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Is there any impact of trade liberalisation on growth? Experiences of India and Korea

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I. Introduction

Import-Substituting Industrialisation vs. Export-Orientation

In the post-Second World War Period, many less developed countries (LDCs) followed the path of import-substituting industrialisation (ISI), guided either by the Prebisch-Singer-Myrdal (PSM) thesis of autarkic development or by economic nationalism independent of the PSM thesis (Prebisch, 1950,1959,1964; Singer, 1950; Myrdal, 1956 and Sarkar, 2001). In most cases these countries were then predominantly agricultural and exporter of primary commodities.

In the process of rapid domestic industrialisation under the ISI strategy the LDCs required increased imports of machines and technology and pulled most new resources to import-competing activities. It resulted into more rapid growth in the demand for foreign exchange that surpassed the growth in export earnings. In the process the LDCs began to face acute balance of payments problems. This situation demanded increased export drive to pay for imports.

Moreover, to finance the balance of payments deficit, these countries became dependent on the rich industrially developed countries (DCs) and international financial institutions such as the IMF/World Bank, dominated by the rich countries. The distressed LDCs seeking their help are often advised to open up their economy not only to tide over their crises but also to experience a higher rate of growth.

An almost universal policy response was that the LDCs left the course of inward-looking ISI and started following outward-oriented development strategy. In the process importance of foreign trade in the level of economic activities of these countries has been rising.

The increased openness was hailed in IMF/World Bank circles. Different World Development Reports (World Bank, 1987,1991,1999-2000) tried to show that outward-oriented trade policies have been more successful in promoting growth than inward-oriented trade policies. Particularly, World Development Report (1987) argued that "outward oriented countries" performed better than "inward oriented countries" even under unfavourable market conditions. Many scholars, however, questioned this standpoint (see for example, Singer, 1987; Singer and Gray, 1988).

Debate over the Growth-Enhancing Effect of Trade Liberalisation

In the Solow model of neoclassical tradition, technological change is exogenous, unaffected by a country's openness to trade. But some of the 'new' endogenous growth theories suggest that trade policy affects long-run growth through its impact on technological change. In the models in this tradition (see for example Grossman and Helpman, 1992) openness to trade provides access to imported inputs, which embody new technology, increases the size of the market faced by the domestic producers, which raises the returns to innovation, and facilitates a country's specialisation in research-intensive production (Harrison, 1996, pp.419-420).

The endogenous growth literature, however, has been 'diverse enough to provide a different array of models in which trade restrictions can decrease or increase the worldwide rate of growth', as Yanikkaya (2003) rightly points and refers the works of Romer (1990), Grossman and Helpman (1990), Rivera-Batiz and Romer (1991a.b) and Matsuyama (1992). Increased competition could discourage innovation by lowering expected profits. Grossman and Helpman (1992) point out that intervention in trade could facilitate long-run growth if protection encourages investment in research-intensive sectors. Works of Lucas (1988), Grossman and Helpman (1991 a, b), Young (1991) and Rivera-Batiz and Xie (1993) show that even if trading partners are asymmetric countries having considerably different

technologies and endowments, economic integration may adversely affect individual countries even if it raises the worldwide growth rate (Yanikkaya 2003, p.59).

Ocampo and Taylor (1998) point out that 'the preferred defence of trade liberalisation' as found in Krueger (1997) and others, 'invokes a general equilibrium model with constant or decreasing returns to scale' and the theory of static comparative advantages; against that they remind the old infant industry argument which formed the basis of state intervention in many countries in the past. They further mention the works of Young (1928) and Kaldor (1978) which 'emphasised how increasing returns and cross firm externalities can lead to cumulative growth processes and different patterns of specialisation across economies' and criticised the neoclassical argument trade intervention based on 'convexity' assumption.

In view of the ambiguities in the theoretical literature, a number of empirical studies were undertaken to examine the relationship between trade liberalisation and growth. Due to the difficulty of measuring openness, different studies have used different measures to examine the effects of trade openness on economic growth. Anderson and Neary (1992) have developed a 'trade restrictiveness index' which tries to incorporate the effects of both tariffs and non-tariffs barriers; it is available for a small sample of countries. So many cross-country studies used trade shares in GDP and found a positive and strong relationship with growth (as reviewed in Harrison, 1996).

Frankel and Romer (1999) tried to control for endogeneity of trade with the geographical variables and found a stronger favourable effect of trade on growth. Rodriguez and Rodrik (1999) and Irwin and Tervio (2002) questioned their higher instrument-variable (IV) estimates of the impact of trade shares on growth.

A number of studies have looked at the relationship between average tariff rates and growth. Lee (1993), Harrison (1996) and Edwards (1998) found a negative relationship between the tariff rates and growth. The studies of Edwards (1992), Sala-i-Martin (1997) and Clemens and Williamson (2001) concluded that the relationship is weak. Rodriguez and Rodrik (1999) tried to replicate the result of Edwards (1998) and found that average tariff rates had a positive and significant relationship with total factor productivity (TFP) growth for a sample of 43 countries over the period 1980-1990.

Studies of Harrison (1996), Edwards (1998) and Sala-i-Martin (1997) used black market premium (BMP) as a measure of the severity of trade restrictions and reported a significant and negative relationship between the BMP and growth. However, Levine and Renelt (1992) and Rodriguez and Rodrik (1999) pointed out that the BMP is highly correlated with a number of 'bad' policies and outcomes such as high inflation, severe external debt problems, ineffective law enforcements etc and so using BMP for a measure of trade restrictions gives a misleading picture.

Some authors constructed different indices of trade orientation such as openness index by Leamer (1988), price distortion and variability index by Dollar (1992) and openness index of Sach and Warner (1995) and argued that outward-oriented countries out-performed inward-oriented countries. These measures of trade barriers are often correlated with other sources of poor economic performance, as Rodriguez and Rodrik (1999) rightly pointed out.

In a recent study Yanikkaya (2003) used a large number of openness measures for a cross-section of countries over the last three decades. His analysis found a significant positive correlation between trade shares and growth. However, this study observed that different

measures of trade barriers are positively associated with growth in the less developed countries.

