ANALYZING EMPIRICAL RELATIONSHIP BETWEEN TRADE OPENNESS, INDUSTRIAL VALUE ADDED AND ECONOMIC GROWTH: A CASE STUDY OF PAKISTAN

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ABSTRACT
Openness and trade liberalization influenced high rates of growth for the developing countries. Liberalization and integration took place in the economies of almost all the developing countries during the late 80s and early 90s, in the previous century, on the inspiration of international donor agencies to implement the structural adjustment programmes. It is a well admitted fact that along with trade variables industrial value added work as an impetus affecting economic growth, positively. Pakistan also adopted the measures and policies to liberalize trade as a result of Washington consensus. This study is an attempt to investigate the empirical relationship among the trade openness, industrial value added and economic growth of Pakistan. Annual time series data set (1980 to 2009) was utilized to observe the connections amongst the indicators of interest. Moreover, unit root test was applied to determine the time series properties while OLS technique of estimation and Granger causality tests were employed to find out direction of causality. The results inferred from the econometric model articulated that imports and exports affect positively to economic growth till the industrial value added are taken into account. It is concluded and recommended from the outcomes of the study that the developing countries must adopt and pursue trade openness and liberalization to strengthen their economies and consequently enhance the living standards of their population.

Key Words: Industrial value added, trade openness, economic growth.
1. INTRODUCTION

Openness to trade has been considered as an important determinant of economic growth and a well debated issue in the recent growth literature. Initially, the developing nations of the world followed restrictive trade policies but with passage of time and emergence of globalization, all the nations realized the need to liberalize to their economies in terms of trade openness. Trade of a country is a key determinant for the improvement of a country’s industrialization. Moreover, development experienced by a country brings some changes in trade structure on the basis of endowments and comparative advantage (Hultman, 1967).

An empirical analysis by Adenikinju and Olofin (2000) suggested that development of industrial sector can be determined by trade openness and policies of trade. There are a number of ways through which a positive link between industrial sector growth and trade policies can be explained like, scale efficiency is increased through expanding the scope of domestic industrial sector. and furthermore an open trade regime causes high competition in world market, which further boosts firms in a country to follow and take up modern technology. Furthermore it enhances efficiency. In addition, an open trade regime relaxes constraints caused by foreign exchange as observed in case of developing nations. Last but not the least it causes high development in technological progress. (Lucas, 1988, Grossman and Helpman, 1989; 1991; and Romer, 1990).

However, some other potential gains from trade sector reforms include (i) opportunities to access intermediate and capital goods embodying better technologies, (ii) stimulation of productive performance, better resources allocation and exports, (iii) access of local producers
and consumers to less expensive and higher quality goods from abroad (Winter, 2004). However, many observers like Noland and Pack (2003) and Milner (2006) among others, believed that domestic policies were largely unrelated to trade such as institutional development, macroeconomic management, education, health, infrastructure, etc may now be the main obstacles to reap the benefits of trade reform in developing economies.

A dynamic process through which a nation starts with the production of primary commodities and afterwards shifts to development by embarking on secondary commodities production and eventually expanding their tertiary i.e. services sector until all these sectors of the economy are integrated because, development requires, in the first place, integration of various sectors of the domestic economy (Wade, 2005). It can be concluded that trade and industrial value added and trade openness both can be important factors to enhance overall economic performance.

**OBJECTIVES OF STUDY**

Objective of this study is to examine the relationship between exports, industrial value added and economic growth in Pakistan, and to present policy recommendations regarding the trade and industrial sector. Outline of this paper is given as follows. Review of theoretical as well as empirical literature is given in next section. Section 3 contains a brief history of trade openness experiences and its outcome for Pakistan. Data, variables and methodology are given in section 4, while discussion on results is given in section 5. Section 6 finally discusses the conclusions and recommendations.
2. LITERATURE REVIEW

The theoretical and empirical literature regarding the openness of trade, industrial developments and economic growth has a number of contributions by recent development economists. The results achieved by these contributors at national and international levels are outlined below.

Ahmad and Dutta (2006) studied the relationship between growth of industrial sector and trade sector policies for Pakistan. The empirical analysis was carried by using the annual time series data over the period 1973-1995 and applying the cointegration and error correction methods of estimation. Major findings suggested a long run and stable relationship among industrial value added, capital stock, real exports and import tariff on collection rate and ratio of secondary school enrollment.

On the same lines Carmen and Pilar (2004) investigated the role played by manufacturing sector imports on real GDP and employment for China. Using quarterly time series data set over the period 1979-2002 and applying dynamic econometric technique of estimation study found a positive and long run relation between economic growth index and index of trade openness.

