

## Import Demand, Economic Development and Trade Liberalization in Pakistan: An Empirical Analysis

# Muhammad Wasif Siddiqi<sup>1</sup>, Amjad Ali<sup>2</sup> and Muhammad Irfan Chani<sup>3</sup>

## Abstract

This study empirically investigates the effects of trade liberalization and economic development on income and price elasticities of import demand in Pakistan. The data used for empirical analysis covers the period of 1972 to 2009. Johanson co-integration test is used to confirm the equilibrium relationship among the variables included in the study. The short run dynamics are estimated through Vector Error Correction Mechanism. The results indicate that trade liberalization in Pakistan positively influences income elasticity of import demand. Similarly, price elasticity of import demand in Pakistan is positively related to level of economic development in the country.

Keywords: import demand, trade liberalization, economic development, price, Pakistan

## I. Introduction

The 'Idea of specialization' by Adam Smith started the debates about import substitution versus export led growth policies in the world (Frankel and Romer, 1999). Imports and exports are two major components of the trade account of any country. Developing countries derive a substantial share of their national income from the export of primary goods. Developing countries are also seriously dependent on the import of diverse capital and consumer goods to fulfill the need of their industries and to satisfy the consumption needs of household. Most of the developing countries face problem of persistent trade deficit because value of their imports exceeds that of their exports. Thus multidimensional research is needed to study the trend of import and export of these countries. Similarly research based trade policies can help these countries to overcome the problem of persistent trade deficit (Salvatore, 1983).

Discussion of import demand elasticities is among the widely studied topics in international trade literature. International trade is playing an important role for countries' economic growth as well as their development. Through international trade of goods as well as services each country specializes in particular goods and services. For all countries the gains from trade are reflected in

<sup>1</sup> Visiting Professor, GCU, Lahore, Pakistan

<sup>2</sup> Ph. D Scholar, National College of Business Administration and Economics (NCBA&E), Lahore, Pakistan

<sup>3</sup> Assistant Professor and HOD Economics, The University of Lahore, Pakpattan, Pakistan

consumption possibilities that exceed production possibilities. All this is possible with the help of free trade (Ali, 2011 and Ali and Chani, 2013).

It is the upper understanding of every country to know which import flows respond to shifting economic conditions in a country and for formulating exchange rate and trade policies. There is a consensus that imports usually respond more speedily than exports to practical trade liberalization, resulting in short run current account inequities. Assessment of import demand functions has remained a dynamic range of research. The main reason is a concern on part of policy makers regarding resolution of trade deficits and volatility in exchange rates and formulation of effective trade policies (Ali, 2011 and Ali and Chani, 2013).

An international institution World Trade Organization (WTO) aims to decrease world-wide trade obstacles and impose trade rules on all countries of the world. Trade liberalization is one of the major policy issues all over the world particularly in WTO member countries. Trade liberalization is advocated on account of efficient economic growth and human welfare. With trade liberalization variety of new and superior quality products are accessible to consumers at economical prices (Balassa, 1963 and World Bank, 2002).

For increasing economic development trade liberalization is one of the main tools for the economies. Therefore liberalized countries are experienced with higher economic growth as compared to non-liberalized countries. As a result, developing countries lag far behind in this regards in case of developed countries (Kruger, 1997).

Pakistan is one of the fast growing economies of Asia for some years. Economic growth of Pakistan has also increased in this period and annual growth rate of the country over a 60 year span has been 5.2 percent. Pakistan maintained highly protective trade till the end of 1980s and traded under fixed exchange rates. Towards late 1980s, a number of revolutionary steps were taken to liberalize the trade of Pakistan by reducing anti-export bias in the trade regime. The non-tariff barriers were reduced significantly and the adoption of a negative import system were major improvements. By 1986, the equivalent percentage was 29 percent and 3.7 percent respectively. This was achieved by two types of measures. Firstly, explicit import quotas on non-capital imports were essentially removed. Secondly, banned and restricted imports were slowly liberalized (Zaidi, 2005).

The speed with which trade liberalization has taken place during the last two decades is impressive. Maximum tariff has been reduced to 25 percent from 80 percent in 2005 with simple average applied rate of 15 percent compared to 51 percent in 1995. As we have discussed trade liberalization can affect the import demand of Pakistan and what is the main effect of trade liberalization on the economic development of Pakistan this is the main question which we are answering in this study.

### **II. Literature Review**

Import demand is widely discussed in international economic and trade liberalization and economic growth are always the main topic to study for the researchers of all the time. Shiells, Stern and Deardorff (1986) have analyzed the import demand elasticities on disaggregated level.

