

EXPORT COMPOSITION AND ECONOMIC GROWTH: CAUSAL EVIDENCE FROM PAKISTAN

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ABSTRACT: This study explores the relationship between total exports and economic growth as well as export composition (manufactured & semi-manufactured) and economic growth in Pakistan. Non-export GDP variable is used as a proxy of economic growth as suggested in export – growth literature. The empirical results reveal that unidirectional causality prevails from total exports to economic growth and from manufactured exports to economic growth in Pakistan. Furthermore, semi-manufactured exports and economic growth have no relationship. These evidences illuminate that emphasis has to be given to the promotion of manufactured exports.

Keywords: Export composition; economic growth; causality analysis; Pakistan

1. INTRODUCTION

Developing countries have great concern about the economic growth and development. Among the other determinants of economic growth, exports may also be a key factor. Export led growth hypothesis (ELGH) postulates that expansion in exports contributes its share to unleash growth process. The voluminous empirical debate is documented on causal link between exports and growth, both in developed as well as in developing countries, but the results are mixed.

[1] elucidates that growth in exports enhance economic growth; therefore, export promotion policy is better than import substitution. [2] explains the benefits of exports growth i.e. exports (i) increase specialty and enhance comparative advantages, (ii) make contribution in economies of scale due to extension in market size (iii) offer better capacity utilization and (iv) contribute in more rapid technological changes. Growth-led export is an opposite phenomenon. Enhancement in productivity reduces unit cost, which boost exports. Moreover, if domestic production increases more than the domestic market's demand the opportunity to sell the goods in the foreign markets can be a good option for the producers. Besides, exports and economic growth may be independent due to the results of development and structural changes process in an economy. Bidirectional causality is another aspect i.e. expansion in exports growth stimulates economic growth and again enhancement in economic growth stimulates exports growth [3].

Although numerous studies available on the relationship between overall exports and economic growth however, numerous studies have also used disaggregated data of exports in order to find the linkage between different segments of exports and economic growth (see; [4-11]). One of the reasons for using different sectors of exports are to identify that which particular sector of exports influences economic growth more pronounced or/and vice versa [8] and [5] asserts that exports-led growth relation may be valid due to some or a particular category of exports, which might be overlooked at composite level of exports. [12] defends exports decomposition analysis on two grounds. First, it is possible that ELGH may not be valid at aggregate level, but the same may be negated for a certain export sector.

Secondly, if ELGH is supported at aggregate level then disaggregated analysis can further underline the relationship.

These are the major reasons which compel to find the linkage of manufactured as well as semi-manufactured exports and growth in Pakistan because these two sectors of exports have bulk share in total exports. In addition to that association in total exports and growth of Pakistan is also analyzed in this study for comparison purposes.

This paper contributes in export – growth empirical literature with the analysis of causal evidence between total exports and non-export GDP as well as export composition (manufactured & semi manufactured exports) and non-export GDP in Pakistan. For empirical analysis models are formulated by including some important, crucial and potential variables, as suggested in the literature, in order to overcome the problem of specification biasness. [13] approach is applied to examine cointegration among the variables whereas [14] approach is applied to explore causality between the above mentioned concerned variables.

After a brief introduction, the plan of this study is as follows. Section-II explains the overview of exports performance in Pakistan. Model specification; methodology and data issues are discussed in section-III. Section-IV reveals empirical results and section-V consists of summary and conclusions.

