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A COMPARATIVE ANALYSIS OF RECENT EXPORT PERFORMANCES OF CHINA AND INDIA*

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Abstract

Drawing on the *convergence theory*, one would expect that as a latecomer to integrate with the globalised economy India's export performance would be at least on par with that of China because China's performance has been as predicted by the theory. This study, using performance measures based on the *endogenous growth theory* that internalises the ability to export the maximum possible exports under the determinants of exports including the existing 'behind the border' and 'beyond the border' constraints, shows that India's export performance is still far behind that of China. The implication of this study is that India's reform measures need to be intensified effectively to catch up and to overtake China.

JEL Classifications: C24, F10, and F14,
Key words: Export performance, 'behind the border constraints, 'beyond the border constraints', potential exports, China, India.

1. Introduction

In the ranking of the largest economies of the world measured by their gross domestic products in terms of 1995 constant US$, China and India stood at the 19th and 20th positions in 1980 but in 2005 the ranking places them at the 7th and 12th positions respectively. Such a quantum jump of these two economies, particularly China, over two and a half decades is remarkable[1]. What is interesting to know is, measured in terms of per capita income in current international dollars with purchasing power parity, China was lagging behind India by $ 223 in 1980, but overtook India with a difference of $ 1,450 in 2000. Based on the IMF data, the per capita income in current international dollars with purchasing power parity in 2005 worked out to be $ 3,320 and $ 7,150 for India and China respectively. Such a dynamic growth performance of China and a respectable growth performance of India raise several interesting questions[2].

For example, is China's growth miracle different from what we observed in other Asian countries? While China has demonstrated its potential to grow faster consistently for several years, why doesn't India exhibit the same kind of dynamism? As a latecomer, what can India learn from China's growth process? These interesting and important questions have occupied the minds of development economists always. There is now rich literature on the economic developments of these two countries including their reform processes and their impacts on macroeconomic policies and overall economic growth. Though some of the conclusions in these studies are controversial, there is consensus that

[1] Sachs and Woo (2000) have provided a comprehensive exposition about the factors behind the successful economic performance of China.

[2] In the eyes of many observers, by the end of the 1990s India had moved to being a "six percent growth" economy: not a 'miracle' perhaps, but certainly respectable.

opening up the economies for export-led-growth through trade liberalization is a crucial factor among others, which significantly influenced the growth performance[3].

When China's growth experience is examined against the growth pattern of other Asian countries, particularly Japan, it is noticeable that Japan's growth rate fell 15 years after its catching-up process started in 1955, whereas China has continued its growth for more than 25 years[4]. However, when China's share of global GDP is compared with that of Japan's, it is evident that the latter's share of global GDP grew faster than that of the former during Japan's catching-up process. Thus, there does not seem to be significant differences in the growth performances of China and Japan[5]. Nevertheless, China's growth performance looks more impressive, if its integration into the global economy in terms of international trade is considered.

For example, China's total merchandise trade increased from $1,155 billion in 2004 to $1,422 billion during 2005. The surge in China's exports has drastically changed the structure of East Asia's trade surplus. Overall the combined trade surplus of Japan, South Korea, Taiwan, and China against the U.S. and EU-15 grew from $144 billion in 1995 to $492 billion in 2005. Of this surplus, China's share accelerated from 34% to 66%, while Japan's share declined from 60% to 24% during this period (Rahman and Kalirajan, 2007). Drawing on the 'convergence theory', if, as a latecomer, China has been able to

[3] For example, some authors have found differences in the political system as the key instrument creating differences in the performance of the two countries. Sachs and Woo (2000) labeled the competing interpretations of China's post-1978 economic growth process as institutional innovations versus institutional convergence, which are in other words, the Experimentalist School and the Convergence School respectively. Important econometric studies of the linkage between trade reform and the rate of economic growth include Sachs and Warner (1995), and Frankel and Romer (1999).

[4] The starting period of the catching-up process for a country is based on the IMF's notion of having an annual rise in exports of more than 10% for three years continuously (IMF, World Economic Outlook, Chapter II, 2004).