The main differentiation of their study is they analyzed the import demand functions for one product group. Goldberg and Maggi (1999) and Gawande and Bandhopadhyay (2000) explored the trade openness effects on different sectors of developing countries and they got the results that trade openness has different effects on productivity growth in different sectors. They found that liberalization has significant effect on growth of different sectors and overall economic development of a country. According to them in developing countries with slow-growth sectors, the governments have to concentrate on stimulating the development of other sectors through technology transfers to medium-growth manufacturing. So the authors suggest that trade openness effects the import demand as well as economic development of a country.

Hakura and Jaumotte (1999) investigate the importance of trade for the transformation of technologies towards the developing countries using data for 87 countries. The authors proved that intra-industry trade plays an impressive role in the transformation of technology. Intra-industry trades is more persistent among developed countries and inter- industry plays a significant role among the trade of developed as well as developing countries. Developing countries will enjoy relatively less technology transfer from trade than developed countries.

Rodrik and Rodriguez (1999) have empirically tested the assumption that there is strong positive correlation between economic growth and external openness of developing countries. According to them trade liberalization in Africa has resulted in high import demand and increase in economic growth, whereas those countries where trade is not open, slow economic development has been observed.

Dutta and Ahmad (2000) accessed the co-integrating relationship between import demand and its determinants in long run as well as in short run in case of Bangladesh using the data from 1974 to 1994. They used two kinds of functions for estimating import demand. The study used import prices, gross domestic product in real terms, real imports and dummy variable. The dummy was used for the proxy of trade liberalization policies. They concluded that only one co-integration relationship prevails among the variables included in import demand function in long run. For the short run co-integrating relationship among the variables, the study found that the included variables are also co-integrated in short run and their equilibrium will be restored in case of any economic shock in the short run as indicated by negative sign and significance of the slop coefficient of error correction term. In the estimation of their second model similar long run behavior was shown by the standard variables included in import demand function and dummy variable of trade liberalization as was shown in first model. The short run estimates indicated the theoretically expected sign of coefficients and these coefficients were significant at 5 percent level. The negative sign of lagged residual term again strengthened the view that long run equilibrium relation among the variables is stable. The dummy variable of trade liberalization showed that liberalization of trade in Bangladesh failed to play an effective role to change import demand behavior in the country as dummy variable had very small coefficients in both models.

Chaudhry and Imran (2009) argued that trade liberalization is often considered as a significant instrument for 'growing' economic growth in the world. The relationship between economic development and trade liberalization always remained controversial in policy making process. There is a great consensus that trade policy openness and higher ratios of trade volume to GDP

were positively related to economic growth. Now many developing countries are trying to liberalize their trade pattern for attracting foreign investment. In this way trade openness can increase the efficiency of a country for achieving high economic development.

## III. The model

For modeling the time series behavior of international trade we should keep certain things in our mind. An appropriate model of international trade depends on, the types of goods being traded, the end use of the imported commodities, the purpose of the modeling and the availability of the required data (Chani and Chaudhary, 2010). Theoretical modeling of international trade flows is dominated by two types of general models; these are perfect substitute's models and imperfect substitute's models. The perfect substitute's models are criticized on many grounds the law of one price does not seem to hold true either across or within countries, except for standard goods such as wheat and copper that are sold through international commodity exchanges. By following the imperfect substitute's model of Goldstein and Khan (1985), the basic model of this study could be defined as

$$IMP_{t} = f(GDPP_{t}, mP_{t}, dP_{t})$$
(1)  
$$LIMP_{t} = B_{0} + B_{1}LGDPP_{t} + B_{2}L(mP_{t} / dP_{t}) + U_{t}$$
(2)

The equation 2 represents the import demand function of Pakistan; Where

t = Time period (1972-2010)

L = The base for natural log

 $LIMP_t =$  Import demand for Pakistan in t time period

 $LGDPP_t =$  Per Capita GDP of Pakistan in t time period (is the proxy for economic development in Pakistan)

 $L(mP_t / dP_t) =_{\text{Relative price of import in t time period (where } mP_t \text{ import}$ price index and  $dP_t$  is domestic price index)

 $U_t =$  The residual term

Melo and Vogt (1984) proposed that elasticity of income would change after some time period when the degree of openness changes, and when the degree of openness is increased, the process of specialization becomes more common among the countries. The elasticity of price of imports has the ability to improve economic development of a country (cheap substitutions give people high satisfaction). So we can conclude that trade liberalization plays a significant role in economic development as well as imports behavior of a country. So we follow the model of Boylan and Cuddy (1987) for finding the effect of trade liberalization on import of Pakistan and we also find the effect of economic development on imports of Pakistan. We can define our model as:

$$LIMP_{t} = B_0 + B_1 LIMP_{t-1} + B_2 LGDPP_t + B_3 LRPM + B_4 LLIBD_t + U_t$$
(3)

All the variables are explained above except  $LLIBD_t$  (which is explaining the trade liberalization process of Pakistan in t time period).