In this perspective of confusion and contradiction, the present study seeks to investigate whether or not trade liberalisation stimulated economic growth in India and Korea since the 1950s. Both Korea and India followed mixed economic planning with state interventions. While Korea's state interventions were often hailed as a sign of good governance (at least before the 1997 crisis), India's policies (before the 1991-liberalisation regime) were often criticised. The share of trade (export, import and total trade) in Korea's GDP is very high while that in India's GDP is very low as we shall see in the next section. So this comparative study of the relationship between the importance of trade in GDP and growth of GDP will be an interesting addition to the existing literature.

The remainder of this paper is structured as follows. The next section, Section II, is based on a simple graphical and ordinary trend analysis of the behaviour of the trade openness indices and growth rates of the two countries, India and Korea. It then examines the question whether the trends exhibited by the series are deterministic. Section III sets out to address the question: is there any meaningful relationship between increased openness and growth. Section IV concludes.

II. Trade Openness and Growth in India and Korea since the 1950s: Ordinary Trend and Graphical Analysis

Importance of foreign trade in India and Korea since the mid-1950s

There is a lack of a globally defined and internationally comparable measure of a country's trade orientation. The two concepts " trade liberalization"(often implying a reduction in tariff and other trade barriers) and "trade openness", while closely related, are not identical. In the relevant literature "increased trade openness" is considered in the sense of an increase in size of the country's traded

sector in relation to total production as an acceptable proxy for trade liberalization. It may be noted that the World Bank itself, when measuring the success or otherwise of structural adjustment programs, uses the ratio of export to GDP as an indicator of increased openness or outward orientation.

In the present analysis, on the basis of data available in *International Financial Statistics Yearbook* 1984, 2001,2002 (published by IMF), three indices of trade openness are calculated over the period, 1956 to 1999 for India and 1956-2001 for Korea: Export/GDP, Import/GDP and Trade/GDP or (Export + Import)/GDP. For our time series study these are more suitable than other indices of trade liberalization such as indices of tariff and/or non-tariff barriers, particularly because of easy availability of long-term data.

India's trade openness indices are diagrammatically represented in Figure 1 and those indices of Korea are represented in Figure 2.These indicators exhibit that the shares of exports and imports in India's GDP were 6.43 per cent and 9.90 per cent (respectively) in the mid-1950s. So the share of foreign trade in GDP was 16.33 per cent. It started declining in an era of ISI under the Plans and exports pessimism,

Figure 1 : Trade Openness in India, 1956-1999

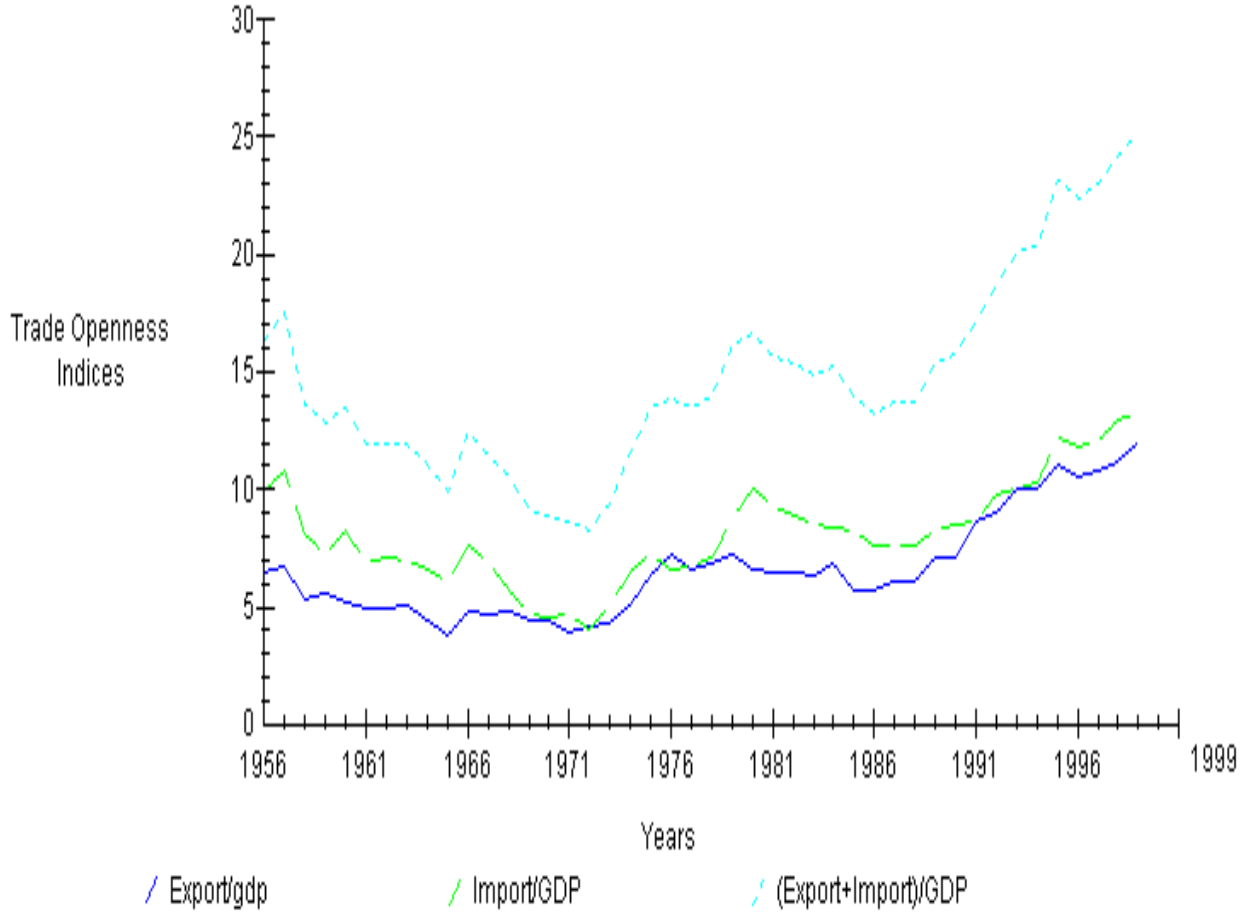
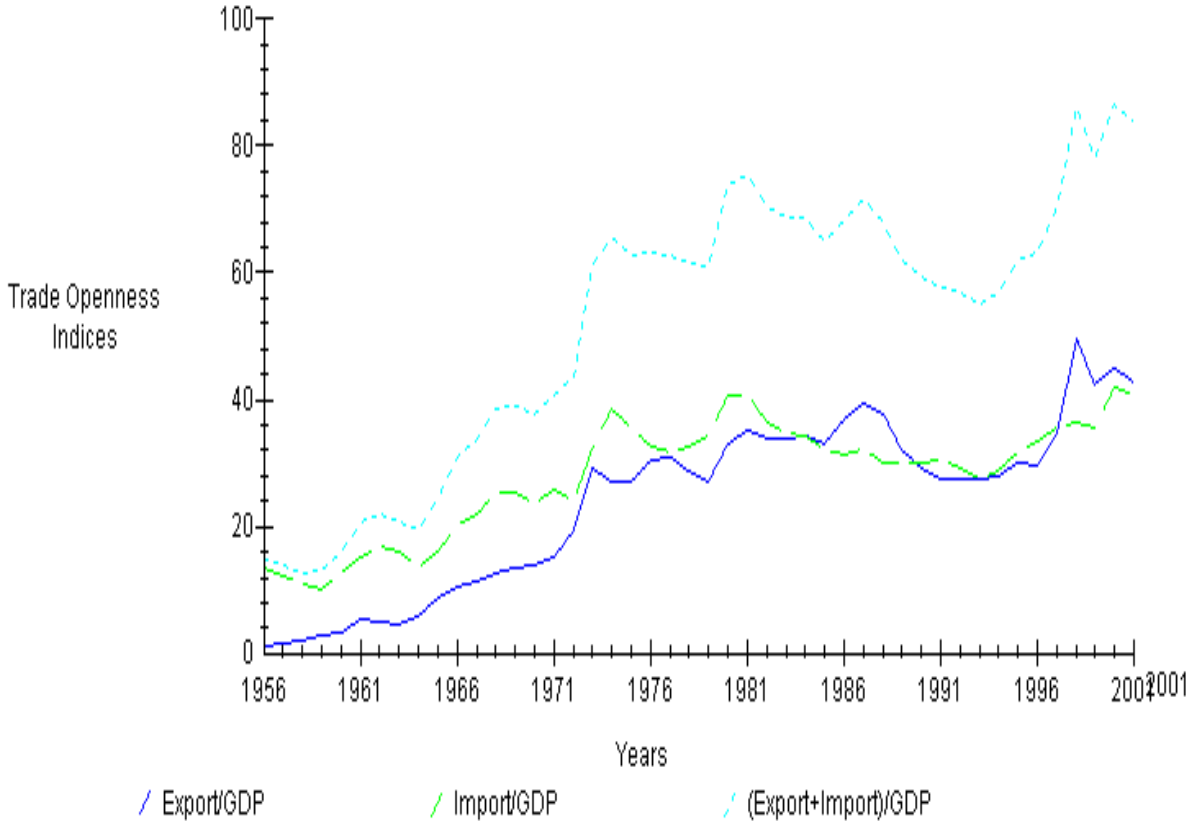


