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IMPACT OF TRADE OPENNESS ON OUTPUT GROWTH FOR PAKISTAN: AN EMPIRICAL INVESTIGATION

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1. Introduction

The relationship between trade openness and growth is a highly debated topic. The empirical literature shows that trade openness or liberalization affects output growth. Most of the studies have concluded that the openness of the trade regime has positive relation with GDP growth [Ahmed, Yusuf and Anoruo Emmanuel (2000), Edwards, S., (1998), Edwards, S., (1992), Harrison, A., (1996), Iscan, Talan (1998), Santos Paulino (2002), Wacziarg R., (2001), Yanikkaya Halit (2003)].

Pakistan has gradually liberalized its trade regime specially after 1988, when the government accepted the first IMF Structural Adjustment Program. After 1995, this policy gained greater momentum and WTO related compliances have induced Pakistan to reduce import duties and eliminate various subsidies.

In this paper we analyze the impact of trade liberalization policy on GDP growth of Pakistan for the period ranging from 1972 to 2002. This paper consists of five sections. The next section reviews the empirical literature on trade openness. Section - 3 describes the model and data sources. Section - 4 reports the estimation results. Final section - 5 concludes the paper.

2. Literature Review

Ynikkaya (2003) estimated the effect of trade liberalization on per capita income growth for 120 countries for the period 1970 to 1997. He used two types of trade openness measures. The first openness measure was estimated by using trade volumes which include different ratios of trade variables (exports, imports, exports plus imports and trade with developed countries) with GDP. Another measure based on trade restrictiveness estimated by calculating restrictions on foreign exchange on bilateral payments and current transactions. The results of the GMM (Generalize Method of Movement) estimates showed that first group of openness, based on trade volumes were significant and positively related with per capita growth. However, for developing countries openness based on trade restrictions were also significant and positively related with per capita growth. He therefore concluded that trade restrictions in developing countries may cause faster GDP growth.

Edward (1992) used a cross country data set to analyze the relations between trade openness (trade intervention and distortions) and GDP growth of 30 developing countries over the period 1970 to 1982. In his model he used two basic sets of trade policy indicators, constructed by Leamer (1988). The first set refers to openness and measures of trade policy (tariff and Non Tariff Barriers - NTB) which restrict imports. The second set measures trade intervention and captured the extent to which trade policy distorted trade. The results of the model, estimated by OLS, showed that all the four openness indicators were positively related with real per capita GDP growth, while trade intervention indexes were found significantly negatively associated with GDP growth. These studies support the hypothesis that countries with a more open trade regime have tended to grow faster, and a more distorted trade regime will tend to grow slower.

Santos-Paulino (2002) examined the impact of trade liberalization on export growth for a sample of 22 developing economies between 1972 to 1998. He used a typical export growth function, which postulate that exports volume depends upon real exchange rate and world income. Trade openness is measured in two ways. First by the ratio of export duties to total export, as indicator of the degree of anti-export bias and second by a dummy variable of timing of the introduction of trade liberalization measures. The results of OLS estimate showed export duty significant with negative sign and the dummy variable is also significant with a positive sign. Therefore it was concluded exports grow faster in open economies.

Edwards (1998) used comparative data for 93 countries to analyze the robustness of the relationship between openness and total factor productivity (TFP) growth. He used nine indexes of trade policy to analyze the connection between trade policy and TFP growth for the period1980 to 1990. Among these nine indexes, three were related to openness, a higher value of which denotes a lower degree of policy intervention in international trade. The other six were related to trade distortions, for which higher values denote a greater departure from free trade. The results of OLS estimates found trade openness indexes significant with positive signs and trade distortion indexes were significant with negative signs. This relationship suggests that more open countries will tend to experience faster productivity growth than more protectionist countries. The

important point of the study was that the coefficients were very small, up to 100th decimals points, while the value of R^2 was also very low.

Ann Harrison (1996) used a general production function to analyze the relationship between openness and GDP growth. He specified GDP as a function of capital stock, years of primary and secondary education, population, labour force, arable land and technological changes. He used seven openness measures to test the statistical relationship between openness and GDP growth. The cross-section estimation results show only black market rate significant with negative sign. The country time series panel result showed that three variable, tariff and non tariff barriers with positive sign, black market rate and price distortion index used in dollar with negative sign, were found significant. Estimation for Annual data show two variables, tariff and non-tarrif bariers, and black market rate, significant with negative sign. He therefore concluded that the choice of period for analysis, of relationship between trade openness measures and GDP growth, is critical.

