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SOME PRICE AND NON-PRICE FACTORS AFFECTING IMPORTS IN PAKISTAN

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This study explores the price and non-price factors which affect the real imports in Pakistan. It considers the Bounds Testing Approach to investigate co-integration between the real imports and its factors in the long-run; and the Error Correction Model based on Bounds Testing Approach in order to find the impact of price and non-price factors on imports in the short-run, respectively. The findings reveal that real exchange rate per capita GDP, rural population, urban population, and money supply are among important factors which significantly accelerate the real imports in Pakistan, whereas, the domestic inflation have found to be depressing force for real imports. Moreover; the coefficients of factors of real imports were to be structurally stable for the selected sample period. Finally, the study suggests that it may not be appropriate to use the exchange rate policy from the perspective of imports to improve trade balance in Pakistan.

I. Introduction

Pakistan is observing a chronic trade deficit since many decades. To reduce the trade deficit, researchers and policy makers generally think about increasing exports and thus determinants of exports are frequently examined. However, these deteminnats are investigated infrequentlty. But as Pakistan adopted the trade liberlaization regime therefore both the imports and exports have increased. The evidence for adopting trade liberalization regime is that even average tariff rate was 40.7 per cent to 25.5 per cent during 1987-88 to 1996-97 [Siddique and Iqbal (2001)]; which dropped to around 8 per cent in 2006-07 [Hussain (2008)]. Therefore, against this backdrop of libearlization, the reduction of trade deficit may not be easy, especially, in the phase of development where imports are necessary to expedite the manufacturing and other sectors of the economy.

It is interesting to note that despite the low growth in imports, as compared to exports the trade account remained in deficit from 1980 to 2013. For example, during the decade of 1980s the average annual growth rate of real imports and exports

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as share of real GDP, were witnessed to be 5.04 per cent (negative) and 3.56 per cent (positive), respectively; whereas in the decade of 1990s the average annual growth rate of real imports as share of real GDP followed an upward trend and moved to almost 1.32 per cent (negative) but, after following the decreasing trend the export share reached to almost 0.37 per cent (negative). Besides, in the decade of 1990s an averange annual growth rate of real imports as share of real GDP increased to almost 0.46 per cent (positive), during the period from 2000 to 2009. Following the increasing trend an average annual growth rate of real exports as share of real GDP turned to be almost 3.19 per cent (positive) during the same period. However, during the period from 2010 to 2013 the average annual growth rate of real imports as percentage of real GDP moved to almost 3.86 per cent (negative), whereas, the average annual growth rate of real exports as share of real GDP was almost witnessed as almost 0.19 per cent (positive). These facts are reported in Table 1 and the complete picture of the growth rate of real imports as share of real GDP from 1980 to 2013 is presented in Figure 1.

TABLE 1

Growth Rate of Real Imports and Real Exports as share of Real GDP

Years	Real Imports	Real Exports
1980 – 1989	-5.0349	3.5573
1990 – 1999	-1.3202	-0.3723
2000 – 2009	0.4628	3.1907
2010 – 2013	-3.8569	0.1867

Note: Author's observation: An average annual growth rate of real imports as share of real GDP has been estimated using WDI (2015), World Bank.

After discussing the historic trends of average annual growth rate of real imports, and also the real exports as share of real GDP the average annual growth rate of the selected macroeconomic indicators are presented from the Pakistan economy. These facts are reported in Table 2:

From the historic pattern of both the real exports and real imports it can be concluded that the growth in exports to GDP ratio would be higher as relative to growth in imports to GDP ratio during 1980 to 2013. Despite this, there has been a trade deficit because of the base effect. This persistent trade deficit in Pakistan has been a serious macroeconomic issue among the other important and severe challenges. Therefore, in order to address the issue of trade deficit, it will have to be seen as to what lies behind the imports in Pakistan. The objective of this study is to explore possible factors which could affect the real imports as the share of GDP in Pakistan. This study will apply the

