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Openness and Economic Growth in India

Dipendra Sinha* and Tapen Sinha **

Abstract

Romer hypothesizes that there is a positive relationship between growth in the volume of trade and growth in output. In this paper we examine the relationship between volume of trade (which we call openness following Summers and Heston) and economic growth using time series data from India. We define openness as real exports plus real imports. Two types of analyses are performed. First, we study the long run relationship between real GDP and openness. Second, we perform causality tests between growth of real GDP and growth of openness. Our results find that there is a long run relationship between real GDP and openness. Our causality tests find two-way causality between growth of real GDP and growth of openness.

1: Introduction

Romer (1989) posits the stylized fact using data for now developed countries: growth in the volume of trade is positively correlated with the growth of output. We examine Romer's proposition in the context of India. We take volume of trade to mean openness rather than exports. In our paper, openness is defined as real exports plus real imports.

Why should openness and growth be related in a developing country? Openness has two parts: exports and imports. Economists have debated the role of exports in economic growth at length. There are three channels of connections between economic growth and exports. First, although industrialization is crucial to economic growth in an LDC, domestic demand is low. Exports provide an outlet for this excess production and generate income (Colombatto, 1990). Second, in the long run, exports help growth because exports lead to greater technical progress and more savings (Krueger, 1978). They also improve credit ratings of a country by

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generating hard currencies and thus make getting foreign loans easier. Third, that export promotion policies improve total factor productivity (Balassa, 1978).

Although most researchers talk about trade policy but in their discussion they focus exclusively on export policy. Does that mean that import does not help a country? Why should import be related to economic growth? Publication of high import statistics in the newspapers stirs up government officials. They feel compelled to defend high import statistics. There is an implicit belief that for a country, a growing rate of import is bad but a growing rate of export is good. Economics literature seems to follow the same line: issues of trade is always implicitly taken to mean issues of exports. The only study to our knowledge that explicitly looks at import at all is that Ram (1990). Ram looks at the relationship between growth rate of imports and growth rate of real GDP in many developing countries using an augmented production function approach. He finds a positive relationship for some countries. Surprisingly, India is not included in his study although data for India are readily available.

Import of capital goods and energy can help economic growth for an LDC. However, imports may not always aid economic growth: they need to be used efficiently. For example, during the 1960s, and the 1970s imported machines were, in many instances, left unutilized in India because of lack of trained personnel to operate these machines or to repair these machines. Capital goods imports were severely restricted and mostly public enterprises were allowed to do so. But in many cases, they were run quite inefficiently. These were clearly the cases where imports provided no boost to growth.

We answer the following questions empirically:

- (1) Is there a long run relationship between openness and GDP in India?
- (2) If there is, is it positive or negative?
- (3) Does increasing openness cause higher or lower GDP?
- (4) Does higher GDP cause increasing or decreasing openness?

Our paper differs from earlier studies with regard to India in the following ways. Firstly, we adopt the recently developed cointegration methodology in time series analysis. Secondly, rather than studying the relationship between exports and economic growth, we explore the relationship between openness and economic growth. To our knowledge, this is the first study to do so. As mentioned earlier, we use the definition of openness as exports plus imports following Summers and Heston (1991). Finally, we pursue causality tests in an error correction framework.

II : Historical

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II : Historical Background

During the late 1980s and early 1990s India has moved towards opening up its economy. The dramatic policy changes by the Central Government in India since 1991 hastened the pace of reforms (Sinha and Sinha, 1994). Traditionally, India had been a low import and a low export oriented country as compared with many other countries in Asia. For example, during the period under study (1950-90), exports plus imports as a percentage of GDP in India never exceeded 18.74 per cent (in 1990). The figure reached its nadir at 8.20 per cent in 1970. Compare this with an Asian Tiger, Singapore where the figure was always higher than 210 per cent during 1960-90. In 1990, the figure stood at 373.83 per cent in Singapore. However, comparison with Singapore is misleading because Singapore is a very outward oriented country. Let us compare India with Pakistan. According to the World Bank (1987), India and Pakistan were both strongly inward oriented countries during 1963-85. However, exports plus imports as a percentage of GDP in Pakistan reached 36.57 per cent in 1980, far bigger than India's Peak in 1990. In summary, among the major developing countries in the non-Communist world, India had been one of the most inwardly oriented country until the 1990s. During that time, India pursued a vigorous import substitution strategy. This was partly influenced by the idea of achieving self-reliance in many sectors of the economy. Protection helped many industries to flourish. However, lack of competition meant that many industries were complacent and were not as cost efficient as what they would have been had these industries faced competition from abroad. As the Indian economy opens up, international competition is forcing Indian companies to be more efficient.

