

Exports and Economic Growth Nexus: The Case of Pakistan

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1. INTRODUCTION

The theoretical association between trade and economic growth has been discussed for over two centuries. However, controversy still persists regarding their real effects. The favourable arguments with respect to trade can be traced back to the classical school of economic thought that started with Adam Smith and subsequently enriched by the work of Ricardo, Torrens, James Mill and John Stuart Mill in the first part of the nineteenth century. Since then the justification for free trade and the various and indisputable benefits that international specialisation brings to the productivity of nations have been widely discussed in the economic literature [Bhagwati (1978) and Krueger (1978)].

The suitability of trade policy—import substitution or export promotion—for growth and development has been also debated in the literature. In 1950s and 1960s, most of the developing countries followed import substitution (IS) policies for the economic growth. The proponents of the IS policy stress upon the need for developing countries (LDCs) to evolve their own style of development and to control their own destiny [Todaro and Smith (2003), p. 556]. Since the mid-1970s, in most developing countries, there has been considerable shift towards export promotion strategy (EP).¹ This approach postulates that export expansion leads to better resource allocation, creating economies of scale and production efficiency through technological development, capital formation, and employment generation.

Theoretical agreement on export-led growth (ELG) emerged among neoclassical economists due to the success of free-market, and outward-oriented policies of East Asian Tigers [World Bank (1993)]. Export-led growth hypothesis

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¹Pakistan, like many developing countries, has adopted an export promotion strategy for the last two and a half decades, moving towards fewer and fewer controls and showing more openness.

has not only been widely accepted by academics [Feder (1982) and Krueger (1990)], and evolved into a “new conventional wisdom” [Tyler (1981) and Balassa (1985)], but, it also, has shaped the development of a number of countries as well as the policies of the World Bank [*World Bank Development Report* (1987)]. However, the reality of the tigers does not support this view of how their export success was achieved. The production and composition of export was not left to the market but resulted as much from carefully planned intervention by the governments. As Amsden (1989) states that the approach behind the emergence of this new ‘Asian Tiger’ is a strong, interventionist state, which has wilfully and abundantly provided tariff protection and subsidies, change interest and exchange rates, management investment, and controlled industry using both lucrative carrots and threatening sticks.

The proponents of the hypothesis and free trade point out that the Latin America economies that followed inward-oriented policies under the import substitution strategy showed poor economic achievements [Balassa (1980)]. In order to correct economic imbalances, many LDCs were forced to further stimulate their export-led orientation through implementing adjustment and stabilisation programmes. It was thought that promoting exports would enable LDCs to correct imbalances in the external sector and assist them in their full recovery. Consequently, numerous researches have been done on the exports and economic growth nexus. However, the results are mixed for both developed and developing countries and the topic is still on the agenda of the researchers.

This paper attempts to reinvestigate the exports and economic growth nexus for Pakistan. For testing the long run relationship between these variables, cointegration techniques of Johansen (1988) and Johansen and Juselius (1990) have been used. To check the directions of causality among these variables, the study uses Granger causality test based on Toda and Yamamoto (1995). This test does not seem to have been employed in the Pakistan’s context.

After introduction, the rest of the paper is organised as follows. Section 2 discusses review of the literature. Section 3 deals with the data and methodological issues. Section 4 presents empirical findings, while, Section 5 concludes the paper.

2. REVIEW OF LITERATURE

The empirical studies regarding the relationship between exports and output growth can be separated into two categories: (i) the cross-sectional analysis, (ii) country-specific time series studies. Both groups of studies, however, indicate that the debate on the nexus is not settled.

2.1. Cross-sectional Studies

In the cross sectional analysis, Kravis (1970); Michaely (1977); Bhagwati (1978), use the Spearman rank correlations test to explore the relationship between

exports and growth. While Balassa (1978, 1985); Tyler (1981); Kavoussi (1984) Ram (1987); Heitger (1987); Fosu (1990); Lussier (1993) investigate exports and growth performance within a neoclassical framework by using ordinary least squares (OLS). These studies, in general, find that export is an important factor in determining economic growth. Gonclaves and Richtering (1986) conduct empirical analysis for a sample of 70 developing countries for the 1960–1981 period, and find that export growth rate and change in export/GDP ratio are significantly correlated with GDP growth. Sheehey (1993) finds inconsistent evidence of higher productivity in the export sector compared with the non-export sector. Colombatto (1990), using OLS, in a 70 countries sample, rejects the export-led growth hypothesis.