2. OVERVIEW OF EXPORT PERFORMANCE IN PAKISTAN

At the time of inception of Pakistan in 1947, the industrial sector was based on some textiles & sugars mills and a few cement factories, therefore, in order to protect infant industries, import substitutions policy was adopted in 1950s decade with some endeavors to promote exports [15]. During early time span of Pakistan history, Pakistan's exports were based on only a few primary commodities. In the year 1948-49, raw jute, raw cotton, raw wool, hides and tea were the five major commodities of exports which turned up to 99 percent of total export earnings. These reached up to 93 percent in 1951-52 and further shrank up to 75% during the year 1958-59 [16]. Decade of 1960s witnessed export bonus scheme but the coverage of export bonus scheme was very small. Although huge devaluation occurred in the arena of 1970s, however, anti-export bias remains existed in Pakistan

due to export taxes. After mid of 1980s, some measures were taken by Government of Pakistan to excel export. The notable measures were; establishment of two export processing zones rebates on excise & sales tax, compensatory rebates on various items and facilitation measures in order to imports of raw materials for export related industries, among the others [17]. But during 1980s Pakistan's trade regime remained under the influence of import-substitution [15]. In 1990s Pakistan focused on outward-looking policy and numbers of initiatives were taken by the government. In sum, after late 1980s Pakistan changed its policy stance towards outward looking policy which still prevails.

Table 1::Percentage share of semi-manufactured and manufactured exports to total exports¹

Year	Percentage share of		Total percentage share of semi-manufactured and manufactured exports
	Semi manufactured Exports	Manufactured Exports	
1971	24	44	68
1976	18	38	56
1981	11	45	56
1986	16	49	65
1991	24	57	81
1996	22	62	84
2001	15	72	87
2006	11	78	89
2007	12	77	89
2008	11	75	86

Source: Economic survey of Pakistan (various issues)

Pakistan's total exports are broadly bifurcated into three categories i.e. primary, semi-manufactured and manufactured goods². Table-1 unveils total share of semi-manufactured and manufactured exports to total exports as well as individual share of these two categories. As far as total percentage share of semi-manufactured and manufactured exports is concerned, it is depicted that accumulative share decreased from 68 percent in 1971 to 56 percent in 1981 but after that their share in total exports increased considerably and now bulk share of total exports are consisted of these two sectors. Manufacturing exports have been enjoying dominance in total exports throughout 1971-2008. This table also depicts that percentage share of manufactured exports to total exports was almost stagnant during 1971-1986 i.e. around 40 to 50 percent. After that the role of manufactured exports became

¹This table shows quinquennial details from the year 1971 to 2006 and annual details for the year 2007 & 2008. Moreover, these are fiscal years. Complete yearly details, including primary exports, can be seen from Economic Survey of Pakistan (various issues) and / or from Statistical supplement of Economic Survey of Pakistan 2008.

²This study confines to only two category i.e. semi-manufactured exports and manufactured exports for empirical analysis purpose.

more pronounced, which jumped up to 62 percent within the next ten years and further enhanced around 75 percent up till 2008.

Last but not the least, semi-manufactured exports had one fourth share in overall exports in 1971 which reduced to around one tenth up to year 1981 but once again the contribution of semi-manufactured exports swelled in the next fifteen years. However, after the year 1991, decay in the semi-manufactured exports are observed.

3. MODEL SPECIFICATION METHODOLOGY AND DATA

3.1. Model

To meet the objectives of this study the following model is used. Most of the studies used overall output i.e. GNP or GDP as a proxy of growth. [5] elucidates that as exports are part and parcel of national accounting identity of the output hence the results of causal relationship between total output and exports may become dubious. Moreover, some researchers made discrimination between total output and output without exports and used the latter variable (see: [4][5][10][18][12]). Following them, we also use non-export GDP.

Besides that, bivariate model may nullify export-led growth hypothesis but with the expansion of model by including potential relevant variables the results may be changed [10]. [19] argues that difference in empirical results regarding relationship between exports and economic growth might be occurred due to non-inclusion of important variables like labor and capital. Therefore, we use Labor (L) and Capital (K) variables in our models in order to avoid misspecification problem.

In addition to that, it is pointed out by [20] that import is a crucial factor and due to omission of import variable, the model may predict spurious results about the interaction between exports and growth. [10][18] stress that instead of using total imports; import of capital goods is to be used. This study also incorporates capital goods import variable in the models in order to avoid misspecification problem.