Wacziarg (2001) investigated the links between trade policy and GDP growth in a panel of 57 countries for the period of 1970 to 1989. His study employs a fully specified empirical model to evaluate the six channels though which trade policy might affect growth. He measured openness through an index which consisted of three trade policy variables, Tariff barrier, captured by share of import duties to total imports, Non-tariff barriers, captured by un-weighted coverage ratio for the pre-Uruguay Round time period and a dummy variable (liberalization status). The fixed estimate OLS results showed that three channel variables i.e., FDI inflows as share of GDP, domestic investment rate and macro economic policy, were significant. He therefore concluded that there is a positive relationship between trade openness and GDP growth.

Iscan, Talan (1998) analyzed the effect of trade openness on total factor productivity growth for Mexican manufacturing industries for the period 1970 to 1990. To identify the differential productivity effects of openness to foreign trade and trade liberalization, two measures (i) foreign trade variables, controlled by export share and (ii) measure of protection, control by effective rate of protection, were considered. He also used a dummy variable controlled for the date from which the liberalization of trade was started (i.e., 1986). The results of the GMM estimations showed that after liberlization productivity growth has positive and significant relationship with exports, while change in effective rate of protection was found negative but significant. It was therefore concluded that liberalization has positively effected productivity growth.

Ahmed, Yusuf and Anoruo, Emmanuel (2000) investigated long run relationship between GDP growth and openness for five South East Asian countries, The Philippines, Indonesia, Malaysia, Singapore and Thailand, for the period 1960 to 1997. They used export plus import growth rate as proxy of openness. The Johansan estimation results rejected the hypothesis that there is no cointegration between economic (GDP) growth and openness while the hypothesis that error correction term is significant could not be rejected. This Vector Error Correction estimates showed bi-direction causality.

Sinha D., Sinha T. (2000) analyzed the effects of growth of openness and investment on the growth of GDP for 15 Asian countries during 1950 to 1992. They developed a model which specified GDP growth a function of growth rates of openness (export plus import), domestic investment and population.. The Auto Regressive Model (ARMA) results show that for China, Hong Kong, Iran, Iraq, Israel, Myanmar, Pakistan and Singapore, the coefficient of the growth of openness is positive and significantly different from zero. For China, Hong Kong, Indonesia, Israel, Japan, Jordan, Philippines, Singapore and South Korea, the coefficient of the growth of domestic investment is positive and significantly different from zero. In some cases, the coefficient of the growth of population is negative but in all such cases, it is not significantly different from zero. Thus, they find support for the proposition that the growth rate of GDP is positively related to the growth rates of openness and domestic investment. However, the relationship between the growth rate of GDP and the growth rate of population is not that clear cut.

3. Model and data

We have used the model of Sinha (2000) which states that the GDP growth has three growth components, namely; trade growth, population growth and investment growth. The volume of trade (import plus export) is used as proxy of openness. He derived the following equation.

$$\mathbf{YG = b_0 + b_1TG + b_2IG + b_3PG + e} \quad \text{——————} \quad \mathbf{(1)}$$

where YG refers to GDP growth, TG to trade growth – proxy for openness –, IG to Fixed Investment growth and PG to population growth, while e is the error term.

The studies referred above estimated the effect of trade openness on GDP growth for several Asian countries including Pakistan. The data for Pakistan was from 1952 to 1992. During these years the Pakistani economy was not very open and in 1971-72 a major change occurred when Pakistan's east wing was separated. To overcome these problems we have collected the data from 1972 to 2002. The results are shown in next section, are quite different from Sinha's study.

The main objective of our study is to find the causality between trade growth and GDP growth. Iqbal, Baig and Tahir (2002) found that policy liberalization leading to an increase in imports may lead to a growth of output. Moreover, Iqbal, Tahir and Baig (2001) argued that import of Pakistan is mostly consisting of intermediate goods (petroleum, machinery, chemicals etc.) which are conducive to output growth, so the impact of import growth on output is positive.

Therefore instead of running a univariate regression the present study investigates multivariate causality analysis amongst the variables appearing in model (1).

Data for YG, TG, IG and PG, are in log form, collected from IMF's International Financial Statistics, while data on population were collected from Government of

Pakistan, Federal Bureau of Statistics. TG is calculated, being the proxy of openness, as sum of real exports and imports divided by real GDP, while IG is the real fixed investment and Population is adopted as given in Economic Surveys. All real values are obtained by deflating nominal values by GDP deflator with base 1995.

4. Estimation Results

The first step in co-integration analysis is to test the stationarity properties of the variables under consideration. Table-1 presents the Augmented Dickey Fuller test. It indicates that all variables have been found stationary at first difference.

