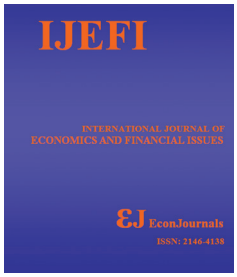

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Sustainability of the Current Account: Evidence from Pakistan

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ABSTRACT

This study examines the sustainability of the current account deficit using Pakistani data over the period 1974-2007. Employing the intertemporal budget constraint model and using autoregressive distributed lag bound testing approach, it is concluded that there is a long-run relationship between real exports and imports. However, the hypothesis of one to one relationship between the two variables does not hold in its strong form. This highlights the need for better policies to improve the current account balance in the long-run.

Keywords: Intertemporal Budget Constraint, Current Account Deficit, Cointegration, Autoregressive Distributed Lag, Bound Testing
JEL Classifications: F30, F32

1. INTRODUCTION

There has been an increasing interest in testing and examining the lung-term cointegration relationship between exports and imports in developed as well as in developing countries. The analysis is important, as the presence of this relationship indicates that any trade deficit or surplus is short term in nature and in the long-run trade balance is sustainable. The short term nature of current account deficit is not considered harmful, as it specifies the movement of capital from low productive country to more productive economy. However, persistence current account deficit may requires undesirable measures such as raising the interest rate, reducing the public deficits, enhancing the private savings and devaluing the exchange rate.

Among many, more cited studies on the subject include Bahmani-Oskooee and Rhee (1997), Arize (2002), and Manuchehr and Ericson (2004). In two different studies, Husted (1992) and Fountas and Wu (1999) have investigate the cointegration between exports and imports for the United States (US). These two studies report contradictory results. Husted have found the presence of a long-run relationship between US exports and imports while Fountas and Wu's finding negate the long-run relationship. In another important study, Arize (2002) tested the hypothesis for 50 OCED and 31 developing countries. He concludes that in 35 out of the 50 OCED countries there exists a long-run relationship between exports and imports while in 31 of the 35 developing countries export coefficient was positive and statistically significantly different from unity. Narayan and Narayan (2005) have investigated the long-run relationship between exports and imports for 22 least developed countries by using the bounds testing approach for cointegration. The results indicate that exports and imports are cointegrated only for six out of the 22 countries, and the coefficient on exports is less than one. More recently Polat (2011) has used Turkish data to investigate the sustainability of current account from January 2000 to June 2010 and found that current account is sustainable in a weak form only. Using Johansen–Juselius cointegration technique and vector error correction model (VECM), Shahbaz et al. (2010) has also confirmed the existence of this relationship for Pakistan. Kalyoncu and Ozturk (2010) examined sustainability of current account for Colombia, Peru, Venezuela, Mexico, Brazil and Argentina. Empirical results suggest that in the case of Peru, there exists a unique long-run or equilibrium relationship among real exports and imports. In the case of Colombia, Venezuela, Mexico, Brazil and Argentina, cointegration results suggest that these countries' current accounts are not sustainable in the long-run. Heidari et al., (2012) have also confirmed that there is a long run equilibrium relationship between imports and exports over the sample period, 1960-2007 in Iran.

Except Narayan and Narayan, most of the studies have employed either Engle and Granger (1987) approaches to cointegration or Johansen (1988), Johansen and Juselius (1990) approach to

conitegration. However, neither of these approaches provides robust results in finite samples. Moreover, Hakkio and Rush (1991) state that the use of monthly or quarterly data to increase the number of observations will not strengthen the robustness of the results in cointegration analysis. Consequently, this study uses the bounds-testing approach to cointegration developed by Pesaran and Shin (1999) and Pesaran et al. (2001) to test the long-run relationship between Pakistani imports and exports. This methodology carries superior small-sample properties than the Johansen and Juselius and the Engle and Granger approaches. Pesaran and Shin also argue that in the autoregressive distributed lag (ARDL) framework for small sample sizes, the short run parameters of the ordinary least squares (OLS) estimators are consistent and the ARDL based estimators of the long-run coefficients are super-consistent.

Like other cointegration techniques ARDL approach captures single cointegration relation. However, the main advantage of ARDL approach lies in its ability to model the series even if they are different order of integration. Though the ARDL framework is capable of modeling series even if they are I(0) or I(1), the technique is not suitable if series are found to be I(2) or above[1].

The current study widens the work of Narayan and Narayan (2005) to a developing economy by testing for the presence of long-run relationship between exports and imports in an intertemporal budget constraint model using the methodology given by Pesaran et al. (2001). There is no other study which has used this methodology to test for the sustainability of current account in Pakistan and this study therefore represents a contribution to this literature.

The paper consists of five sections. In section 2 a theoretical and econometrical model is presented. Section 3 briefly reviews the trade policies of Pakistan. The estimation results are reported in section 4. Section 5 concludes.

