the devaluation alone is not fair enough to bring about the improvement in trade balance.

A number of suggestions have been given time to time to focus on the import of capital goods and machinery to support domestic production capacity and gradual shifting exports from primary to value added or capital goods. Pakistan needs various economics policies to enhance the balance of trade and boosts the economic activity and development included i.e. tariff structure, exchange rates, import control, export taxation, and foreign exchange allocation system. Pakistan needs to make and adjust external trade policies along with strengthening the internal system of the economy to reap potential benefits of trade liberalization so that the gap in trade balance could also be mitigated by the time.

NOTES

[1] Where all the variables are expected to become stationary on the same level of integration.

REFERENCES

Aziz, N. (2008). 'Role of Exchange rate in Trade Balance: Empirics from Bangladesh Economy'- presented in the *Small Open Economics in a Globalized World* conference, June 12-15, 2008, Waterloo, Ontario, Canada.

Bhattachary, S.K.(2004). 'Does Bangladesh Benefit from Preferential Trade with India? A Gravity Analysis'. *Economic and Political Weekly*, vol. 39 (48): 5152-5162.

Dong, F. (2010). 'Testing the Marshall-Lerner Condition: Cointegration in Models with Regime Shifts'. *International Atlantic Economic Society.*

Dutta, D., and Ahmed, N. (1997). *'An Aggregate Import Demand Function for Bangladesh: A Cointegration Approach'*. Working Paper. University of Sydney.

Enders, W. (1995). *'Applied Econometric Time Series'*. New York: John Wiley.

Jenkins, R. (1997). 'Trade Liberalization in Latin America: The Bolivian Case.' *Bulletin of Latin American Research*, vol. 16(3): 307-325

Khan, M.S. and R. Zahler (1985). 'Trade and Financial Liberalization given External Shocks and Inconsistent Domestic Policies.' *IMF Staff Papers*, vol. 32: 22-55.

Kreuger, A.D. (1983). '*Exchange Rate Determination*. Cambridge.' *Cambridge University Press*

Mohammad, S. (2010). 'Determinant of Balance of Trade: Case Study of Pakistan', *European Journal of* Scientific Research, vol. 41(1): 13-20

Nelson, C., and Plosser, C. (1982), 'Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications', *Journal of Monetary Economics*, 10, 130-162.

Odhiambo, N. M. (2005). 'Financial Liberalization and Financial Deepening: Evidence from Three Sub-Saharan African Countries'. *African Review of Money, Finance and Banking (Savings and Development Supplement)*, 5-23.

Pakistan, Government of (2009-10), 'Pakistan Economic Survey', Ministry of Finance, Islamabad

Parikh, A. and C. Stirbu (2004). 'Relationship between Trade Liberalization, Economic Growth and Trade Balance: An Econometric Investigation.' *HAWWA discussion paper 282*.

Park, J. and Phillips, P. C. B. (1988). 'Statistical inference in regressions with integrated processes': Part I, *Econometric Theory*, 4: 468-97.

Paulino, A.S. and A. P. Thirlwall (2004). 'The Impact of Trade Liberalization on Exports, Imports and the Balance of Payments of Developing Countries.' *The Economic Journal*, Vol. 114 (493): 50-72.

Sanso, Marcos and Montañés, Antonio (2002). 'Cointegration, Error Correction Mechanism and Trade Liberalization: The Case of the Spanish Imports of Manufactures', *Applied Economics*, vol. 34(2): 231-240

Shafaeddin, S. M.(2005). 'Trade Liberalization and Economic Reform In Developing Countries: Structural Change or Deindustrilization?'*United Nations Conference on Trade and Development*, No. 179.

Stock, J. (1987). 'Asymptotic properties of least-squares estimator of Cointegrating vectors', *Econometrica*, 55, 1035-56

Wu, Y. and L. Zeng (2008). 'The Impact of Trade Liberalization on the Trade Balance in Developing Countries.' *IMF Working Paper /08/14*

