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EXPORT-LED GROWTH HYPOTHESIS: EVIDENCE FROM PAKISTAN

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Abstract

The relationship between economic growth, exports and imports in Pakistan from1990Q1 to 2008Q1 has been examined. Economic growth and exports are not cointegrated suggesting the absence of long-run relationship. Causality in Granger's sense is absent between economic growth and exports as well as between imports and economic growth. Impulse response functions show that income, exports, and imports have negative impact on each other. Variance decomposition analysis demonstrates that imports appear to have a stronger impact on exports relative to income. The effect of exports on economic growth is modest. This paper finds no support for export-led growth hypothesis in Pakistan. Strong development of agriculture on modern scientific lines is suggested

Keywords: Pakistan, exports, economic growth, cointegration, Granger causality, impulse response functions

JEL Classification: F10

1. Introduction

The importance and relevance of exports for economic growth and development has been well documented in literature. Import substitution (IS) and export promotion (EP) development strategies have been examined extensively in development literature. Majority of the third world countries that got independence from the colonial powers were poor and backward. It was concluded from the economic development of the developed countries that the major cause of the underdevelopment was the lack of industrialization. The magic of western industrialization was conceived a panacea that meant structural transformation from a predominant agrarian structure to a fast growing industrial development. Rostow theory of stages, Lewis unlimited labour supply and two-gap models were instrumental in shaping the policy issues of the economic development strategy in the post War period. These countries adopted IS industrialisation strategy as they had expected that such strategy would increase employment, warrant export earnings stability and lesser difficulties in balance of payments (BoPs). IS was used as a deliberate policy for promoting new industries and expanding established domestic industry. IS

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was carried out behind the walls of tariff protection and concessionary monetary and fiscal policies.

A number of individual country studies investigating the relationship between economic growth, industrialisation and economic policy (OECD 1970 and NBER 1978 studies)[3] have demonstrated that IS have not been a success. For practical purposes the distinction between IS and EP is less clear than many advocates would imply. Most LDCs have used both strategies with different degrees of emphasis at one time or another (Todaro 1992, 370). Bhagwati (1988) and Reidel (1988) reported some new studies which carry new arguments in defence of IS. Harmful effects and inefficiencies associated with IS are most likely to occur in EP.

The disillusionment with IS industrialisation and the impressive export performance of some developing countries notably East Asian nations augmented the interest in export promotion during the seventies. During the past three decades a number of developing countries including Pakistan have pursued EP policies. Export promotion policies will lead to greater capacity utilization, spill-over effects of labour productivity, and beneficial effects on BoPs. International trade plays a dynamic role by widening the market and would result in resource allocation according to comparative advantage, and generate technological improvements. These arguments form the basis of *Export-led hypothesis* (Afzal 2006).

Government of Pakistan adopted a comprehensive programme of macroeconomic reforms in late 1980s that included trade liberalisation and export promotion besides inflation, fiscal and current account management. Export promotion strategy was emphatically espoused in early 1990s while in the early decades Pakistan had followed a vigorous IS strategy. Exports have not figured prominently in the economic growth and development of Pakistan's economy since the earlier years. Exports have not played a significant role in the economic growth of Pakistan (Afzal 2004, Afzal and Ali 2008).

Studies on the relationship between Pakistan's exports and economic growth are Pakistan's-specific (Khan and Saqib 1993, Khan et al., 1995, Mutairi 1993, Akbar and Naqvi 2000, Afzal 2004, Shirazi and Manap 2005, Afzal 2006) as well as cross-country context (Maizels 1968, Ram 1987, Greenway and Sapsford 1994, Bahmani-Oskooee and Alse 1993, Dutt and Ghosh 1996, Ahmad et al., 2000, Anwar and Sampath 2000). These studies have used different methodologies, diverse time periods and have reported divergent results.

The purpose of the paper is to reinvestigate the relationship between economic growth represented by Pakistan's GDP, imports and exports. The contribution of the paper to the literature is that the studies on Pakistan's exports-economic growth relationship have not examined the export-led growth hypothesis exclusively for the post- liberalization period. This paper uses quarterly data (1990-I: 2008-I) on GDP or income, imports and exports for a period of more than nineteen years and is expected to provide a better view of the achievements of the post-liberalization period regarding exports, imports and economic growth. Besides time series properties, cointegration and causality analysis, we use impulse response functions and variance

[3] The Oxford University Press in five country volumes and one overall volume has published the OECD studies. Little I.M.D, T.Scitovsky and M.Scot (1970) "Industry and Trade in Some Developing Countries: A Comparative Study", was most important in attack on IS. Columbia University Press has published the NBER studies in ten country volumes and two overall volumes. Krueger 1978 and Bhagwati 1978 got prominence in pointing out IS limitations and disadvantages.

decomposition analysis to examine the impact of shocks on the underlying variables. These aspects have not been studied before for Pakistan.