[5] In this context, it is worth noting the publication by Garnaut and Huang (2001), which is titled as 'Growth without Miracles'.

improve its export performance faster, why not India, which opened up its economy much later than China? It is in this context, this paper examines the export performances of China and India with the following three empirical questions: (a) How far China and India have been from reaching their exports potential with their trading partners given the existing 'behind the border constraints' and 'beyond the border constraints' to exports?[6] (b) If China's exporting environment is emulated by India, what would be the latter's export performance? and (c) If India's exporting environment is duplicated by China, what would be the latter's export performance?

The following section briefly describes important trade policy reforms of China and India. The next section discusses the concept and measurements of potential exports and data, which is followed by empirical estimations of different measures of potential exports of China and India with their trading partners. This section also provides the simulation results of export performances of China and India with the assumption of China emulating the exporting environment of India and India duplicating the exporting environment of China respectively. A final section discusses what India can learn from the export performance of China to shape up its trade policies.

2. Trade Policy Reforms of China and India

2.1. China

Trade policy in China underwent a major change during 1979-1980, when the central government decided to establish four Special Economic Zones (SEZs) in two coastal

[6] "Behind the border constraints" to export, within the home country, which mainly include regulatory policies that impede competition, restrictions on foreign trade and investment, tolerance of business cartels, monopoly privileges given to public enterprises, and the cost and performance of infrastructure services that are important to the functioning of businesses, services such as ports, customs and transport, generally affect the domestic costs of production. "Beyond the border constraints" mainly refer to non-tariff barriers of partner countries, which generally influence the shifting of the export frontier.

provinces, Guangdong and Fujian, to attract foreign direct investment and new technologies. This was the beginning of the Open-Door Policy of China. Initial success encouraged Chinese policymakers to adopt similar policies in 14 east coastal cities in 1984, which were further extended to a far wider area of China's east coast region in 1985 and in the following years. It is worth noting that the 12 East Coast provinces, out of the total 30,[7] contributed 2/3 of China's total exports in 1990. The openness of the Chinese economy was accelerated in the 1990s, after Deng Xiaoping's push for acceleration of economic reform and openness in 1992. Twenty inland cities became "open cities" that could enjoy a series of preferential policies in 1993. Border areas in the North and West China, i.e., Xinjiang, Inner Mongolia, Heilongjiang, Yuannan and Guangxi, were also opened to border trade (Wang, 2004).

FDI increased dramatically in the 1990s, which was only US$ 1.7 billion in 1985. In 1995, FDI increased to 37.5 billion, and then to 40.7 billion in 2000, and to 72.4 billion in 2005. Domestic and foreign trade sectors were opened to FDI in the late 1990s. Foreign enterprises, which include enterprises with investment from Chinese Hong Kong, Macao and Taiwan, played more and more important roles in the manufacturing sector of China (Jiang, 2002).

Trade policy was not immediately shifted from import-substitution to export-orientation. During a long period of the reform era, it was a mix of both import-substitution and export-orientation, but gradually shifted towards the East Asian growth model of export-oriented growth. China remained with high import tariffs, although the real tariff rate was far lower, due to various preferential policies and smuggling. In 1995, for example, the

[7] This includes four Minority Autonomous Regions and three Central-Administrated Municipalities. The total number became 31 later.

average nominal tariff rate on electronic products was 40 percent, but the actual rate (that is, tariffs actually collected as a share of the value of imports) was only 11.8 percent (Wang, 2004).

There were also trade-related investment measures (TRIMs) in the 1980s and 1990s, such as domestic component, export performance, and foreign exchange balance requirements, to ensure the national trade balance. In spite of these, the foreign-invested industries were not a foreign-exchange earner in the 1980s and early-to-middle 1990s, because their exports could not exceed their imports before 1998, though it did contribute to economic growth, employment generation and increase in foreign trade to a large extent (Wang, 2004).

More policy changes occurred during the period when China made great efforts for joining the WTO. There were major changes before and after the WTO accession in 2001. Concerning TRIMs, mainly requirements on domestic component, export performance and foreign exchange balance of foreign enterprises, were removed. Upon China's WTO accession in 2001, the banking and insurance, and telecommunication sectors, which were not opened to FDI before, were opened.[8] Not only the trade policies relating to FDI were changed, trade liberalization also occurred in the domestic sectors. More and more manufacturers that producing export goods were also permitted to directly purchase inputs and sell products overseas.