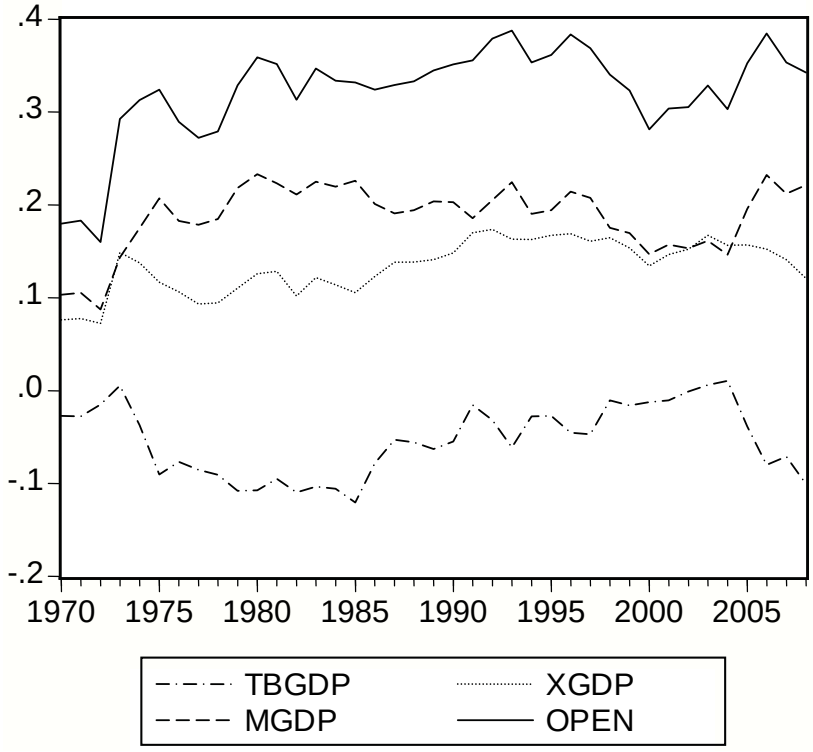
Appendix

Table 1: Exports, Imports and Trade Balance (Rs million)

Year	Exports	Imports	Trade Balance	Trade deficit as % of GDP
2000-01	539,070	627,000	-87,930	2.1
2001-02	560,947	634,630	-73,683	1.7
2002-03	652,294	714,372	-62,078	1.3
2003-04	709,036	897,825	-188,789	3.3
2004-05	854,088	1,223,079	-368,991	5.5
2005-06	984,841	1,711,158	-726,317	9.5
2006-07	1,029,312	1,851,806	-822,494	9.4
2007-08	1,196,638	2,512,072	-1,315,434	12.8
2008-09	1,383,718	2,723,570	-1,339,852	10.6
2009-10	1,176,388	2,081,763	-905,375	7.0

Source: Pakistan, Government of (2009-10)

Figure 1: Trends in Trade Balance of Pakistan



Source: IMF (various issues)

Table 2: Augmented Dickey Fuller (ADF) Unit Root Tests

Variables	Level	First difference	Order of Integration
TB	-1.730	-5.287	I(1)
drgdp	-0.229	-5.099	I(1)
open	-3.40	-6.33	I(1)
rer	-1.783	-5.194	I(1)
TOT	-2.99	-5.96	I(1)
fisr	-2.48	-7.014	I(1)
5 % critical value	-3.53	-3.53	-

Table 3: Cointegration Test based on Johansen's Maximum Likelihood Method

Null Hypothesis	Alternative Hypothesis	Trace test Maximal		Eigenvalue test	
		Statistics	95 % critical value	Statistics	95 % critical value
r = 0	r = 1	115.16	47.86*	63.49	27.58*
r ≤ 1	r = 2	51.66	29.79*	40.76	21.13*
r ≤ 2	r = 3	10.89	15.49	6.09	14.26

Note: * implies that null hypothesis is rejected at 5 % confidence level and therefore there are two Cointegrating vector.

Table 4: Error Correction Model for Trade balance

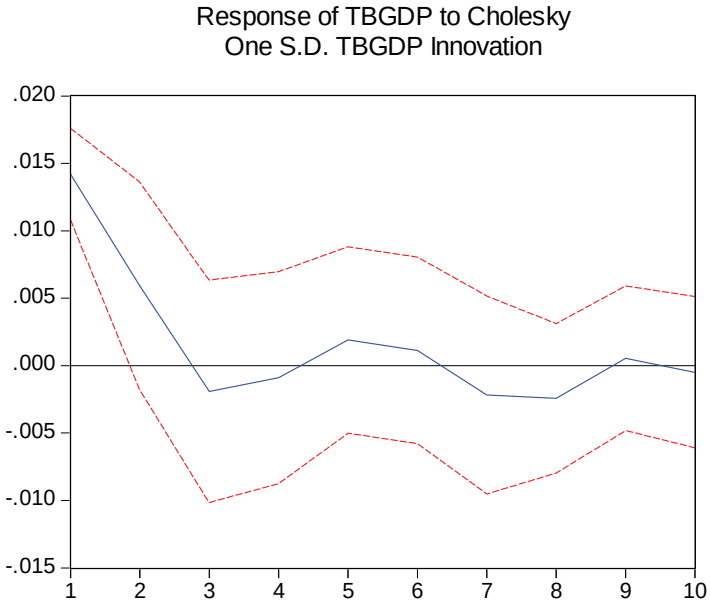
Variables	**ECM based on Johansen Technique (se in parentheses)**
Constant	0.382
$DGDP_{t-1}$	-0.0027* (0.0011)
$DOPEN_{t-1}$	0.86* (0.189)
$DRER_{t-1}$	0.0028** (0.001)
ECT_{t-1}	-0.362* (0.142)

Diagnostic Tests

R^2	0.84
RSS	0.0029
Log-likelihood	110.86
F statistic	3.8
Normality test (Cholesky)	$\chi^2(4) = 0.159$ (0.997)
Wald test (block exogeneity)	$\chi^2(9) = 22.27$ (0.008)
Hetroskedasticity- White test	$\chi^2 = 251$(0.46)
Serial Correlation (Breusch–Godfrey serial LM)	18.45 (0.298)

Note: **, * indicates statistically significant at 5 % and 1 % level, respectively.
p- values in parentheses of diagnostic tests.

Graph 1



Graph 2