Cross sectional empirical investigations can explain to some extent why growth differs across a wide spectrum of countries. Nevertheless, cross-sectional investigation has its deficiencies, that raises doubts about their usefulness. In these studies, countries in similar stages of development were grouped together and implicitly assumed a common economic structure and similar production technology across different countries. However, this assumption is most likely unrealistic. Thus the results reported in these studies are vulnerable to criticism. Moreover, cross sectional analysis ignore the shifts in the relationship between variables overtime within a country, while export and economic growth is a long run phenomenon that can not be studied by using cross sectional analysis.

2.2. Time Series Studies

The recent evidence from time series analysis fails to support a robust exports-economic growth nexus. Jung and Marshall (1985), for instance, based on the standard Granger causality tests, analyse the relationship between exports growth and economic growth using time series data for 37 developing countries could find evidence for the export-led growth hypothesis only in four countries. Similarly results from Bahmani-Oskooee, *et al.* (1991) and Dodaro (1993) are mixed. Darrat (1986, 1987) rejects export-economic growth causality for three out of four countries. However, Chow (1987) in a sample of eight newly industrialised countries (NICs), find strong bi-directional causality between the export growth and industrial development in seven countries.

Using Error Correction Modelling (ECM) approach, Bahmani-Oskooee and Alse (1993) re-examine the relationship between export growth and economic growth for nine developing countries and find strong support for the export-led growth hypothesis for all the countries in the sample. Dutt and Ghosh (1996) and Xu (1996) find support for the export-led growth hypothesis in 17 out of 32 countries under study.

Al-Yousif (1997) by using a multivariate model for Malaysia supports the export-led growth hypothesis as a short run phenomenon, while El-Sakka, *et al.* (2000) find mixed results regarding the direction of causality in 16 Arab countries.

Ghartey (1993), using a vector auto-regressive model for Taiwan, USA and Japan, finds export-led growth in Taiwan, economic growth Granger-causes export growth in the USA, and a feedback causal relationship exists in the case of Japan. On the contrary, Kwan, *et al.* (1996) find mixed results for Taiwan, while Boltho (1996) finds that domestic forces rather than foreign demand propelled longer run growth in Japan. Ahmed and Harnhirun (1996) find no support for the export-led growth hypothesis for 5 ASEAN economies. Gupta (1985) finds bi-directional association between exports and economic growth for Israel and South Korea.

Nandi (1991) and Bhat (1995), for example, find evidence of export-led growth hypothesis for India. While Ghatak and Wheatley (1997) finds that export growth is Granger-caused by output growth in India. On the other hand, Xu (1996) rejects the export-led growth hypothesis for India for the 1960–1990 period.

Some studies have been carried out in the recent past on Pakistan. Khan and Saqib (1993), use a simultaneous equation model and find a strong relationship between export performance and economic growth in Pakistan. Mutairi (1993) finds no support for the period 1959-91, while Khan, *et al.* (1995) find strong evidence of bi-directional causality between export growth and economic growth for Pakistan.

Rana (1985) estimates an export-augmented production function for 14 Asian developing countries including Pakistan. The evidence supports that exports contribute positively to economic growth. Anwar and Sampath (2000) examine the export-led growth hypothesis for 97 countries including Pakistan for the 1960–1992 period. They find unidirectional causality in the case of Pakistan. Ahmed, *et al.* (2000) investigate the relationship between exports, economic growth and foreign debt for Bangladesh, India, Pakistan, Sri Lanka and four South East Asian countries using a trivariate causality framework. The study rejects the export-led growth hypothesis for all the countries (except for Bangladesh) included in the sample. Kemal, *et al.* (2002) investigate export-led hypothesis for five South Asian Countries including Pakistan. The study finds no evidence of causation in the short run for Pakistan in either direction. However, they find a strong support for long-run causality from export to GDP for Pakistan.

Some studies find that the effect of export on economic growth depends on the level of development of the country concerned [Tyler (1981); Dodaro (1991); Michaely (1977); Singer and Gray (1988); Watanabe (1985)] and the composition of export itself [Kavoussi (1985) and Dodaro (1991)]. Furthermore, some authors [Yanghmaian and Ghorashi (1995)] maintain that a long and complex process of structural change and economic development precedes both exports and economic growth.

The above studies show that results are far from settled and require further investigation.