2. Review of Studies

During the past three decades a number of cross-section and time series studies using different samples, time period and methodologies have been done in developed and underdeveloped countries on export-economic growth link. Earlier studies concentrated on the investigation of statistical correlation between exports and income (Emery 1967, Maizels 1968, Kravis 1970). Emery (1967) argued that it is export expansion that stimulates economic growth rather than vice versa. Maizels (1968) showed that except Pakistan, there seems a general positive correlation between exports and the GDP growth rates of the members of sterling area for the period 1963-61. Michaely (1977) complained that his predecessors (Emery 1967, Maizels 1968, Kravis 1970) shared a "common fault" because exports are themselves part of the national product; a positive correlation of the two variables is almost inevitable. Heller and Porter (1978) pointed out that Michaely's criticism also applies to his own test because any change in the growth rate of the export share of output will change the output growth rate in the same direction even if it causes no change at all in the growth rate of the other component of output.

Other studies used exports- augmented production function (Balassa 1978, Tyler 1981, Ram 1985, Kavoussi 1985, Moschos1989, Fosu 1990) and have reported beneficial effects of export-oriented policies. Ram (1985) suggested extending the analysis by taking into account the direction of causality, recognition of simultaneous equation bias and the problem of heteroscedasticity arising from the use of cross section models. Unlike previous studies, Ram's (1987) study including Pakistan used time series data and concluded a positive role of exports in economic development. Feder (1982), Ram (1987), Begum and Shamsudinn (1998) used two - sector models of growth and supported EP policies. Salvatore (1983) using simultaneous equation model concludes that trade is neither actually harmful nor exceedingly beneficial but appears to serve more in the nature of handmaiden than an engine of growth. Rashid (1995) applied the simultaneous equation model to study the trade-growth relationship and the liberalisation experience of India for the period 1977-1989 and has reported insignificant coefficient for exports. Khan and Saqib (1993) and Afzal (2004) have studied export-growth relationship in Pakistan for the period 1972–88 and 1960-2003 respectively. Afzal (2004) reports insignificant coefficient for exports; Khan and Saqib (1993) concluded strong relationship between exports and economic growth

Bhagwati (1988, 37) pointed out that cross-section studies do not "bear directly on the question whether the EP strategy is productive of more growth," and therefore, these studies have not succeeded in proving that superior export growth rates apply only to countries that follow export promotion policies (Alam 1991). However, World Bank (1987) has provided a qualitative evaluation of 41 developing countries according to their trade-orientation for the periods 1963-73 and 1973-85 and has shown that those countries which adopted outward-oriented trade strategies performed better than those countries which followed inward-oriented trade strategies. Pakistan has been classified as strongly inward–oriented and moderately outward-oriented for the periods 1963-73 and 1973-85 respectively. Many studies (Greenway and Nam 1988, Alam 1991, Salvatore and Hatcher 1991, Clark 1995, 1997) supported World Bank (1987) findings and concluded that outward-looking economies perform better than inward-

looking economies. Singer (1987) maintains that most of the outward-oriented countries in the World Bank sample were higher income economies than the inward-oriented countries. The higher rates of growth may not have been the necessary result of outward versus inward trade strategies. Rather it may merely reflect the general tendency of higher income economies to grow faster than lower income countries.

Other empirical studies did not accept the alleged benefits of export-oriented policies (Cline 1982, Adelman 1984, Jung and Marshall 1985, Chow 1987, Singer and Gray 1988, Colombatto 1990) among others. Cline (1982) and Chow (1987) argue that if large number of LDCs pursues the East Asian model of growth simultaneously it may breakdown because the supply of manufactured exports might be more than the Western markets could absorb. Similarly, Singer (1984, 951) argues "Most advocates of export-orientation would agree that self-sufficiency in food production is a desirable objective, but many would place it below export-orientation whereas our results suggest the opposite". Greenway and Sapsford (1994) have reported little support for export-growth hypothesis for a sample of 14 countries including Pakistan (1971-83) for different time periods. They found little support for the positive impacts of liberalisation.

Time series and cross section studies discussed above suffer from many econometric problems like simultaneous equation bias and have not investigated the direction of causal relationship between exports and growth. Many studies using Granger or Sims causality and econometric techniques of cointegration and error-correction (Jung and Marshall 1985, Chow 1987, Dodaro 1993, Bahmani-Oskooee 1993, Dutt and Ghosh 1996, Khan et. al., 1995, Anwar and Sampath (2000), Ahmad et al., (2000), Shirazi and Manap 2005, Afzal 2006) among others have reported different results.

Jung and Marshall (1985) examined the direction of causality from exports to GNP and vice versa for a sample of 37 countries including Pakistan (1960-81). Their results supported EP only for four countries–Indonesia, Egypt, Costa Rica, and Ecuador. Bahmani-Oskooee and Alse (1993) found bi-directional causality between export growth and output growth for LDCs including Pakistan. Khan et.al., (1995) and Afzal (2006) found bidirectional causality between manufactured exports and economic growth. Sherazi and Manap (2005) study strongly supports a long-run relationship between imports, exports and output growth.