Similarly, many studies concluded that trade performance of developing countries is less dependent on natural factors endowment and comparative advantages given the imperfect competition, economies of scale, and technological spillovers. Rather it is a function of technological spillover, strategies followed for trade and industrialization (Verspagen 1992).

Njikam (2009) tried to analyze the trade openness and development of industrial performance in Cameroon, while trying to explore whether a relation exists between infrastructure and industrial performance during the two time periods, before and after trade openness this study utilized the
annual values during the import-substitution era (1986-94) and immediately after trade reform (1995-2003) for a sample of 29 industrial sectors. By means of panel data techniques this study found that development in infrastructure leads to enhance the productivity of industrial sector and in trade openness agenda better quality of infrastructure must be given priority. Barua and Chakraborty (2006) analyzed the industrial sector performance for India. The study analyzed high market and openness effects on industrial and exports performance. Major conclusion drawn suggested that liberalization leads to high price cost margins and reduction in concentration of industries lowers producer surplus and hence boosts up consumer welfare.

Adebiyi (2006) investigated the relationship between policies of trade openness and economic growth performance in Nigeria. This study applied Vector Auto regression Techniques and used annual time series data set. Major findings suggest that sustained economic growth in Nigeria can be achieved by implementing a comprehensive trade openness programme. A number of case studies for Pakistan have been conducted to analyze the relationship between trade openness and economic growth including Khan et al. (1995) who showed that economic growth is enhanced through export promotion. Another analysis conducted by Iqbal and Zahid (1998) concluded that Pakistan had gained welfare effects through trade openness. Similarly Mohsin et al. (2001) found an evidence that trade openness has helped to eradicate poverty in Pakistan. An evidence of positive relationship has been found for the South Asian region including Pakistan by Kemal et al. (2002). Khan and Qayyum (2007) also found a positive and robust relationship between trade and financial sector policies with economic growth.

After analyzing the review of literature on theoretical as well as empirical side we can summarize that literature documented strong evidence in the favor of openness. Openness to
trade is an important factor to enhance the industrial growth and overall economic performance. But a successful outcomes demand that economy be competitive along with strong institutional framework. However, developing nations like Pakistan, must adopt the policies to improve trade performance as well as industrial performance. Guerrieri (2002) stated that at world level trade can be beneficial but it is not necessary for all the countries to get the benefits individually, at national level benefits by trade openness are dependent upon a number of endogenous factors. Specialization pattern plays an important role for the benefits and macroeconomic stability is pre requisite to get the maximum gains of trade liberalization.

3. A BRIEF HISTORY OF TRADE SECTOR IN PAKISTAN

During the early years of Pakistan, being an agrarian economy in nature, Pakistan had a very weak industrial sector along with poor infrastructure facilities and instability in social as well as political sector. The so-called development economist of that time and policy makers emphasized to strengthen the industrial structure those days. In this regards. The objectives included restricting the imports and promoting the exports. As a result high tarrif rate policies were adopted to discourage imports in the country. During the era of sixties, large scale manufacturing sector started to develop during this time period. In those days, focus was on expanding the industrial sector. Policies were introduced to strengthen the industrial base including overvalued exchange rate, export bonuses, preferential credit access to industries with export potential and automatic renewal of import licenses.

Until the late 1980s Pakistan restricted and protected its trade regime. Imports were far away from domestic markets as a result of high tarrif rates and non tarrif barriers. During the early 1990s as a result of structural adjustment programme proposed by international funding agencies (IMF and World Bank) Pakistan followed liberalization policy for its trade as well as financial
sector. These policies got momentum, especially during the mid nineties, with the reduction of import duties and eliminating various subsidies (Siddiqui and Iqbal, 2005). Consequently, a reduction in the share of Pakistani exports in the world has been observed from 0.22% to 0.18% and remained stagnant over it. As compared to Pakistan all other Asian countries gained lots of benefits in the same time (Hussein, 2007).

An upward trend was seen in exports as well as industrial value added as a result of policies. Nationalization took place during the decade of 70s. Along with nationalization act government adopted a few measures for the openness of trade sector, they removed the pre provided export bonus scheme, devaluation of Pakistani rupee, and removing restricted licensing scheme, consequently the exports in manufacturing increased.