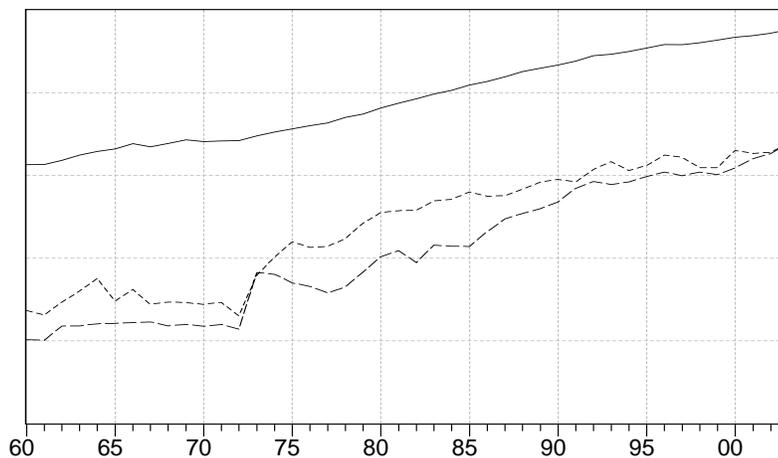
It is established in the literature of econometrics that causality tests are sensitive to model selection and function form [Gujarati (1995)]. Riezman, Whiteman, and Summers (1996) point out that omitting the important variables in the VAR estimation process can result in both Type I and Type II errors, that is, spurious rejection of one causality as well as spurious detection of it. Lutkepohl (1982) and more recently Caporale and Pittis (1997) have shown the sensitivity of causality inference between the variables of the incomplete system. Moreover, Caporale, Hassapis, and Pittis (1998) show that the omission of an important variable results in invalid inferences about the causality structure of the system, unless causality is in the direction of the omitted variable but not vice versa. To avoid the said problem we have also included imports in our study.

3. DATA AND METHODOLOGICAL ISSUES

3.1. Data

The Annual data were retrieved from *IMF's International Financial Statistics* (CD-ROM) for the year 1960 to 2003. The exports, the imports and the GDP were converted into real terms using consumer price indices. All the time series are transformed into logarithms. Logarithmic Plot of the three time series are shown in Figure 1. Figure 1 shows that real GDP, 'y' the real export, 'x' and the real imports, 'm' exhibit strong upward trends indicating that these series tend to move together.

Fig. 1. Economic Growth, Import and Export in Pakistan 1960–2003.



3.2. The Methodology

The objective of the study is to investigate the dynamic relationships among the variables, i.e. the real output (GDP), real exports and real imports. For the examination of long-run relationship among these variables, we used test developed by Johansen (1988) and Johansen and Juselius (1990). For the direction of causality, we have used Granger causality test based on Toda and Yamamoto (1995).

3.2.1. The Cointegration Test

To determine whether the variables are integrated or otherwise, we applied the standard maximum likelihood method of Johansen (1988) and Johansen and Juselius (1990).² This test involves estimating the following unrestricted vector autoregressive (VAR) model:

$$Y_t = A_0 + \sum_{j=1}^p A_j Y_{t-j} + \varepsilon_t \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

Where $Y_t = (y, x, m)$ is an 3×1 vector of non-stationary $I(1)$ variables, A_0 is a 3×1 vector of constants, p is the number of lags, A_j is a 3×3 matrix of estimable parameters, and ε_t is a 3×1 vector of independent and identically distributed innovations. If Y_t is cointegrated, Equation (1) can be generated by a vector error correction model (VECM):

$$\Delta Y_t = A_0 + \sum_{j=1}^{p-1} \Gamma_j \Delta Y_{t-j} + \Pi Y_{t-1} + \varepsilon_t \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

Where $\Gamma_j = -\sum_{i=j+1}^p A_i$ and $\Pi = \sum_{j=1}^p A_j - I$. Δ is the difference operator, Γ and Π represents coefficient matrices, and I is an $n \times n$ identity matrix. The coefficient matrix Π is known as the impact matrix, and it contains information about the long-run relations. Johansen's methodology requires the estimation of the VAR Equation (2) and the residuals are then used to compute two likelihood ratios (LR) test statistics that can be used in the determination of the unique cointegrating vectors of Y_t . The cointegrating rank can be tested with two statistics: the trace test and the maximal eigenvalue test.