Figure 2: Trade Openness in Korea,1956-2001



and reached 8.92 per cent by 1970. Thereafter it started rising partly due to the rising share of imports (thanks to the rise of OPEC in the 1970s) and partly due to the increased export drive to pay for rising import bill. The trade openness index touched 16.64 per cent by 1980. With the fall of OPEC and the declining prices of oil, the share started falling. With the introduction of trade liberalization in the middle of the 1980s, the share of foreign trade in India's GDP started rising and accelerated under the New Economic Policy (NEP) in the 1990s – it reached 25.24 per cent in 1998 – of which 11.98 per cent was the share of exports and 13.27 per cent was the share of imports.

Ordinary trend analysis (without bothering for the time being whether these trends are deterministic or not) shows that exports as a proportion of India's GDP exhibited a statistically significant trend over the period of the study (1956-1999). But no such trend of statistical significance can be observed for India's import as a proportion of GDP and so for trade (export + import) as a proportion of GDP. Incorporating structural shift parameters (intercept and slope dummies) in the trend analysis, it is observed that Export/GDP ratio showed a significant rising trend from the mid-1970s after the earlier period of trendlessness; Import/GDP ratio and so Trade/GDP ratio also exhibited a significant rising trend during the same period after a declining trend of the earlier period (Table 1, Part I).

Korea's initial condition was a bit worse than India – exports had averaged only 1.33 per cent of GDP, while imports represented 13.33 per cent of GDP. That is, the share of foreign trade in GDP accounted for 14.67 per cent. Major policy reforms took place in Korea in the early 1960's, which greatly increased the return to exports. Consequently the fruits of policy reforms became apparent as the share of foreign trade reached 37.63 per cent in 1970. Since then it had been rising rapidly and by 1980 it attained the height of 73.71 per cent mark.

Table 1

Analysis of Trends in Trade Openness Indices and Real Growth Rate of India and Korea, 1956-1999/2001

Series & Model[1]	Intercept (a)	Time Trend (b)	Intercept Dummy '73 (c)	Slope Dummy '73 (d)	R-Bar Square	DW-Statistics
I. India: 1956-1999						
Export/GDP						
AR (1)	1.58*	0.02*			0.90	1.89
RAR(1,8)	1.71*	-0.01	-0.56*	0.04*	0.93	2.00
Import/GDP						
AR (1)	1.97*	0.01			0.82	1.69
RAR(8)	2.34*	-0.05*	-0.81*	0.07*	0.87	0.98
Trade/GDP						
AR (1)	2.52*	0.01			0.89	1.59
RAR(8)	2.75*	-0.03*	-0.65*	0.05*	0.92	0.90
Real GDP Growth Rate OLS	2.10	0.13*			0.10	2.00
OLS	2.20	0.16	-3.48	0.07	0.08	1.98
Per Capita Real GDP Growth Rate OLS	-0.27	0.13*			0.12	2.00
RAR (3)	0.15	0.15	-3.67	0.09	0.18	2.05
II. Korea: 1956-2001						
Export/GDP						
AR (1)	0.61	0.08*			0.97	1.47
AR (1)	0.46x	0.16*	2.59*	-0.14**	0.98	1.70
Import/GDP						
AR (1)	2.66	0.02*			0.93	1.40
AR (1)	2.13*	0.07*	1.41*	-0.07*	0.93	1.43
Trade/GDP						
AR (1)	2.82*	0.04*			0.97	1.38
AR (1)	2.17*	0.10*	1.83*	-0.10*	0.97	1.46
Real GDP Growth Rate OLS	7.77*	-0.01			-0.02	1.62
OLS	1.42	0.70*	9.07*	-0.81*	0.20	2.14
Per Capita Real GDP Growth Rate OLS	3.13	0.05			-0.00	1.61
OLS	-1.76	0.75*	9.68*	-0.81*	0.21	2.13