Dodaro (1993) concluded no causality between export growth and output growth for Pakistan. Dutt and Ghosh (1996) reported growth-led exports for Pakistan and USA for a sample of 26 low, middle and high income countries for the period 1953-91 including Pakistan (1960-91). Ahmad et al., (2000) examined exports, economic growth and foreign debt relationship for eight Asian countries and except Bangladesh rejected the exports-led growth hypothesis including Pakistan of their sample.

3. Econometric Methodology

3.1 Unit Roots and Cointegration

In time-series econometrics the starting point is to study the time series properties of the variables being considered to avoid any spurious relationship between them. If the time-series properties of the variables are satisfied, then a possible long-run relationship or co-integration is likely to exist. For the application of cointegration it is necessary that the variables are integrated

of the same order. They are stationary in their level or in their first differences denoted as I (0) and I (1) respectively. The theory of cointegration attempts to study the long-run relationship between the nonstationary time series. A lack of cointegration suggests that such variables have no long-run relationship: in principal they can drift arbitrarily far away from each other (Dickey et. al., 1991).

3.2 Johansen Cointegration Test

We use Johansen (1991, 1995) cointegration methodology. This approach is considered more robust and has more advantages over the Engle and Granger (1987) technique (Gonzalo 1994). Johansen's method tests the restrictions imposed by cointegration on the unrestricted VAR involving the series. Consider a VAR of order p.

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} \ldots + A_p y_{t-p} + BZ_t + \mu_t \quad \ldots (1)$$

Where Y_t is a k-vector of non-stationary I (1) variables, Z_t is a d-vector of deterministic variables, and μ_t is a vector of innovations. We can write the VAR as

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma i \, \Delta Y_{t-i} + BZ_t + \mu_t \quad \ldots (2)$$

$$\text{Where } \Pi = \sum_{i=1}^{p} Ai - I \quad i = 1 \ldots p \; \Gamma i = - \sum_{j=i+1}^{p} A_j \quad \ldots (3)$$

Where Δ is first difference operator and I is a k×k identity matrix. The rank of coefficient matrix Π determines the number of cointegrating vectors because the rank of Π is equal to the number of independent cointegrating vectors. Granger's representation theorem asserts that if the coefficient matrix Π has reduced rank r < k, then there exist k × r matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta' y_t$ is I (0) and r shows the cointegrating rank and each column of β is the cointegrating vector. The elements of α are known as the adjustment parameters in the vector error correction model. Johansen's method estimates the matrix from an unrestricted VAR and tests whether we can reject the restrictions implied by the reduced rank of Π.

Johansen's method uses two test statistics for the number of cointegrating vectors: the trace test (λ_{trace}) and maximum eigenvalue (λ-max) test. λ_{trace} statistic tests the null hypothesis (H_0) that the number of distinct cointegrating vectors is less than or equal to r against the alternative hypothesis of more than r cointegrating vectors and is given by:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{p} \ln [I - \lambda i] \quad \ldots (4)$$

Where T is the number of useable observations and λi are the eigenvalues obtained from the estimated Π matrix in equation (3). The second statistic tests Ho that the number of cointegrating vectors is r against the alternative of r +1 cointegrating vectors and is defined as:

$$\lambda_{max}(r, r+1) = -T \ln [I - \lambda i] \quad \ldots (5)$$

If variables are cointegrated then an error correction model exists which combines the long- run relationships with the short run dynamics of the model known as Granger's representation theorem (Engle and Granger 1987).

3.2 Granger Causality

If the series are not cointegrated, standard Granger causality can be used. In the two variables case, the variable X is said to cause the variable Y in the Granger sense if the forecast for Y improves when lagged values of X are taken into consideration, *ceteris paribus* (Charemza and Deadman 1997). This means that standard Granger causality test is based on past changes in one variable that explains the actual changes in another variable. This test consists of estimating the following equations:

$$Y_t = \alpha_0 + \sum_{i=1}^{n} a_i Y_{t-i} + \sum_{j=1}^{m} b_j X_{t-j} + \varepsilon_t \quad \ldots (6)$$

$$X_t = \beta_0 + \sum_{i=1}^{n} c_i X_{t-i} + \sum_{j=1}^{m} d_j Y_{t-j} + \mu_t \quad \ldots (7)$$

Where α_0 and β_0 are parameters representing intercept terms. ε_t and μ_t are uncorrelated white noise series. Causality can be determined by estimating the above equations and testing the null hypothesis $b_j = d_j = 0$ against the alternative hypothesis $b_j \neq 0$ and $d_j \neq 0$ for at least some j's. Using the above equations three types of causal relationships can emerge. If b_j or d_j is statistically significant, there is unidirectional causality from X to Y or from Y to X. There is bidirectional causality if both b_j and d_j are statistically significant. X and Y do not cause each other if both b_j and d_j are statistically insignificant. This test is highly sensitive to the choice of lag length that can be decided using diverse criteria.

