The Role of Expenditure Components in Determination of Import Demand: Empirical Evidence from Pakistan

Muhammad Irfan Chani (Corresponding Author)
PhD Scholar at National College of Business Administration and Economics,
Lahore, Pakistan
E-mail: irfanchani@hotmail.com

Amatul R. Chaudhary
Professor of Economics at National College of Business Administration and Economics,
Lahore, Pakistan
E-mail: amatul_chaudhary@yahoo.com

Abstract

This study is aimed at in-depth empirical analysis of impact of final expenditure components on import demand in Pakistan. ARDL bound testing approach to cointegration is used to analyze the long run relationship of import demand, relative prices of imports and components of final expenditure like household consumption, investment, exports and government consumption expenditures. Empirical results show that there exists a long run relationship between import demand and the macro components of final expenditure and relative prices. Long run coefficients indicate that elasticity of import demand with respect to different macro components of final expenditure is different. The impact of the all expenditure components on import demand is positive and significant. The relative prices have negative but insignificant relationship with import demand in Pakistan. For the analysis of Short Run dynamics, Vector Error Correction Model (VECM) has been used. The results show that all expenditure components have positive and significant impact on import demand in Pakistan while the effect of relative prices is also statistically insignificant in short run.

Keywords: Import Demand, Expenditure Components, Relative Prices.

1. Introduction

International trade plays an important role in the development of an economy. To fulfill the growing needs of their respective economies, trade among the nations is almost unavoidable. Traditional theories of absolute advantage and comparative advantage treat the trade as a source of enhanced global economic activity which is mutually beneficial for all the nations. The empirical evidence shows that distribution of trade gains among different nations is uneven. Every nation wants to maximize its own gain irrespective of what happens to other nations. Formulation of economic policies to get maximum benefit out of trade   creates controversy among the economists.

On the basis of above mentioned controversy Kavoussi (1985) divides the trade economists into two groups. These groups are named as 'Trade Optimists' and 'Trade Pessimists'. The first group prefers free trade, export promotion and outward looking

trade policies. The second group is inward looking and supports import substitution and protection policies. In today's world trade optimistic ideas are dominant.

After emergence of World Trade Organization (WTO) trade liberalization is one of the major policy issues all over the world, particularly in WTO member countries. Liberalization of trade is not only advocated on the basis of economic growth but also on the basis of human welfare. It is argued that, based on comparative advantage, trade enables countries to specialize in the production of goods and services, promotes competition and stimulates advancement in technology. As an outcome, wide variety of better quality products will be available to consumer at cheaper prices (Gupta and Choudhry, 1997 and World Bank, 2002).

Idea of specialization by Adam Smith gave birth to the debates about import substitution versus export led growth policies (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).

Elasticities of export and import are needed to be estimated, particularly in the age of trade liberalization, in order to gauge the effect of income and price changes on trade balance (Brester, 1996). Income elasticities of imports and exports are as important as their price elasticities, especially in a growing economy. If trade is initially balanced in a two-country model, prices are stagnant and income growth is the same in both countries, then the trade balance between them can still change over time if their respective income elasticities of demand for imports differ (Johnson, 1958). In such case, even relatively slow domestic income growth may be insufficient to alleviate payments imbalances for the country having relatively unfavorable income elasticities (Houthakker and Magee, 1969).

The estimated price and income elasticities of (imports) demand and (exports) supply have seemingly wide applications for macro-economic policy making. These applications include the international transmission of changes in prices and national expenditure and the impact of both exchange rate, monetary and fiscal policies on a country's trade balance. Welfare and employment implications of changes in own or partner-countries' trade restrictions and the severity of external balance constraints on domestic policy choices can also be explained by the trade elasticities (Goldstein and Khan, 1985).

The use of aggregate expenditure variable in the aggregate import demand function results in aggregation bias because different macro components of final expenditure have different import contents. Most of the earlier studies on expenditure components and import demand took into account only the effect of import contents of consumption, investment and exports but they did not differentiate between private and public consumption expenditure. Tang (2002a) and Funke and Nickel (2006) are among the few studies which considered the government consumption expenditure and household

consumption expenditure separately in import demand equation. In case of Pakistan most of the studies on import demand used the conventional method which takes total expenditure (Gross Domestic Product (GDP)) as an explanatory variable. To the best of our knowledge there is no study that measures the effect of disaggregated expenditure components on import demand in Pakistan.

This study measures the responsiveness of import demand in Pakistan to the changes in relative prices of imports and disaggregated components of total expenditure (GDP) like household consumption, investment, exports and government consumption expenditures. The study will provide detailed information for macroeconomic policy decisions in Pakistan. This information will be useful for efficient utilization of both expenditure switching and expenditure dampening policies to overcome the problem of persistent trade deficit in the country. Exports and investment elasticities of import demand will also provide direction for future industrial policy.

The organization of the study is as follows. Introduction of the study is given in section one. The second section presents the review the literature on import demand. Theoretical evolution of import demand function and methodology for economic estimation are discussed in third section. Fourth section consists of the discussion of empirical estimates. Concluding remarks and policy suggestions are given in fifth section.

