



Revisiting Openness-Growth Nexus: Evidence from India

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Abstract

The present study attempts to verify long run relationship (if any) between trade openness and growth for the Indian economy. To carry out the analysis quarterly data, spanning between 1996Q1 to 2020Q has been employed. Quarterly data provides sufficient data points that help to capture the relationship between variables and lag structure properly. Given the characteristics of data after performing diagnostic tests, the appropriate methodology to use turns out to be Johansen Cointegration analysis. The results from Johansson confirmed the long-run cointegration among subject variables. While analyzing the impact of trade openness on economic growth, the coefficient on trade openness is negative in the Normalized cointegrated equation. Hence implying openness has a negative influence on growth. This type of result is somewhat surprising for the economic theory postulates that openness to trade should have a positive effect on growth.

Key Words: trade openness, growth, Cointegration,

Introduction

Though macroeconomics encompasses a variety of concepts and variables, the issues of *Growth* and *Openness* stand out among the most important ones. A bulk of literature exists and continues to accumulate, studying the dynamics among economic growth and openness. The recent decades have seen a lot of developments in the Open-economy macroeconomics. These developments occurred as a result of events like the disintegration of the Soviet Union, currency crises in Asia, abandonment of fixed exchange rates globally; persistent trade imbalances; debt crises, etc. Also, with the development of transport and the ways of communication international aspects of growth turn out to be more important (Rodseth, 2004). The existing literature suggests that openness of an economy leads to better resources allocation, enlarged consumer choice, enhanced technological transfer, and improved and efficient production. Therefore, the focal point of international organizations over the years has been the promotion of policy reforms centered on trade liberalization.

With the prime motive to foster economic wellbeing and overall welfare of the society as a whole. However, for the developing countries, it was not always due to the 'public relations campaign' of international organizations that motivated them to embrace the policy of free trade. Rather the changing global order necessitates every developing country to honor the set of rules that govern the new global order. For the newly developing and transitional economies there remains a serious threat, a threat associated with *import-substitution led growth strategies* and that of international financial institutions, such as the International Monetary Fund (IMF) and the World Bank (WB), which are committed to lending their support conditional on trade liberalization. This topic while being of significant importance has been largely ignored by trade literature. While openness to trade is unambiguously beneficial for everyone from the theoretical point of view, the real-world experience unfolds contrary. Among the number of macroeconomic variables that are supposed to be influenced by growing openness, the study has taken

the issue related to economic growth. The nature of the relationship among these variables remains debatable, requiring further serious and apt empirical examination. This study re-investigates the relationship between openness and growth in the context of the Indian economy.

India stepped on the path to globalization after the crisis of the early 1990s and dismal growth performance in the preceding decades. The choice for openness was mostly driven by the immediate compulsions resulting from the crisis of the 1990s and also to an extent because of the experience of certain developing countries like that of the Asian tigers. With these reforms, it was expected that there will be an increase in capital inflows, expansion of the market for the country's production and an overall increase in welfare. The overall experience since the 1990s reforms has been increased growth, lower inflation and increased openness of the Indian economy. However, the effect of openness on growth is yet to be ascertained clearly. Specifically, the supposed impact of openness on growth and other macroeconomic variables needs empirical verification and direction of causality. In this context, the present study attempts to verify the interrelationship (if any) between the study variables. The study employs recent methodological advances, a longer period of data, and the broadest possible set of variables for the purpose.

The rest of the paper is coordinated as follows. Section 2 deals with a brief review of theoretical and empirical literature. Section 3 deals with the econometric technique and data sources. The last two sections examine the results and the outcomes followed by the closing comments.

2. Openness and growth in literature

Back in 1991, India was struggling with the most adverse economic and currency crisis ever. New economic reforms of 1991 were the preconditions set by the WTO and IMF that led to their support based on the removal of trade barriers, particularly an acceleration in the removal of import restrictions

on foreign products. The Indian government adopted New Economic Reforms in 1991, intending to improve the country's economy. Several barriers and restrictions were taken off. The Economic Policy 1991 marked a new era of Liberalization, Privatization, and Globalization (LPG) for the country. The impetus for increasing pressure to open was also inspired by 'new' growth theories, which consider that trade reforms lead to economic growth. The chief proponents of 'new' growth theories particularly, (Grossman and Helpman, 1991), (Romer, 1992), and (Barro and Sala-i-Martin, 1995), among others, put forward that technological progress can be influenced by a country's openness to trade. They believe, openness facilitates easier access to new technology embodied in imported goods and services. The new technology is then imitated by the domestic producers in their production process. This leads to the improvement of domestic production that in turn makes the production process more efficient. Therefore, a country that is open to world trade may grow faster than closed ones.