3.3 Impulse Response Functions

Since it is difficult to interpret the coefficients estimated by a vector autoregression (VAR), impulse response analysis and variance decomposition are useful tools to examine the relationships among economic problems. In simultaneous equations models, some variables are endogenous and others are exogenous. The identification of these equations (exactly or over) is necessary before estimation. Sims (1980) has severely criticised this subjective decision and developed VAR model in which all variables are treated on equal footing. Once the stability condition of VAR is satisfied, we can express the variables under consideration as function of the error term. These are known as *impulse response functions*. An impulse response function traces out the response of the dependent variable in the VAR system to shocks in the error terms. For example a certain change in the error term in the GDP equation will change GDP in the current as well as future periods and will also affect the other endogenous variables. VAR is used to examine the dynamic impact of random disturbances on the system of variables under consideration. We use the first differences of the variables because the variables are neither stationary nor cointegrated. The mathematical representation of the VAR is:

$$\Delta y_t = A_1 \Delta y_{t-1} + \ldots + A_p \Delta y_{t-p} + B \Delta x_t + \varepsilon_t \quad \ldots (8)$$

Where y_t is a k vector of endogenous variables, x_t is a vector of exogenous variables, $A_1, \ldots, A_p$ and B are matrices of coefficients to be estimated, and ε_t is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables.

3.4 Variance Decomposition

While *impulse response functions* trace the effects of a shock to one endogenous variable on to the other variables in the VAR, *variance decomposition* separates the variation in an endogenous variable into the components shocks to the VAR. Thus the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR. Variance decomposition measures the forecast error variance that throws light on the proportion of movements in a series due to its own shocks versus shocks to the other variables. In practice it is useful to examine the variance decomposition at various horizons. Variance decomposition should converge as n-step ahead forecast increases (Enders 2004). Following Sims (1980), a three-dimensional VAR model of order k is used.

4. Data Sources

We use quarterly data on GDP (Y), imports (M) and exports (X) for Pakistan for the period 1990Q1 to 2008Q1. Quarterly data on imports and exports from 1990Q1 to 2003Q4 were collected from IMF International Financial Statistics (various Year books) and the annual data on imports and exports from 2004 to 2008 were obtained from Government of Pakistan (GOP) Economic Survey (2007-08). The annual data on Pakistan's GDP or income from 1990 to 2008 were obtained from GOP Economic Survey (various years). Quarterly data on imports and exports for 2004-2008 and for GDP for the aforementioned period were not available. Nominal GDP was deflated by the consumer price index (2001=100) to obtain real GDP and the real imports and exports data were obtained by deflating the series by their respective unit value indices. The annual data on imports and exports (2004 -2008) and GDP for 1990 to 2008 were transformed into quarterly data by the method given in Khan and Raza (1989).

5. Empirical Results

5.1 Unit Root Test

Before the examination of cointegration, it is necessary that the data are examined for stationarity or nonstationarity which is closely linked to the tests for unit roots. For this purpose we use PP (Phillips-Perron) unit root test. Unit roots tests are routinely computed by econometrics softwares and therefore, theory underlying the test is not explained. Table 1 provides the PP test results for level as well first difference forms. If the PP test values exceed the test critical values, we reject the null hypothesis of a unit root. We also use MacKinnon (1996) one-sided p-values given in parentheses. We reject the null hypothesis of unit root at conventional levels of significance as well as MacKinnon (1996) one-sided p-values. The variables are not nonstationary in level form. But the null hypothesis that the series are first difference nonstationary for without trend and with trend is rejected for all the underlying variables coupled with significant MacKinnon (1996) one-sided p-values showing that all the variables are nonsatationary or have a unit root.

Table 1. PP Test Results

Variable (ln)	*PP level*		*PP First difference*	
	Without trend	*With trend*	*Without trend*	*With trend*
M	-7.42 (0.000) BW = 0	-8.83 (0.000) BW = 7	-25.66 (0.000) BW = 13	-27.51 (0.001) BW = 13
X`	-7.81 (0.000) BW = 2	-8.73 (0.000) BW = 7	-24.76 (0.000) BW = 7	-26.44 (0.001) BW = 13
Y	-18.63 (0.000) BW = 12	-27.46 (0.000) BW = 12	-5.92 (0.0001) BW =12	-35.51 (0.0001) BW = 12

Note: Test critical values for 1%, 5% and 10% respectively for *without trend* are -3.57, -2.92 and -2.60 and -4.17, -3.51 -3.18 for 1%, 5% and 10% respectively for *with trend* and the figures in parentheses are MacKinnon (1996) one-sided p-values. BW is the Bandwidth based on Newey-West using Bartlett kernel.

5.2 Johansen Cointegration Test

Johansen cointegration technique uses the maximum likelihood procedure to decide about cointegrating vectors. Johansen's method tests the restrictions imposed by cointegration on the unrestricted VAR involving the series. Since VAR is the multivariate generalization of autoregressive process, it is important that determination of the appropriate lag length is decided. This could be accomplished by employing different criteria (LR, FPE, AIC, SC). For the application of Johansen cointegration test the lag structure of the VAR system is selected on the basis of four criteria reported in Table 2. Lag 5 is the optimal lag of the VAR to be used for Johansen's method.