2. Literature Review[1]

Literature on import demand has various dimensions. First strand includes the studies which term import demand as a function of aggregate income and prices. In the second category those studies which disaggregate the total imports into different commodity groups and take import of each commodity group as a function of income and relative prices. In the third category we may include the studies which take aggregate import as a function of disaggregated strand components of total income or aggregate expenditure. In all these categories, both kinds of studies are included that take price determinant of import demand as relative prices or take domestic and import prices separately.

Over the past several decades a lot of research in international economics has been devoted to study the import demand behaviour in developing as well as in developed countries. Income and price elasticities remained the most important empirical estimates in international economic literature. Being more than just theoretical debate, such estimates have implications for trade balance (Chang et al. 2005).

Adler (1945) studied the import demand in United States (U.S.) from 1922 to 1937 through regression analysis. The author checked the impact of real income and relative prices on import demand. He found that the effect of relative prices on import demand was not significant but the national income is positively and significantly related to import demand. The effect of relative prices on duty free imports found to be negative and significant in second regression which used the duty free imports as a dependent variable. Similarly, Vegh (1941), Hinshaw (1945), Harberger (1953), Liu (1953) and

---

[1] For detailed review of literature and discussion on Pakistan's economy refer " Irfan, M. (2010). *The Impact of Expenditure Components on Import Demand in Pakistan: An Empirical Analysis*. An unpuplished M.Phil dissertation submitted to National College of Business Administration and Economics, Lahore, Pakistan.

Lovasy and Zassenhaus (1953) are among the earlier studies that checked the effect of aggregate national income and relative prices on import demand.

Rehman (2007) estimated import demand function for Pakistan using 31 annual observations for the period 1975 to 2005. Johansen cointegration test was used to check the cointegration among aggregate import demand, income, and domestic price level and import prices. The author used log-linear form of import demand equation and found that there exists cointegrating relation among the variables. The study discovered that in long run income and import price elasticities were significant but domestic price level did not significantly affect the import demand in Pakistan. In short run import demand elasticities with respect to all three variables were found to be insignificant.

Afzal (2001) and Hye (2008) calculated income and price elasticities of aggregate import demand in Pakistan. Both studies used log linear form of import demand equation and found that income elasticity had positive sign while import demand elasticity with respect to relative prices had negative sign. Based on Ordinary Least Square (OLS) method and two step least square method, Afzal (2001) found that coefficient of relative prices is insignificant. Based on cointegration analysis, Hye (2008) found that imports, income and relative prices variables are cointegrated but he did not discuss the significance of long run coefficients of income and relative prices. Shabbir and Mahmood (1991) studied the structural change in Pakistan's aggregate import demand function using switching regression based on maximum likelihood method. The study concluded that both price and income elasticities were changed during the fiscal year 1971-72.

Constant and Yue (2010) studied import demand function for Cote D'Ivoire using thirty-eight annual observations for the period 1970 to 2007 and by using employing autoregressive distributed lag model approach to cointegration. All the variables were used in logarithmic form. The study confirmed the existence of cointegration among the import demand, consumption expenditure, investment expenditure, exports and relative prices. The results indicated that exports and investment expenditure have the higher elasticities and are major determinants of import demand in long run. The short run analysis showed that imports in Cote d'Ivoire are more sensitive to consumption expenditure than exports and investment expenditure. The empirical evidence showed that import demand in the country is price inelastic as the coefficient of relative prices was insignificant both in long and short run.

Abbott and Seddighi (1996) estimated an import demand function for the United Kingdom, by using the Johansen co-integration and the error correction models, and found that consumption expenditure had more impact on import demand than investment expenditure and export expenditure.

Mohammed and Tang (2000) also used the Johansen cointegration approach to calculate aggregate import demand for Malaysia. The results showed that in long run import demand did not response to expenditure components. Consumption expenditure explained less variation in import demand than investment expenditure. Similarly expenditure on exports had the lowest coefficient. The study also indicated a negative as well as inelastic relationship between import demand and relative prices of imports.

For five member countries of Association of Southeast Asian Nations (ASEAN) Mohammad et al. (2001) checked the long-run co-integrating relationship between imports and expenditure by using Johansen multivariate cointegration approach. The

study found that import demand had long run relationship, for all five countries, with expenditure components.

South Korea's income elasticity of import demand was estimated by Min et al. (2002) by using the Johansen co-integration. The study found that import demand is negatively and significantly affected by relative prices. There was also evidence of positive and elastic long run relation between import demand and consumption expenditure, negative and insignificant relation between investment expenditure and import demand and finally positive and inelastic effect of export expenditure on import demand.

Using the bounds testing cointegration approach Tang (2003) estimated import demand for Chinese economy. The study revealed negative long run relationship between import demand and relative prices. As far as expenditure components are concerned, the result showed in the long run, exports had the positive and largest coefficient, investment and consumption expenditure also had positive and significant long run relationship with import demand.

Disaggregated import demand model for Fiji is estimated by Narayan and Narayan (2005) to find out the long run elasticities of import with respect to relative prices, investment expenditure, total consumption and export expenditure. The results indicated a long run co-integrating relationship among the variables by using bounds testing approach to cointegration. The study found import demand (the explained variable) to be significantly inelastic with respect to all the explanatory variables in both the long-run and the short-run.