Table-1

Variables	Level	1st Difference
LGDP	0.458	-4.916*
LM95	-2.873	-5.937*
LX95	-0.193	-3.598**
LT	-2.107	-5.528*
LRINV	-0.810	-2.20**
LPOP	-0.02	-3.551***

***, ** and *** denotes significance at 1%, 5% and 10%, respectively.**

For modal (1) both Akaik Information criteria and Schwarz criteria support VAR(2) as the best representation of the Vector Auto Regression. Under the assumption of linear deterministic trend in the data and intercept and no trend in the Co-integration equation Johansan co-integration test identifies one co-integration equation which is given below:

LGDP95 = - 0.198LT + 0.235LRINV + 2.045LPPO - 1.29 —— (a)
statistics value (-3.23) (4.32) (8.45)

Equation (a) shows that all the independent variables are significant. There is negative long run relationship between GDP and trade liberalization, the coefficient defined that a 1% increase in trade volume would decrease the GDP by 0.198%. The relationship between GDP and investment is found to be positive and indicates that a 1% increase in investment would increase the GDP by 0.235%. The population variable was also found to be positive.

We introduced a second model by separating the trade variable, in Model (1), into Export (LX95) and Import (LM95) separately and also introduce a dummy variable 1995, when Pakistan joined WTO. In this case Schwarz criteria support VAR(1) as the best representation of the Vector Auto Regression. Under the same assumption given for Model (1) the co-integration equation is as under:

LGDP95= 0.032LX95 + 0.0817LM95 + 0.517LRINV + 0.619LPPO + 3.205 ——— (b)
(0.0603) (1.29) (4.118) (1.35)
[values in parenthesis showing t statistics value]

In this model only Investment has significance and positive long run relationship with GDP. It shows that 1% increase in investment would increase GDP by 0.517%.

Table-2 and 3 represent the Granger Causality Test in Error Correction Model. The Optimal lag structure in these Error Correction models has been determined by means of Final Prediction Error (FPE) criteria

Table – 2

	YG	TG	IG	PG	ECT
YG	-	1.4934	4.0491**	0.0986	-0.60138* (-4.52926)
TG	3.58718**	-	0.0019	0.0015	-1.58109* (-5.43237)
IG	6.6056**	0.1475	-	7.2958**	-0.68109* (-2.88805)
PG	1.3055	0.3993	0.1467	-	-0.01149 (-0.1262)

***, ** and *** denotes significance at 1%, 5% and 10%, respectively**

Table – 3

	YG	XG	MG	IG	PG	ECT
YG	-	7.5687**	11.5628*	0.2832	11.6245*	-0.2585*** (-1.9103)
XG	0.4383	-	0.0638	0.6045	0.0090	-0.662* (-3.3417)
MG	3.5445**	0.0093	-	0.1036	0.0639	-1.0613* (-4.6965)
IG	1.657801	0.371883	0.181212		1.365129	-0.31818 (-1.55711)
PG	0.101964	2.022354	0.033769	0.906024		-0.06496 (-0.6705)

***, ** and *** denotes significance at 1%, 5% and 10%, respectively.**

The significance of Error Correction Term (ECT) implies causality from all right hand side variables to the left-hand side variable, while the insignificance of ECT shows that this variable is exogenous in the given model. Table – 2, shows that the ECT for variables GDP growth, Trade growth and Investment growth are significant at 1% level. Investment growth, GDP growth and population growth cause GDP growth, trade growth and significantly as a component of the long-term co-integrating relations embodied in the ECTs. On the other hand, in the short run, Investment growth causes GDP growth, GDP growth causes trade growth and GDP growth together with Population growth cause Investment growth. The important outcome is that trade growth does not cause GDP growth.

Table – 3, shows that the ECT for variables GDP growth, export growth and import growth are significant at 1% level. Investment growth, GDP growth and Population growth cause GDP growth, Trade growth and Investment growth significantly as a component of the long-term co-integrating relations embodied in the ECTs. In the short run, export growth, import growth and population growth cause GDP growth, and GDP growth cause import growth.

Conclusion:

We first estimated the co-integration equations for our model and found that there is long run negative relationship between trade growth and GDP growth. When we separate the total trade volume in export and import we find insignificant positive relationship between GDP and export and import. Both the models showed positive and significant relationship between GDP and investment.

The Engle Granger Causality tests showed insignificant relationship between trade growth and GDP growth, while investment growth was found to have a significant relationship with GDP growth.

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GMM stands for Generalized Method of Movements, which is a method of estimation.

Sinha (2000) follows measure trade liberalization as real exports plus imports

We measured growth of Trade Liberalization as (Exports + Imports)/GDP as used by Sinha (2000). The Exports + Imports is widely used as Trade Liberalization proxy. Wacziarg (2001) has mentioned that a country's trade to GDP ratio can be viewed as resulting from trade policy.