Table 2. VAR Order Selection Criteria: lny lnx lnm

Lag	*LR**	*FPE*	*AIC*	*SC*
0	NA	0.892219	8.399581	8.498299
1	65.37440	0.413683	7.630549	8.025420
2	51.10667	0.231331	7.047428	7.738451
3	180.0117	0.012921	4.157985	5.145161
4	325.3102	4.12e-05	-1.597621	-0.314293
5	37.81349*	2.60e-05*	-2.070406*	-0.490924*
6	9.849222	2.83e-05	-2.006941	-0.131307

* LR: likelihood ratio test, FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion

Johansen cointegration test results are given in Table 3. This test used intercept but no trend in the cointegrating equation. Results show that the hypothesis of no cointegration (H_0: r = 0) is rejected by both λ-max and trace tests. However, when we apply the Johansen cointegration

test to the bivariate case (income-exports, income-imports, export-imports), we see no evidence of cointegration on the basis of both tests. This fact is supported when we graph income-exports, income-imports, export-imports and income-imports and exports

Up to 2004, exports followed almost a similar trend, income exceeded the exports which started to decline after 2004 and the trend continued. We observe similar pattern for imports. Imports and exports move together not closely and imports exceed exports up to 2000, move closely during 2001- 04 and after that both demonstrate a precipitate fall with imports outstripping exports. However, income appears to be unaffected by both imports and exports. When we take the three variables together, we see pattern analogous to the bivariate patterns (figure 1-4).

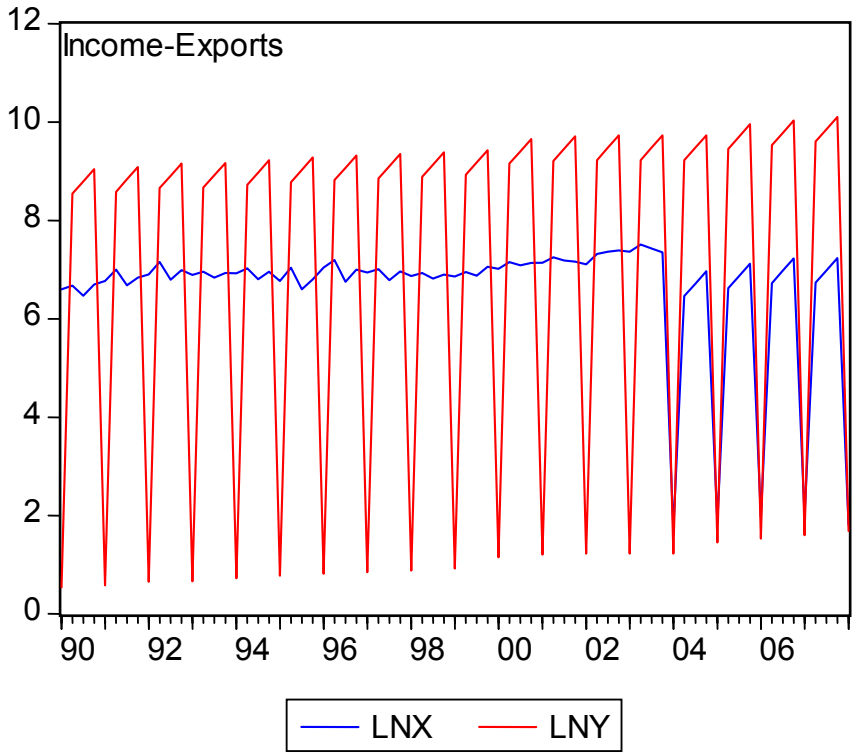

Figure 1.