3. Theoretical Framework

Following the imperfect substitutes framework, Chani et al. (2011) used the import demand model which uses consumption expenditure as a sum of government and household consumption expenditure along with relative prices and other expenditure components like investment and exports. Government has different pattern of consumption as compared to pattern of household consumption expenditure. Giovannetti (1989) argues that government and household consumption expenditures have different import contents using input-output tables approach. This argument is also supported by Tang (2002a) in case of Bangladesh and Funke and Nickel (2006). Xu (2002) and Tang (2003) also propose that time trend should be included in import demand function to represent the role of taste and habits in import demand.

In the light of arguments presented above, the model used for the present study is given below:

$$M_t = f(C_t, G_t, I_t, X_t, RP_t, t), t = 1, 2, 3, ..., 37, \qquad (1)$$

where

M_t = Volume of imports in time t

C_t = Household consumption expenditure in time t

G_t = Government consumption expenditure in time t

I_t = Total investment in time t

$$X_t = \text{Exports in time } t$$

$$RP_t = \text{Relative prices of import in time } t$$

The equation (1) can be written in the following form:

$$M_t = \alpha_0\, C_t^{\beta_1} G_t^{\beta_2} I_t^{\beta_3} X_t^{\beta_4} RP_t^{\beta_5} e^{\beta_6 t} e^{\varepsilon_t}, \quad t = 1, 2, 3, ..., 37, \tag{2}$$

where 'e' is base of natural logarithm and ε_t is the error term.

Taking natural logarithm of equation (2), we can have the following estimation equation:

$$\ln M_t = \beta_0 + \beta_1 \ln C_t + \beta_2 \ln G_t + \beta_3 \ln I_t + \beta_4 \ln X_t + \beta_5 \ln RP_t + \beta_6 t + \varepsilon_t, \quad t = 1, 2, 3, ..., 37, \tag{3}$$

where 'ln' represents the natural logarithm and $\beta_0 = \ln \alpha_0$.

3.1 Data Sources

This study uses the variables of household consumption expenditure, government consumption expenditure, total investment expenditure, expenditure on total exports of goods and services, imports of goods and services and relative prices of imports in Pakistan for empirical analysis from 1972 to 2008. Data for the variables of household consumption expenditure, government consumption expenditure, total investment expenditure, expenditure on total exports of goods and services and imports of goods and service is taken from World Development Indicators (WDI) online database by World Bank (2009). The relative price variable is the ratio of unit value index of imports to the GDP deflator and both variables are taken from International Financial Statistics (IFS) online database by International Monetary Fund (2009).

3.2 Econometric Methodology

Time trend is included in most of the time series data due to which it faces the problem of non-stationarity. The regression applied on non-stationary data can give spurious results (Granger and Newbold, 1974). According to Philips (1986) regression results are misleading if long run cointegration relationship among the variables does not exist. Stationary of the data is prerequisite for cointegration. Thus the regression results obtained through Ordinary Least Square (OLS) method are reliable if the variables are stationary and cointegrated. Ng-Perron unit root test, developed by Ng and Perron (2001), is one of tests which are used to check the problem of non-stationarity in time series data.

When applying unit root tests, the most important issues are power and size properties of the available tests. To check the stationarity of data standard tests for unit root like the Phillips-Perron (PP) and the Augmented Dickey-Fuller (ADF) tests are often used. The reliability of these tests is questioned particularly when they are used for small samples. Dickey-Fuller Generalized Least Square (DFGLS) test and Ng-Perron test are proposed, in the literature, to address these issues. While having the better power as compared to other available tests, DFGLS test faces size distortion (Ng and Perron, 2001).

The unit root test developed by Ng and Perron (2001) has better power and size properties as compared to the other available unit root tests. Based on Generalized Least Square (GLS) method they propose the following four test statistics:

1. MZ_α^{GLS}

2. MSB^{GLS}

3. MZ_t^{GLS}

4. MP_T^{GLS}.

Like other tests of unit root, the null hypothesis of unit root cannot be rejected if the test statistic is greater than the critical value.

They suggested new information criteria, named as Modified Information Criteria (MIC), to address the lag selection sensitivity of unit root tests. MIC includes a sample dependent penalty factor and considers the fact that the bias in the sum of the autoregressive coefficients is largely dependent on the number of lags and the type of deterministic components present.

The Ng-Perron test is preferred over other available tests of unit root due to its statistical properties. Particularly power of this test makes it more preferable to other available unit root tests. This test is particularly suitable for the small samples (Harris and Sollis, 2003). Simulation results given by Ng and Perron (2001), show that performance of the test is better than the DFGLS test. To check the problem of unit root, this study uses the Ng and Perron unit root test.

3.2.1 ARDL Bound Testing Approach to Cointegration

Cointegration is a test to check the existence of long run relationship among the variables. Initially, the concept of cointegration was given by Engle and Granger (1987). Later on it was further extended by Stock and Watson (1988), Johansen (1988, 1991, 1992, 1995), Johansen and Juselius (1990), Pesaran and Shin (1999) and Pesaran et al. (2001). Johansen and Juselius (1990) approach and Pesaran et al. (2001) approach are widely used approaches to cointegration. This study uses bound testing approach to cointegration, within an Auto-Regressive Distributed Lag (ARDL) framework, developed by Pesaran and Shin (1999) and Pesaran et al. (2001).

