Trade Openness and Economic Growth: An Econometric Study of India

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The relation between trade openness and economic performance has been a topic of discussion among policy makers and academia for more than a century. Trade openness is also supported by the comparative advantage theory of Hecksher-Ohlin; according to it trade openness can be beneficial in improving the economic performance of a country. Based on this theory, a country will export products having comparative advantage and import goods having no comparative advantage and this will lead to increased efficiency of a country, thus increasing economic growth.

In practice it is possible to establish long-run relationships between trade openness and economic growth in a number of ways. Exports are the most important source of foreign exchange, which can be used to ease pressure on balance of payments and generate job opportunities in developing countries like India. The export-led growth strategy also aims at increasing the capability of producing goods that can compete in the world market using advanced technology and making provision for foreign exchange needed to import capital goods. On the other hand, import liberalization helps in promoting technology transfer through the import of advanced capital goods. Therefore, an open economy generally leads to higher growth. This is because there are some economic factors, such as returns to scale and the impact of competition, which probably produce a more

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satisfactory economic performance under an open trade policy. India and many other developing countries have ushered in financial and trade liberalization. One of the main objectives of such liberalization and financial measures was to achieve higher economic growth.

There are a number of empirical studies linking economic growth to the openness of the trade regime (Little, Scitovsky, and Scott, 1970; Balassa, 1971; Bhagwati, 1978; Krueger, 1978; Heitger, 1987; Romer, 1989; Quah and Rauch, 1990; Michaely, Papageorgiou, and Choksi, 1991; Dollar, 1992; Edwards, 1992; Harrison, 1995; Bakht, 1998; Onafowora and Owoye, 1998). On the other hand, Quinn (1997), and Kraay (1998) have shown that openness does not have any effect on economic growth.

Trade liberalization may also have negative impact on economic growth. Trade openness exposes a country to volatility of exchange rate and output. If the magnitude of volatility is beyond the absorptive capacity of the country, the forces of dynamic comparative advantage push the economy away from the direction of industrial activities that stimulate long run economic growth. This view is supported by Rodríguez and Rodrik (1999), who argue that the measures of trade openness used in most of the papers showing positive links between trade liberalization and exports are faulty. On the other hand, Harrison (1996), and Harrison and Hanson (1999) suggest that the nature of relationship is dependent on the chosen measure of openness and the specification used. A review by Greenaway, Morgaon, and Wright (1998) concludes that trade liberalization has resulted in both increase and decrease in the growth rate depending on country circumstances. Similar findings were reported by Bolaky and Freund (2004).

Empirical evidence thus shows that the relationship between trade openness and economic growth is mixed. Some studies have found a positive relationship between openness and GDP growth in developing countries; however, other studies have shown that openness does not accelerate economic growth. In this paper, an effort has been made to investigate the causality and cointegration between trade openness and economic growth in India.

Literature Review

Much work has been done to suggest causality between trade openness and economic growth. Measures mostly used include ratio of trade (sum of imports and exports) to GDP as a proxy measure for trade openness. In most of the cases, per capita GDP or natural log of GDP is used as a proxy measure of economic growth.

Harrison (1995) examined the relationship between openness to international trade and economic growth in developing countries using cross-section and panel data from 1960 to 1987. The results suggested that the choice of time period or analysis is critical, i.e. more evidence of the positive impact of openness to international trade on economic growth is found when a longer time series is used. Openness to international trade positively affects economic growth. The results of Granger causality suggested that the causality between openness to international trade and economic growth runs in both directions: more openness to international trade precedes a higher economic growth and a higher economic growth leads to more openness to international trade.

Toda and Yamamoto (1995) examined the long-run relationship among import, export, and economic growth for the period 1960 to 2003.The results showed unidirectional causality from export to output while no significant causality was reported between import and export.

Harrison(1996) addresses the effects of trade openness on growth using panel data and compares predictions of several measures of trade openness. In this view, openness and growth impact each other in both directions.

Vamvakidis (2002) examined the relationship between openness to international trade and economic growth in developed and developing countries using cross-section data for the period 1920-90. Estimating economic growth over a long period provides useful conclusions on the robustness of openness to international trade and other explanatory variables in the empirical model. The results showed that there was no positive relationship between openness to international trade and economic growth before 1970. The positive relationship between openness to international trade and economic growth was only a recent phenomenon. However, it was sensitive to the measures of openness to international trade. This finding may suggest that openness to international trade when protection in the world economy is high does not result in economic growth.