3.2.2. The Toda and Yamamoto Multivariate Causality Test

The use of Granger causality tests to trace the direction of causality between two economic variables is not uncommon in empirical work. However, (1) the

²Treating all variables to be endogenous, the JJ test is noted to offer several advantages over the two-step residual-based test of Engle and Granger (1987) [see Masih and Masih (2000)].

standard Granger (1969) causality test for inferring leads and lags among integrated variables will end up in spurious regression results and the F -test is not valid unless the variables in levels are cointegrated; (2) The error correction model [due to Engle and Granger (1987)]³ and the vector auto regression error-correction model [due to Johansen and Juselius (1990)]⁴ as alternatives for the testing of non-causality between economic time series are cumbersome; (3) Toda and Phillips (1993) provide evidence that the Granger causality tests in ECMs still contain the possibility of incorrect inference. They also suffer from nuisance parameter dependency asymptotically in some cases [see Toda and Phillips (1993) for details]. In this paper we use the Toda and Yamamoto's (1995) methodology to avoid the problems outlined above.

Toda and Yamamoto (1995) proposed a simple procedure requiring the estimation of an 'augmented' VAR, which is applicable irrespective of the integration or cointegration present in the system. The Toda and Yamamoto (1995) procedure uses a modified Wald (MWALD) test to test restrictions on the parameters of the VAR(k) model. This test has an asymptotic chi-squared distribution with k degrees of freedom in the limit when a VAR [$k+d(\max)$] is estimated (where $d(\max)$ is the maximal order of integration for the series in the system). Two steps are involved with implementing the procedure. The first step includes determination of the true lag length (k) and the maximum order of integration (d) of the variables in the system. Given the VAR (k) selected, and that the order of integration $d(\max)$ is determined, a level VAR($k+d$) can then be estimated. The second step is to apply standard Wald tests to the first k VAR coefficient matrix (but not all lagged coefficients) to conduct inference on Granger causality.

3.2.3. The Procedure

We followed the following procedures. First, since both cointegration test and Toda-Yamamoto Granger Causality test require certain stochastic structure of the time series, a stationary test is performed to determine the order of integration of each time series. We have used the augmented Dickey-Fuller test (ADF) (1979) and Phillips-Perron (PP) (1988). Secondly, since one of critical parts of the cointegration

³This methodology involves transforming the suggested relationship into an Error Correction model (ECM) and identifies the parameters associated with causality. If the case involves more than two cointegration vectors, this is not easy work.

⁴Further, there is growing concern among applied researchers that the cointegration likelihood ratio (LR) test of Johansen (1998) and Johansen and Juselius (1990) have often not provide the degree of empirical support that might reasonably have been expected for a long run relationship. Furthermore, using a Monte Carlo experiment, Bewley and Yang (1996) argue that the power of LR tests is high only when the correlation between the shocks that generate the stationary and non-stationary components of typical macroeconomic series is sufficiently large and also that the power of LR tests deteriorates rapidly with over-specification of lag length. This concern has also been supported by the simulation studies of Ho and Sorensen (1996).

test and Toda-Yamamoto Granger Causality test is to determine the lag length k in the level VAR system. The lag length of the level VAR system was determined by minimising the Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC). Thirdly, we conduct the cointegration test and finally, we applied the Toda-Yamamoto (1995) Granger causality test to investigate the directions of the causality.

4. EMPIRICAL FINDINGS

4.1. Order of Integration

Before testing for cointegration we tested for unit roots in order to investigate the stationarity properties of the data, Dickey-Fuller (ADF) t-tests [Dickey and Fuller (1979) and (PP) Phillips and Perron (1988)] test are used to each of the three time series real GDP, real exports and real imports testing for the presence of a unit root. The lag length for the ADF tests was selected to ensure that the residuals were white noise.

The results of the Augmented Dickey Fuller (ADF) test both with and without trend as recommended by Engle and Granger (1987) and the Phillips and Perron (1988) test again with and without trend are reported in Table 1.

Table 1 shows that the null of unit root can not be rejected for any of the three level variables. However, the null of unit root is rejected for first differenced variables, indicating that all variables are first differenced stationary or integrated of order one, $I(1)$.

Table 1

Stationary Test of Each Variables Using ADF, PP

Variables	ADF		PP	
	Without Trend	With Trend	Without Trend	With Trend
LE	-0.106	-3.185	0.502	-3.143
LM	-0.665	-2.253	-0.548	-2.305
LY	-0.138	-3.573*	0.1456	-1.748
Δ LE	-7.041***	-6.986***	-8.684***	-8.802***
Δ LM	-7.047***	-6.975***	-7.152***	-7.076***
Δ LE	-5.880***	-5.798***	-6.045***	-5.978***

Note: *** and * denotes significance at the 1 percent and 10 percent levels, respectively.