Notes

1 The fitted equation is:

$$Y(t) = a + b.t + u(t)$$

where Y(t) is the series under study taken in log form only for trade openness indices , t is the time variable and u(t) is the OLS residuals.

To examine the changes in intercept and slope parameters since 1973, intercept and slope dummies are added to the above regression.

A 12-order Lagrange Multiplier test is conducted on the OLS residuals to ascertain the order (p) of the AR process. The AR (p) process and restricted AR, RAR process (significant lags in parentheses) are fitted through the Gauss-Newton Iterative procedure under the Microfit program developed by Professor M. H. Pesaran and Dr. B. Pesaran.

* Significant at 5 per cent level.

Finally, instead of beset of economic crisis in 1997, the share of foreign trade in Korea's GDP increased to 83.47 per cent – of which the export share constituted 42.91 per cent while the import share constituted 40.56 per cent in 2001.

Ordinary trend analysis shows that all the series of trade openness indices of Korea exhibited statistically significant rising trends over the period of the study, 1956-2001. Structural Shift analysis reveals that all the trade openness indices exhibited a significant deceleration in their growth since the mid-1970s (Table 1, Part II).

Growth of Indian and Korean economy since 1956

The real growth rates –the annual growth rates of real GDP and per capita real GDP - of both the countries fluctuated (see Figures 3 & 5 for India and Figures 4 & 6 for Korea). Amidst much fluctuation, Indian growth rates exhibited rising trends but no such trends can be found for Korea. Actually rapid growth of Korean economy (in terms of both real GDP and per capita real GDP growth rates) slowed down since the mid-1970s. No such changes can be observed for India (Table 1).

Now we bring into our discussion the question: are the trends found by the ordinary time-series trend analysis deterministic? The question, once raised by Nelson and Plosser (1982) in the context of US macroeconomic series, initiated a great debate and led to innovations of various tools of testing deterministic trends as against stochastic trends or 'unit root'. Out of all these tests, Augmented Dickey-Fuller (1976), ADF, test is the most popular (Mixon and Sawyer, 2002) with much widely known advantages and disadvantages. But choosing the appropriate order of the ADF test is another problem and different methods of choosing the lag structure of an ADF equation often give different results.

