Empirical Analysis of Exports, Imports and Industrial Value Added and Their Impact on Annual Growth Rate of Pakistan

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Abstract:

Exports of goods and services and industrial value added are considered the two pinnacle sectors in the economic growth of Pakistan. Today’s capital intensive international markets and Pakistan’s primary goods and labor intensive goods results in increase trade deficit. This study empirically analyzed the extent of impact of exports, imports and industrial value added on growth rate of Pakistan. We have found that exports and industrial value added sectors have positive contribution in the economic growth of Pakistan while imports negatively affect the growth rate. An Ordinary Least Square method is used and multi linear regression estimation is utilized. The Johnson Co-integration test shows strong long-run relationship of exports, imports and industrial value added with Gross Domestic Product of Pakistan. Analyzing the short-run, the Error Correction Model has negative and significant co-efficient. This study concluded that the industrial value added has the largest positive impact on economic growth and Pakistan should focus to make its industrial sector more competitive.

Key words: Exports and Imports of Goods and Services, Industrial Value added, Annual GDP growth rate, Sort-run and Long-run Growth, Pakistan.

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1. Introduction:

Export is believed to be a vehicle for economic growth. The increase in Export of a country turns into increase in factors of production, which can be used to increase the demand of inputs for production expansion. This will help to have technological changes and will also create investment opportunities in an economy. So in this paper we try to determine the relationship between exports of goods, import of goods and services and industrial value added with Gross Domestic Product (GDP). Most of the paper showed that there exist a positive relationship between export and economic growth of a country. A country having more exports and low imports are added to GDP, while increased imports and reduced exports contract GDP. The expansion in export may be in the form of export subsidies, provision of concessional loan, access to duty free inputs, incentives etc. According to Emery (1967) as long export of a country increases it boosts the economic growth.

In current situation of Pakistan the volume of import has become too large so that it is alarming trade deficit. The GDP growth rate has been also very strongly related with import growth (expansion) especially import of technological items, machinery, food items, fuel etc. Import of a country at some extent play a significant role in promoting export, and these imports could be machineries, fuels and raw materials which are used in manufacturing sector of the economy. It is expected that imports of consumer goods have a direct relation with exports while import of capital goods have an indirect impact on exports, it is because when it is imported first it will take time to setup and then will start production.

Industrial growth has changed the course of economic growth. Today’s developed economies like US, European countries and Japan, all greatly focused on industrial development. Industries increases the value of other sectors like agriculture and mining. Industry provide
an economic hub to all other sectors by adding value to the output (IW Cologne, Report 2013).

Pakistan is facing trade deficit since long time period and to have a trade surplus a country total exports should be higher than its total imports. Trade deficit of Pakistan is on increasing trend with $30 billion in Fiscal Year. The difference was due to combined effect of higher net payment under income, goods and services accounts. Export performance can be an imperative tool for improvement of balance of payment, the employment opportunities, increasing economic growth and increasing the living standard of the masses. At the time of independence 99% of Pakistan’s export consist of just a few primary commodities; raw cotton, raw jutes, tea, raw wools and hides. Change occurred in export pattern and policy and now contribution of export of primary commodities has decreased to 19% in total export earnings.

2. Literature Review:

Free trade regimes helps in importation of better technology and can also create an improved investment climate, Grossman and Hillman (1991), similarly Jing and Marshall (1983) presented their hypothesis that in a growing economy, the technological changes and learning take place which are not related to a specific government export promotion measures rather this may be the result of human capital improvement, physical capital accumulation, transfer of technology using direct investment or cumulative productive process. Due to higher growth, the exporter have to search foreign markets to sell their products and the domestic markets may not supply to the increased production of goods. This is an implied hypothesis that export growth is a result of increased economic growth. This relationship may not be positive, it may be negative if an increased output growth result in a decrease in export goods. This may happen when there is an increased demand by domestic consumer in the exportable sector which may at last result in a low export growth due to the increased demand by domestic economy. Bader (2006) gives the empirical results which support the hypothesis that in Pakistan the import of intermediate and capital goods are critical inputs for the export production.
Hassan (1994) conducted his study and concluded that Pakistan is slow in adapting to change its policies to the global economic changes. To compete internationally the government and exporters are unable to change themselves as like many other successful countries and their exporters did, so Pakistan should react to changes more quickly. The import of capital goods should be encouraged to increase domestic production. The government also failed to have import substitution strategy and should take step to adapt it. For this purpose import tariff should increase which will lead domestic industries to compete as it encouraged the industries to get productivity and efficiency in eastern countries. Such import tariff which is decrease in revenue will be compensated by increased taxes on domestic production, this will result increase in export and revenue to the government. In today’s competitive world like Asian countries Philippines, Malaysia, and Thailand, Pakistan should also jump or crawl. But crawling will be less efficient and will be slow for the economy.