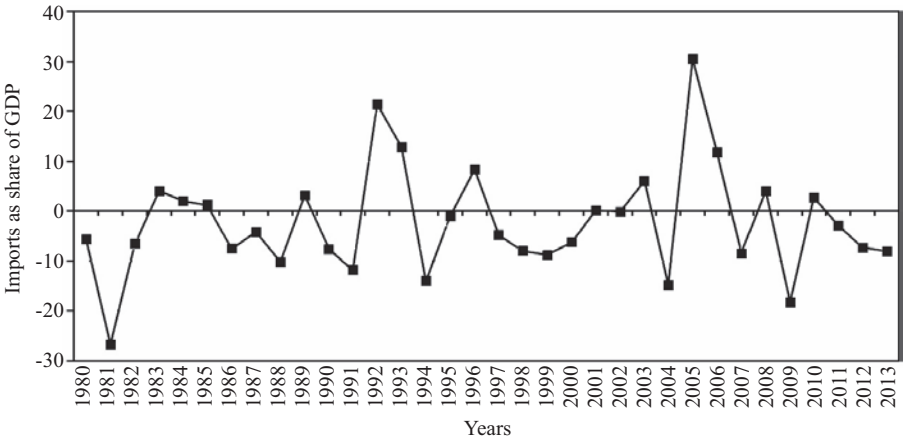


FIGURE 1

Growth Rate of Real Imports as share of GDP

ARDL Bounds Testing Approach in order to explore the long-run co-integrating relationship between the real imports and its predictors. It would also investigate that marginal effect of each predictor on real imports into long-run and short-run. Finally, the study will test that structural stability of mean and variance of the error term over time would see whether estimated coefficients of the predictors of real imports are structurally stable or unstable? The present paper is different from the earlier studies on the following grounds: firstly, it incorporates segregated rural and urban population which tells about the rural-urban bias in import demand. Secondly, the study uses the inflation and money supply making two specifications. Thirdly, we have employed the bounds testing approach on the current available data on real imports as share of GDP.

TABLE 2

Trends of Growth Rate of Selected Macroeconomic Indicators

Years	Exchange Rate	Per Capita Real GDP	Rural Population	Urban Population	Inflation	Broad Money Supply
1980 – 1989	-3.3106	3.3710	-0.3673	0.9048	7.2656	-7.3795
1990 – 1999	-1.9134	1.2570	-0.3717	0.8097	9.7158	-7.4588
2000 – 2009	-0.9288	2.5181	-0.5070	0.9687	7.9681	-7.7111
2010 – 2013	1.8657	1.8625	-0.6565	1.1265	10.7931	-9.5929

Note: Author's observation: An average annual growth rate of each indicator of real imports has been calculated using WDI (2015), World Bank.

The rest of the paper is structured as follows: in Section II the literature review is provided. Section III discusses the data sources and the methodological framework. Empirical findings and their discussion is explained in Section IV, where as, Section V conclude the discussion and propose some policy implications.

II. The Literature Review

In this section of the study some of the earlier studies conducted on factors which have affected imports are reviewed. Islam and Hassan (2004) used multivariate co-integration approach and estimated determinants of imports on quarterly data set for the case of Bangladesh. They found that relative price and income have significant impact on imports. The coefficient of income was positive and greater than one which means that income encourage people to import luxury items. The coefficient of relative prices was found to be negative but less than one which means that in Bangladesh variability in the relative prices does not influence the demand heavily for importable. Rehman (2007) tested the import demand function for the case of Pakistan by applying Johansen multivariate co-integration approach for the data set which range from 1975 to 2005. The empirical results of this study stated that in the long-run real income has significant and positive impact on imports, whereas, import prices have negative and significant impact on imports. It was further found that domestic prices have negative but insignificant impact on imports. The study also concludes that during the period of estimation, import demand function remained stable in Pakistan.

Khan et al. (2007) conducted a study in which the effect of remittance on imports was investigated for the case of Pakistan by using the simple OLS technique. The empirical results revealed that real gross domestic product and remittance have significant and positive effect on imports, whereas, real exchange rate has inverse and significant effect on imports in Pakistan. Alam (2009) conducted a study for the case of Pakistan for data set from 1980Q1 to 2005Q4 in order to examine the impact of exchange rate volatility on the import demand. After applying the Vector Autoregressive Model and the Vector Error Correction Model, respectively; the findings of the study showed that demand for imports declined as volatility of the exchange rate increased. Alam and Ahmed (2010) used the ARDL Bounds Testing Approach for the data series from 1982Q1 to 2008Q2 and examined the import demand function for the case of Pakistan. In this study it was found that demand for imports respond insignificantly negative to the changes in the exchange rate volatility. Following the contribution of Alam and Ahmed (2010), Fatukasi and Awomuse (2011), investigated some of the factors which have significant impact on imports in Nigeria. In this study it was both the long-run and short-run coefficients that are found by using the Simple OLS and Error Correction Method for the data series from 1970 to 2008. The GDP and ratio of openness having positive and significant

impact on imports in both the long-run and short-run were also found; whereas, exchange rate had negative but insignificant impact on imports in the long-run; but in the short-run, it had positive but insignificant impact on imports.