Unlike other available approaches to cointegration ARDL bound testing approach tests the existence of long run relationships among the variables irrespective of whether the variables are integrated of order zero ($I(0)$), order one ($I(1)$) or mixed order. This approach is based on the estimates of an Unrestricted Vector Error Correction Model (UECM) and is likely to have better statistical properties since it does not restrict the short-run dynamics and long run equilibrium to the residual term as in the case of the Engle–Granger technique (Pattichis, 1999). Mah (2000) recommended that the small sample bias of cointegration analysis could be addressed by employing bounds testing approach to cointegration. According to Alam and Quazi (2003) bounds test procedure is applicable even when the regressors are endogenous.

To apply the bounds testing procedure, it is necessary to represent Equation (3) in a conditional autoregressive distributed lag model as follows:

$$\Delta \ln M_t = \alpha_1 + \alpha_2 t + \alpha_3 \ln M_{t-1} + \alpha_4 \ln I_{t-1} + \alpha_5 \ln G_{t-1} + \alpha_6 \ln C_{t-1}$$

$$+ \alpha_7 \ln X_{t-1} + \alpha_8 \ln RP_{t-1} + \sum_{h=1}^{p} \beta_h \Delta \ln M_{t-h} + \sum_{i=0}^{p} \gamma_i \Delta \ln I_{t-i}$$

$$+ \sum_{j=0}^{p} \varphi_j \Delta \ln G_{t-j} + \sum_{l=0}^{p} \alpha_l \Delta \ln C_{t-1} + \sum_{m=0}^{p} \omega_m \Delta \ln X_{t-m}$$

$$+ \sum_{s=0}^{p} \xi_s \Delta \ln RP_{t-s} + \nu_t,$$

$$t = 1, 2, 3, ..., 37, \qquad (4)$$

where all the variables are previously explained. The symbol Δ represents change ($\Delta X = X_t - X_{t-1}$, it is also known as first difference of variable X) and ν_t is the error term. The bounds test uses Wald test (F statistics) to check the existence of a long run relationship. The null hypothesis of no cointegration is tested through the joint significance of one period lagged variables using F-statistics.

$$H_0 : \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0$$
(no cointegration among the variables)
$$H_a : \alpha_3 \neq 0, \alpha_4 \neq 0, \alpha_5 \neq 0, \alpha_6 \neq 0, \alpha_7 \neq 0, \text{or } \alpha_8 \neq 0$$
(there is cointegrating relation among the variables).

The critical F-values are values for testing the above hypotheses are given by Pesaran et al. (2001) and are further updated by Narayan (2005) for small samples.

The Wald test for bounds testing has a non-standard distribution and depends on the following factors:

1. The order of integration (I (d)) of variables in the ARDL model.
2. Whether the intercept or trend or both are included in the ARDL   model.
3. The number of regressors in ARDL model.

If the calculated F statistic is either below the value of lower bound or above the upper bound at acceptable level of significance, a conclusive inference can be drawn without knowing about the regressors' order of integration. We can reject the null hypothesis of no cointegration if the calculated F statistic is greater than the upper bound. It implies that there is a long run cointegrating relation among the variables. A conclusive decision cannot be made if the computed F statistic lies between the upper and lower bounds. In this situation, it is necessary to have prior information about the order of integration of regressors before making decision about the acceptance or rejection of null hypothesis.

When the computed F statistic is less than critical value of the lower bound, the null of no cointegration cannot be rejected (Pesaran et al. 2001).

When there is long run cointegrating relationship among the variables, the possibility of short run equilibrium is confirmed through Vector Error Correction Model (VECM). The representation of VECM based on equation (4) and with respect to variables used in the study will be as under:

$$\Delta \ln M_t = \alpha_1 + \alpha_2 t + \sum_{h=1}^{p} \beta_h \Delta \ln M_{t-h} + \sum_{i=0}^{p} \gamma_i \Delta \ln I_{t-i} + \sum_{j=0}^{p} \varphi_j \Delta \ln G_{t-j}$$

$$+ \sum_{l=0}^{p} \alpha_l \Delta \ln C_{t-l} + \sum_{m=0}^{p} \omega_m \Delta \ln X_{t-m} + \sum_{s=0}^{p} \xi_s \Delta \ln RP_{t-s}$$

$$+ \theta ECT_{t-1} + \mu_t,$$

$$t = 1, 2, 3, ..., 37, \qquad (5)$$

where all the variables are as defined earlier except ECT_{t-1}, which is the one year lagged error correction term . The value and sign of coefficient of ECT_{t-1} (i.e. θ) measures the speed of convergence or divergence to or from the long run equilibrium in case of shocks. The significance of θ confirms the existence of short run relationship among the variables and is also a further evidence for long run cointegration.