Yanikkaya (2003) examined the impact of openness to international trade on economic growth of over 100 developed and developing countries using panel data from 1970 to 1997. The results show that openness to international trade does not have a simple and straightforward relationship with economic growth. However, contrary to the conventional view, the results showed that trade barriers were positively and, in most specifications, significantly associated with economic growth, particularly for developing countries.

Shirazi and Manap (2004) studied the short run and long run relationship among real export, real import, and economic growth on the basis of cointegration and multivariate Granger causality developed by Tang (2006). This study shows that there is no long run relationship among export, real gross domestic product, and imports. it further shows no long-run and short-run causality between export expansion and economic growth in China on the basis of Granger causality while economic growth does Granger cause imports in the short run.

Katiricioglu, Kahyalar, and Benar (2007) examined the possible cointegration and the direction of causality between financial development, international trade, and economic growth in India. Annual data covering the period 1965-2004 were used to investigate cointegration and Granger causality tests between financial development, international trade, and growth. They show that there is a long-run equilibrium relationship between financial development, international trade, and real income growth in the case of India.

Yucel (2009) studied the causality relations between trade openness, financial development, and economic growth (GDP) for the Turkish economy for the period 1989 to 2007. The study shows that trade openness has a positive effect on growth. Moreover, the Granger causality test results discovered the

presence of bi-causal relationship between financial development, trade openness, and growth, indicating that economic policies aimed at financial development and trade openness have a statistically significant impact on economic growth.

A number of studies, however, have failed to establish the link between export and economic growth. For instance, Hsiao (1987) found evidence of no causality for four Asian economies, except Hong Kong, where unidirectional causality from GDP to exports was found. Trade liberalization may also have negative impact on economic growth.

Hassan and Islam (2005) examined whether financial development and openness to international trade can play any positive role in reducing poverty in Bangladesh through their growth enhancing effect for the period 1974-2003. Standard Granger causality test is employed to ascertain whether financial development and trade openness cause growth. The paper does not find any causal relationship between trade openness and growth, and financial development and growth.

Research Methodology

The first step in determining the relationship between trade liberalization and economic growth is whether the data series are stationary or not. Thus, logarithms of time series were taken and augmented Dickey-Fuller test was used for testing stationarity. Then, Johansen co-integration test was used to examine the long-term relationship between trade liberalization and economic growth. After that Granger causality test was used to test the causal relation between trade openness and economic growth.

The present study uses annual time series data for the period 1970-71 to 2008-9 for India on trade openness which is proxied by the ratio of sum of exports and imports to GDP and economic growth measured by natural log of GDP. Both variables were extracted from the *Handbook of Statistics on Indian Economy*. In the empirical analysis, the variables are used in their log form.

Unit Root Test

The empirical estimation begins with unit root tests. The aim is to examine whether a series is stationary or non-stationary. A series that has a unit root is said to be a non-stationary series. In the study, the Dickey-Fuller unit root test statistics are employed to check the stationary nature of the series.

Johansen Cointegration

It is to be noted that for applying cointegration the first step is to test the stationarity of the variables. Then the presence of cointegration between the series of the same order of integration is found through forming a cointegration equation. The basic idea behind cointegration is that if, in the long-run, two or more series move closely together, even though the series themselves are trended, the difference between them is constant.

It is possible to regard these series as defining a long-run equilibrium relationship, as the difference between them is stationary. A lack of cointegration suggests that such variables have no long-run

relationship: in principle they can wander arbitrarily far away from each other. We employ the maximum-likelihood test procedure of Johansen (1991). Since the main objective of this paper is to assess not only the long run relationship between the variables but also pair-wise nature of causality among the variables as well, we used the Granger causality test.

Empirical Analysis

Table 1 shows that both variables were not stationary in levels. This can be seen by comparing the observed values (in absolute terms) of ADF with the critical values (also in absolute terms) of the test statistics at 1 per cent, 5 per cent and 10 per cent levels of significance. Therefore, the null hypothesis is accepted and it is sufficient to conclude that there is presence of unit root in the variables at levels. Following from this result, both variables were differenced once and the ADF test was conducted on them. The result is shown in Table 2. Here both variables are stationary at first difference. On the basis of this, the null hypothesis of non-stationarity is rejected and it is safe to conclude that the variables are stationary. This implies that the variables are integrated of order one, i.e. 1(1).