Figure 3 : India's Real GDP Growth Rate,1956-1999

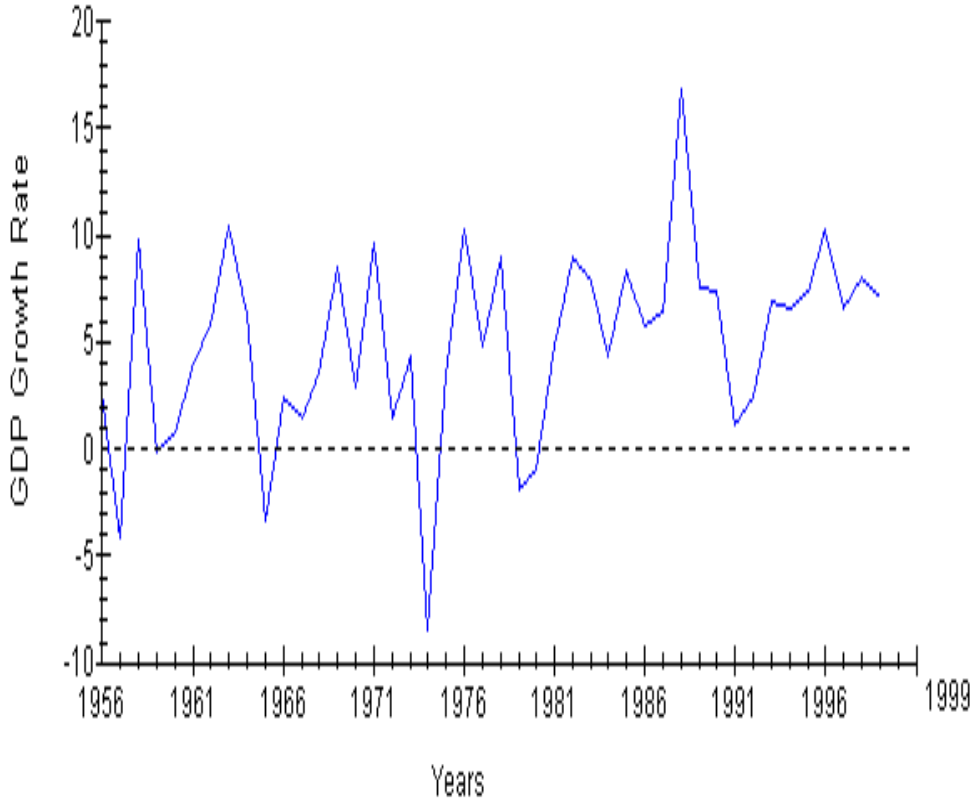


Figure 4 : Korea's Real GDP Growth Rate, 1956-2001

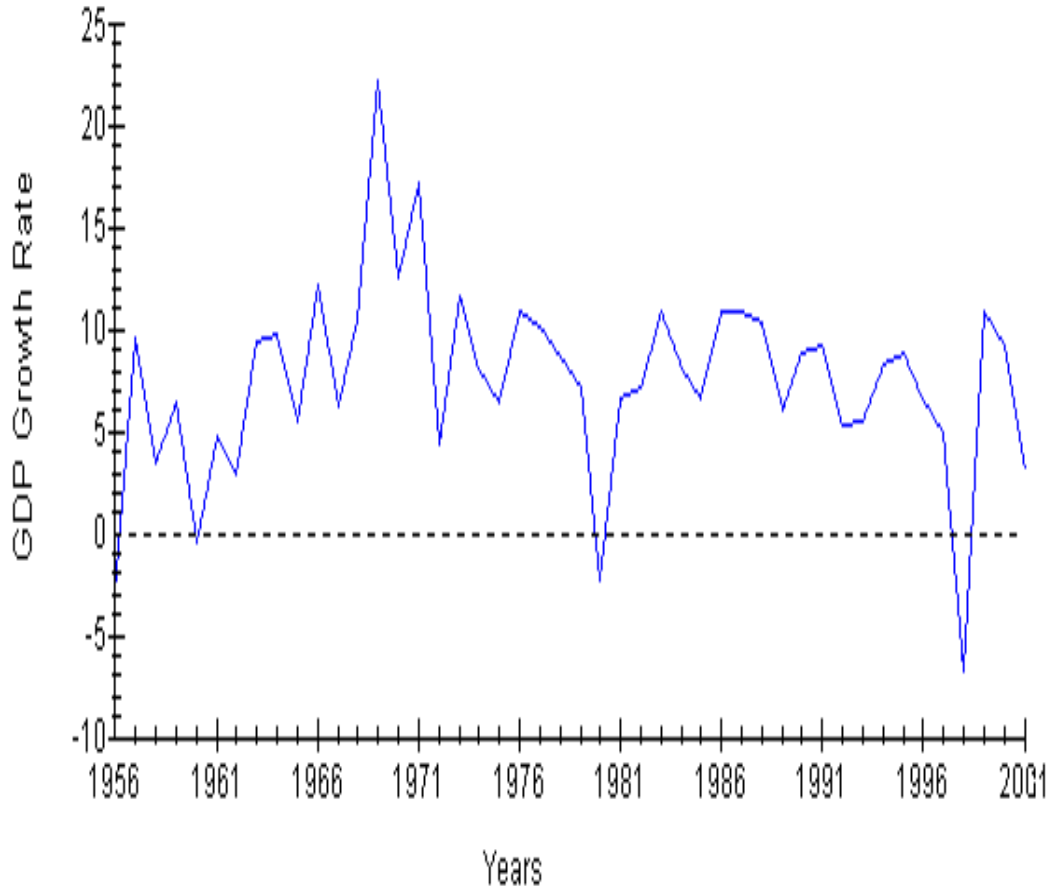


Figure 5 : India's Per Capita GDP Growth Rate

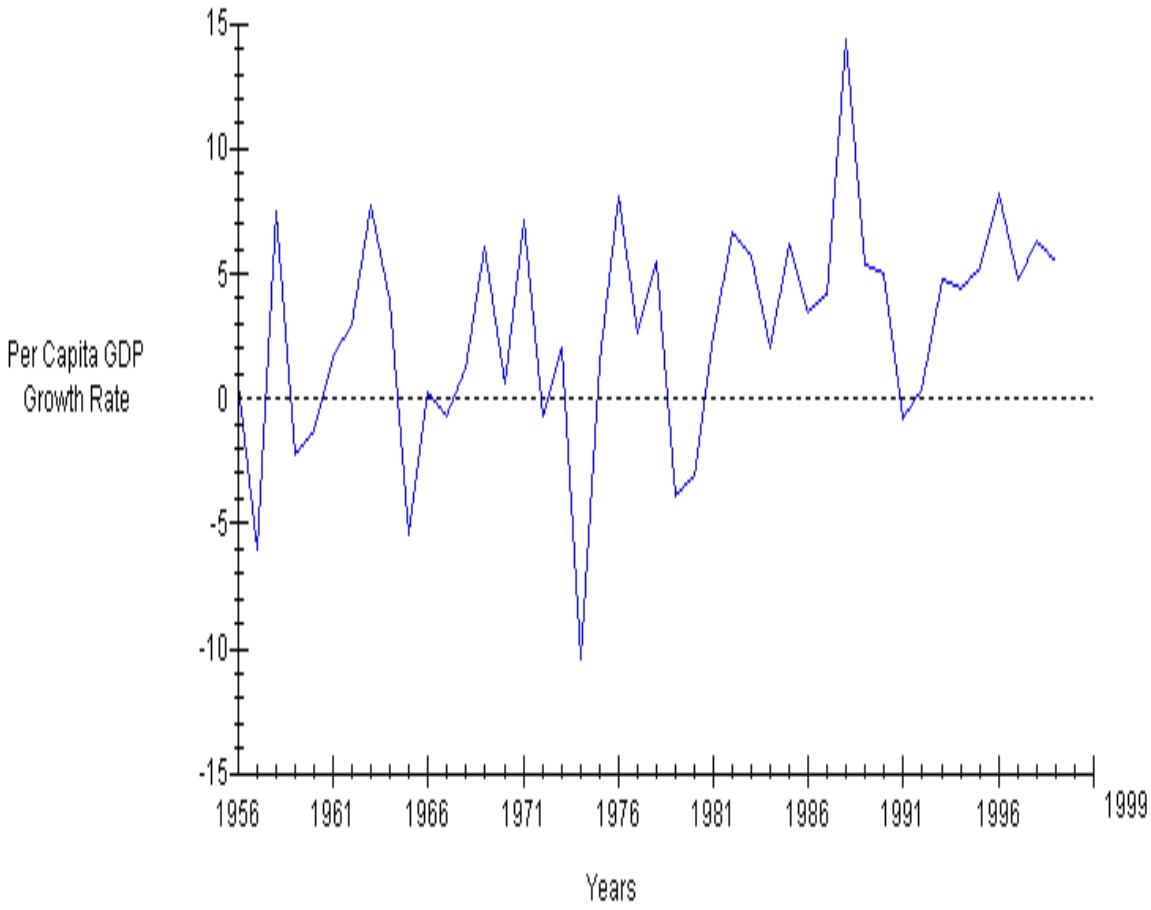
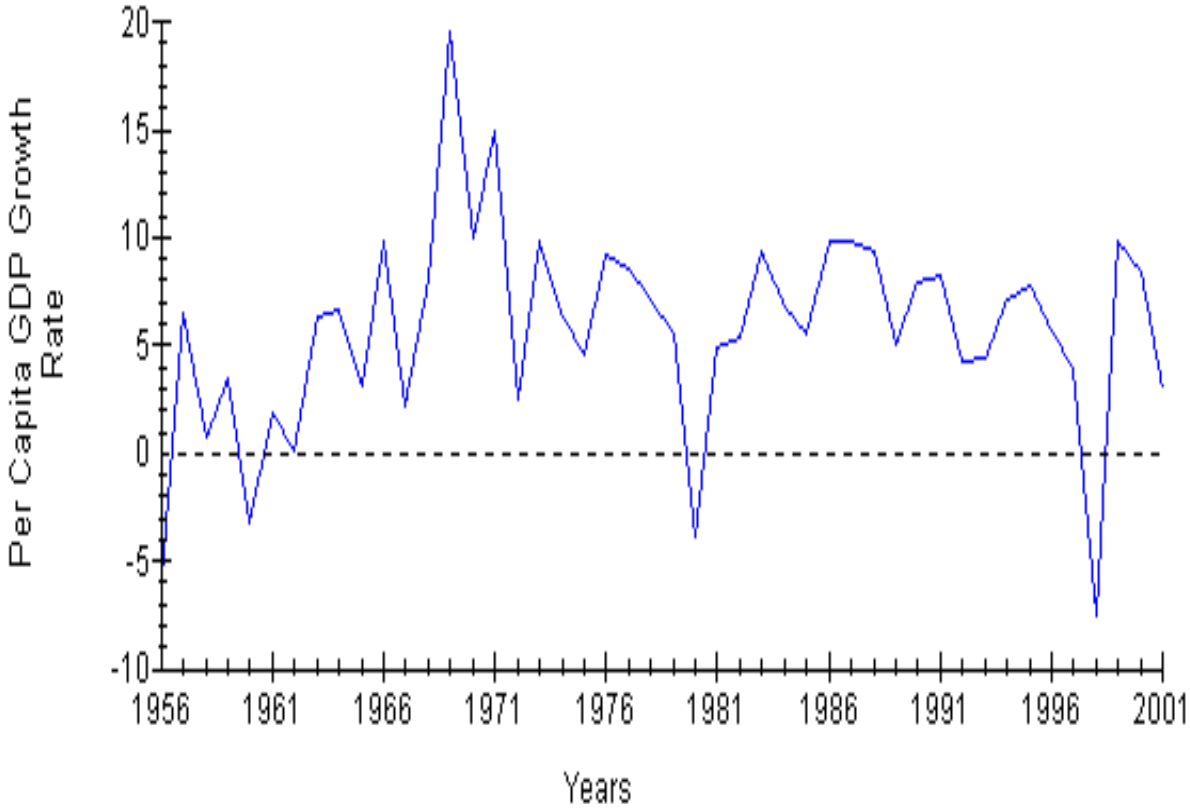