III : Review of Literature

Previous literature has looked solely at the relationship between export and economic growth. Early efforts investigating the relationship between export and economic growth include Emery (1967), Michaely (1977), Balassa (1978), Krueger (1978), Feder (1982), Ram (1985) and Ram (1987). Some of these are multi-country studies while others concentrate on a single country. Recent papers include Ahmed and Harnhirun (1995), Dollar (1992), Harrison (1996), Frankel, Romer and Cyrus (1995), Krueger (1990), Sengupta (1994) and van den Berg and Schmidt (1994). Edwards (1993) provides an excellent review of the many previous studies.

One problem with the earlier studies using time series data is that the studies might have estimated spurious regressions as Granger and Newbold (1974) and Phillips (1986) have shown. In other studies, causality between exports and economic growth are explored. But earlier studies (including that of Nandi and Biswas (1991) who study the Indian case) suffered from a methodological problem because these studies looked at the causal relationship between two variables without addressing the issue of

In (5) and (6), z_{t-1} and z'_{t-1} are lagged error terms of the following cointegrating equations respectively.

$$y_t = g_0 + g_1 x_t + z_t \quad (7)$$

$$x_t = h_0 + h_1 y_t + z'_t \quad (8)$$

As we will see in the next section, we find that the variables in our study to be cointegrated. Granger suggests that causality tests can be performed on the levels or on the first differences if the variables are cointegrated. We use Akaike's Final Prediction Error (FPE) criterion to decide the number of lags in (5) and (6).

V : Results

We explore the relationship between the log of real GDP (GDP) and log of openness (OPEN). We report the results of both the non-trended and trended cases. The qualitative nature of the results are the same in both cases. The results of Augmented Dickey Fuller tests and Phillips-Perron tests of the variables in their levels and first differences are given in Table 1 and Table 2 respectively.

Table 1

Augmented Dickey Fuller (ADF) Unit Root Tests

Variable	ADF Test Statistic*	Lag Order [†]	Critical Value
GDP	$T_\mu = 0.760341$	0	-2.60
GDP	$T_t = -1.471838$	0	-3.18
OPEN	$T_\mu = -1.205433$	2	-2.60
OPEN	$T_t = -0.591034$	2	-3.18
Δ GDP	$T_\mu = -6.295146$	0	-2.60
Δ GDP	$T_t = -6.403936$	0	-3.18
Δ OPEN	$T_\mu = -5.475728$	1	-2.60
Δ OPEN	$T_t = -5.821821$	1	-3.18

* T_μ and T_t are the test statistics (1) with drift and no trend and (2) with drift and trend respectively. Critical values are from Fuller (1976), table 8.5.2, p. 373. A 10 per cent level of significance was used.

[†]The lag order was determined using the Akaike Information Criterion (AIC).

Phillips-Perron

Variable

GDP

GDP

OPEN

OPEN

Δ GDP

Δ GDP

Δ OPEN

Δ OPEN

* The truncation lag was
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with drift and trend. Cri

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respectively.

Maximal Eigenval

Null Alternative

$r = 0$ $r = 1$

$r \leq 1$ $r = 2$

*Critical values are for t

[†]Significant at the 5% le

Table 2

Phillips-Perron (PP) Unit Root Tests (Truncation lag = 3)*

Variable	Test Statistic	Critical Value
GDP	2.345302 ^(a)	-2.60
GDP	-1.054861 ^(b)	-3.18
OPEN	-1.095660 ^(a)	-2.60
OPEN	-1.107974 ^(b)	-3.18
ΔGDP	-7.096304 ^(a)	-2.60
ΔGDP	-9.089425 ^(b)	-3.18
ΔOPEN	-6.553609 ^(a)	-2.60
ΔOPEN	-7.293581 ^(b)	-3.18

* The truncation lag was determined using the Schwert (1989) Criterion. The truncation lag = integer $[4(T/100)^{1/4}]$ where T stands for the number of observations (41 in our case).