4. Estimation Results

We have used Ng-Perron unit root test to check the stationarity of time series data in logarithmic form. Schwarz Information Criterion has been used for maximum lag selection for applying Ng-Perron unit root test. The results of Ng-Perron test have been reported in table 1. According to these results variables of import of goods and services, household consumption expenditure, government consumption expenditure, total investment expenditure and relative prices of imports are not stationary at level. Only variable of exports of goods and services is stationary at 5 percent level of significance at level. This implies that null hypothesis of unit root at level cannot be rejected for all variables except import of goods and services variable. However all the variables are stationary at first difference. This shows that the null hypothesis of unit root for all variables is rejected when we use the first difference of the variables. Thus the variables have mix order of integration. Some of them are I(0) (integrated of order zero) and other I(1) (integrated of order one).

Table 1: Ng-Perron Unit Root Test

	At Level			
Variable	**Ng-Perron Test Statistics**			
	MZa	MZt	MSB	MPT
$\ln M_t$	-12.3394	-2.4608	0.1994	7.5092
$\ln C_t$	-11.4699	-2.3933	0.2087	7.9521
$\ln G_t$	-6.7316	-1.8346	0.2725	13.5370
$\ln I_t$	-3.9272	-1.3936	0.3549	23.1047
$\ln X_t$	-22.1022**	-3.3016	0.1494	4.2591
$\ln RP_t$	-9.7816	-2.0693	0.2116	9.9124
	At 1st Difference			
Variable	**Ng-Perron Test Statistics**			
	MZa	MZt	MSB	MPT
$\Delta \ln M_t$	-31.9862***	-3.9864	0.1246	2.9205
$\Delta \ln C_t$	-17.7914**	-2.9665	0.1667	5.2184
$\Delta \ln G_t$	-18.4028**	-3.0334	0.1648	4.9519
$\Delta \ln I_t$	-18.4009**	-3.0320	0.1648	4.9597
$\Delta \ln X_t$	-18.4368**	-2.9872	0.1620	5.2357
$\Delta \ln RP_t$	-12.9893**	-2.4660	0.1899	2.1993

*, ** and *** represent that we may reject the null hypothesis of unit root at 10%, 5% and 1% level of significance respectively.

Keeping in view the number of observations, number of variables to be studied and lags requirement of the cointegration test maximum two 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 used in our analysis.

The results of ARDL cointegration test, based on equation (4) are reported in Table 2. Wald statistics is used to test the null hypothesis of no cointegration $(\alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0)$ among the variables. The wald statistics is 7.35, which is greater than Narayan (2005) upper bound value of 6.26 at 1% significance level and also greater than Pesaran et al (2001) upper bound value of 7.30 at 5% significance level. Hence we can reject the null hypothesis of no cointegration $(\alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0)$ and accept the alternative hypothesis $(\alpha_3 \neq 0, \alpha_4 \neq 0, \alpha_5 \neq 0, \alpha_6 \neq 0, \alpha_7 \neq 0, or \alpha_8 \neq 0)$ which states that there is cointegrating relationship among the variables used in the study.

Thus the analysis of data confirms the presence of long run relationship among import demand, household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services and relative prices of imports in Pakistan.

Table 2: Bound Testing Approach to Cointegration

ARDL (1, 1, 0, 1, 1, 1)

F-Statistic (Wald-Test) = **7.35**				
Level of Significance	**Pesaran et al. (2001)**		**Narayan (2005)**	
	Lower Bound Value	Upper Bound Value	Lower Bound Value	Upper Bound Value
1%	8.74	9.63	4.53	6.26
5%	6.56	7.30	3.33	4.70
10%	5.59	6.26	2.83	4.04

As cointegration exists among the variables used in the study, therefore, the results presented for long run are reliable. These results represent long run elasticities of import demand with respect to expenditure components. The long run results are reported in table 3.

Table 3: Long Run Relationships

Dependent Variable: $\ln M_t$			
Variable	Coefficient	t-Statistic	p-Value
$\ln I_t$	0.5755	2.2149	0.0351
$\ln G_t$	0.2870	1.9212	0.0649
$\ln C_t$	2.3248	5.9103	0.0000
$\ln X_t$	0.2641	2.3614	0.0254
$\ln RP_t$	-0.1175	-0.9506	0.3499
Time	-0.1182	-4.9154	0.0000
Constant	-66.6962	-	-
$R^2 = 0.9646$			
Adj-R^2 = 0.9558			
F-Statistic = 109.0083			
Prob(F-statistic) = 0.0000			
Durbin-Watson = 2.2045			

The results reported in the table 3 show that all expenditure components (household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services) have statistically significant impact on import demand in Pakistan. But the impact of relative prices on import demand is negative and not significant in long run. While studying the import demand behaviour in Pakistan, Afzal (2001) and Rehman (2007) also find the similar result about the effect of relative prices on import demand in Pakistan. The household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services have positive impact on import demand. The results show that household consumption has the highest 2.3248 elasticity of import demand and it is followed by investment expenditure 0.5755, government consumption expenditure 0.2870 and exports of goods and services 0.2641. Relative prices have insignificant, negative and the lowest elasticity -0.1175 of import demand. The positive and significant import demand elasticities with respect to all components of final expenditure indicate that increase in economic growth will lead to higher import demand in Pakistan as indicated by Keynesian absorption theory.