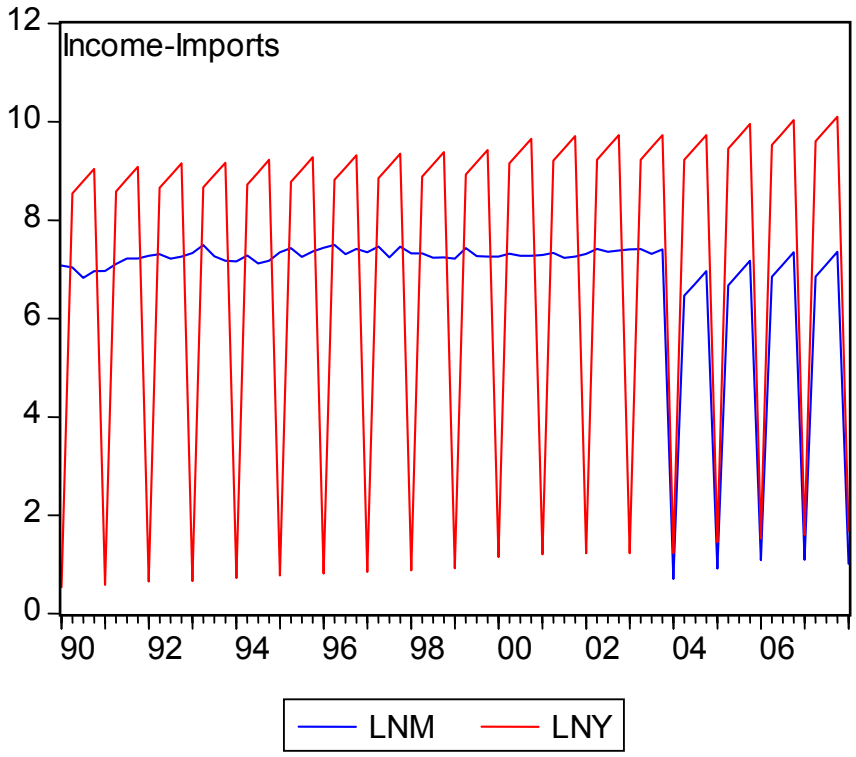

Figure 2.

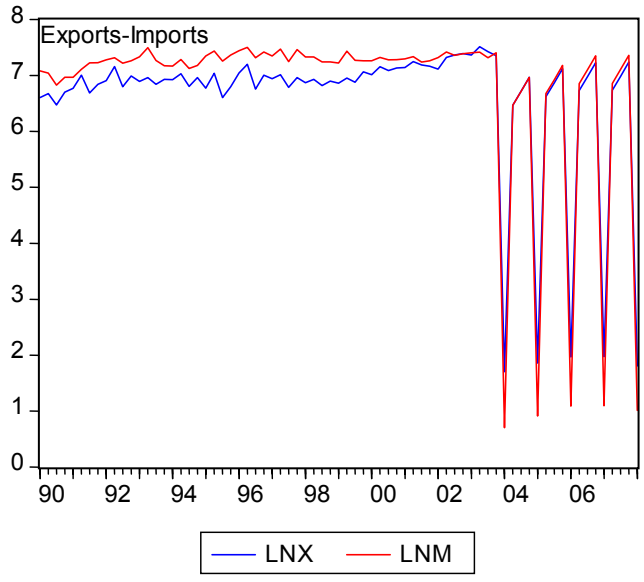

Figure 3.

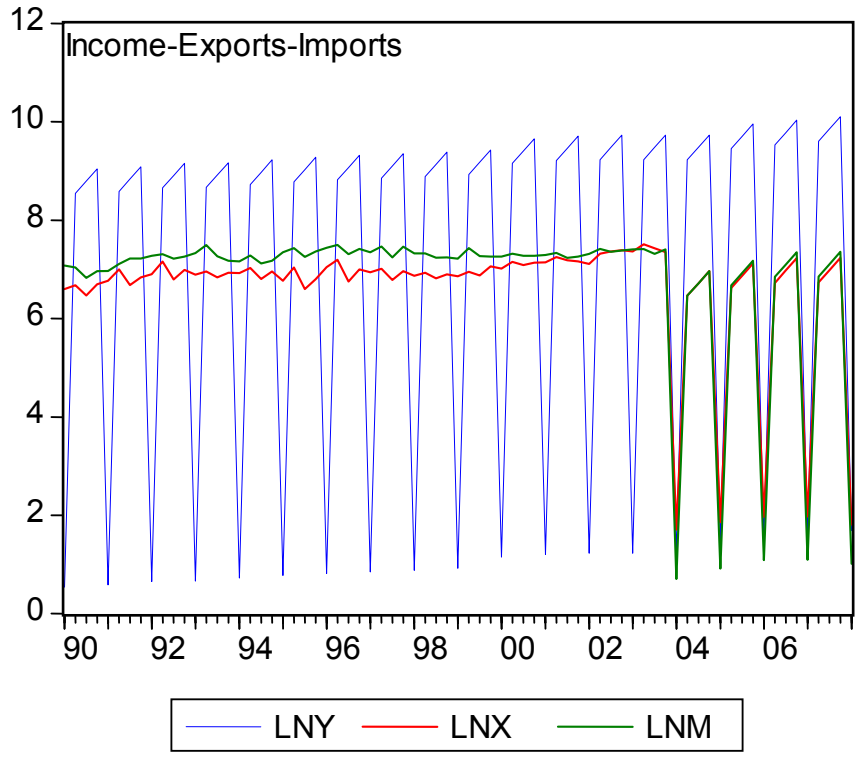

Figure 4.