Table 1: ADF Test on Variables at Levels

Variables	ADF Intercept	ADF Intercept and Trend
LNGDP	ADF test statistic – 3.219505 Test critical values: 1% level – 3.615588 5% level – 2.941145 10% level – 2.609066	ADF test statistic – 1.501226 Test critical values: 1% level – 4.219126 5% level – 3.533083 10% level – 3.198312
LNSUM	ADF test statistic – 0.212955 Test critical values 1% level – 3.615588 5% level – 2.941145 10% level – 2.609066	ADF test statistic – 1.181340 Test critical values 1% level – 4.219126 5% level – 3.533083 10% level – 3.198312

Table 2 : ADF Test on Variables at First Difference

Variables	ADF Intercept	ADF Intercept & Trend
LNGDP	ADF test statistic – 5.552369 Test critical values 1% level – 3.621023 5% level – 2.943427 10% level – 2.610263	ADF test statistic – 7.170799 Test critical values 1% level – 4.226815 5% level – 3.536601 10% level – 3.200320
LNSUM	ADF test statistic – 4.540582 Test critical values 1% level – 3.621023 5% level – 2.943427 10% level – 2.610263	ADF test statistic – 4.513243 Test critical values 1% level – 4.226815 5% level – 3.536601 10% level – 3.200320

After confirming the stationarity of the variables at 1(1), the Johansen cointegration test was conducted with assumption of linear deterministic trend. Tables 3 and 4 show the results. Trace statistic test indicates two cointegrating relationships between LNGDP and LNSUM while the maximum Eigen value statistic shows no cointegration at 5 per cent level of significance. Thus, the results of the two tests are contradictory.

However, one should give more importance to trace statistics, as trace statistic considers all of the smallest eigenvalues, and holds more power than the maximum eigenvalue statistic (Kasa, 1992; Serletis and King, 1997). Moreover, Johansen and Juselius (1990) recommend the use of trace statistic when these two statistics provide conflicting results. So, a cointegrating relationship between LNGDP and LNSUM is evident.

Table 3 : Cointegration Test Statistic (Trace)

Hypothesized No. of CE(s)	Alternative Hypothesis	Eigen value	Trace Statistic	5% Critical Value
r = 0	r = 1	0.267239	17.68610	15.49471
$r \leq 1$	r = 2	0.153857	6.181477	3.841466

Note: *r* stands for the number of cointegrating vectors

Table 4 : Cointegration Test Statistic (Max-Eigen)

Hypothesized No. of CE(s)	Alternative Hypothesis	Eigen value	Max-Eigen Statistic	5% Critical Value
r = 0	r = 1	0.267239	11.50462	14.26460
r ≤ 1	r = 2	0.153857	6.181477	3.841466

Note: *r* stands for the number of cointegrating vectors

Since there is cointegration between the two variables, the next step is to test for the direction of causality using traditional Granger causality test. The results of the test are shown in Table 5. GDP Granger causes trade openness. It also shows that trade openness does not Granger cause GDP. Therefore, the causality is unidirectional.

Table 5 : Pair-wise Granger Causality Test between LNGDP and LNSUM

Null Hypothesis	Observations	F-Statistics	Probability
LNSUM does not Granger Cause LNGDP	37	1.56731	0.22420
LNGDP does not Granger Cause LNSUM		3.49595	0.04235

Conclusion

The objective of this paper is to empirically investigate the long-run relation and causality between economic growth measured by GDP and trade openness measured by ratio of sum of import and export to GDP in India over the period 1970-71 to 2008-09.

We have shown that there is a long run relationship between trade and economic growth. An improved economic growth is accountable for enhanced trade situation.

The implications of the causality test are that there are some other factors which are more important than trade openness to Granger cause GDP. But it confirms that improved GDP is responsible for enhancement in export and import of the country. Increasing GDP means more of industrial output which means more consumption in terms of import and increased output means there are chances of increase in exports as well.

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