The results show that long run coefficients of independent variables have theoretically correct signs. The difference in magnitude of the effects of different expenditure components on import demand further strengthen the significance of using different components of final expenditure separately in import demand equation. The inelastic and insignificant effect of relative prices on import demand reflects that import substitution policy adopted by government of Pakistan since 1950s has not been successful in achieving the target of producing sufficient import substitutes. The elasticity import demand with respect to relative prices reveals that a large proportion of Pakistan's imports are essential goods which have inelastic demand.

4.1 Short Run Estimates

Once cointegration among the variables is proved, we can use VECM to study the short run dynamics. Table 4 shows the short run dynamics of the variables. According to the table household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services have statistically significant effect on import demand in short run while the impact of relative price variable is statistically insignificant in short run.

Table 4: Short Run Estimates

Dependent Variable = $\Delta \ln M_t$			
Variable	Coefficient	t-Statistic	p-Value
$\Delta \ln I_t$	0.7833	3.2616	0.0033
$\Delta \ln G_t$	0.2338	2.2002	0.0377
$\Delta \ln G_{t-1}$	-0.0450	-0.3963	0.6954
$\Delta \ln C_t$	2.1348	7.0784	0.0000
$\Delta \ln X_t$	0.2308	2.6515	0.0140
$\Delta \ln X_{t-1}$	-0.1076	-1.1479	0.2623
$\Delta \ln RP_t$	0.1170	0.9782	0.3378
$\Delta \ln RP_{t-1}$	-0.2707	-1.8404	0.0781
ECT_{t-1}	-0.4915	-4.9540	0.0000
Time	0.0002	0.2113	0.8344
Constant	-0.1209	-	-
$R^2 = 0.7927$			
Adj-$R^2 = 0.7064$			
F-Statistic = 9.1789			
Prob(F-statistic) = 0.0000			
Durbin-Watson = 1.6529			

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 4, show that coefficients of all expenditure components have theoretically expected signs and are statistically significant in short run. The coefficient of relative price variable has theoretically incorrect sign and is insignificant in short run. The household consumption expenditure, government consumption expenditure, total investment expenditure, exports of goods and services have positive impact on import demand in short run as well. The results show that household consumption has the highest 2.1348 elasticity of import demand and it is followed by investment expenditure 0.7833, government consumption expenditure 0.2338 and exports of goods and services 0.2308. Relative prices have positive as well as insignificant elasticity 0.1170 of import demand.

Lags of government consumption expenditure, total investment expenditure, exports of goods and services and relative price variables are used in our short run analysis. The result shows that lag of relative prices has negative coefficient and is significant. It means that relative prices affect the import demand with one year lag. Increase in relative prices does not significantly decrease the import demand in current year but it will significantly decrease the import demand in the next year. The elasticity of import demand with respect to one year lag of relative prices is -0.2707. This elasticity indicates that one

percent change in relative prices will cause an inverse change of 0.27 percent in import demand in the next year. On the other hand short run import demand elasticity with respect to one year lagged consumption expenditure, total investment expenditure and exports is insignificant. It indicates that effect of changes in these variables is limited to the year in which these changes have occurred.

Diagnostic tests are applied to check the validity of the assumptions of serial correlation, normality, model specification and heteroskedasticity have been conducted. The results of these tests are presented in Table 5.

Table 5: Diagnostic Tests

Normality Test (Jarque-Bera Statistics)	Jarque-Bera Statistics = 1.2357	Probability = 0.5391
Serial Correlation (Breush-Godfrey Serial Correlation LM Test)	F-statistics = 0.6710	Probability = 0.4181
ARCH Test (Autoregressive Heteroskedasticity Test)	F-statistics = 1.3485	Probability = 0.2541
Heteroskedasticity Test (White Heteroskedasticity Test)	F-statistics = 0.9183	Probability = 0.5792
Model Specification Test (Ramsey RESET Test)	F-statistics = 0.0412	Probability = 0.8408

These results indicate that the residuals obtained from short run model are normally distributed and there is no presence of heteroskedasticity. The specification of the model has also been tested through Ramsey's RESET test. This test suggests that the model is well specified. There is also no problem of serial correlation and autoregressive conditional heteroskedasticity.

5. Conclusion

The results indicate that household consumption expenditure is the major determinant of import demand in Pakistan as it has the highest coefficient in our import demand equation. The investment expenditure has the second highest coefficient and is followed by government expenditure and exports. The highest elasticity of import demand with respect to household consumption expenditure is due to the reason that final consumer goods and raw materials used as inputs in the production of consumer goods have more than sixty percent share in total imports of Pakistan. Our results also confirm the reality that our imports are more consumption oriented and import growth of Pakistan is more sensitive to change in domestic consumption.

5.1 Policy Implications

1. The exchange rate policies which directly affect the relative prices will have little impact on import demand in Pakistan. Thus devaluation of domestic currency is not a rational and suitable policy to overcome the problem of persistent trade deficit rather this policy can increase the severity of the problem by reducing the competitiveness of our exports. Devaluation of domestic currency may serve to raise the production costs because very large share of our imports consists of raw material and capital goods. It may also increase the import bill and can lead to balance of payment problems.

2. Import substitution policy should focus on the establishment of capital goods industries and the industries which can utilize the domestic resources rather than imported raw material.