Table 3. Cointegration Test

Null	*Alternative*	*λ-max*	*5% CV*	*Prob.***	*λ-trace*	*5% CV*	*Prob.***
1. Income-exports-imports (VAR lag =5)							
H_0: r =0	H_1: r = 1	0.29*	23.84	0.0202	30.82*****	29.79	0.0380
H_0: r ≤1	H_1: r = 2	0.09	6.35	0.5675	6.97	15.49	0.5804
H_0: r ≤2	H_1: r = 3	0.009	0.62	0.4324	0.62	3.84	0.4324
2. income-exports (VAR=5)							
H_0: r =0	H_1: r = 1	8.18	14.26	0.3627	9.60	15.49	0.3121
H_0: r ≤1	H_1: r = 2	1.45	3.84	0.2287	1.44	3.84	0.2287
3. income-imports (VAR =5)							
H_0: r =0	H_1: r = 1	8.29	14.26	0.3491	9.95	15.49	0.2846
H_0: r ≤1	H_1: r = 2	1.65	3.84	0.1989	1.65	3.84	0.1989
4. export-imports (VAR =4)							
H_0: r =0	H_1: r = 1	9.49	14.26	0.2476	11.01	15.49	0.2106
H_0: r ≤1	H_1: r = 2	1.52	3.84	0.2171	1.52	3.84	0.2171

**MacKinnon-Haug-Michelis (1999) p-values

Since the inception of the country, exports have not figured prominently in the economic growth and development of Pakistan's economy. A number of domestic and international factors like adverse terms-of-trade, Multifibre arrangements, concentration of exports in few commodities and markets, high population growth, exchange rate policy, high inflation, lack of access to EU

and USA markets among others reinforced each other to prevent exports from playing a dominant role in economic growth.

The direction of exports also influences the export performance of a country. Although Pakistan trades with a large number of countries but its exports are highly concentrated in few countries. More than 50% of Pakistan exports went to seven countries during 1990-2008. The exports are destined to captive markets for the last over sixty years (GOP 2008-09, 124). Another limiting factor having tremendous bearing on export performance is the composition of exports. Pakistan exports are highly concentrated in a few items namely; cotton manufactures, leather, rice, synthetic textiles, and sports goods. These seven categories of exports accounted for 84% in 1990-91 but declined to 75.7 in 2006-07. Such a high degree of concentration of exports in a few items leads to instability in export earnings that also hinders smooth growth of exports.

High rate of population growth tends to neutralise a large part of economic growth as resources are diverted to consumption instead of productive channels. Exports are not expected to function as "Vent-for-Surplus" in an economy where one million souls are added after every three months. Unless there is surplus capacity in the economy, export production can be increased at the expense of reducing domestic production.

Evaluating Pakistan's exports performance historically, Afzal and Ali (2008) have concluded that economy had led exports more than the exports led the economy. Economic growth has responded to the emphasis on domestic market rather than on trade. Export-led growth slogan coupled with extreme liberalization of trade has only seen imports immensely outstripping exports to open an alarming current account deficit in the 2000s.

5.3 Granger Causality

We performed standard Granger causality test that can be used for stationary variables. This test is sensitive to lag length. We used FPE, AIC and SC criteria to determine the lag length and lag 5 was found optimal. The test results (Table 4) show that the null hypothesis that exports does not Granger-cause economic growth and vice versa; and import does not Granger-cause economic growth and the income does not Granger-cause imports is not rejected by the F-statistic. However, import and export does not Granger-cause each other is rejected by the F-statistic at 10% level of significance. These results are not against expectations and are supported by Pakistan's data of exports and imports. Both have increased over the period. However, imports have increased more than exports.

Table 4. Granger Causality

Null Hypothesis:	*Obs*	*F-Statistic*	*Probability*
Dlnx does not Granger Cause Dlny	68	1.14651	0.34674
Dlny does not Granger Cause Dlnx		1.51626	0.19918
Dlnm does not Granger Cause Dlny	68	1.14651	0.34674
Dlny does not Granger Cause Dlnm		1.51626	0.19918
Dlnm does not Granger Cause Dlnx	68	1.95328	0.09964
Dlnx does not Granger Cause Dlnm		2.16649	0.07051

Table 5 shows the direction of the impact of innovation on other variables. For the effect we consider maximum 12 quarters that seems quite adequate. For income shock, income falls in quarter 2, recovers in quarter 4 and again falls in quarters 6, 9 and 10 and recovers insignificantly in the remaining quarters. Considering export shock, exports fall in quarter 2 with slight recovery in the next two quarters; it dies out at quarter 7. With imports shock, imports fall in quarter 1, recover in quarter 2 and then follow an uneven trend and reach a minimum at quarter 12. The impact of income on exports and imports is negative for half quarters and not significant for rest of the quarters. Impact on itself is also not positive for all quarters. Similarly the impact of exports on itself as well as on income and imports is not positive for all quarters. The impact of imports shock on itself is not positive for four quarters while the imports shock impact on income and export is negative for more than half quarters.

Variance decomposition measures the fraction of forecast error variance for each variable owing to its own shocks as well as other shocks. Variance decomposition in Table 6 shows both direct and indirect impacts of the shocks caused by distributing each variable one standard deviation. Estimates of the variance decomposition were obtained up to 12 quarters.