The first model is expressed in the following equation form.

$$NXY = f(L, K, MEX, SMEX, CIMP) \quad (1)$$

Where

NXY	=	Non-export GDP
L	=	Labor (Total labor force)
K	=	Capital (Measured as Gross Fixed Capital Formation)
MES	=	Manufactured exports
SMEX	=	Semi-manufactured exports
CIMP	=	Capital Goods Import

Although, the foremost objective is to examine the linkage in export composition and non-export GDP but, in addition to that, we also explore total exports and non-export GDP nexus. For this purpose, another model is built which is a modified version of equation (1) and this model is presented in the following equation.

$$NXY = f(L, K, EX, CIMP) \quad (2)$$

Equation-2 is based on five variables i.e. Non-exports GDP (NXY), labor (L), capital stock (K), Total Exports (EX), Imports of Capital Goods (CIMP).

3.2 Methodology

In this study time series data are used and such data are usually non-stationary. OLS estimation may produce spurious results if non-stationarity exists. Hence it is of paramount importance that non-stationarity is to be examined of all data series. In this regards, different tests are used to examine unit roots in the data³. Augmented Dickey Fuller (ADF) test is being extensively used by the researchers hence, this study also exercises ADF test. This test can be performed with the following two equations.

$$\Delta Y_t = \mu + \alpha Y_{t-1} + \sum_{i=1}^k c_i \Delta Y_{t-i} + \varepsilon_t \quad (3)$$

$$\Delta Y_t = \mu + \beta t + \alpha Y_{t-1} + \sum_{i=1}^k c_i \Delta Y_{t-i} + \varepsilon_t \quad (4)$$

The differences between Equation-2& 3 are constant (μ) and trend (β). Equation 3 carries only constant whereas equation 4 contains constant as well as time trend. The legged terms, mentioned in these equations, are used to eliminate autocorrelation and lag length can be determined with certain lag selection criteria. This study adopts the procedure suggested by [21] regarding the selection of the equation. Different tests are used in empirical studies in order to examine cointegration such as [22] and [13] etc. However, [13] test is superior and overcome the shortcomings of Engle & Granger (1987) test. Therefore, we applied this test and is briefly explained below.

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \quad (5)$$

Where

$$\Pi = -(I - \sum_{i=1}^{p-1} A_i)$$

$$\Gamma_i = - \sum_{j=i+1}^p A_j$$

Co-integration can be found with ranks (r) of the Π matrix. If rank (r) = 0; it means that no co-integration exists, however, if rank (r) \leq (n-1) then there are (n-1) co-integration relation. The ranks are sorted with the help of values of the following trace and maximum eigenvalue statistics.

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^k \ln(1 - \hat{\lambda}_i)$$

³ For example; Kwiatkowski-Philips-Schmidt-Shin (KPSS) test, Augmented Dickey Fuller (ADF) test, etc. Moreover, the methodology of each test is different from each other.

$$\lambda_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1})$$

[13] causality technique is applied to find causal relationship. There are numerous reasons to prefer Toda – Yamamoto Causality test. One, Granger causality test results are called spurious if the data series are non-stationary at level unless the variables at levels are co-integrated. Second, error correction model proposed by [22] and the vector autoregressive error-correction model [13] can be used as alternatives for testing causality among economic time series variables. But the applications of these tests are cumbersome and complex procedures [23]. [13] proposed a simple test which is based on augmented VAR ($k + d_{max}$) regardless whether co-integration prevails or not? In Augmented VAR ($k + d_{max}$) k is the lag length which can be measured with certain Criteria e.g. Akaike Information Criterion (AIC) Swartz Information Criterion (SIC) etc. whereas d_{max} is maximum order of integration. [24] explained that the augmented VAR can also be jointly estimated through “seemingly unrelated regression (SUR) method because this technique is more efficient. After that Wald test is used on lag (k) to have the results of causality.