Siddique and Iqbal (2001) suited the reduction in tariff and efficient distribution of income in Pakistan. They concluded that import control policy against export and overestimated rate of exchange gives an inefficient use of resources. Though this reduction tools to face trade would make the LDCs structure of production more consistent and would also pushed up economic growth since 80s and during 90s Pakistan liberalized import under the Structural Adjustment Programmers (SAP). During this period due to reduction in tariff the economic growth of Pakistan was satisfactory. Such policy increased both export and import but decreased government revenue by 28.63% and also decreased the investment demand.

Tang and Niar (2002) used bound testing approach (pesaran et al 1996) with the objective to reinvestigate the import demand function for Malaysia. They used annual data from 1970 to 1998 as which was used by Tang ad Alias (2000) too. Their study results showed that the volume of real income, import and relative prices were co-integrated. The empirical results indicated that the estimated price elasticity and income were -1.3 and 1.5 respectively. As the positive sign of income indicates that an increase in income leads to increase import and as it is also elastic (1.5) which shows that imports are not regarded as necessary good in Malaysia. These estimated elasticity parameters were consistent with those of Tang and Alias (2000).
But the difference between these two studies is that Tang and Alias (2000) analyzed that volume of import, relative prices and real income were not co-integrated based on insignificant error correction term.

Aurangzeb (2006) investigated through analytical framework the relationship between export and economic growth in Pakistan. A time series data 1973 to 2005 used to test the hypothesis that marginal factor productivity are not the same in export and non-export sector of the economy of Pakistan. Their study showed that marginal factors productivities are higher in the export sector. In broader term, therefore over the past decade the policymakers adapted the export oriented, outward looking approach to the trade relation which were supported by their study results.

Bayson and Pitigala (2006) identified that south Asian countries have more interest to trade with the industrialized countries that is with European Union (EU) and United States (US) than with their neighboring countries and this could be due to the differences in factors endowment with large industrial countries. Panel data and time series cross sectional analysis has estimated to find out the effect of trade liberalization on growth of export, import, balance of payment and trade for the sample of 22 countries who have adopted trade liberalization policy since 1970s. The study showed that due to adaptation of trade liberalization both exports and imports have been increased but import has increased more than export which leads to worsening the balance of payment and trade.

Chew (2010) in his study founded the interaction between export, import and income in both short and long run for Pakistan within a multivariate framework. He suggested that if import can be used as an additional variable in the model, then it will enable a researcher to understand the effect of export on economic growth. His study showed argument to support the short term export led growth, growth led export, growth led import, import led growth hypothesis but does not showed in the long run. Finally he concluded that import and export should be the important factors which accelerate the economic growth of Pakistan.

3. Methodology:
3.1. Data Description:

A time series annual data of Pakistan about Gross domestic product (GDP), Export of goods and services (XGS), Imports of goods and services (MGS) and Industrial value added is collected from World Bank publications for the period of 1974-2017. The values on average basis and were non-linear. Therefore log is taken to convert data into linear form.

3.2. Model Specification:

The data is annual time series for which a multi-linear regression model is used to determine the relationship of the independent variables export of goods and services, Import of goods and services and industrial value added with the dependent variable GDP. For the data stationarity, Ducky fuller unit root test is used and Johnson co-integration test is used to check the long-run association between the variables.

The general Multi Linear Regression equation is

\[ Y = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + e \]  

(1)

Where

\( Y = \) GDP Growth Rate of Pakistan (Dependent variable)

\( X1 = \) Export of goods and services (independent variable)

\( X2 = \) Import of goods and services (independent variable)

\( X3 = \) Industrial value added (independent variable)

\( e = \) disturbance/error term of the model.