4. METHODOLOGY AND DATA

A number of studies used time series data set and econometric modeling to examine the possible impact of trade openness on economic growth*. Econometric model and variable scheme adopted by Sultan (2008) were followed in this study to achieve the objectives using imports and exports as indicators of trade. While, industrial value added is taken as a determinant of economic growth. This analysis used imports, exports and industrial value added as dependent variables, and real GDP as dependent variable, all variables are expressed in logarithm. Annual data set over the period 1975 to 2009 in millions of US dollar have been used to carry empirical estimation. The data sources include World Development Indicators (WDI), and International Financial Statistics (IFS).

For estimation in the first steps this study applied ADF Unit root test to examine the time series properties of data. We found all the variables be stationary at their first level, hence OLS estimation method has been applied to the all first difference variables, finally after having established the longrun cointegration among the variable study applied Granger Causality Test to find the direction of causal relation between the variables.

5. METHODOLOGY AND ESTIMATION RESULTS

The results of unit root are reported below in Table 5.1. It is seen from the table that all the variables i.e. exports, imports, GDP and industrial value added are non stationary at level and are stationary at first difference. It is concluding that all the variables are integrated of order one.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF at Level</th>
<th>ADF at First Difference</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEXPORTS</td>
<td>-0.6263</td>
<td>-3.3265*</td>
<td>I(1)</td>
</tr>
<tr>
<td>LIMPORTS</td>
<td>-0.1026</td>
<td>-2.8863*</td>
<td>I(1)</td>
</tr>
<tr>
<td>LGDP</td>
<td>-1.3027</td>
<td>-2.6987*</td>
<td>I(1)</td>
</tr>
<tr>
<td>INVA</td>
<td>-0.1026</td>
<td>-2.8863*</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Note: * shows significance at 5% level of significance, For testing unit root null hypothesis is that Variable possesses unit root, hypothesis is rejected if the calculated value exceeds ADF critical value at 5% level of significance.
In the second step correlation among the variables has been found, given below in Table 6.2. The correlation matrix here presents the evidence of strong correlation. Positive correlation exists between industrial value added and exports and GDP which implies that high industrial value added cause GDP to be high. Not a single evidence of negative correlation has been found here. Furthermore serial correlation LM test was also employed to observe the existence or non existence of autocorrelation. However, the F-statistic was so high (F-Stat = 17.9) and probability was also found to be less than 0.05, so we are right to reject the null hypothesis of autocorrelation at 5% level of significance.

Table 5.2
Correlation Matrix

<table>
<thead>
<tr>
<th>Variables</th>
<th>D(LRGDP)</th>
<th>D(LEXPORTS)</th>
<th>D(LIMPORTS)</th>
<th>D(LINVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(LRGDP)</td>
<td>1</td>
<td>0.97</td>
<td>0.93</td>
<td>0.98</td>
</tr>
<tr>
<td>D(LEXPORTS)</td>
<td>0.97</td>
<td>1</td>
<td>0.94</td>
<td>0.98</td>
</tr>
<tr>
<td>D(LIMPORTS)</td>
<td>0.93</td>
<td>0.94</td>
<td>1</td>
<td>0.95</td>
</tr>
<tr>
<td>D(LINVA)</td>
<td>0.98</td>
<td>0.98</td>
<td>0.95</td>
<td>1</td>
</tr>
</tbody>
</table>

Serial Correlation LM Test

<table>
<thead>
<tr>
<th>F-Stat</th>
<th>n*R²</th>
<th>Probability F-Stat</th>
<th>Probability (Chi square)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.93959</td>
<td>17.67172</td>
<td>0.0000020</td>
<td>0.000145</td>
</tr>
</tbody>
</table>

Note: Null hypothesis for testing correlation is existence of autocorrelation.

After econometric modeling the estimation results are given below in Table 5.3, where c is intercept term, D (LEXPORTS), D(LIMPORTS), D(LINVA) are independent variables and were first differences of log of exports, imports and industrial value added, respectively. Dependent
variable was LRGDP which is log of real GDP. Coefficient of exports possesses negative sign indicating a negative impact of growth rate of exports on growth rate of economic growth. Moreover it has an insignificant effect overall i.e. 1% increase in growth rate of imports causes 1.16% increase in real GDP growth rate, industrial value added is an important determinant of economic growth in addition to imports and exports. Industrial value added has positive and significant impact on economic growth, but its contribution is very small in economic growth as compared to exports growth or imports growth. 1% rise in growth rate of industrial value added causes 0.0001% rise in real GDP growth rate. Adjusted $R^2$ is 0.96 which is indicating that 96% variation in explanatory variables has been caused by explained variables. Values of coefficients suggested that the effect of growth rate of imports has more strong effect on dependent variable as compared to growth rates of exports or imports.