2. THEORETICAL BACKGROUND

Following Husted (1992), we write an individual's current period budget constraint by assuming that consumers want to maximize utility subject to a budget constraint and borrowing and lending in international markets is permissible at a given interest rate. Furthermore, consumers' revenues are assumed to be the sum of profits distributed by firms and an endowment of outputs. There is no government in the model. The constraint is:

$$C_t = Y_t + B_t - I_t - (1 + r_t)B_{t-1} \quad (1)$$

Where, C_t is current period consumption; Y_t is output; I_t is investment; r_t is one period world interest rate; B_t is the international borrowing and $(1 + r_t)B_{t-1}$ is the debt of the previous period. Husted makes several assumptions to reach at a testable model, which is given by,

$$X_t = \alpha + \beta M_t + \varepsilon_t \quad (2)$$

Where, X_t represents exports, M_t are imports of a representative economy while ε_t is a white noise disturbance term. Equation 2 states that a country satisfies its inter-temporal budget constraint or equivalently the current account is sustainable if the exports and imports are cointegrated and the estimated coefficient of $M_t(\beta)$ equals to unity. In this case it is unlikely that economy will default on its debt. If no long-run cointegration relationship between exports and imports could be detected, we conclude that current account is not sustainable. In the presence of long-run relationship between exports and imports, if the value of β is less than unity, it may be concluded that current account is not sustainable or the country is following its week form of intertemporal budget constraint. To estimate the value of β and to find the long-run relationship between the two variables, we can write equation 2 in the ARDL specification.

Starting from unrestricted level Vector autoregression (VAR),

$$Y_t = C + \sum_{j=1}^{p} A_j Y_{t-j} + u_t \quad (3)$$

Where, $Y_t = \begin{bmatrix} X_t & M_t \end{bmatrix}'$ and X_t represents exports at time t and M_t shows imports. The two series given in equation 3 can either be integrated of order 1 or order zero. C is a vector of two constants, i.e., $C_t = \begin{bmatrix} C_X & C_M \end{bmatrix}'$ and the term A_j is a 2×2 matrix of coefficients for lag j. The error terms vector $u_t = \begin{bmatrix} u_{X,t} & u_{M,t} \end{bmatrix}'$ is normally distributed with zero mean and a variance Ψ. This variance is positive definite stated as,

$$\Psi = \begin{bmatrix} \sigma_{XX} & \sigma_{XM} \\ \sigma_{MX} & \sigma_{MM} \end{bmatrix} \quad (4)$$

We can write $u_{X,t}$ in terms of $u_{M,t}$ as,

$$u_{X,t} = \frac{\sigma_{XM}}{\sigma_{MM}} u_{M,t} + v_t \text{ Where } v_t \sim \text{IN}\left(0, \sigma_{XX}\right)$$

After some manipulation the above VAR can be written as a VECM;

$$\Delta Y_t = C + \alpha Y_{t-1} + \sum_{j=1}^{p-1} \beta_j \Delta Y_{t-j} + u_t \quad (5)$$

Where, $\Delta = 1 - L$, and,

$$\beta_j = \begin{bmatrix} \beta_{XX,j} & \beta_{XM,j} \\ \beta_{MX,j} & \beta_{MM,j} \end{bmatrix} = -\sum_{k=j+1}^{p-1} \Omega_k \quad (6)$$

and the long-run multipliers are presented by α and can be written as,

$$\alpha = \begin{bmatrix} \alpha_{XX} & \alpha_{XM} \\ \alpha_{MX} & \alpha_{MM} \end{bmatrix} = -\left(\mathrm{I} - \sum_{j=1}^{p} \Omega_j \right) \quad (7)$$

Where, I represents a 2×2 identity matrix having unrestricted diagonal, which leaves the option for the series to be I(0) or I(1). For instance, $\alpha_{MM} = 0$ means that the imports are first difference stationary while $\alpha_{MM} < 0$ implies it is level stationary.

1 For more discussion and application of ARDL methodology see Ahmad (2008; 2010 and 2012).

Now we can test the maximum of one long-run relationship, which needs a zero restriction to be imposed on one of the off diagonals element of the α matrix. For example $\alpha_{MX} = 0$ implies that in the long-run exports have no impact on the imports or the imports are long-run forcing variable for the nominal interest rate.