Figure 6 : Korea's Real Per Capita GDP Growth Rate, 1956-2001



There are three well-known parsimonious criteria of choosing the lags of the ADF equation, namely, Akaike Information Criterion (AIC), Hannan-Quinn Criterion (HQ) and Schwarz Bayesian Criterion (SBC). There is also a pre-determined lag (p) structure, given the number of observations, n.

Recently, Ng-Perron (1995) and Perron (1997) advocated in favour of the data-dependent general-to-specific (GS) criterion. Under this process, the specific order is chosen out of the general order on the basis of the standard t-tests of significance of the lag terms.[1]

We have estimated ADF test statistics for different lags chosen on the basis of all these criteria. As the distribution of the ADF test statistic is asymptotically true, the conclusion drawn on the basis of this test for a small sample may not be true. So the wild boot strapping method (1000 simulations) is used to derive the true probability value of the ADF test statistic estimated in each case. All these are reported in Table 2.

By and large trade openness indices do not show deterministic time trends. On the contrary, real growth rates show somewhat deterministic trends. To incorporate the impact of oil price shock of 1973 in all the series, Perron test[2] is applied. The lag-structure is chosen only through the GS criterion. The estimated Perron statistics (also reported in Table 2) show no evidence of deterministic

[1] Initially we have tried 12 lag terms for India and 13 for Korea (default lag order of EASYREG programme). If out of 12 or 13 lag terms, the 8th lag (say) term is statistically significant but all higher order lag terms are insignificant we run an 8th order ADF equation and check whether 8th order lag is significant. If now (say) the 6th order lag term is significant but the higher order lag terms are insignificant, we fit a 6th order ADF equation and check the maximum order significant lag terms. If the 6th order lag term is significant the appropriate ADF model is taken to be 6th order. If not, the process continues until we arrive at the zero-order ADF (i.e. DF) equation.

[2] We have used Perron's innovational outlier model with exogenous break point at 1973. It assumes that the impact of oil price shock on the series is gradual. The use of exogenous break point has been criticized by Christiano (1992) and others and suggested data-dependent break points. However, as Maddala and Kim (1997) argued it is not very meaningful to search for a break over the entire period ignoring prior information.

trend-growth with structural shift (since 1973) in the trade openness indices. [3] Only Indian real growth rates are the exceptions.

[3] Deterministic trend analysis finds no evidence of structural changes in the growth rate series.