#### **IV. Johansen Co-integration Test**

Johansen (1988) proposed Johansen Co-integration test and Johansen and Juselius (1990) extended it for finding long run relationship of the variables when they are stationary at some order of integration. Originally, co-integration concept was developed by Engle and Granger (1987). Engle and Granger (1987) proposed two step estimation for only one co-integrating vector, but Johansen (1988) and Johansen and Juselius (1990) proposed maximum likelihood test for finding the number of co-integrating vectors in demonstration of Vector Autoregressive (VAR). The common method of VAR is as below:

$$X_{t} = \alpha_{0} + \alpha_{t} X_{t-1} + \dots + \alpha_{k} X_{t-k} + \varepsilon_{t}$$

$$\tag{4}$$

Where  $X_i$  is a  $(n \times 1)$  vector of variables that are integrated at same order,  $\alpha_0$  is a  $(n \times 1)$  vector of constant terms,  $\alpha_t \dots \alpha_{t-k}$  are parameters and  $\varepsilon_i$  is the residual term, for Vector Error Correction Model (VECM) the VAR can be written in following form.

$$\Delta X_{t} = \mu + \sum_{i=0}^{\rho-1} \varphi_{i} \Delta X_{t-i} + \Upsilon X_{t-1} + \varepsilon_{t}$$
(5)

Where  $X_t$  is a  $(n \times 1)$  column vector of P variables, u is a  $(n \times 1)$ vector of constant terms,  $\varepsilon_t$  is  $(n \times 1)$  vector of usual error term,  $\Box$  is difference operator and  $\mathcal{P}$  as well as  $\Upsilon$  represent coefficient matrices. The coefficient matrix  $\Upsilon$  is representing the long run equilibrium relationship for the matrix. In this analysis two types of likelihood ratio tests are utilized (trace test statistics and maximum eigenvalue test statistics) for finding co-integrating vectors. VECM is represented according to the variables of our model as:

$$IMP_{t} = \alpha_{0} + \sum_{j=0}^{n} \alpha_{1}GDPP_{t} + \sum_{j=0}^{n} \alpha_{2}RPM + \sum_{j=0}^{n} \alpha_{3}LIBD_{t} + \eta ECT_{t-1} + U_{t}$$
(6)

If the term ECTt-1 is significant it is the sign of short run relationship among our variables. The value of ECTt-1 also tells the convergence and divergence speed from short run to long run. The negative value explains the speed of convergence whereas the negative value explains the divergence speed. The significance of the ECTt-1 is another proof of stable long run relationship among the variables (Banerjee et al. 1998).

#### **V. Empirical Results and Discussions**

For investigating the problem of stationary Augmented Dickey-Fuller (ADF) unit root test is utilized when variables are in logarithmic form. The results indicate that all the variables are not stationary at level except relative prices of imports so we cannot reject the null hypothesis of

non-stationary. But the results shows that all variables of our model are stationary at 1st difference and here we can reject the null of non-stationary and accept the alternative which show the stationarity of data. The results also explain that all the variables of our model have same order of integration I(1) which is suitable condition for applying Johansen Co-integration. The results of ADF have been presented in the table 1.

Table 1: Unit Root Estimates				
Augmented Dickey-Fuller (ADF) test at Level				
Variables	t-Statistic	p-Value		
LGDPP	-1.256644	0.6391		
LIMP	-1.056172	0.7225		
LRPM	-3.203315	0.0280		
Augmented Dickey-Fuller (ADF) Test at 1 <sup>st</sup> Difference				
ΔLGDPP	-4.603042	0.0007		
ΔLIMP	-6.054621	0.0000		
ΔLRPM	-5.350873	0.0001		

For the selection of optimal lag length one should retain certain things in one's mind that the number of observations and variables to be studied and lags requirement for co integration test, maximum three lags are allowed to select the optimum lag length in Vector Auto-Regressive (VAR) process. Schwarz Information Criterion (SIC) suggests that an optimal lag length of 1. Thus the lag length 1 has been selected for the analysis.