The variables are transformed by taking log to remove unit differences.

\[ \ln GDP = \beta_0 + \beta_1 l_{XGS} + \beta_2 l_{MGS} + \beta_3 l_{IndVA} + e \]  

(2)
4. Results and Discussion:

4.1. Dickey-Fuller Test of Unit Root:

Table 1
Unit Root (1974-2017)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Level DF Test Statistic</th>
<th>First Difference DF Test Statistic</th>
<th>1% Critical Value (At level, At First difference)</th>
<th>5% Critical Value (At level, At First difference)</th>
<th>10% Critical Value (At level, At First difference)</th>
<th>MacKinnon p-value for Z(t) at level</th>
<th>MacKinnon p-value for Z(t) at first difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gdp</td>
<td>-1.310</td>
<td>-6.481***</td>
<td>-3.628, -3.634</td>
<td>-2.950, -2.952</td>
<td>-2.608, -2.610</td>
<td>0.6246</td>
<td>0.0000</td>
</tr>
<tr>
<td>Xgs</td>
<td>-2.308</td>
<td>-14.49***</td>
<td>-3.628, -3.634</td>
<td>-2.950, -2.952</td>
<td>-2.608, -2.610</td>
<td>0.1693</td>
<td>0.0000</td>
</tr>
<tr>
<td>Mgs</td>
<td>0.151</td>
<td>-6.435***</td>
<td>-3.628, -3.634</td>
<td>-2.950, -2.952</td>
<td>-2.608, -2.610</td>
<td>0.9694</td>
<td>0.0000</td>
</tr>
<tr>
<td>Indva</td>
<td>-0.339</td>
<td>-5.385***</td>
<td>-3.628, -3.634</td>
<td>-2.950, -2.952</td>
<td>-2.608, -2.610</td>
<td>0.9198</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

*Note: DF = Dickey-Fuller, ***Significant at 1% critical value*

In time series, the data is not stationary due to time factor which influence the behavior of the data. The dependent variable GDP and all the three explanatory variables that are xgs, mgs and indva were not stationary at level at all critical values. By generating the first difference, the data becomes stationary as the test statistic values of gdp, xgs, mgs and indva are -6.481, -14.49, -6.435 and -5.385 which are greater than the critical values at all levels respectively.
4.2. Regression Analysis:

Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>Std. Error</th>
<th>T Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gdp Const.</td>
<td>.825</td>
<td>.886</td>
<td>0.93</td>
<td>0.358</td>
</tr>
<tr>
<td>Xgs</td>
<td>.535</td>
<td>.130</td>
<td>4.09***</td>
<td>0.000</td>
</tr>
<tr>
<td>Mgs</td>
<td>-.871</td>
<td>.403</td>
<td>-2.16**</td>
<td>0.037</td>
</tr>
<tr>
<td>Indva</td>
<td>1.329</td>
<td>.407</td>
<td>3.26***</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Prob > F (3, 41) 43.42***
R² (Adj R²) 0.76 (0.74) R², Auxiliary Regression 0.59
Breusch-Pagan Test of Constant Variance (Chi2 (1)) 0.03
Number of obs. 44

Note: ***Significant at 1% level, **Significant at 5% level

Estimating the cause and effect relationship, we applied Ordinary Least Square Regression. The results are in accord to our expectations. Exports of goods and services and Industrial value added both have positive impact on GDP of Pakistan while Imports of goods and services have negative impact on GDP. The co-efficient of Exports of goods and services and Industrial value added are significant at 1%, 5% and 10% level while Imports of goods and services is significant at 5% and 10% level of significance. The model is overall significant and the R-square value shows that 76% variation in dependent variable (GDP) has explained by the independent variables (XGS, IGS and IVA) in the model.

Testing the heteroscedasticity, we applied the Breusch-Pagan Test. The result shows that the model has no heteroscedasticity problem as the chi-square value is small with P-value greater than 0.05 level of significance. It indicates to accept null hypothesis of constant variances and the variables have no large variations and the model is well specified. In Time series analysis, multicholinearity in a data occurs most often for which we have first tested it through correlation matrix followed by estimating an Auxiliary regression. The results showed no significant relationship and checked by lower R² value of 0.59 from Auxiliary regression which is lower than our regression model R² value of 0.76.
4.3. Johnson Co-integration Test of Long-run Relationship:

The regression results are significant with co-efficient signs as were expected. The long-run relationship was analyzed through Johnson Co-integration test with linear deterministic trend. The results of Johnson co-integration shows that there is strong long-run relationship present in the model. Both the Trace Statistic and Maximum-Eigen Statistic shows 4 co-integrating equations tested at 0.05 level with MacKinnon-Haug-Michelis probability values were less than significance level of 0.05.