Table 2

Trade Openness Indices and Growth Rates of India and Korea: Augmented Dickey-Fuller[1] and Perron[2] Tests of Stationarity

Series	ADF-Fixed[3]	ADF-AC[3]	ADF-HQ[3]	ADF-SBC[3]	ADF-GS[3]	Perron-GS
INDIA						
Export/GDP						
With Time Trend	-3.318*t	-2.159(2)t	-2.159(2)t	-2.658(1)t	-2.248(0)t	-1.599(0)
Without Time Trend	-0.6404	-0.0298(2)	-0.0298(2)	-0.013(1)	0.0051(0)	
Import/GDP						
With Time Trend	-4.279*t	-2.002(2)t	-2.002(2)t	-2.916(1)t	-2.179(0)t	-2.228(0)
Without Time Trend	0.201	-0.662(2)	-0.662(2)	-1.203(1)	-0.877(0)	
(Export + Import)/GDP						
With Time Trend	-3.399*t	-1.929(2)	-1.929(2)	-2.973(1)t	-2.126(0)t	-1.231(0)
Without Time Trend	0.458	-0.243(2)	-0.243(2)	-0.5437(1)	-0.15(0)	
Real GDP Growth Rate						
With Time Trend	-1.448	-3.342(4)*t	-3.342(4)*t	-4.836(1)*t	-6.323(0)*t	-5.516(0)*
Without Time Trend	-0.569	-2.427(4)	-2.427(4)	-4.371(1)*	-5.677(0)*	
Per Capita Real GDP Growth Rate						
With Time Trend	-1.378	-3.244(4)*t	-3.244(4)*t	-4.814(1)*	-6.323(0)*t	-5.659(0)*
Without Time Trend	-0.399	-2.198(4)	-2.198(4)	-4.236(1)*	-5.552(0)*	
KOREA						
Export/GDP						
With Time Trend	-2.242	-2.348(6)	-2.645(1)x	-2.645(1)x	-2.356(0)	-2.944(0)
Without Time Trend	-2.285	-2.524(7)x	-2.834(6)	-3.829(1)*	-4.123(0)*	
Import/GDP						
With Time Trend	-3.18xt	-1.896(5)t	-1.901(2)t	-2.146(1)	-4.334(8)*t	-2.021(0)
Without Time Trend	-1.202	-2.311(5)	-2.311(5)	-1.942(1)	-1.405(0)	
(Export + Import)/GDP						
With Time Trend	-2.831	-1.847(1)	-1.847(1)	-1.847(1)	-1.254(0)	-2.825(0)
Without Time Trend	-2.927x	-2.223(1)	-2.223(1)	-2.223(1)	-1.831(0)	

Real GDP Growth Rate						
With Time Trend	-2.78*	-3.434(1)*	-3.434(1)*	-3.434(1)*	-5.997(0)*	-2.711(9)
Without Time Trend	-1.018	-1.309(1)	-1.309(1)	-1.309(1)	-6.032(0)*	
Per Capita Real GDP Growth Rate						
With Time Trend	-2.426	-3.423(1)*	-3.423(1)*	-3.423(1)*	-5.929*	2.289(0)
Without Time Trend	-1.755	-3.487(1)*	-3.487(1)*	-3.487(1)*	-6.05*	

Notes:

1 The fitted equation for testing the trend-stationarity of three "Trade Openness" indices is:

$$\text{Log Y (t) - Log Y (t - 1)} = a + b.t + c.\text{ Log Y (t-1)} + \sum_{i=1}^{k} \Upsilon_i \Delta\text{Log Y (t-i)} + u(t)$$

where k is the lag order of the augmented Dickey-Fuller (ADF) test chosen by different criteria.

The above type of equation is also fitted for "GDP growth rate" and "Per Capita GDP Growth Rate" series with the only change that the series are actual values – not in logarithmic form.

The reported ADF figures are the ADF statistics for testing 'c =1'.

2 For Perron test, the following Innovational Outlier Model is fitted:

$$\Delta \log Y(t) = a + b.t + c.D + d.SD + e.SPD + f.\log Y(t-1) + \Sigma \Upsilon_i \Delta\text{Log Y(t-i)} + u(t)$$

where D = 0 for $t < $ or $= T_B$ (chosen break point, 1973) and =1 for $t > T_B$ and accordingly SD = 0 & t ; SPD =1 for $t = (T_B + 1)$ & 0 otherwise.

3 Selection of k – the optimum lag structure - is done by the Akaike (AC), Hannan-Quinn (HQ) and Schwarz (SBC) information criteria. Besides we have used General-to-specific (GS) criterion. In the EASYREG program a default value of k is provided on the basis of the number of observations. These are reported under the column heading 'fixed'. For India, k = 12 and for Korea, k = 13.

* The null hypothesis of unit root is rejected in favour of the alternative hypothesis of stationarity or trend-stationarity or trend stationarity with structural shifts as applicable at 5 per cent level of significance (based on wild bootstrap method with 1000 times simulation for ADF statistics).

x The null hypothesis of unit root is rejected in favour of the alternative hypothesis of stationarity or trend-stationarity at 10 per cent level of significance (based on wild bootstrap method with 1000 times simulation for ADF statistics).

t The time trend is statistically significant at 5 per cent level.

III Relationship between trade openness and growth in Indian and Korean economies

The simple procedure of studying the impact of trade openness on growth based on time series data is to fit a linear regression with time trends:

$$g = a + b.t + c.\ O + u\ (t) \quad .....(1)$$

where g = annual percentage rate of growth of real GDP or real GDP per capita, O = index of trade openness; t = time variable, u = error term, and a, b and c are the parameters to be estimated. The explicit introduction of the trend variable in the regression has the effect of detrending growth rate.

The validity of such procedure is now questioned after decades of development of 'unit root' econometrics and cointegration study. According to this new breed of time series analysis one can carry on with the standard practice only if the trend variables are deterministic and not stochastic. Now-a-days to examine the relationship between two series one has to carry on usual unit root tests which often suffer from a very important problem of power specially under small samples. There exists also uncertainty regarding the choice of appropriate lag of a unit root test.

Recently, Pesaran and Shin (1999) developed a technique to test for the existence of a long run relationship between two variables irrespective of whether they are stationary or stochastic. This is known as Autoregressive Distributive Lag (ARDL) approach to cointegration. In this section, this technique has been applied to examine the relationship between growth rate and trade openness.

Under the ARDL procedure, above equation, Equation (1) is modified by incorporating m^{th} order lag terms of the dependent variable (that is, growth rate) and nth order lag terms of the independent variable (that is, trade openness) where the actual lag orders of the two variables are determined by different criteria as in the case of ADF tests. Pesaran and Shin (1999) recommended the SBC criterion.