New growth theories, however, do not argue that trade will always raise economic growth. It is essentially the impact of comparative advantage that if it orients the economy's resources towards long-run growth leads to the positive effects on growth, otherwise might harm it. Some theories suggest that trade may negatively impact economic growth or there exists no relationship at all. As, (Leamer, 1995) argues that countries with unrestrictive trade policies are more prone to economic downturns. As free trade reduces tariffs, and the reduced tariffs bring down the relative price of home manufactures, this leads to less attractiveness of manufacturing goods produced domestically and comparatively more attractiveness of imported goods; subsequently, the domestic economy may suffer a loss. Meanwhile, there is enough scope for the empirical work to answer the argument put forward by these studies, to which the theoretical stand is a

bit ambiguous. (Zahonogo, 2017) in his study revealed that the benefits of higher trade openness are more for higher-income countries. He also found that the lack of investment in human capital along with an inefficient financial institutions causes low growth expected from trade openness through technological innovations. (Rodriguez and Rodrik, 2001) reinvestigate the existing cross-country studies regarding openness and growth, predicting a positive correlation between openness and growth. While employing the data from earlier studies like, (Dollar, 1992), (Ben-David, 1993), (Sachs and Warner, 1995) and for the robustness checks, their study confirmed that most of the openness proxies lose their statistical significance when some other policies and institutional variables are involved in the regressions, different data are used, or different weights are utilized. Rodriguez and Rodrik finally suggest that a free and unrestrictive trade approach is not good enough to result in higher growth. Jin, (2004), while empirically investigating the effects of growing openness on growth and inflation for the Korean economy employed a seven-variable Vector, Autoregressive model. The model was estimated by using quarterly data from 1960:1 to 1973:3. The Growth rate of the output and the price level was found to be negatively impacted by openness in the short-run, while the long-run effects were absent. Despite different lag lengths, alternative openness measures, the variance decomposition functions validated the same results. Such a result however is in contrast to the argument put forward by the supporters of the new growth theorists. According to them, openness to international trade affects the output positively both in the long run and short run. Although there exists a voluminous cross-country literature on the nexus between openness and growth there is a dearth of literature available on the same issue for India. The available studies have mixed results regarding the relationship between openness and growth. In the IMF working paper, (Topalova, 2004) claimed that trade openness improves a firm's

productivity which in turn impacts economic growth and thus economic welfare in a positive way. While revisiting the export-led growth hypothesis, (Dash, 2009) found that there exists a long-run relationship between exports and output.

There are some theoretical and empirical studies that claims, trade openness impedes economic growth. Batra and Slottje (1993) specify that trade liberalization is associated with an increase in poverty, which is against the concept of "trade as an engine of growth". Sarkar and Bhattacharyya, (2005) supported the claim that openness has an "unfavorable" impact on real growth rates. Jayati (2006) in her study found that the basic objective of trade openness is to boost export growth and to attract capital inflows that are rarely met. Instead it reduces manufacturing investment due to greater threat of import penetration. A recent study by (Sengupta, 2020) found that trade openness harms economic growth in India, both in the short-run and long-run.

3. Data and Methodology

To carry out the objectives of this study quarterly data, spans between 1996Q1 to 2020Q has been employed. Quarterly data provides sufficient data points that help to capture the relationship between variables and lag structure properly. The data about model variables i.e. gross domestic product, government final consumption expenditure, Gross fixed capital formation and money supply are taken from the Reserve Bank of India, *Handbook of statistics for Indian economy*. As the data available on RBI is on different base years, the study follows standard statistical procedures to link the different series on the same base year. The standard measurement of openness i.e. Trade divide by GDP is used as openness variable. The data regarding prices is given by percentage change in consumer price index taken from *International Financial Statistics (IFS)* produced by International Monetary Fund (IMF). To include the effects of macroeconomic policies that might are indirectly

correlated to growth-openness relationship, the study uses both monetary policy and fiscal policy variables as controls. The inclusion of Government final consumption expenditure as fiscal policy variable is justified on the grounds it can affect output, even if the country have restrictive trade policies.