There were more changes in the 1990s. In 1996, joint ventures with foreign investment were allowed to deal with foreign trade. In 1998, private enterprises were also allowed to engage in foreign trade. The state monopoly in foreign trade was gradually replaced by

market competition. Deduction, or removal, of tariff and non-tariff barriers was also an important part of trade policy reform. During the 1982-1992 period, the nominal tariff rate, as an average, reduced from 56% to 43%. During the 1992-2003 period, it further reduced from 43% to 11% (Wu, 2003).[9] The average tariff in 2005 was 9.9%. Non-tariff barriers, e.g., import licensing and requirement for special import approvals, were reduced in the 1990s and basically eliminated in the early 2000s, as the government's commitment upon the WTO accession. Thus, it is apparent that trade policy reforms significantly contributed to economic growth in China, which was more or less on average at the two-digit level over more than two decades.[10]

Nevertheless, there are rooms for further improvement in China's trade policies[11]. Some analysts have suggested that the imbalance of policy treatment between FDI and domestic investment, which favours FDI, has resulted in rent-seeking behaviour and inefficiencies. In addition, there are needs for further policy reform towards transparency and better business environment (Huang and Khanna, 2003; Sachs and Woo, 2002).

2.2. India

Figure 1 presents a simplified record of India's aggregate growth (growth in real GDP at factor cost, 1993-94 prices) performance over the 52 years from 1951-52 to 2002-03. It also plots trend growth (TG) rates for each decade starting 1951-61 and some of the key

[8] Sachs and Woo (2002) have argued that the Chinese leadership's opinion has been that in the short-run, there could be significant displacement of Chinese state banks by foreign banks, but in the long run, Chinese banks (most likely private ones) would rise in importance.

[9] As mentioned earlier, the real tariff rate in the 1990s should be far below the nominal rate because of various tariff exemptions and deductions, and smuggling. This should not be the case in the early 1980s, because the coverage of policy preferences on tariff deduction was only limited at the time, and smuggling was less serious. .

[10] Literature indicates that countries, which liberalized their trade (raising their trade-to-GDP ratio by an average of 5percentage points) between 1950 and 1998 enjoyed on average 1.5 percentage points higher GDP growth compared with their pre-reform growth rates (Greenaway, et al., 2002; and Baldwin, 2003).

[11] Gang Fan and Xiaojing Zhang (2003) have discussed how the further reform agenda can be designed to achieve another period of two decades of high growth.

events responsible for slowdown episodes and a summary table indicating the coefficient of variation across decades and average growths after ignoring the drought and crisis periods. Sweeping policy changes were made in the trade sector during the 1990s in India, though at a pace slower than in other reforming countries. Customs tariffs are now lower and quantitative restrictions on imports have been done away with. Export restrictions have been reduced along with the implementation of various export promotion measures. However, the pace of tariff reforms slowed down after 1996-97. While the peak rate of duty has been reduced gradually, the average tariff rate remained broadly unchanged at about 30 per cent during 1997-2002, though the average tariff was about 18% in 2005, which is almost double that of China. This tariff rate is also very high by the current world standards. Figure 2 shows plots of four indicators of tariff-related trade barriers, all-product simple mean, standard deviation of tariff lines, simple mean of tariff lines for manufactured goods, and share of tariff lines with international peaks. When compared with countries, such as China, Brazil, South Korea, Sri Lanka, Malaysia, Japan and the United States, India turns out to be an outlier in terms of all product simple mean tariffs. What is most disturbing is the number of lines with world peak. It appears that the Indian authorities simply look at the highest rates prevailing anywhere in the world and adopt the same as tariff without much analysis.