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Max-Eigen Statistic</th>
<th>Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None *</td>
<td>0.508839</td>
<td>29.86126</td>
<td>27.58434</td>
<td>0.0251</td>
</tr>
<tr>
<td>At most 1 *</td>
<td>0.462524</td>
<td>26.07663</td>
<td>21.13162</td>
<td>0.0093</td>
</tr>
<tr>
<td>At most 2 *</td>
<td>0.432643</td>
<td>23.80418</td>
<td>14.26460</td>
<td>0.0012</td>
</tr>
<tr>
<td>At most 3 *</td>
<td>0.222331</td>
<td>10.56106</td>
<td>3.841466</td>
<td>0.0012</td>
</tr>
</tbody>
</table>

Max-eigenvalue test indicates 4 co-integrating eqn.(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

4.4. Error Correction Model (ECM) for Short-run:

Analyzing the cause and effect of exports, imports and industrial value added on GDP growth rate in the short-run, we specified ECM equation. All the co-efficient were significant at 1% level. The results were satisfactory as coefficient of lag of error term was negative and significant. It means the speed of adjustment to reach equilibrium is quick. But the coefficient of imports is significant and positive, which shows that in the short-run, the imports positively affect the GDP growth rate, which is opposite to our regression results. The Durban-Watson value shows no autocorrelation issue in our model. The increased R-squared
value of ECM may be due to the addition of variable of lag error term. On the basis of our difference stationary variables, we specified the following ECM

\[ D(GDP) = \beta_0 + \beta_1 D(XGS) + \beta_2 D(MGS) + \beta_3 D(INVA) + \gamma e(-1) + e \quad (3) \]

<table>
<thead>
<tr>
<th>D(GDP)</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>T Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const.</td>
<td>-0.056199</td>
<td>0.219513</td>
<td>-0.256</td>
<td>0.799</td>
</tr>
<tr>
<td>D(XGS)</td>
<td>0.057800</td>
<td>0.012655</td>
<td>4.567***</td>
<td>0.000</td>
</tr>
<tr>
<td>D(MGS)</td>
<td>0.028839</td>
<td>0.010184</td>
<td>2.831***</td>
<td>0.007</td>
</tr>
<tr>
<td>D(INVA)</td>
<td>0.419228</td>
<td>0.047371</td>
<td>8.849***</td>
<td>0.000</td>
</tr>
<tr>
<td>ET(-1)</td>
<td>-1.349922</td>
<td>0.150198</td>
<td>-8.987***</td>
<td>0.000</td>
</tr>
<tr>
<td>F-statistic</td>
<td>41.58***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2 (Adj. R2)</td>
<td>0.814 (0.794)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obs.</td>
<td>43 after adjustment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: ***Significant at 1% level.

5. Conclusion and Recommendations:

This study empirically analyzed the relationship of annual exports of goods and services, imports of goods and services and industrial value added with economic growth of Pakistan. The study concluded that increase in exports and industrial value added products positively affect the economic growth. The co-efficient of exports is smaller than value added industrial sector because Pakistan mostly exports primary and unfinished goods while the industrial sector with semi-finished to finished goods greatly increases the GDP which is evident from the textile industry. The imports of goods and services negatively affect the economic growth as concluded from the regression analysis as it leads to deficit in balance of payments. In the study it is also evident from the data as at years when there were higher exports growth and industrial value added product, the economic growth was high too, which showed a strong and effective
relationship between these variables. The positive impact of imports on GDP in the short-run was not expected, which needs to be analyzed extensively. But from the sample data, it is evident that noticing the behavior of GDP and mgs, both the variables shows ups and down in same direction.

On the basis of conclusion of this study, we have put forward following recommendations,

- Pakistan should greatly focus on building infrastructure for the development of industries in order to enable itself to produce finished and quality assured products both for domestic and international markets. As most of the exports are in primary goods, which yield a little income.

- Pakistan is an agricultural country and should focus on finished and processed agro-based exports. Public sectors should come forward along with private sectors to strengthen and develop the agriculture markets.

- The government should collaborate with international quality assurance organization to share expertise with exporters of Pakistan.

- Research and development should be practiced to focus on genetically modified agricultural products having a higher value in international markets and will also be a source to increase the export in a competitive markets.

- Trade policy also to be revised. Textiles industry is considered as the backbone of Pakistan finished goods exports which is falling behind the competition with
capital intensive industrial competitors. Pakistan need to focus on improving the capital and trade expertise to increase the textile exports.

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