In the next step we find the cointegration among the variables, i.e. tried to find the existence or non existence of longrun relationship between the variables. So we apply Johansson bivariate cointegration test to detect the status of longrun relationship.

### Table 5.3
**OLS Regression Results**

<table>
<thead>
<tr>
<th>Variables</th>
<th>coefficients</th>
<th>t-statistics</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>7.7333*</td>
<td>3.83776</td>
<td>0.0008</td>
</tr>
<tr>
<td>D(LEXPORTS)</td>
<td>-0.6397</td>
<td>-1.21322</td>
<td>0.2364</td>
</tr>
<tr>
<td>D(LIMPORTS)</td>
<td>1.1618*</td>
<td>4.83107</td>
<td>0.0001</td>
</tr>
<tr>
<td>D(LINVA)</td>
<td>0.0001*</td>
<td>3.14487</td>
<td>0.0043</td>
</tr>
<tr>
<td>$R^2 = 0.962921$</td>
<td>F-stat = 243.38</td>
<td>D.W stat = 0.509</td>
<td>Prob(F-tat) = 0.000</td>
</tr>
</tbody>
</table>

* shows significance at 1% level of significance, ** at 5% and *** at 10% level of significance.
All the variables are non stationary at their level but are stationary at first difference and hence integrated of same order. After testing the existence of cointegration and longrun relationship between the variables now we move to find the causality between the variables given. The results of causality are given in appendix, which state that bidirectional causality exists between imports and exports indicating, imports cause exports which further cause imports to be high. Moreover industrial value added cause imports, a unidirectional causality running from industrial value added to imports is found showing that industrial value added growth requires more technology and capital goods which is enhanced by growth of industrial value added. The results can be summarized in this way that if we import capital goods and technology from abroad, it will be helpful for the improvement of industrial value added and its growth.

6. CONCLUSION AND POLICY RECOMMENDATION

The results of our study supported the argument of no positive and robust relationship between growth rate of exports and growth rate of real GDP, furthermore our findings also suggested imports to be an important determinant for growth of industrial value added which further contributed positively to economic growth for the period mentioned. These findings can be summarized in another way that trade openness or the growth of imports and exports is not only determinant of economic growth but a positive and significant contribution can be achieved by considering the industrial value added as well. The case study found that potential benefits can be gained by Pakistan economy by adopting more openness policies, further these benefits can be overblown if the policies are made taking industrial sector into account.

Industrial sector of Pakistan has not entered into the competition of world market through high value added so if demand of imported goods is associated with exports and industrial value added,
we can achieve high and sustained growth of real GDP. So it is recommended that there must be reduction in tariff and non tariff barrier along with promotion of exports and imports. Policies must be introduced to promote the imports of capital goods, in addition new and advanced technologies must be promoted in enhancing the growth of industrial value added which in turn contributed to positive economic growth.
REFERENCES


# APPENDIX

**Granger Causality Results**

<table>
<thead>
<tr>
<th>Hypothesis to Test</th>
<th>F-Statistics(probability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEXPORTS does not Granger Cause LRGDP</td>
<td>0.58431 (0.56555)</td>
</tr>
<tr>
<td>LRGDP does not Granger Cause LEXPORTS</td>
<td>0.78365 (0.46856)</td>
</tr>
<tr>
<td>LIMPORTS does not Granger Cause LRGDP</td>
<td>0.43751 (0.65090)</td>
</tr>
<tr>
<td>LRGDP does not Granger Cause LIMPORTS</td>
<td>2.48412 (0.10549)</td>
</tr>
<tr>
<td>LINV does not Granger Cause LRGDP</td>
<td>0.66570 (0.52396)</td>
</tr>
<tr>
<td>LRGDP does not Granger Cause LINV</td>
<td>0.94847 (0.40261)</td>
</tr>
<tr>
<td>LIMPORTS does not Granger Cause EXPORTS</td>
<td>2.99739 (0.06969)</td>
</tr>
<tr>
<td>LEXPORTS does not Granger Cause IMPORTS</td>
<td>3.95982 (0.03328)</td>
</tr>
<tr>
<td>LINV does not Granger Cause LEXPORTS</td>
<td>3.27533 (0.05687)</td>
</tr>
<tr>
<td>LEXPORTS does not Granger Cause LINV</td>
<td>1.15954 (0.33207)</td>
</tr>
<tr>
<td>LINV does not Granger Cause LIMPORTS</td>
<td>6.43980 (0.00629)</td>
</tr>
<tr>
<td>LIMPORTS does not Granger Cause LINV</td>
<td>0.02862 (0.97182)</td>
</tr>
</tbody>
</table>