The forecast error variance of income is more than 78% for more than half quarters due to its own innovations, more than 1.44% and 18.92% due to exports and imports for majority of quarters. The same for exports except few quarters is more than 59% due to its own innovations, 0.56% for imports for majority of quarters and more than 40% for majority of quarters for income. For imports, more than half quarters forecast error variance of imports exceeds 0.77% and for income and exports it is 38% and 60% respectively.

Table 5: Impulse Response Functions: Cholesky Ordering: dln (income), dln (exports), dln (imports)

Quarter	*dln(income)*	*dln (exports)*	*dln(imports)*
(1) Response to one standard Deviation shock of dln(income)			
1	4.590826	0.000000	0.000000
4	0.315505	0.080111	-1.082905
7	0.165986	0.216481	0.349090
12	0.044375	-0.079206	-0.126461
(1) Response to one standard Deviation shock of dln (exports)			
1	0.974784	1.283213	0.000000
4	0.102259	0.188381	0.093659
7	-0.005644	0.006482	-0.030427
12	-0.001893	0.010165	0.013975
(1) Response to one standard Deviation shock of dln(imports)			
1	-1.138776	-1.525327	0.120825
4	-0.148426	-0.222123	-0.128975
7	0.014264	-0.015228	0.031309
12	0.000121	-0.010271	-0.014127

Table 6. Variance Decomposition

Quarter	*dln(income)*	*dln (exports)*	*dln(imports)*
(1) Variance decomposition of dln(income)			
1	100.0000	0.000000	0.000000
4	80.44778	0.630304	18.92192
7	79.24518	1.717678	19.03714
12	78.72807	1.892454	19.37948
(2) Variance decomposition of dln (exports)			
1	36.59078	63.40922	0.000000
4	39.57277	59.85909	0.568140
7	40.07292	59.32159	0.605491
12	40.07076	59.25613	0.673105
(3) Variance decomposition of dln(imports)			
1	35.64596	63.95276	0.401279
4	38.06834	61.16125	0.770409
7	38.61151	60.59433	0.794160
12	38.60910	60.53775	0.853148

Imports appear to have a stronger impact on exports relative to income. Because of forceful IS industrialisation, industrial sector in Pakistan has relied heavily on imports. Industrial raw material imports shared more than 50% of the total imports during 1970s - 2000s. Like exports, imports are also concentrated in few items namely food, petroleum and machinery group which are necessary for running the economy including exports production.

6. Policy Implications

1. Export-led growth emphasised in literature depends upon a number of factors: favourable geo-political and world conditions, political stability, peaceful law and order situation, highly developed infrastructure, productive manpower, price competitiveness, adequate access to important markets, high bargaining power in trade negotiations, low population growth rate, effective marketing, maintenance of quality standard , substantial research and development expenditure etc. There is little likelihood of managing the said factors effectively in Pakistan to enable the exports to increase to a level where they could contribute significantly to economic growth.
2. Another policy implication is that excessive and exclusive reliance on exports for economic growth is less likely to accelerate economic growth. Because, Pakistan's exports will face cut throat competition and Pakistan's small economy in respect of foreign trade (Pakistan has less than one- percent share in world trade) is not able to compete successfully.
3. Obstacles to smooth expansion and growth of textile exports, the mainstay of Pakistan's exports, will continue to haunt the textile sector. Unless Pakistan makes serious and

intensive efforts to diversify exports and search for substitute markets, it is extremely difficult to have an enviable realisation of the export promotion policies.

4. Agriculture is still the stronghold of the economy in terms of its contribution to GDP, employment and foreign exchange earnings. Agriculture contributes more than twenty percent to GDP and not only that 44% of the total labour force is employed in agriculture, but also 67.5% of population living in rural areas is directly or indirectly linked with agriculture. It also contributes substantially to Pakistan's exports and supplies raw materials to industry as well as market for industrial products. Export-led growth in Pakistan is an uphill task. Pakistan has comparative advantage in agriculture that must be developed seriously and scientifically. This will provide food-security keeping in view soaring food prices and imports. This will discourage rural-urban migration that in turn will help reduce ethnic-strife, improve law and order situation that has been threatening the country's political and economic stability and may reduce the enormous pressure on the supply of infrastructure like housing, transportation, electricity, water, sewerage, health and educational facilities.

7. Conclusions

We used time series econometrics techniques to investigate the relationship between economic growth, exports and imports in Pakistan from 1990Q1 to 2008Q1 to see the success of export-led growth strategy. Economic growth and exports are not cointegrated suggesting the absence of long-run relationship. Causality in Granger's sense is also absent between economic growth and exports as well as between imports and economic growth. However, imports and export Granger-cause each other. Impulse response functions show that income shocks have negative impact on exports and imports. Exports and imports are characterised by similar propensity. Variance decomposition analysis indicates that the effect of income on exports is not strong compared to imports. The effect of exports on income vis-à-vis imports is modest, while imports appear to have a stronger impact on exports relative to income. These results do not support the export-led hypothesis in Pakistan. Strong development of agriculture on modern scientific lines is suggested because of obvious comparative advantage.

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