Apart from the SBC we have used other criteria to determine an appropriate ARDL (m, n) model.[4] Estimates of long-term coefficients of different trade openness indices under different ARDL (m, n) models with intercept and time trends are presented in Table 3.

In view of non-significant time trends we have also estimated the coefficients without time trends but not reported, as the basic conclusion remains unaffected.

The conclusion that follows from the ARDL approach is that there is no favourable or positive relationship between trade openness (as measured by the three indices) and growth rates (of both real GDP and per capita real GDP). The conclusion does not change if we use ARDL (0, 0) – that is ordinary regression analysis. A cursory look at the estimates of Table 3 (particularly the models chosen by the SBC criterion) shows that our study by and large supports an opposite conclusion – a negative relationship between trade openness and growth!

[4] We have also used GS criterion, which in many cases suggested an ARDL (0,0) model. But the basic conclusion does not change.

Table 3

Impact of Trade Openness on Growth Rates of India and Korea
Since 1956: ARDL Approach to Cointegration

Series, Criteria and Model[1]		Intercept (a)	Time Coefficient (b)	Long-run Coefficient of different trade openness indices (c)
India, 1956-1999				
REAL GDP GROWTH RATE				
Export/GDP				
RBSQ	(11,12)	0.1	0.22*	-0.46
AIC/HQ	(12,12)	0.22	0.23*	-0.63
SBC	(4,0)	8.0*	0.36	-6.78*
Import/GDP				
RBSQ/AIC/SBC/HQ	(12,12)	11.76	0.44*	-9.21x
Trade/GDP				
RBSQ	(9,9)	10.37	0.33*	-5.38
AIC/HQ	(12,11)	10.8	0.36*	-5.84
SBC	(4,1)	14.34*	0.39*	-7.4*
PER CAPITA REAL GDP GROWTH RATE				
Export/GDP				
RBSQ	(11,12)	-2.81	0.22*	-0.06
AIC/HQ	(12,12)	-2.59	0.24*	-0.34
SBC	(4, 0)	5.28*	0.36*	-6.55*
Import/GDP				
RBSQ/AIC/SBC/HQ	(12,12)	8.78	0.44*	-8.87
Trade/GDP				
RBSQ/HQ	(12, 9)	12.85	0.43*	-8.13
AIC	(12,11)	7.48	0.36*	-5.42
SBC	(4,1)	11.7*	0.40*	-7.32*

Korea, 1956-2001				
REAL GDP GROWTH RATE				
Export/GDP				
RBSQ/AIC	(11,6)	13.34*	-0.11*	-0.42
HQ/SBC	(0,1)	31.62*	-0.11	-5.87x
Import/GDP				
RBSQ	(11,11)	23.85*	0.07	-5.32x
HQ/AIC	(12,11)	19.96*	0.06	-4.06
SBC	(0, 0)	52.33*	-0.14x	-11.51*
Trade/GDP				
RBSQ/AIC	(7,5)	33.63*	-0.05	-5.8x
SBC/HQ	(0,0)	51.6*	-0.07	-10.01*
PER CAPITA REAL GDP GROWTH RATE				
Export/GDP				
RBSQ/AIC	(11,6)	9.01x	-0.07	-0.01
SBC/HQ	(0,1)	27.26*	-0.07	-5.32x
Import/GDP				
RBSQ	(11,11)	18.68x	0.12x	-4.78
HQ/AIC	(12,11)	13.66	0.11x	-3.19
SBC	(0, 0)	47.96	-0.09	-11.07*
Trade/GDP				
RBSQ/AIC	(7,5)	27.65*	-0.01	-5.01
SBC/HQ	(0, 0)	46.45*	-0.03	-9.41*

Notes

1 The original equation is

$$Y(t) = a + b.t + c \log X(t)$$

where Y is the growth rate of either real GDP or per capita real GDP and X is the alternative trade openness indices.

The Autoregressive Distributed Lag (ARDL) model is chosen on the basis of four alternative criteria: R Bar Square Criterion (RBSQ), Akaike Information Criterion (AIC), Schwarz Bayesian criterion (SBC) and Hannan-Quinn (HQ) criterion. The estimates are obtained with the aid of Microfit program.

* Significant at 5 per cent level.

x Significant at 10 per cent level.

IV. Concluding Observations

The question addressed in this paper was about the relationship between trade liberalisation/trade openness and real growth rates of India and Korea. In the first stage of simple trend analysis, it was observed that both India and Korea opened up and consequently shares of trade (export, import and sum of the two) in their GDPs rose significantly. The process of opening up accelerated in India and decelerated in Korea after 1973. Real growth rates of both India and Korea fluctuated and there is some evidence of a rise in Indian real growth rates. On the other hand, the rates of growth of GDP and per capita GDP swelled in Korea at a rapid rate up to the beginning of the 1970s and fell subsequently.

Application of the tests of stationarity (Augmented Dickey-Fuller tests and Perron tests), however, exhibit that the series do not have deterministic trends so that temporary shocks can have permanent effects.

Application of ARDL approach to co-integration finds no positive long-term relationship between opening up and growth. This finding is very interesting in view of the fact that Korea was trade-oriented since the early 1960s and showed a very high and rapidly rising share of trade in their total production in the subsequent years while India followed the ISI strategy in the 1960s with a very low and declining share of trade in their total output and changed this strategy in recent years (see Sarkar, 2005a or a study of the impact of liberalisation on India's macroeconomic performance). But none of the countries experienced a positive long-term relationship between trade share and growth. If there is at all any relationship, that is negative!

This negative long-term relationship (if any) requires further investigation – whether the process of rapid growth causes declining importance of trade or a rising importance of trade leads to a deceleration in economic growth. We leave this to future work in this field. On *a priori* reasoning, one can make a case for both. Rapid growth under ISI can lead to a declining importance of trade while an outward oriented strategy can be a drag on economic growth under the inexorable Prebisch-Singer law of secular decline in the terms of trade (see Sarkar, 2001; also Sarkar 2005b or an evidence of Korean terms of trade decline).

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