Table 2: Cointegration Estimates-I					
Unrestricted Co-integration Rank Test (Trace)					
$H_0$	$H_1$	Trace Statistic	0.05 Critical Value	Prob.	
$R = 0^*$	$R \ge 1$	47.25804	35.19275	0.0016	
$R \leq 1^*$	$R \ge 2$	21.61543	20.26184	0.0324	
Trace test indic	ates 1 co-integrat	ing eq (s) at the 0.05 le	evel		
* denotes reject	tion of the hypoth	nesis at the 0.05 level			
**MacKinnon-	Haug-Michelis (1	999) p-values			
Unrestricted Co-integration Rank Test (Max-Eigen)					
$H_0$	$H_1$	Max-Eigen Statistic	0.05 Critical Value	Prob.	
$R=0^*$	$R \ge 1$	25.64262	22.29962	0.0164	
$R \leq 1^*$	$R \ge 2$	12.52822	15.89210	0.1574	
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level					
* denotes rejection of the hypothesis at the 0.05 level					
**MacKinnon-Haug-Michelis (1999) p-values					

For testing co-integrational relationship among the variables import demand, gross domestic product per capita and relative prices of imports, Johansen co-integration is applied. The results

of Johansen's co-integration test are defined in table 2. Trace statistics  $\lambda_{trace}$  and Maximum Eigen statistics are utilized for finding the co-integrating vectors number. In both Trace statistics

 $\lambda_{trace}$  and Maximum Eigen statistics when we reject null hypothesis of no co-integration show that there is co-integrational relationship among our variables. Starting with the trace statistic null hypothesis of no co-integration (R=0) among the variables. The value of trace-test statistics is 47.25804, which is above the critical value of 35.19275 at 5% significance level. Hence it rejects the null hypothesis R=0 of no co-integration and in favour of alternative hypothesis  $R \ge 1$  of co-integration. On the bases of results we can conclude that there is existence of one co-integrating vectors. In case of Maximum Eigen test statistics, the value of Max-Eigen is 25.64262which is higher than the critical value of 22.29962 at 5% level of significance level. So the Max-Eigen value also confirms the existence of one co-integrating vectors.

The coefficients of normalized co-integrating equation are presented in equation 7. According to the results that there is positive relationship between import demand and GDPP and there is negative relationship between import demand and relative prices of imports. If 1% increase in GDPP brings 3.90% increase in imports demand, this shows that import of Pakistan are positively related to income and -6.522 coefficients of relative price show that imports of Pakistan are negatively related to relative prices of imports. So the end results of our analysis is that in the long run imports of Pakistan are highly sensitive to change in income as well as change in relative prices.

$$LIMP_{t} = B_{0} + B_{1}LGDPP_{t} + B_{2}L(mP_{t} / dP_{t}) + U_{t}$$
$$LIMP_{t} = 13.53998 + 3.907226LGDPP_{t} - 6.522749LRPM_{t}$$
(7)

When long run co-integration among the variables is verified, then VECM is used to find short run dynamics. Table 3 shows the short run dynamics of the variables. According to the results presented in the table 3, GDPP and relative price have insignificant effect on import demand of Pakistan and both the independent variables have theoretically correct sign. The results of ECT are significant and have negative sign which is theoretically correct and this is a further proof of the long run relationship of the variables.

Table 3: Short Kun Estimates-1				
Dependent Variable: DLIMP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLGDPP	0.798114	0.940499	0.848607	0.4022
DLRPM	-0.141891	0.119216	-1.190206	0.2425
ECT1(-1)	-0.434244	0.145804	-2.978281	0.0054
С	0.010543	0.028603	0.368583	0.7148
R-squared 0.254594				
Adjusted R-squared 0.186829				
F-statistic 3.757051				
Prob(F-statistic) 0.019997				
Durbin-Watson stat 1.591323				

Table 3. Short Run Estimator-I

When in the 1988, under the structural adjustment program of IMF government of Pakistan started to liberalize its trade pattern which is under different restrictions like import Tariffs and import Quotas (Zaidi, 2005). And for finding co-integrational relationship among the variables import demand, gross domestic product per capita and relative prices of imports and trade liberalize process (a dummy variable) Johansen co-integration is applied. The results of

Johansen's co-integration test are defined in table 4. Trace statistics  $\lambda_{trace}$  and Maximum Eigen

statistics are utilized for finding the co-integrating vectors number. In both Trace statistics  $\lambda_{trace}$  and Maximum Eigen statistics when we reject null hypothesis of no co-integration shows that there is co-integrational relationship among our variables. Starting with the trace statistic null hypothesis of no co-integration (R=0) among the variables. The value of trace-test statistics is 211.6098, which is above the critical value of 69.81889at 5% significance level. Hence it rejects the null hypothesis R=0 of no co-integration and in favour of alternative hypothesis  $R \ge 1$  of co-integration. On the bases of results we can conclude that there is existence of two co-integrating vectors. In case of Maximum Eigen test statistics, the value of Max-Eigen is 123.7532 which is higher than the critical value of 33.87687at 5% level of significance level. So the Max-Eigen value also confirms the existence of two co-integrating vectors.