In addition to the contribution of Fatukasi and Awomuse (2011); Sultan (2011) used the Johansen multivariate co-integration approach on the sample period from 1970 to 2008, in the same year, and examined the import demand function for India and found the long-run co-integration between imports and its determinants. Besides, the impact of income on import was found elastic whereas, the impact of relative prices and foreign reserves was found inelastic in the long-run. However, the impact of all these factors was witnessed to be inelastic in the short-run. In the end, the study concluded that currency devaluation strategy is not beneficial as export promotion strategy would combat trade deficit. Niksic et al. (2013) used the sample period from 1997 to 2010 and explored the import demand function for Palestine. The study found the exchange rate, gross domestic product, and consumer price index as determinants of imports in Palestine. This shows that the effect of exchange rate on imports was insignificant, whereas, the impact of GDP on imports was positive and significant; and the impact of consumer price index on imports was negative and significant. During the same period another study by Islam (2013) theoretically examined the impact of inflation on imports for the case of Bangladesh for the period from 2006 to 2010 and found that inflation has too small impact on imports which should be considered as insignificant impact. The study concluded that imports do not significantly respond to changes in inflation.

In addition to reviewing the above studies, the data source, model and the methodological framework will be discussed in the following part of the study.

III. Data Source and the Methodological Framework

1. Data Source

The data on aggregate imports, per capita gross domestic product, rural and the urban population as share of total population, broad money supply, and the consumer price index have been taken from the World Bank (2015). However; the data on real effective exchange rate was extracted from the International Financial Statistics (2015) IMF. Using the annual data the sample period ranges from 1980 to 2013.[1] The above mentioned variables like: imports, per capita gross domestic product, and broad money supply have constant local currency units, whereas, the real effective exchange rate is a multilateral exchange between the local currency and currency of major trading partners. It incorporates domestic and major trading part-

[1] The reason for starting the sample period from 1980 is the unavailability of real effective exchange rate in IFS (2015), before 1980. Nonetheless, it is a reasonable sample period and real effective exchange rate is a crucial variable that deserve to be in the model.

ner prices, rural population and urban population which are ratios of the total population. The CPI is the index of prices of consumer's goods.

2. The Methodological Framework

In this study the double logged model is used because log-form approach provide more efficient estimates as compared to simple form approach [Ehrlich (1977), Layson (1983), Bowers and Pierce (1975), Cameron (1994) and Ehrlich (1996)]. The models are proposed as:

$$lnIMPOT_t = a_0 + a_{1t}lnREER_t + a_{2t}lnGDPPC_t + a_{3t}lnRUPO_t + a_{4t}lnURPO_t + a_{5t}lnINF_t + \pi_{1t} \quad (1)$$

$$lnIMPOT_t = b_0 + b_{1t}lnREER_t + b_{2t}lnGDPPC_t + b_{3t}lnRUPO_t + b_{4t}lnURPO_t + b_{5t}lnBMS_t + \pi_{2t} \quad (2)$$

whereas; the construction of each variable along with its sample period is presented below:

Discription of the Variables

Variable Representation	Variable Name	Proxy For	Variable Construction	Data Source
$lnIMPOT_t$	Real Imports as share of Real GDP	Imports	ln (Real Imports/ Real GDP)	WDI (2015) 1980 – 2013
$lnREER_t$	Real Effective Exchange Rate	Exchange Rate	ln (REER)	WDI (2015) 1980 – 2013
$lnGDPPC_t$	Per Capita Real GDP	Economic Growth	ln (Real GDP/ Total Population)	WDI (2015) 1980 – 2013
$lnRUPO_t$	Rural Population as share of Total Population	Rural Population	ln (Rural Population/ Total Population)	WDI (2015) 1980 – 2013
$lnURPO_t$	Urban Population as share of Total Population	Urban Population	ln (Urban Population/ Total Population)	WDI (2015) 1980 – 2013
$lnINF_t$	Inflation	Inflation	ln (Consumer Price Index)	WDI (2015) 1980 – 2013
$lnBMS_t$	Real Broad Money Supply as share of Real GDP	Money Supply	ln (Real Money Supply/ Real GDP)	WDI (2015) 1980 – 2013