3.1. Methodology

3.1.1. Unit Root Test

As the macroeconomic data is usually non-stationary, i.e. its mean, variance, and autocovariance (at various lags), keep changing with time (Gujarati, 2003). So, at the very outset of cointegration and Autoregressive distributive lag model (ARDL), stationarity of time series data is checked. In doing so, various testing measures have been developed over the years and most of these tests are intended to overcome the difficulties encountered in practice. The study applies Dicky Fuller and Augmented Dickey-Fuller (ADF) test because, for both the Johansen cointegration test and ARDL, order of integration is the must. The main purpose of testing the unit root is to check the adequacy of regression, for example, if we treat the non-stationery time series with ordinary lest square in the cointegration regression without converting it to the stationery, the results will be insufficient for economic analysis Moreover, ADF helps to avoid the problem of spurious regression.

ADF test is a developed form of Dicky and Fuller (DF) test. The major shortcoming in Dicky-Fuller test is that it is set on a rigid assumption of no correlation in error term. Dicky and Fuller in their subsequent efforts came up with improved test known as Augmented Dicky Fuller test (ADF) and relaxed the assumption that error term is uncorrelated. This test is conducted by “augmenting” the three equations in the DF test and adding the lagged values of the dependent variable. The general context of the ADF test is as follows (Gujarati, 2012).

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \epsilon_t \quad (1)$$

Where, $\Delta Y_t = Y_t - Y_{t-1}$, β_1 Is the constant, t is the time variable ϵ_t is the white noise error term.

Also, ϵ_t is a pure white noise error term and $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = (Y_{t-2} - Y_{t-3})$, etc. the number of lagged difference terms to include is often determined empirically.

3.1.2. Johansen Cointegration Test

Theoretical literature confirms the association between openness and growth necessitates the application of an appropriate econometric model. Johansen (1998) and Johansen and Juselius (1990) maximum likelihood cointegration technique is used as an econometric framework which tests both the existence and number of cointegration vectors. Johansen cointegration test is a multivariate procedure which is a useful technique when more than one cointegrating vector exists.

Johansen (1988) and Johansen and Juselius (1990)

Maximum likelihood Cointegration Approach suggested two ratio test statistics for determining the number of cointegrated equations viz. Trace statistics (J_{trace}) and maximum Eigen value statistic (λ_{max}). Both the ratio test statistics are used to determine the existence of number of cointegrating vectors, however, in some cases Trace and Maximum Eigenvalue statistics may yield different results and Alexander (2001) suggests that in such a condition, the results of trace test are ideal. Following is the equation to calculate Trace test statistics;

$$J_{trace} = -T \sum_{i=r+1}^N \ln \quad (2)$$

Where, T is the number of sample observation and $\hat{\lambda}$ is the estimated value for the ith ordered Eigen value from the Π matrix. The standard approach to the Johansen ML procedure is to first calculate the trace and maximum Eigen value statistics, then compare these with the appropriate critical values. This test is based on the log-likelihood ratio and is conducted

sequentially. This test, tests the null hypothesis that the cointegration rank is equal to r against the alternative that the cointegration rank is n .

$$\lambda_{max} = TIn \quad (3)$$

The test is also based on the log-likelihood ratio and is shown sequentially for $r = 0, 1, \dots, k-1$. The name comes from the fact that the test statistics involved is a maximum generalized Eigen value. This test tests the null hypothesis that the cointegration rank is equal to r against the alternative hypothesis that the cointegration rank is equal to $r+1$.

The Johansen's maximum eigenvalue and trace tests indicate the cointegrating vector (eq's) in model and reject the null hypothesis of no cointegration at 5 percent significance level. Then consider the 1st cointegrating equation having normalized coefficients of all variables with standard error (S.E) in parentheses and calculate T value by dividing coefficient with S.E. T value greater than 2 indicate the significance of those variables at 5 percent confidence

4. Results and Discussion

Before investigating long-run estimates of the model, stationarity of the variables is tested, as

failure to account for the presence of unit root may have far-reaching consequences in interpreting the time series model. The study employs one of the most celebrated unit root tests developed by Dickey and Fuller (1979) to check the stationarity of the variables. The estimated results of ADF are reported in table 1. It can be seen from Table 1 that all the variables of the model are non-stationary at level I (0) when adjusted for only trend, only intercept, and with both trend and intercept. However, the same set of variables attains stationarity at five percent when transformed to first difference. The lag length used in the test is based upon the Schwartz Bayesian information criterion and following Enders, (1995) the testing of stationarity is performed with both trend and intercept. As can be seen from table 1 the value of computed ADF test statistics against the critical values at five percent level of significance accepts the null hypothesis of no unit root at first difference. The same is confirmed by the alternative test that depends upon the probability value of t-statistics with the rule of the thumb “accept the null when P-value is less than five percent.