3.3 Data

For estimation of the above models, this study uses annual data from FY-1971 to FY-2008. Following [10] this paper calculated non-export GDP (NXGDP) as real GDP net of real exports. Data on Labor force, overall exports, manufactured & semi-manufactured exports are extracted from Economic Survey of Pakistan (various issues) whereas real GDP and GFCF data were collected from Hand Book of Pakistan Economy 2005 and State Bank of Pakistan’s annual reports. GDP deflator is used to make the data in real form⁴. Moreover, all the variables are transformed into natural logarithm.

4. EMPIRICAL FINDINGS

For the sake of knowing about the order of integration, this study employed ADF test as to whether all the series used in this studies are stationary or not? Table-2 shows the results of the ADF test.

Lag length is selected with SIC criterion in order to ensure that the residuals are white noise. It is evident from this Table that all series contain unit root at level both with and without trend because null hypotheses of unit roots can’t be rejected at 5% level for all the series. However, all variables stationary at first difference.

[13] approach is applied to envisage long run relationship. Table 3 depicts long run relationship among the variables of first model i.e. Manufactured and semi-manufactured case. Lag length is two according to FPE, LR and HQ criteria. Furthermore, LM test is also exercised to find the whiteness of residuals and this test shows no autocorrelation at the selected lag length. Keeping in view the selected lag length,

⁴ GDP deflator is also taken from Hand Book of Pakistan Economy 2005 and Annual Report of SBP 2008. Moreover, the base year of GDP deflator is FY-2000.

Johansen's co-integration procedure is employed. The results are presented in Table 3 which indicates that two co-integration vectors exist. So long run relationship prevails among the variables

As far as Equation-2 is concerned (total exports and non-export GDP case), again [13] approach is applied in to find long run relationship because total exports too is stationary at first difference hence there may be the possibility of long run relationship. Co-integration results of this case are shown in Table 4.

In this case, AIC, FPE and LR criteria confirmed that the lag length of VAR is two. Moreover, Autocorrelation LM test is also again applied on this particular VAR which shows no autocorrelation. At lag length two, it is clear that there exists three co-integration vectors. Multivariate co-integration evidence reveals that these variables are co-integrated.

Toda–Yamamoto approach is exercised to examine causality between export composition and economic growth. As explained above, there are two requirements i.e. order of integration and lag length to proceed further. By incorporating these the equations are estimated jointly with seemingly unrelated regression method. The results are mentioned in Table-4 which reveals unidirectional causality from manufactured exports to non-export GDP whereas semi-manufactured export does not have any impact on non-export GDP and the same is true in opposite direction i.e. non-export GDP also does not change semi-manufactured export because the result is not significant at 5% level of significance. These results confirm that ELGH is valid for only manufactured export sector. In addition to that, it is also clear from the results that unidirectional causality exists from export composition (manufactured export and semi-manufactured

Table 2: ADF unit roots test

Variables	Intercept		Intercept & trend	
	At Level	At 1 st Difference	At Level	At 1 st Difference
lnNXY	-0.2756	-4.7511*	-1.8816	-1.6575*
lnL	0.1169	-6.5469*	-1.8727	-6.4458*
lnK	-0.1145	-5.1994*	-2.0571	-5.0832*
lnEX	0.2774	-7.5827*	-3.1052	-7.4819*
lnMEX	-2.1018	-5.8731*	-3.4161	-8.2258*
lnSMEX	-2.1127	-5.8262*	-2.4100	-5.7687*
lnCIMP	-0.9197	-6.2147*	-2.2841	-6.2031*

Note: * show significant at 1%.

Table 3: The results of Johansen Co-integration Test of Manufactured and Semi-manufactured Case

H ₀	H ₁	λ -max	95% C.V.	H ₀	H ₁	λ -trace	95% C.V.
r = 0	r = 1	53.80481*	40.07757	r = 0	r ≥ 1	147.5393*	95.75366
r ≤ 1	r = 2	47.576*	33.876	r ≤ 1	r ≥ 2	93.734*	69.818
r ≤ 2	r = 3	21.450	27.584	r ≤ 2	r ≥ 3	46.155	47.856
r ≤ 3	r = 4	20.191	21.131	r ≤ 3	r ≥ 4	24.706	29.797
r ≤ 4	r = 5	4.5080	14.264	r ≤ 4	r ≥ 5	4.515	15.494
r ≤ 5	r = 6	0.0069	3.8414	r ≤ 5	r ≥ 6	0.006	3.841