3. The Estimation Technique

In order to investigate factors which affect the real imports in Pakistan, different econometric tools are used in the study. Initially; the unit root problem is examined after identifying the order of integration of the data series and then the long-run co-integration between imports and its predictors is tested. Besides finding the lon-run co-integration, the impact of each predictor in the long-run and in the short-run is found. All these econometric steps are discussed as under:

a) Testing the Unit Root Problem

The unit root problem is tested by using the KPSS (1992) unit root test. This test is more suitable and efficient for small number of observations. The null hypothesis series is stationary against the alternate hypothesis that series is non-stationary. The following LM-test will be used to test the unit root for each variable:

$$LM = \sum_{i=1}^{T} S_t^2 \Big/ \hat{\sigma}_{\varepsilon}^2 \tag{3}$$

After discussing the KPSS (1992) the unit root test, the Co-Integration technique is discussed:

b) Testing the Co–Integration

The long-run co-integrating relationship between the real imports and its predictors is found by using the ARDL bounds testing approach which was introduced by Pesaran et al. (2001). This co-integration technique is more consistent for small number of observations and for the data series which reports mixed order of integration. The null hypothesis of no co-integration is tested against the alternative hypothesis of co-integration by the F-test which is found by using the Wald test. If the estimated value of F-test is greater, the upper critical bound rejects the null hypothesis and accept the alternative hypothesis. Therefore, it is concluded that the long-run co-integrating relationship between the real imports and its predictors will exist. If the estimated value of F-test becomes less than the lower critical bound the null hypothesis is accepted. It will therefore be concluded that there is no long-run relationship between the real imports and its factors. Moreover, if the estimated value of F-test is found in between the lower and upper critical bounds, then in this case, the test becomes inconclusive, meaning that no decision can be taken about long-run relationship between the real imports and its factors. The following equations investigate the long run co-integration between imports and its factors and the same equations will be used to capture the long run coefficients.

$$\Delta lnIMPOT_t = \omega_{10}+\omega_{11} lnIMPOT_{t-1}+\omega_{12} lnREER_{t-1}+\omega_{13} lnGDPPC_{t-1}+ \omega_{14} lnRUPO_{t-1}+\omega_{15} lnURPO_{t-1}+\omega_{16} lnINF_{t-1}+\varphi_{11}\sum_{i=1}^{p}\Delta lnIMPOT_{t-i}+ \varphi_{12}\sum_{i=0}^{p}\Delta lnREER_{t-i}+\varphi_{13}\sum_{i=1}^{p}\Delta lnGDPPC_{t-i}+\varphi_{14}\sum_{i=0}^{p}\Delta lnRUPO_{t-i}+ \varphi_{15}\sum_{i=0}^{p}\Delta lnURPO_{t-i}+\varphi_{16}\sum_{i=0}^{p}\Delta lnRLINF_{t-i}+\Psi_{11} \quad (4)$$

$$\Delta lnIMPOT_t = \lambda_{10}+\lambda_{11} lnIMPOT_{t-1}+\lambda_{12} lnREER_{t-1}+\lambda_{13} lnGDPPC_{t-1}+ \lambda_{14} lnRUPO_{t-1}+\lambda_{15} lnURPO_{t-1}+\lambda_{16} lnINF_{t-1}+\gamma_{11}\sum_{i=1}^{p}\Delta lnIMPOT_{t-i}+ \gamma_{12}\sum_{i=0}^{p}\Delta lnREER_{t-i}+\gamma_{13}\sum_{i=1}^{p}\Delta lnGDPPC_{t-i}+\gamma_{14}\sum_{i=0}^{p}\Delta lnRUPO_{t-i}+ \gamma_{15}\sum_{i=0}^{p}\Delta lnURPO_{t-i}+\gamma_{16}\sum_{i=0}^{p}\Delta lnRLINF_{t-i}+\varphi_{11} \quad (5)$$

Besides finding the long-run co-integrating relationship and the long-run coefficients, the short-run coefficients is examined, using the following equations of Error Correction Model.

$$\Delta lnIMPOT_t = \omega_{10}+\varphi_{11}\sum_{i=0}^{p}\Delta lnIMPOT_{t-i}+\varphi_{12}\sum_{i=0}^{p}\Delta lnREER_{t-i}+\varphi_{13}\sum_{i=0}^{p}\Delta lnGDPPC_{t-i}+ \varphi_{14}\sum_{i=0}^{p}\Delta lnRUPO_{t-i}+\varphi_{15}\sum_{i=0}^{p}\Delta lnURPO_{t-i}+\varphi_{16}\sum_{i=0}^{p}\Delta LINF_{t-i}+ \chi_{11}\, ecm_{t-1}+\Psi_{11} \quad (6)$$

$$\Delta lnIMPOT_t = \lambda_{10}+\gamma_{11}\sum_{i=0}^{p}\Delta lnIMPOT_{t-i}+\gamma_{12}\sum_{i=0}^{p}\Delta lnREER_{t-i}+\gamma_{13}\sum_{i=0}^{p}\Delta lnGDPPC_{t-i}+ \gamma_{14}\sum_{i=0}^{p}\Delta lnRUPO_{t-i}+\gamma_{15}\sum_{i=0}^{p}\Delta lnURPO_{t-i}+\gamma_{16}\sum_{i=0}^{p}\Delta LBMS_{t-i}+ \lambda_{11}\, ecm_{t-1}+\varphi_{11} \quad (7)$$

IV. Results and Discussions

In this part of the study; the empirical results for conceptualized models and their discussion are presented. The analysis starts from estimating descriptive statistics of both predictors and outcome variables of this study. The results are shown in Table 3.