Using equation 5 and assuming $\alpha_{MX} = 0$ or normalizing exports, VECM of equation 5 for exports can be stated as,

$$\Delta X_t = \tau + \rho X_{t-1} + \delta M_{t-1} + \sum_{j=1}^{p-1} \omega_{X,j} \Delta X_{t-j} + \sum_{j=1}^{q-1} \omega_{M,j} \Delta M_{t-j} + \sigma \Delta M_t + v_t \quad (8)$$

Where,

$\tau = C_X - \sigma C_M$, $\rho = \alpha_{XX}$, $\delta = \alpha_{XM} - \sigma \alpha_{MM}$, $\omega_{X,j} = \beta_{XX,j} - \sigma \beta_{MX,j}$ and $\omega_{M,j} = \beta_{XM,j} - \sigma \beta_{MM,j}$ while $\sigma = \frac{\sigma_{XM}}{\sigma_{MM}}$

The above model, which is also called ARDL(*p, q*), allows the first difference of exports and imports to be different in lag lengths where *p* represents number of lag lengths of the first difference of exports and *q* is the number of the first difference of the imports. To check the absence of long-run relationship between exports and imports the null hypothesis is $\rho = \delta = 0$ while the alternative hypothesis $\rho \neq 0$ and $\delta \neq 0$ implies the existence of following type long-run relationship between the two variables of interest,

$$X_t = \varphi_0 + \varphi_1 M_t + \varepsilon_t \quad (9)$$

Where, $\varphi_0 = -\tau/\rho$, $\varphi_1 = \delta/\rho$ and ε_t is a white noise error term.

The equation (9) can be estimated using OLS and the significance of the above null and alternative hypothesis can be estimated using F-statistic. However, the distribution of this test is non standard which depends upon the order of the integration, the number of regressors and the choice of intercept and a time trend. The asymptotic critical values of this test for two cases, i.e., when both the series are I(0) and I(1) are calculated and reported by Pesaran et al. (2001)[2]. As the sample size is small in this study, we use the small sample size (30-80) based critical values reported by Narayan (2004). The two set of reported critical values represent two bounds, upper and lower. If the calculated value fall below the lower critical value we accept the null hypothesis of no long-run relationship between exports and imports regardless the individual series are I(0) or I(1). On the other hand, if the calculated value falls above the upper critical value, the alternative hypothesis that there exist a long-run relationship exports and imports irrespective of the order of the integration of the variables is accepted. A conclusive inference is not possible if the calculated value falls in between these two bounds at a particular significance level.

3. TRADE POLICIES IN PAKISTAN

During 1970s import policy can be thought of a step towards import liberalization and eradication of administrative controls which hinder export growth. This involves the abolition of peculiarity between industrial and commercial imports, permission for the import of capital goods under free list as well as expansion in the free list for the import of raw material. The introduction of Export Refinance Scheme by the State Bank of Pakistan, and many other measures like reduction in duties, rebate on excise and custom duties, and tax exemption for exports, were some of the measure for the promotion of exports. However, trade balance remained in deficit during the 70's reflecting a gap between higher imports and lower exports. The international oil price hike and poor agricultural sector performance, besides the above mention policies, can be considered as a contributing factor of this deficit (Janjua, 2003).

In the early 80's Zia government removed the explicit import cottas on non capital imports and the category of the commodities that were subject to import licensing value ceiling declined from 406 in 1980/81 to 5 consumer goods in July 1983. The authorities also abolished the system of free and banned imports in 1983 and set up a negative list items. Beside other changes, the tariff rate continued to decline in the 70's and in the June 1987 tariff slabs were reduced from 17 to 10.

In the 1980s, Pakistan, upheld its policies of opening up the trade. Besides many other export promotion measures, the removal of fixed exchange rate system, duty free imports of essential machinery and raw material, and export rebates led to export growth during the period. Moreover, under the structural adjustment programme signed with the IMF in 1988, the pace of trade liberalization amplified and the maximum tariff rate were reduced to 90% besides moving from non tariff barriers to tariff barriers.

The liberalization of imports continued during 90's and, except for commodities on the negative list, most of the restrictions on import license scheme were abandoned. Importers were allowed to use their own foreign exchange with no limits and authorized dealers were permitted to open letter of credit for imports.

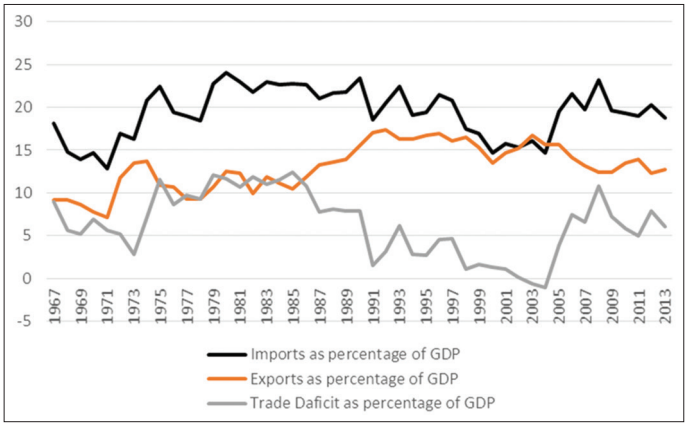
During 2005-2006 several steps were taken to promote export growth by providing incentives to reduce export cost and enhance the diversity of export base. The new and untapped exports markets for both traditional and non-traditional exports were also explored. To facilitate small and medium enterprises for working capital requirement, the government set up Pakistan export finance guarantee agency. Moreover, more than 5-year-old machinery's import has been allowed and to support textile sector, the establishment of textile cities in Karachi and Faisalabad has been suggested. Figure 1 gives the pattern of current account of Pakistan for the last four decades. It can be noted that trade deficit declined considerably during 2004 and in fact went into surplus due to the earlier mentioned steps taken to promote exports. The usual trend in trade deficit i.e., a higher level of imports and lower level of exports has again started to appear in the recent past years.