Table 4: Johansen Co-integration Test Results for Total Export Case

H ₀	H ₁	λ -max	95% C.V.	H ₀	H ₁	λ -trace	95% C.V.
r = 0	r = 1	44.268*	34.805	r = 0	r ≥ 1	125.7530*	76.972
r ≤ 1	r = 2	34.090*	28.588	r ≤ 1	r ≥ 2	81.484*	54.079
r ≤ 2	r = 3	29.746*	22.299	r ≤ 2	r ≥ 3	47.394*	35.192
r ≤ 3	r = 4	13.347	15.892	r ≤ 3	r ≥ 4	17.648	20.261
r ≤ 4	r = 5	4.300	9.164	r ≤ 4	r ≥ 5	4.301	9.164

Table 5: Toda–Yamamoto Causality test results – Manufactured & Semi-manufactured case

Dependent Variables	Modified Wald Statistics					
	lnNXY	lnMEX	lnSMEX	lnGFCF	lnL	lnCIMP
lnNXY	-	8.750317 (0.013)	1.349714 (0.509)	1.5228 (0.467)	0.5565 (0.757)	8.6963 (0.013)
lnMEX	1.9559 (0.376)	-	6.1918 (0.045)	0.9373 (0.626)	0.8933 (0.640)	5.5561 (0.062)
lnSMEX	5.5423 (0.063)	5.4468 (0.066)	-	1.8251 (0.402)	10.4176 (0.006)	2.5616 (0.278)
lnGFCF	1.7155 (0.424)	2.9233 (0.232)	3.2320 (0.199)	-	5.1908 (0.0746)	1.6942 (0.429)
lnL	0.2118 (0.8995)	1.8025 (0.406)	3.1114 (0.211)	1.3753 (0.503)	-	1.6374 (0.441)
lnCIMP	4.5674 (0.102)	13.4930 (0.001)	15.2588 (0.001)	8.4873 (0.014)	6.0456 (0.049)	-

Table 6 Toda-Yamamoto Causality test – Total Exports Case

Null Hypothesis	Modified Wald Statistics (Probability)	Results
Total exports does not Granger Cause Non-Export GDP	14.3262 (0.00)	Null Hypothesis is rejected
Non-export GDP does not Granger Cause Total Exports	0.4731 (0.79)	Null Hypothesis is accepted

export) to capital goods imports. Moreover, imports of capital goods also stimulate economic growth.

Moreover, this technique is also applied for examining causality between total exports and economic growth is concerned [14] approach is also applied. The major outcomes are mentioned at Table-5 which reveals that total exports granger cause non-export GDP but not vice versa⁵. Table-6 shows that unidirectional causality exists from total exports to non-export GDP in Pakistan. Again these results are consistent with the result of manufactured exports and economic growth relationship.

5. CONCLUSION

This study empirically envisage causal linkage in economic growth as well as total exports and two important categories of exports i.e. semi-manufactured exports and manufactured. Some important variables are included in the models as suggested in the literature on export – growth to avoid misspecification. Using modern times series econometric techniques, this paper unveils unidirectional causality from manufactured exports to economic growth in Pakistan. However, semi-manufactured exports has no any significant role in growth process of this country. Further, this study found unidirectional causal link from total exports to economic growth. These results illuminate the importance of manufactured export for long-run economic growth in Pakistan and suggest that emphasis should be given to manufactured export sector of total exports because of its significant contribution in economic growth of this country.

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⁵ Instead of giving complete details only the causality relationship between total exports and non-export GDP is shown as it is suffice according to this paper's requirement.

SECTION B

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ISSN 1013-5316;CODEN: SINTE 8

Sci.Int.(Lahore),28(4),523-528,2016

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