3. Industrial policy should be formulated in a way which could increase the export of value added goods instead of exports of raw material or primary goods. For this purpose forward and backward linkages among the industries should be established.

4. The positive and significant import demand elasticities with respect to all components of final expenditure indicate that increase in economic growth will lead to higher import demand in Pakistan as indicated by Keynesian absorption theory. Thus monetary and fiscal policies should be designed in such a way that may be helpful in altering the existing composition of final expenditure for reducing the trade deficit. This objective can be achieved by increasing the share of those components for which import demand elasticity is low and by reducing the share of those components for which import demand elasticity is high. For instance, monetary policy promoting saving and investment and fiscal policy providing incentives for domestic resource-based and export oriented industries will be useful. Export of finished goods instead of primary or semi-finished commodities should be promoted.

REFERENCES

Abbott, A.J. and Seddighi, H.R. (1996). Aggregate Imports and Expenditure Components in the UK: An Empirical Analysis. *Applied Economics,* 28(9), 1119- 1125.

Adler, J.H. (1945). United States Import Demand During the Interwar Period. *The American Economic Review,* 35(3), 418-30.

Afzal, M. (2001). Import Function for Pakistan: A Simultaneous Equation Approach. *The Lahore Journal of Economics*, 6(2), 109-116.

Alam, M.I. and Quazi, R.M. (2003). Determinants of Capital Flight: An Econometric Case Study of Bangladesh. *International Review of Applied Economics*, 17(1), 85-103.

Brester, G.W. (1996). Estimation of the U.S. Import Demand Elasticity for Beef: The Importance of Disaggregation. *Review of Agricultural Economics,* 18(1), 31-42.

Chang, T., Ho, Y.H. and Huang, C.J. (2005). A Reexamination of South Korea's Aggregate Import Demand Function: The Bounds Test Analysis. *Journal of Economic Development,* 30(1), 119-128.

Chani, M.I., Pervaiz, Z. and Chaudhary, A.R. (2011). Determination of Import Demand in Pakistan: The Role of Expenditure Components. *Theoretical and Applied Economics*,

18(8), 93-110.

Constant, N. B. Z. S. and Yue, Y. (2010). An Econometric Estimation of Import Demand Function for Cote D'Ivoire. *International Journal of Business and Management,* 5(2), 77-84.

Deaton, A. and Muellbauer, J. (1980). *Economics and Consumer Behaviour,* Cambridge: Cambridge University Press.

Engle, R. and Granger, C. (1987). Co-integration and Error Correction: Representation, Estimation and Testing. *Econometrica*, 55(2), 251-276.

Frankel, J.A. and Romer, D. (1999). Does Trade Cause Growth? *The American Economic Review,* 89(3), 379-399.

Funke, K. and Nickel, C. (2006). Does Fiscal Policy Matter for the Trade Account? A Panel Cointegration Study. IMF [Working Paper] No. WP/06/147. Washington, D.C., USA: International Monetary Fund.

Giovannetti, G. (1989). Aggregate Imports and Expenditure Components in Italy: An Econometric Analysis. *Applied Economics*, 21(7), 957-971.

Goldstein, M. and Khan, M.S. (1985). Income and Price Effects in Foreign Trade. In Jones, R.W. and P.B. Kenen (Eds.), Handbook of International Economics II, New York: Elsevier Science Publications, 1041-1105.

Granger, C. and Newbold, P. (1974). Spurious Regressions in Econometrics. *Journal of Econometrics*, 2(2), 111-120.

Gupta, S.D. and Choudhry, N.K. (1997). Globalization, Growth and Sustainability: An Introduction. In Gupta, S.D. and Choudhry, N.K. (Ed.), *Globalization Growth and Sustainability*. Massachusetts, USA: Kluwer Academic Publishers.

Harberger, A.C. (1953). A Structural Approach to the Problem of Import Demand. *The American Economic Review,* 43(2), 148-159.

Harris, R. and Sollis, R. (2003). *Applied Time Series Modeling and Forecasting.* West Sussex, England: Wiley and Sons Ltd.

Hinshaw, R. (1945). American Prosperity and the British Balance of Payments Problems. *The Review of Economics and Statistics*, 27(1), 130-146.

Houthakker, H.S. and Magee, S.P. (1969). Income and Price Elasticities in World Trade. *The Review of Economics and Statistics*, 51(2), 111-125.

Hye, Q.M.A. (2008). Aggregate Import Demand Function for Pakistan: Analysis in the Form of Old and Relatively New Cointegration Techniques. *International Journal of Economic Perspectives*, 2(4), 190-198.

International Monetary Fund (2009). *International Financial Statistics (IFS) Online Database*, Washington, D.C., USA: International Monetary Fund.

Irfan, M. (2010). *The Impact of Expenditure Components on Import Demand in Pakistan: An Empirical Analysis.* An unpuplished M.Phil dissertation submitted to National College of Business Administration and Economics, Lahore, Pakistan.

Johansen, S. (1988). Statistical Analysis of Co-integrating Vectors. *Journal of Economic Dynamics and Control*, 12(2-3), 231-254.

Johansen, S. (1991). Estimation and Hypothesis Testing of Co-integration Vectors in Gaussian Vector Autoregressive Models. *Econometrica*, 59(6), 1551-1580.