Table 1: ADF Unit Root Test Results for GDP and its Determinants

Variables	t-Statistics	Critical values at 5 percent	Probability	Remarks
At Level				
LGDP	-2.824451	-3.459950	0.1926	Non-Stationary
INF	-2.209624	-3.461094	0.4782	Non-Stationary
LM1	-0.826982	-3.459397	0.9588	Non-Stationary
LGFCF	-1.074777	-3.459950	0.9271	Non-Stationary
LGFCF	-1.758947	-3.459397	0.7166	Non-Stationary
LIMPGDP	-2.0719	-3.4578	0.5547	Non-Stationary
At 1st Difference				
LGDP*	-3.834960	-3.459950	0.019	Stationary
INF*	-4.978797	-3.462292	0.0005	Stationary
LM1*	-10.56762	-3.459397	0.0000	Stationary
LGFCF*	-3.533262	-3.459950	0.0418	Stationary
LGFCF*	-30.79531	-3.459397	0.0001	Stationary
IMPGDP*	-8.4997	-3.459345	0.0000	Stationary

Source: Author's compilation

Note: (*) represent 1 percent level of significance.

4.1. Cointegration Test Results

As Cointegration is sensitive to lag structure, the study sets max. Lag length on each variable to eight, while as optimal lag length structure is set by using the Akaike information criteria.

To estimate long run and short run relationship between trade openness and economic growth, Johansen Cointegration is used and the results are reported in Table 2. The rule of thumb to reject the null hypothesis of no cointegration depends upon trace statistics (based on likelihood ratio) and Max. Eigen values that if turns greater than critical value at 5percent leads to the rejection of null hypothesis. From Table 2 and 3 the indication from trace statistics and Max. Eigen statistics rejects the null hypothesis of no cointegration ($r=0$) against the alternative hypothesis of at least one cointegrating

equation ($r < 1$). In the same way $r \leq 1$ and $r \leq 2$, the null hypotheses are rejected both by trace as well as Max Eigen statics values as both the values are greater than their critical value at 5 percent level of significance against their alternative hypothesis $r \geq 1$ and $r \geq 2$. However, the null hypothesis $r \leq 3$ is accepted against its alternative hypothesis $r \leq 4$ by both trace as well as Max Eigen statics with values ($23.39265 < 29.79707$ and $15.78628 < 21.13162$) respectively. The alternative way to accept or reject the null hypothesis rest on the Mackinnon-Haug-Hichells (1999) P-value. The null hypothesis is rejected if p value is less than 0.05 percent significance level and it is accepted if p value is greater than 0.05 percent level of significance. Both the results confirm that there are three cointegrating vectors out of five cointegrating equations.

Table 2. Johansson cointegration test results and Trace statistics

No. of cointegrated Equations		Eigen value	Trace statistics	Critical Value at 5percent	Prob.
Null hypothesis	Alternative hypothesis				
$r = 0^*$	$r \geq 1$	0.421179	155.9367	95.75366	0.0000
$r \leq 1$	$r \geq 2$	0.385068	105.0879	69.81889	0.0000
$r \leq 2$	$r \geq 3$	0.324431	59.86719	47.85613	0.0025
$r \leq 3$	$r \geq 4$	0.156120	23.39265	29.79707	0.2273
$r \leq 4$	$r \geq 5$	0.047841	7.606367	15.49471	0.5084
$r \leq 5$	$r \geq 5$	0.032235	3.047227	3.841466	0.0809

Note: * and **, indicates the rejection of null hypothesis at 1 and 5 percent level of significance respectively.