It can be seen that mean value of natural log of total real imports as share of real GDP is found to be 2.9963 per cent during the sample period 1980 to 2013 (see, Table 3). However, the probability value of Jarqu-Bera test is also found to be insignificant. This concludes that real imports fulfill all assump-

tions of normal distribution. Similarly, it can be seen that probability values of Jarque-Bera test for all variables, except the natural log of real effective exchange rate values, conclude that the Jarque-Bera test for all these variables other than the real effective exchange rate are insignificant. This concludes that all these variables except the real effective exchange rate follow all assumptions of normal distribution.

TABLE 3

Descriptive Statistics

	Mean	Standard Deviation	Jarque – Bera Test	Probability	Observations
$lnIMPOT_t$	2.9963	0.1923	1.8270	0.4011	34
$lnREER_t$	4.8048	0.2773	6.9841	0.0304	34
$lnGDPPC_t$	10.6182	0.1975	1.1950	0.5502	34
$lnRUPO_t$	4.2116	0.0425	1.9807	0.3715	34
$lnURPO_t$	3.4769	0.0873	1.8181	0.4029	34
$lnINF_t$	3.4644	0.7910	1.8026	0.4060	34
$lnBMS_t$	0.2902	0.7871	1.6038	0.4485	34

After discussing the descriptive statistics of all predictors and outcome variables, the stationarity of data series using KPSS (1992) unit root test are estimated. KPSS (1992) is efficient test for small number of observations. The null hypothesis test states that data series is stationary whereas alternative hypothesis shows that series is non-stationary. Estimated results of this test are shown in Table 4.

From Table 4 it can be viewed that KPSS unit root test has been tested at level and at first difference for the sample period from 1980 to 2013; hence, it may be concluded that the estimated value of KPSS unit root test for real imports, real effective exchange rate, per capita GDP, and inflation, has been found greater than its corresponding critical value at one per cent level of significance. The null hypothesis for these four variables is rejected and it is conclude that these four variables are found to be non-stationary at level. However; the estimated values of KPSS unit root test for rural population, urban population; and broad money supply have found to be less than the corresponding critical value at one per cent level of significance at level. Therefore, the null hypothesis may be accepted and it may be concluded that these three variables have found to be stationary at level.

TABLE 4

KPSS Unit Root Test

Variables	LM – Statistic At Level	Decision	Variables	LM – Statistic At First Difference	Decision
$lnIMPOT_t$	1.2856	Non-Stationary	$\Delta lnIMPOT_t$	0.1079	Stationary
$lnREER_t$	1.4192	Non –Stationary	$\Delta lnREER_t$	0.3812	Stationary
$lnGDPPC_t$	1.7164	Non –Stationary	$\Delta lnGDPPC_t$	0.1426	Stationary
$lnRUPO_t$	0.6075	Stationary	$\Delta lnRUPO_t$	0.5162	Stationary
$lnURPO_t$	0.6100	Stationary	$\Delta lnURPO_t$	0.3924	Stationary
$lnINF_t$	1.7593	Non –Stationary	$\Delta lnINF_t$	0.2195	Stationary
$lnBMS_t$	0.6081	Stationary	$\Delta lnBMS_t$	0.1597	Stationary

Asymptotic Critical Values of Kwiatkowski-Phillips-Schmidt-Shin Unit Root Test

Significance Level	01 Per cent	0.7390
	05 Per cent	0.4630
	10 Per cent	0.3470

Moreover; the estimates of KPSS unit root test for all seven variables of the study at first difference have shown that the estimated LM-test for all the seven variables has found to be less than the corresponding critical value at one per cent level of significance. The null hypothesis is accepted and it is concluded that all these variables are stationary at first difference. Therefore, Table 4 conclude that some variables are stationary at level and some are stationary at first difference. Thus, the data series of the present study has mixed order of integration like I(0) and I(1).Thereafter, in order to investigate the long-run co-integration between the real imports and its predictors the ARDL bounds testing approach was applied. The estimated results are presented in Table 5.