4.2. Testing for Cointegration

Having established that all variables in the study are integrated of order one $I(1)$, we proceed to test for cointegration between the variables on levels.

Two time series are cointegrated when a linear combination of the time series is stationary, even though each series may individually be non-stationary. Since non-stationary time series do not return to their long-run average values following a disturbance, it is important to convert them to stationary processes; otherwise regressing one non-stationary process on another non-stationary process can generate spurious results.

Before we formally use the Johansen (1991) procedure to test for cointegration, we have used the Engle-Granger test and CRDW test [see Sargan and Bhargava (1983)] initially to test whether there exist a long-run relationship among the variables of interest. This is just a complementary test.

4.2.1. The EG and CRDE Test

In this section, we have used the Engle-Granger test and CRDW test [see Sargan and Bhargava (1983)] to investigate whether the variables under question are cointegrated or not. In doing so, we estimate Equation (1) in levels through OLS and check whether the residuals from the regression is stationary, i.e., $I(0)$. The results are shown as follows:

$$ly = 1.8235 + 0.5644export + 0.1324import$$

$$\text{Adjusted } R^2 = 0.9771 \quad \text{CRDW} = 0.9308 \quad \text{ADF}(0) = -3.6304^{***}$$

Notes: ***Significant at 1 percent level.

It is noted from the above that the CRDW clearly exceeds the value of 0.89, which is the approximate critical value for $n=50$ at the 0.05 level of significance. Therefore, the CRDW test is in the position to reject the null hypothesis that the variables are not cointegrated. At the same time, the EG cointegration test also rejected the null hypothesis at the 1 percent significance level. Thus, the residuals estimated suggest that the output, exports and imports have a long run relationship for the 1960 to 2003 period.

However, although both CRDW and the EG procedure have distinct advantages and in spite of the positive results mentioned earlier, both tests have several important defects.⁵ Thus, before making any kind of judgment, we are

⁵This issue emerged after several Monte Carlo studies that considered the robustness of these tests showed that in general the most standard tests are not powerful. Moreover, most of the studies come to the conclusion that no one test predominates over the others. In fact, in cases where the sample size is finite, the estimations conducted through the EG procedure are sensitive to the imposition of normalisation and it assumes only one cointegration vector and does not allow for potential feedback effects [Enders (1995)].

proceeding to employ more powerful test, Johansen Maximum likelihood techniques, to verify the existence of cointegration in the following sub-section.

4.2.2. Johansen Maximum Likelihood Techniques

Before we run cointegration test, using the Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC), the lag length for the VAR system is determined. Both criteria suggest the use of 2 lags in the VAR. Moreover, since the data are of annual periodicity, an inspection of the results suggests that serial correlation is not a problem when we set the order of the VAR at 2. The results of their λ -max and trace tests to identify the number of cointegrating vectors are reported in Table 2.

Note that Reinsel and Ahn (1992) argue that in model with a limited number of observations, the likelihood ratio tests can be biased toward finding cointegration too often. Thus they suggest multiplying the LR test statistics (λ -max and trace) by a factor $(T-nk)/T$, where T is the effective number of observations, n is the number of variables in the model, and k is the order of VAR, to obtain the adjusted estimates. Table 2 reports these adjusted statistics.

Table 2

Johansen and Juselius Cointegration Test Results
(Variables: GDP, Exports and Imports)

Null	Alternative	λ -Max Statistics	Critical Value		Trace Statistics	Critical Value	
			95 %	99%		95%	99%
r=0	r=1	32.60**	22.00	26.81	49.42**	34.91	41.07
r≤1	r=2	12.75	15.67	0.20	16.82	19.96	24.60
r≤2	r=3	4.06	9.24	12.97	4.06	9.24	12.97

Note: **Indicate significance at 5 percent level.

Table 2 shows that the null of no cointegration is rejected using either statistics because both statistics are greater than their critical values. However, the null of at most one cointegrating vector cannot be rejected in favour of $r = 2$. Thus the empirical support for one cointegration vector implies that all three variables, namely, imports, exports and the GDP, are cointegrated and follow a common long-run path. This is consistent with our “a priori” expectation that imports, export and economic growth are inter-connected. Therefore, the cointegration analysis provides a justification for the inclusion of imports in the analysis of export-led growth hypothesis for Pakistan.