Table 3. Johansson cointegration test results and- Max Eigen statistics

No. of cointegrated Equations		Eigen Value	Max. Eigen statistics	Critical Value at 5percent	Prob.
Null hypothesis	Alternative hypothesis				
$r = 0^*$	$r \geq 1$	0.421179	50.84884	40.07757	0.0021
$r \leq 1$	$r \geq 2$	0.385068	45.22066	33.87687	0.0015
$r \leq 2$	$r \geq 3$	0.324431	36.47455	27.58434	0.0028
$r \leq 3$	$r \geq 4$	0.156120	15.78628	21.13162	0.2376
$r \leq 4$	$r \geq 5$	0.047841	4.559140	14.26460	0.7961
$r \leq 5$	$r \geq 5$	0.032235	3.047227	3.841466	0.0809

Note: * and **, indicates the rejection of null hypothesis at 1 and 5 percent level of significance respectively.

4.2. Long Run Estimate of the Model

As results from Johansson cointegration test confirms the long run cointegration among the variables, next we present the Normalized cointegrated Equation. In the normalized cointegrated equation the coefficient on openness is negative. Hence implying openness has a negative influence on growth. Magnitude wise a one percent increase in LIMPGDP is associated with a decrease in economic growth by 0.738 percent. This type of a result is somewhat surprising for the economic theory postulates that openness to trade should have a positive effect on growth. Kim (2011) got the same results for developing economies. Sengupta (2020)

Normalized cointegrated Equation

$$LGDP = 3.711 - 0.738 \times LIMPGDP - 0.006 \times CPI + 0.403 \times LGFCF + 0.384 \times LGFCE + 0.072 \times LM1 \quad (4)$$

T Value **12.039** **2.2923** **5.7905** **6.3471** **9.7877**

World economy. This result can also highlight necessity of the initiatives like ‘Make in India’ and ‘Aatmnirbhar Bharat’. These initiatives signify the realization on the part of policy makers of the adverse effect of persistent current account deficit. The coefficient on inflation is negative and small though significant, implying that inflation has adverse effect on growth. A developing country

also found the found that the trade openness has negative impact on economic growth in India in both the short and long run. There is a plausible explanation for this type of an outcome. Since we measure openness as the ratio of Imports to GDP and India has persistently witnessed large current account deficits which can have some adverse consequences. The persistent current account deficit implies in a way loss of foreign exchange, investment and employment opportunities and hence lower growth. The implication of such outcome is that India needs to shore up its manufacturing activities and exports in order to reap the potential benefits of integration into

such as that of India facing so many challenges like supply shocks fiscal and current account deficit together with a weak currency will naturally see inflation expectations set-in quickly. Hence episodes of inflation leading to further inflationary expectation results in uncertainty and hence adversely affects economic growth. The effect of Capital formation and Government expenditure on

growth is positive and significant. Finally the effect of increase in money supply is positive and significant.

5. Conclusion

The overall experience since the 1990s reforms has been increased growth, lower inflation, and increased openness of the Indian economy. However, the effect of openness on growth and inflation is yet to be ascertained clearly. Specifically, the supposed impact of openness on growth, inflation, and other macroeconomic variables needs empirical verification and direction of causality. In this context, the present study attempts to verify the interrelationship (if any) between the study variables. Given the characteristics of data after performing diagnostic tests, the appropriate methodology to use turns out to be Johansen Cointegration analysis. The results from Johansson confirm the long-run cointegration among subject variables. While analyzing the impact of trade openness on economic growth, the coefficient on trade openness is negative in the Normalized cointegrated equation. Hence implying openness has a negative influence on growth. This type of result is somewhat surprising for the economic theory postulates that openness to trade should have a positive effect on growth. However, some empirical studies support a negative impact of openness on growth like Kim (2011), Sengupta (2020), and others. In an attempt to present a plausible explanation for this type of outcome. Since we measure openness as the ratio of Imports to GDP and India has persistently witnessed large current account deficits which can have some adverse consequences. The persistent current account deficit implies in a way loss of foreign exchange, investment, and employment opportunities and hence lower growth. Such an outcome implies that India needs to shore up its manufacturing activities and exports to reap the potential benefits of

integration into the world economy. This result can also highlight the necessity of the initiatives like 'Make in India' and 'Aatmnirbhar Bharat'. These initiatives signify the realization on the part of policymakers of the adverse effect of persistent current account deficit. The coefficient on inflation is negative and small though significant, implying that inflation harms growth. A developing country such as that of India facing so many challenges like supply shocks fiscal and current account deficit together with a weak currency will naturally see inflation expectations set in quickly. Hence episodes of inflation leading to further inflationary expectation result in uncertainty and hence adversely affect economic growth. The effect of Capital formation and Government expenditure on growth is positive and significant. Finally, the effect of an increase in money supply is positive and significant.

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