Johansen, S. (1992). Determination of Co-integration Rank in the Presence of a Linear Trend. *Oxford Bulletin of Economics and Statistics*, 54(3), 383-397.

Johansen, S. (1995). *Likelihood-based Inference in Co-integrated Vector Autoregressive Models*. Oxford: Oxford University Press.

Johansen, S. and Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Co-integration - with Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics*, 52(2), 169-210.

Johnson, H.G. (1958). *International Trade and Economic Growth.* Cambridge: Harvard University Press.

Kavoussi, R.M. (1985). International Trade and Economic Development: The Recent Experience of Developing Countries. *Journal of Developing Areas*, l9(3), 379-392.

Liu, T.C. (1954). The Elasticity of U.S. Import Demand: A Theoretical and Empirical Reappraisal. *IMF Staff Papers*, 3(3), 416-441.

Lovasy, G. and Zassenhaus, H.K. (1953). Short-Run Fluctuations in U.S. Imports of Raw Materials, 1928-39 and 1947-52. *IMF Staff Papers*, 3(2), 270-289.

Magee, S.P. (1975). Prices, Income and Foreign Trade: A Survey of Recent Economic Studies. In Kenen, P.B. (Eds.), *International trade and finance: Frontiers for research*, Cambridge: Cambridge University Press.

Mah, J.S. (2000). An Empirical Examination of the Disaggregated Import Demand of Korea: The Case of Information Technology Products. *Journal of Asian Economics,* 11(2), 237-244.

Min, B.S., Mohammed, H.A. and Tang, T.C. (2002). An analysis of South Korea's Import Demand. *Journal of Asia Pacific Affairs*, 4(1), 1-17.

Mohammed, H.A. and Tang, T.C. (2000). Aggregate Imports and Expenditure Components in Malaysia: A Cointegration and Error Correction Analysis. *ASEAN Economic Bulletin*, 17, 257-269.

Mohammed, H.A., Tang, T.C. and Othman, J. (2001). Aggregate Import Demand and Expenditure Components in Five ASEAN Countries: An Empirical Study. *Journal Ekonomi Malaysia*, 35, 37-60.

Narayan, P.K. (2005). The Saving and Investment Nexus for China: Evidence from Cointegration Tests. *Applied Economics,* 37(17), 1979-1990.

Narayan, P.K. and Narayan, S. (2005). An Empirical Analysis of Fijis Import Demand Function. *Journal of Economic Studies*, 32(2), 158-168.

Ng, S. and Perron, P. (2001). Lag Length Selection and the Construction of Unit Root Test with Good Size and Power. *Econometrica*, 69(6), 1519-54.

Pattichis, C.A. (1999). Price and Income Elasticities of Disaggregated Import Demand: Results from UECMs and an Application. *Applied Economics*, 31(9), 1061-1071.

Pesaran M.H. and Shin, Y. (1999). An Autoregressive Distributed Lag Modelling

Approach to Cointegration Analysis. In Strom, S. (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium,* Cambridge: Cambridge University Press.

Pesaran, M.H., Shin, Y. and Smith, R.J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16(3), 289-326.

Philips, P.C.B. (1986). Understanding Spurious Regressions in Econometrics. *Journal of Econometrics,* 33(3), 311-340.

Rehman, H. (2007). An Econometric Estimation of Traditional Import Demand Function for Pakistan. *Pakistan Economic and Social Review*, 45(2), 245–56.

Salvatore, D. (1983). A Simultaneous Equations Model of Trade and Development with Dynamic Policy Simulations. *KYKLOS*, 36(1), 66-90.

Shabbir, T. and Mahmood, R. (1991), Structural Change in the Import Demand Function for Pakistan. *The Pakistan Development Review*, 30(4), 1159-1166.

Stock, J.H. and Watson, M.W. (1988). Testing for Common Trends. *Journal of the American Statistical Association,* 83(404), 1097-1107.

Tang, T. C. (2002). Aggregate Import Demand in India: Stable or Unstable? *The Economic Challenger*, *14(4), 35-47.*

Tang, T.C. (2002a). Determinants of Aggregate Import Demand in Bangladesh. Journal of Bangladesh Studies, 4, 37-46.

Tang, T.C. (2003). An Empirical Analysis of China's Aggregate Import Demand Function. *China Economic Review*, 14(2), 142-163.

Tang, T.C. and Alias, H.M. (2000). An Aggregate Import Demand Function for Malaysia: A Cointegration and Error-correction Analysis. *Utara Management Review*, 1(1), 43-57.

Tang, T.C. and Nair, M. (2002). A Cointegration Analysis of Malaysian Import Demand Function: Reassessment from the Bounds Test. *Applied Economics Letters*, 9(5), 293-296.

Vegh, I.D. (1941). Imports and Income in the United States and Canada. *The Review of Economics and Statistics*, 23(3), 130-146.

World Bank (2002). World Development Report: Building Institutions for Markets. Washington, D.C., USA: The World Bank.

World Bank (2009). World Development Indicators (WDI) Online Database. Washington D.C., USA: The World Bank.

Xu, X. (2002). The Dynamic-Optimizing Approach to Import Demand: A Structural Model. *Economics Letters*, 74(2), 265–270.