4. DATA AND ESTIMATION

This study uses annual data on exports and imports from 1974 to 2013 for estimation purpose. It may be argued that this small

2 See Table CI(i) to CI(v) for different form of VECM's critical values (Pages 300-301).

Figure 1: Trade pattern



Source: The World Development Indicators

sample size is not appropriate to capture the long-run sustainability of current account imbalance. The argument is more relevant to other existing cointegration techniques such as Johansen and Juselius and the Engle and Granger approaches. However, as discussed earlier, the ARDL approach carries superior small-sample properties and is well suited to capture the long-run relationship in small sample.

Following Wu, Fountas and Chen (1996) our measure of Exports include exports of goods and services while imports are defined as imports of goods and services plus net interest payments and net transfer payments. Exports and imports are measured in local currency and in real terms as a percentage of real gross domestic product. All the data is taken from International Financial Statistics published by International Monetary Fund.

The equation 8 with an intercept term and no time trend is estimated to examine the long-run relationship between exports and imports. To select the appropriate lag lengths of exports and imports variables included in the conditional error correction model, three different criteria, i.e., Akaike information criterion, Schwarz Bayesian Criterion, and Hannan-Quinn criteria were used. All three criteria selected the same number of lag lengths. Consequently, an ARDL(3, 0) model was estimated. The calculated F-values are reported in Table 1, while the critical bound F-values for small sample based on Narayan (2004) are reported in Table 2. To check the sensitivity of the results to different lag lengths we also estimated an ARDL(2, 1) and ARDL(2, 0) model, which essentially gave the same results. On the basis of LM and F version tests of autocorrelation and heteroscedasticity, the reported results are essentially free from these problems.

Comparing the F-calculated and critical values, it is concluded that calculated values of all three models fall above the upper bound of the critical values at 5% significance level. On the basis of these results we can confidently conclude that the hypothesis of no long-run relationship between exports and imports can be rejected. As Hakkio and Rush (1991) and Husted (1992) have stated that if exports and imports are measured relative to domestic income and $\varphi_1 < 1$, there is an incentive for the country to default on its international debt as it is violating its intertemporal external constraint. To check the one to one long-run relationship between

Table 1: ADF tests (not reported) indicate that none of the variables is I(2)

Calculated F-values	φ_0	φ_1
7.84 (3, 0)	0.56	0.76
	1.38 (0.184)	9.10 (0.00)
5.3895 (2, 1)	0.81	0.78
	2.30 (0.032)	9.38 (0.00)
5.46 (2, 0)	0.84	0.78
	2.83 (0.010)	10.99 (0.00)

ADF: Augmented Dickey–Fuller

Table 2: Bound critical values

Significance level	Restricted intercept and no trend		Restricted intercept and trend	
	I(0)	I(1)	I(0)	I(1)
1%	4.614	5.966	5.333	7.063
5%	3.272	4.306	3.710	5.018
10%	2.676	3.586	3.008	4.150

Source: Narayan (2004)

exports and imports, the estimates of equation 7 are also reported in Table 1. The second and third columns of the table give the estimated coefficients of φ_0 and φ_1 besides the t and P values. Observing the values of φ_1 for three models it can be concluded that this value is slightly lower than unity (0.76 and 0.78), which might indicate that the persistent current account deficit is not sustainable in Pakistan. However this value is closer to unity that indicates the two series do not move very far from each other and it is less likely that country would default on its debt.

5. CONCLUSION

This paper has been an attempt to test the sustainability of current account balance of Pakistan by checking the long-run relationship between exports and imports. Contrast to other studies on the topic, this approach tests the long-run cointegration relation between exports and imports by employing the superior ARDL bound testing approach. The estimation results indicate the presence of stable long-run relation between exports and imports. However, a slightly less then one to one relation between the two series shows the slight violation of intertemporal international budget constraint and indicates that authorities should adopt better policies to attain sustained trade balance.

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