It can now be viewed that estimates of ARDL bounds testing approach for both the conceptualized models; using the Wald test, and the estimated values of F-test in Model 1 and Model 2 were 5.8780 and 6.6180, respectively. Both these values of F-test are greater than the corresponding upper critical bound (= 4.4732) at five per cent level of significance. This concludes that real imports and its predictors are co-integrated in the long-run. Later, the serial correlation, functional form, normality, and heteroscedasticity tests were also applied. From the estimated results reported in Table 5, it can be seen that probability values of all these four tests are insignificant, therefore, the null hypothesis of all these four tests was accepted and that there is an absence of serial correlation problem in both the models. Functional form of both these models is correctly specified, error terms of both

TABLE 5

ARDL Bounds Testing Approach [1980 – 2013]

Estimated Models	Model 1		Model 2	
	$lnIMPOT_t = f(lnREER_t, lnGDPPC_t, lnRRPO_t, lnURPO_t, lnINF_t)$		$lnIMPOT_t = f(lnREER_t, lnGDPPC_t, lnRRPO_t, lnURPO_t, lnBMS_t)$	
Optimal lags	(1, 0, 1, 0, 0, 0)		(1, 0, 1, 0, 0, 0)	
F - Statistics	5.8780**		6.6180**	
W - Statistics	35.2678**		39.7082**	
	Critical Values for F-Test		Critical Values for W-Test	
Level of Significance	Lower Bound	Upper Bound	Lower Bound	Upper Bound
At 5 per cent	3.0624	4.4732	18.3746	26.8389
At 10 per cent	2.5341	3.7686	15.2046	22.6117
	Diagnostics Tests			
R^2	0.8809		0.8991	
Adjusted - R^2	0.8475		0.8708	
F - Statistics [P - Value]	26.405*** [0.000]		31.8171*** [0.0000]	
DW - Statistic	2.3251		2.4330	
Serial Correlation	1.6234 [0.203]		2.8727 [0.103]	
Functional Form	1.4619 [0.227]		0.5630 [0.453]	
Normality	0.7363 [0.692]		0.9101 [0.634]	
Heteroscedasticity	0.0035 [0.953]		0.3283 [0.567]	

*,**, and *** demonstrates significance level at 10%; 5% and 1% respectively. Also the values within [ ] represents Probability Values.

models are normally distributed, and variance of error term is homoscedastic over time into both models. Therefore, the summarized estimates of ARDL bounds testing approach are consistent and efficient. Moreover; the estimated results of KPSS (1992) unit root test; and the ARDL bounds testing approach is efficient and consistent for small number of observations. After finding the long-run co-integration between the real imports and its predictors, the impact of each predictor on real imports is captured separately in the long-run. The estimated long-run coefficients based on the ARDL bounds testing approach are given in Table 6.

The impact of predictors of the Total Real Imports (including oil), using the two models has been investigated in Table 7. The empirical results reveal that exchange rate, GDP per capita, rural population, and urban population have positive and statistically significant impact on real imports in the long-run, in Pakistan. One might argue that why not excluding oil? A priori, the argument is very cogent but the coefficients attained excluding oil may be less relevant for policy debate. When talking about trade deficit, generally, it does not exclude oil; and because of this policy relevance oil is not excluded from the total imports.

TABLE 6

Estimated Long Term Coefficients using the ARDL Approach

Dependant Variable: $lnIMPOT_t$		
Variable	Model 1	Model 2
	Coefficients	Coefficients
$lnREER_t$	0.1310***	0.1107***
	[0.000]	[0.000]
$lnGDPPC_t$	0.2323***	0.2085***
	[0.000]	[0.000]
$lnRUPO_t$	0.5091***	0.3285**
	[0.002]	[0.012]
$lnURPO_t$	0.2554***	0.1628**
	[0.008]	[0.015]
$lnINF_t$	-0.4336**	-
	[0.059]	
$lnBMS_t$	-	0.3909***
		[0.005]
C	-329.635***	-219.4843***
	[0.002]	[0.006]

*, **, *** indicate significance of the variable at 10 per cent, 5 per cent, and 1 per cent level of significance, respectively.