Table 4: Cointegration Estimates-II					
Unrestricted Co-integration Rank Test (Trace)					
${H}_0$	$H_1$	Trace Statistic	0.05 Critical Value	Prob.	
$R = 0^*$	$R \ge 1$	211.6098	69.81889	0.0000	
$R \leq 1^*$	$R \ge 2$	87.85664	47.85613	0.0000	
Trace test ind	icates 2 co-integ	rating eq (s) at the 0.05 l	evel		
* denotes reje	ction of the hype	othesis at the 0.05 level			
	• 1	(1999) p-values			
	0	Co-integration Rank Te	est (Max-Eigen)		
$H_0$	$H_1$	Max-Eigen Statistic	0.05 Critical Value	Prob.	
$R = 0^*$	$R \ge 1$	123.7532	33.87687	0.0000	
$R \leq 1^*$	$R \ge 2$	41.84177	27.58434	0.0004	
Max-eigenva	lue test indicates	s 2 co-integrating eqn(s)	at the 0.05 level		
* denotes rejection of the hypothesis at the 0.05 level					
	• 1	s (1999) p-values			

**Table 4: Cointegration Estimates-II** 

The coefficients of normalized co-integrating are presented in equation 8. According to the results that there is positive relationship between import demand and GDPP and trade liberalization when trade liberalization is increased, the economic development of a country also increases with increasing trend of imports. This is empirically proven in equation 8 for the case of Pakistan. The relative price is negatively related to imports and is less elastic as compared to income. But in presence of trade liberalization although prices are positively related to each other

because of economic development. According to the results given in the equation 8 when trade is liberalized there is 1% increase in GDPP and imports of Pakistan increase at the rate of 1.66 %. This shows the fast economic development of Pakistan. In case of relative price when trade is liberalized 1% change in relative price brings 2.55% change in imports of Pakistan.

# $LIMP_{t} = B_{0} + B_{1}LIMP_{t-1} + B_{2}LGDPP_{t} + B_{3}LRPM_{t} + B_{4}LLIBD_{t} + U_{t}$

 $LIMP_{t} = 1.66LLIBD_{t} * LGDPP_{t} + 6.232LGDPP_{t} - 1.588LRPM_{t} + 2.565LLIBD_{t} * LRPM_{t} + U_{t}$ (8)

The results of long run show that import demand of Pakistan gets tremendously changed after the trade liberalization policy of late 1980s and economic development of after that period shows that the with huge trade liberalization cheap imports come in Pakistani markets and welfare of the consumer is increased which is the sign of better living standard.

Once co-integration among the variables is proved, we can use VECM to study the short run dynamics. Table 5 shows the short run dynamics of the variables. According to the table, import demand, relative price, GDPP and trade liberalization are statistically insignificant in short run in case of Pakistan.

Table 5: Short Run Estimates-II				
Dependent Variable: DLIMP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLGDPP	0.707999	0.981055	0.721671	0.4757
DLRPM	-0.135460	0.121927	-1.110986	0.2749
LIBD	-0.014991	0.038841	-0.385957	0.7021
RECT1(-1)	-0.444537	0.150109	-2.961432	0.0057
С	0.021652	0.040845	0.530102	0.5997
R-squared 0.258047				
Durbin-Watson stat 1.574140				

The error correction term is statistically significant and has a negative sign. It is further proof of long run relationship among the variables of our interest. The results, reported in table 5, show that coefficients of all variables of the model have theoretically expected signs but are statistically insignificant in short run. The coefficient of relative price variable has theoretically correct sign and is insignificant in short run. This shows that in short run trade liberalization cannot play a beneficial role in the economic development of Pakistan.

#### **VI.** Conclusion of the Study

This study finds the empirical relationship among import demand, relative prices, trade liberalization and economic development of Pakistan. The data is used from 1972-2009 for this study. For finding the long run cointegration relationship Johanson co-integration method is utilized and for the short run dynamic VECM is used. The long run results of co-integration show that economic development is highly link import demand and tradition liberalization. As trade liberalization is adopted, economic development is achieved. The results also explain that imports are highly attached with relative price of imports and trade liberalization. The result of VECM shows that all the variables have insignificant effect on the import demand of Pakistan,

the ECT has theoretically correct sign and significant which show the validity of long run relationship of variables. At the end the results explain that there is strong relationship among the import demand, economic development and trade liberalization.

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