Since all of above tests confirm cointegration among these variables under study, therefore, the standard Granger causality test is no longer valid in this case. Hence, we have used multivariate Granger Causality [Toda and Yamamoto (1995)] to find the direction of causality among exports, imports and real output growth.

4.3. Multivariate Granger Causality Test

The results from Table 1 clearly suggest that none of the variables are stationary in level. However, the first differences of these series are stationary. This means that $d_{\max}=1$ in our case. We then proceed in estimating the lag structure of a system of VAR in levels and our results indicate that the optimal lag length based on Akaike's FPE is 2, that is, $k=2$. We then estimate a system of VAR in levels with a total of $(d_{\max}+k=2+1)=3$ lags.

Using these information, the system of equations is jointly estimated as a "Seemingly Unrelated Regression Equations" (SURE) model by Maximum Likelihood and computes the MWALD test statistic as shown in Table 3.

Table 3

Granger Causality Test (TY Augmented Lags Methods)

Dependent Variable	Sources of Causation		
	GDP	Exports	Imports
	$\chi^2(5)$	$\chi^2(5)$	$\chi^2(5)$
GDP	–	17.08***	16.35***
Export	5.959	–	6.71
Import	9.90*	8.429	–

Note: *** and * Indicate significance at the 1 percent and 10 percent respectively.

Table 3 shows that the null hypothesis that Granger no-causality from export to GDP can be rejected at 1 percent level of significance. However, there is no evidence to support the converse. This indicates that there is a unidirectional causality running from exports to output. This confirms the ELG hypothesis for Pakistan. Exports boost the growth of economy through access to the wide world market and hence the economies of scale. It earns foreign exchange and also supports the employment in the export sectors of the economy. Table 3 does not show any significant causality between import and exports.

Our results are in contrast to those of Akbar and Naqvi (2000) and Ahmed, Butt and Alam (2000). Their results do not support the ELG hypothesis for Pakistan. Akbar and Naqvi (2000) find that imports do not play any role in the output growth relationship, while Ahmed, *et al.* (2000) conclude that both the export driven output growth and output growth-led export promotion hypotheses are not being supported in all cases. The contradictory results of these studies may be due to the standard granger causality test, which is an oversimplified approach. Our study confirms the long run results of Kemal, *et al.* (2002), while it contradicts the short run results for Pakistan.

5. CONCLUSION

The importance of international trade and economic growth has been debated over the decades. The suitability of trade policy for growth and development has been also debated in the literature. In 1950s and 1960s, most of the developing countries followed import substitution (IS) policy for their economic growth. Since the mid-1970s, in most developing countries, there has been considerable shift towards export promotion strategy (EP). This approach postulates that export expansion leads to better resource allocation, creating economies of scale and production efficiency through technological development, capital formation, employment creation and hence economic growth. The export-led growth has been focus of the economic debate. However, results were found to be mixed. Moreover, findings of the recent studies, which are conducted with reference to Pakistan, are also mixed.

This paper re-investigates the exports-economic growth nexus. A vector autoregression (VAR) model applying the multivariate Granger causality procedure [Toda and Yamamoto (1995)], has been used to test the causal link between the exports and the real output in Pakistan over the 1960 to 2003 period. The time series data for the said period were retrieved from IFS.

The results strongly support a long-run relationship among the three variables. The paper finds a feedback effect between imports and output. Though exports causes output growth, but converse is not true. More interestingly, there is no significant causality between imports and exports.

It is a fact that in the process of growth, imports play important role through different channels. Imports of raw material increase the value added products and import of necessary technology increase the productive capacity and productivity that further enhances the growth rate of the economy. Imports generate employment especially in the handling and transportation sectors directly and indirectly in the wholesale and retail sectors that positively effects the growth of the economy. Moreover, unrestricted access to imports also supports by reducing the prices of essential production inputs. The overall effect of this is to increase growth which supports the increase demand of the imports. However, excessive imports of finished goods may replace the domestic output and displace the workers. Exports boost the growth of economy through access to the wide world market and hence the economies of scale. It earns foreign exchange and also supports the employment in the export sectors of the economy. Therefore, it is suggested that Pakistan may continue with the imports of necessary raw material for value addition and needed technology to expand capacity and improve productivity. It may pay full attention to boost up the exports.

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