TABLE 7

Error Correction Representation for the Selected ARDL Model

Dependant Variable: $\Delta lnIMPOT_t$		
Variable	Model 1	Model 2
	Coefficients	Coefficients
$\Delta lnREER_t$	0.1221*** [0.000]	0.1091*** [0.000]
$\Delta lnGDPPC_t$	0.0031 [0.972]	-0.0483 [0.567]
$\Delta lnRUPO_t$	0.4748*** [0.001]	0.3237*** [0.009]
$\Delta lnURPO_t$	0.2382*** [0.005]	0.1604** [0.012]
$\Delta lnINF_t$	-0.4044* [0.055]	–
$\Delta lnBMS_t$	–	0.3851*** [0.005]
ECM_{t-1}	-0.9327*** [0.000]	-0.9853*** [0.000]
Diagnostic Tests		
R-squared	0.7343	0.7749
Adjusted R-squared	0.6598	0.7119
S.D. Dependent Variable	0.1121	0.1121
S.E. of Regression	0.0654	0.0602
Akaike Information Criterion	39.7693	42.5079
Schwarz Bayesian Criterion	33.7832	36.5219
F-statistic [Prob. Value]	11.5123*** [0.0000]	14.3431*** [0.0000]
Durbin-Watson Stat	2.32510	2.4330

*, **, *** indicate significance of the variable at 10 per cent, 5 per cent, and 1 per cent level of significance respectively.

The coefficients of exchange rate are found to be 0.1310 and 0.1107 in both models. This shows that if the exchange rate appreciates by one per cent then it will significantly elevate the real imports by almost 0.13 per cent in model 1 and 0.11 per cent in model 2, respectively. This is quite intuitive as appreciation of domestic currency makes the imports cheaper. Besides, the impact of exchange rate on real imports; the coefficients of per capita GDP were found to be 0.2323 in model 1 and 0.2085 in the model 2. This was due to one per cent increase in the per capita GDP and value of real imports will also significantly increase by almost 0.23 per cent in model 1 and 0.21 per cent in model 2, respectively. The possible reason is that as per capita GDP increases, it represents rise in income of the country and also of its citizens, as well. Therefore, increase in income of citizen will encourage them to switch over to the imported products. Therefore, value of imports will increase due to increase in per capita GDP. These findings support this reason. However, the micro level investigation is that with increase in GDP, the per capita share of consumer items or producer items (raw material and machinery) increase because both have different implications for the economy.

The coefficients of rural and urban population have found to be 0.5091 and 0.2554 in model 1, and 0.3285 and 0.1628 in model 2. This shows that as time passes, both the rural and the urban population would demand more imported goods, but however the coefficients of rural population are larger than the coefficients of urban population, in both models. As 68 per cent of the total population (average of our sample period) reside in rural area, therefore, the high magnitude of rural coefficient relative to urban seems plausible. However, this implicitly assumes that there is no rural-urban bias in imports.

Furthermore, in model 1, the coefficient of inflation has found to be –0.4336 which is significant. This shows that if domestic price is elevated by one per cent, it wwould encourage the domestic users to reduce the imported goods significantly by almost 0.43 per cent. This coefficient is not according to our expectations, as increase in the domestic inflation encourages the domestic users to switch over to the imported goods. But this is a text book interpretation as it assumes that there is a possibility of substitution and consumers can still switch. However, if we look at the composition of CPI basket, the groups of food items and housing, water, electricity, gas and other fuels which assume 64 per cent weight in the basket and possibility of substitutability for these products is quite less. Therefore, it would be fair to say that increasing inflation will not increase imports, rather the available cash balance would be consumed to purchase the domestic goods, thus, leading to reduction in imports. However, this study separate money supply from the model of inflation and built model 2. The coefficient of money supply has found to be 0.3909 which is also significant. This shows that if cash in hand increase with the citizens of Pakistan by one per cent, then,

it will significantly increase the value of real imports by almost 0.39 per cent. This finding is according to the expectations of the study.

After finding the impact of predictors of value of real imports on value of real imports in the long-run using the ARDL bounds testing approach, the impact of the factors of value of real imports on value of real imports in the short-run for the selected ARDL model using Error Correction Representation, is examined. The estimated results are shown in Table 7.

The empirical results reported in Table 7 shows that coefficients of the exchange rate, rural population, and urban population were found to be positive and are significant into both models in the short-run. This shows that value of real imports also increase significantly in the short-run because of appreciation in exchange rate and increase in the rural and urban population. However, the coefficient of inflation was found to be negative and significant in the short-run, showing negative and significant impact on value the e of real imports; whereas, the coefficient of money supply has witnessed to be positive and significant. This shows that increase in money supply also appreciate the value of real imports in the short-run, as well.