(a) indicates test statistic with drift and no trend and (b) indicates test statistics with drift and trend. Critical values are from Fuller (1976), table 8.5.2, p. 373.

Both tables indicate that GDP and OPEN are non-stationary in their level form when we use the critical values at 10% level. However, the variables are stationary in their first-differenced forms for both variables and for both the trended and the non-trended cases.

Next, we proceed with the cointegration tests using the Johansen Juselius method. Since we have annual data, we use a lag of one (see Pesaran and Pesaran (1991)). A lag of two also yielded the same qualitative results. Tables 3 and 4 give the results of maximal eigenvalue and trace tests respectively.

Table 3

Maximal Eigenvalue Tests using Johansen-Juselius Maximum Likelihood Procedure for GDP and OPEN.

Null	Alternative	Test statistic	Critical Value*
$r = 0$	$r = 1$	29.8456 [†]	15.6720
$r \leq 1$	$r = 2$	4.3275	9.2430

*Critical values are for the 95% quantile. These are from Osterwald-Lenum (1992).

[†]Significant at the 5% level.

of the following

(7)

(8)

variables in our unit root tests can be performed on the variables are tested using the ADF (ADF) criterion to

GDP (GDP) and OPEN (OPEN) are non-trended and non-trended and the same in both level and first-differenced forms. All Phillips-Perron tests are given in Table 1

ts

Critical Value

-2.60

-3.18

-2.60

-3.18

-2.60

-3.18

-2.60

-3.18

with drift and trend at the 10 per cent

on (AIC).

Table 4
*Trace Tests Using Johansen-Juselius Maximum Likelihood
 Procedure for GDP and OPEN.*

Null	Alternative	Test Statistic	Critical Value*
$r = 0$	$r \geq 1$	34.1731 [†]	19.9640
$r \leq 1$	$r = 2$	4.3275	9.2430

*Critical values are for the 95% quantile. These are from Osterwald-Lenum (1992).

[†]Significant at the 5% level.

Both tables indicate that there is one cointegrating vector. The cointegrating equation with GDP as the dependent variable is :

$$\text{GDP} = 5.1835 + 0.71180 \text{ OPEN} \quad (9)$$

(11.70) (17.36)

$$R^2 = 0.8854$$

Thus, we find that there is a positive long run relationship between GDP and OPEN in India. As pointed out earlier, there is *no priori* reason for expecting such a positive relationship in view of the fact that OPEN includes both exports and imports.

Since GDP and OPEN are cointegrated, we proceed with the Granger causality tests. In performing the causality tests, we take growth rate of GDP and growth rate of OPEN. As we use the variables in their log form, the first differences will approximate the growth rates. First, we test the null hypothesis that "Growth of OPEN does not cause growth of GDP". The test statistic is 32.8630 and the relevant critical F value at the 5% level of significance is 4.16. Thus, we reject the null hypothesis. Second, we test the null hypothesis that "Growth of GDP does not Granger cause growth of OPEN". The test statistic is 19.243478 and the relevant critical F value at the 5% level is 3.293. Once again, we reject the null hypothesis. Thus, we find a two-way causality between the growth of GDP and the growth of OPEN. Thus, the reduction in trade barriers is likely to promote economic growth. Previous studies showing that growth of exports promotes growth of GDP were methodologically flawed. Our study shows that growth of openness contributes to growth of real GDP.

Therefore, both exports and imports contribute to economic growth in the long run.

VI : Summary and Conc

Unlike previous studies on exports and economic growth, this study examines the relationship between openness and growth in India. It also studies the causal relationship between GDP and OPEN. Here, we find that there is a positive long run relationship between GDP and OPEN. The implications are clear : by reducing trade barriers, India can promote economic growth. Previous studies on India have not taken into account the cointegration. Our results suggest that the cointegration methodology

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VI : Summary and Conclusions

Unlike previous studies which look at the relationship between exports and economic growth, this study explores relationship between openness and growth in India. First, we study the existence of a long run relationship between openness and GDP. Our results indicate that there exists a positive long run relationship between the two variables. Second, we also study the causality between growth of openness and growth of real GDP. Here, we find that causality runs in both directions. The policy implications are clear : recently adopted policy of opening up the economy by reducing trade barriers is contributing to economic growth. Previous studies on India have not paid any attention to the issues of stationarity and cointegration. Our results are more robust as we use a larger sample and the cointegration methodology.

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