Furthermore, the findings also reveal that coefficients of the first period lagged-term of error term have found to be –0.9327 and –0.9853 for model 1 and model 2, respectively. These coefficients are negative and significant and confirm the convergence hypothesis [Bannerjee et al. (1998)] which means that if we destabilize from the stable equilibrium in response to any macroeconomic shock, then for both models, the long-run and stable equilibrium would be resorted. The speed of adjustment is quite high for both models; it is approximately 93 per cent for model 1 and 99 per cent for model 2. Moreover; all diagnostics of Error Correction Representation for both conceptualized models are reliable, and therefore, as whole these short-run models are good. It is worth mentioning that short-run and long-run elasticity of import determinants are less than unity, which implies that import demands are less sensitive to changes in its determinants.

After examining the short-run coefficients the stability test is applied to see whether coefficients of predictors of value of real imports are stable over time or if there is any structural instability in the conceptualized models. For this purpose, the CUSUM and CUSUM squared graphs are used. If the graphs of CUSUM and CUSUM squared are found within their critical bounds, then it would be concluded that the estimated parameters or coefficients over time are stable. Moreover; the stability of CUSUM refers to the stability of mean of error term over time and the stability of CUSUM squared refers to the stability of variance of error term over time. The CUSUM and CUSUM Square are presented in Figure 2.

CUSUM
Model 1

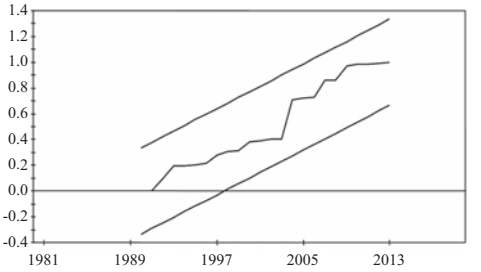
Plot of Cumulative Sum of
Recursive Residuals

Year

The straight lines represent critical bounds
at 5% significance level.

CUSUM SQUARE
Model 1

Plot of Cumulative Sum of Squares of
Recursive Residuals

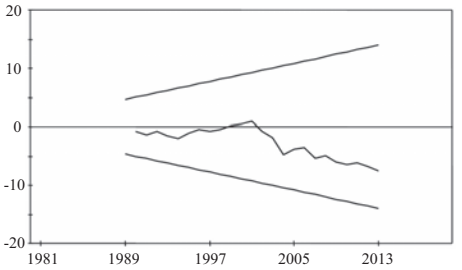


Year

The straight lines represent critical bounds
at 5% significance level.

CUSUM
Model 2

Plot of Cumulative Sum of
Recursive Residuals

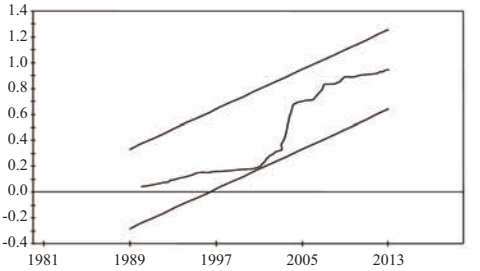


Year

The straight lines represent critical bounds
at 5% significance level.

CUSUM SQUARE
Model 2

Plot of Cumulative Sum of Squares of
Recursive Residuals



Year

The straight lines represent critical bounds
at 5% significance level.

FIGURE 2

Stability Test for both Models

V. Conclusion and Policy Implications

This paper explores the factors which affect the total real imports as share of real GDP in Pakistan. The study uses the annual data from 1980 to 2013, and apply the ARDL Bounds Testing Approach to identify and estimate the long-run relationship. The study also uses the error correction model to estimate the short-run coefficients and speed of adjustment. To check the stability of estimated parameters, the study apply the CUSUM and CUSUM of squares residual plots.

Using the two specifications the study finds that predictors of real imports have co-integrating relationship with each other. Moreover; the study also finds that real exchange rate, economic growth, rural population, urban population, and real money supply have significant and elevating effect on real imports in Pakistan. All coefficients have signs in line with theory and intuition except inflation having negative sign which means that when domestic inflation increases, imports go down. However, this is not unusual as the reviewed literature in this study finds mixed results, e.g., Niksic et al. (2013) and Islam (2013). Furthermore, the composition of the CPI basket and the origin of inflation are important. If inflation originates from the group which cannot be substituted then the domestic consumer is left with no option but to purchase domestic products, despite high domestic inflation. Nonetheless, the inclusion of real money balance instead of inflation in the second model, emerges with positive and significant relationship. To be confident about the results of this study, the stability test was also run. Findings of the stability test have confirmed that the predictors of real imports for the selected sample period are structurally stable.

The short-run and the long-run determinants of imports are same, except the GDP per capita which is statistically insignificant in the short-run. Further, the elasticities of import determinants are less than unity. These results have policy implications to improve the trade performance., particularly, low elasticity of exchange rate suggest that to improve trade balance and exchange rate

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