There are also concerns about the institutional role in determining tariff. At least four institutions are assigned the role of fixing tariffs in one way or the other. Among them the most relevant department, the Tariff Commission, which has resources to determine tariffs with more techno-economic analysis has never been involved in tariff determination or regulation since its inception in September 1997. Then, there is a tariff

research unit (TRU) in the revenue department of the Ministry of Finance, presumably most effective in determining tariff, which obviously would be more concerned about short-term effects of changes in tariffs, particularly on revenue than long-term effects on trade and growth. The Ministry of Agriculture reportedly determines agricultural tariffs. Besides, there is an anti-dumping directorate in the ministry of commerce to look into complaints of dumping. Thus, lack of institutional co-ordination may not be overlooked. Though the medium-term exports strategy (MTES 2002-2007), which was announced in January 2002, aimed to increasing India's share in world trade from about 0.7 per cent to 1 per cent by 2006-07, the current target is to reach 1.5% of world trade by 2009.[12] Latest trade figures in the World Trade Report 2006 reveal that in calendar year 2005, India's merchandise exports were worth $90billion that is approximately 0.89% of total global exports worth $10,121billion. China's share, on the other hand, increased from 6.67% in 2004 to 7.52% in 2005 with the country exporting goods worth $762billion during the year. While India's share in world total merchandise exports surged from 0.4% in 1992 to 0.8% in 2002, it took three long years for India to move another step further. At this rate, the target of reaching 1.5% of world trade by 2009 would not be that easy to achieve. To keep pace with the growth in world trade and grab a larger share of the world exports market, India has to strive still more and aim higher.

The five-year Export and Import (EXIM) Policy (2002-2007) announced on March 31, 2002 aimed to removing all quantitative restrictions on exports except for a few sensitive items reserved for exports through the state trading enterprises. It also outlined a farm-to-port approach for exports of agricultural products, special focus on the

[12]The MTES is a comprehensive exercise, which includes product and market identification for exports and indicated sector-wise strategies for identified potential sectors.

cottage sector and handicrafts, and assistance to states for infrastructure development for exports (ASIDE). New private sector-run special economic zones (SEZs) started coming up to provide investors an export-friendly environment. The incentives offered under the SEZ scheme included duty-free importation/domestic procurement of goods for the development of SEZ and setting up of units, 100 per cent FDI in the manufacturing sector under the automatic route, 100 per cent income tax exemption for the first five years and 50 per cent tax for two years thereafter. Other incentives included sub-contracting of part of production abroad, reimbursement/exemption of central sales tax on domestic purchases by the SEZ units and retention of 100 per cent foreign exchange earnings in the Exchange Earners Foreign Currency (EEFC) Account. In terms of financing SEZs, overseas banking units (OBUs) that were exempted from CRR and SLR requirements, were permitted to set up in SEZs. These OBUs have given access to SEZ units and SEZ developers to international finance at international rates. SEZ units were exempted from external commercial borrowing (ECB) restrictions and were allowed to make overseas investment and carry out commodity hedging. SEZs were exempted from central sales tax in respect of supplies from domestic tariff area (DTA) and transactions from DTA to SEZs were treated as exports under the Indian Income Tax and Customs Acts.

The number of goods reserved for the small-scale sector is set to reduce further. The strategic sectors identified for providing special focus include electronics, electrical goods and engineering goods referred to as "3Es" (Chadha, 2003). Policy on entry of direct foreign investment has been greatly eased, but investors continue to face a daunting regulatory framework beyond the foreign investment regime itself.

While policy initiatives are yielding favourable results to some extent, the foregoing discussion indicates that there are several concerns and issues that need to be addressed if exports are to grow faster, which mainly involves 'behind the border constraints' issues. How effective these trade policy reforms have been in improving export performances of China and India? Export performance can be measured in several ways. A simple conventional method is to work out the growth rate of absolute values of exports between two time periods and comparing it with another time periods within the country or comparing it with the growth rate of another country during the same period. Though this kind of measure is useful in a way, what is more interesting is to measure the country's potential exports, given the determinants of exports and comparing it with its own actual exports. Such a measure provides a better understandable link between trade policies and export performance, which is explained in the following pages.

3. Measuring Export Performances of China and India

3.1. Methodology I

A common feature of all performance measures is that performance is defined with respect to a benchmark. Though there are several methods to arrive at a benchmark, drawing on the endogenous growth theory popularized by Romer (1986) and Lucas (1988), the method of comparing one's own potential to his or her own actual achievement is more appealing because any performance improvements come from 'within'. It is the endogenous growth theory that facilitates the assumption of internalisation of the 'within' aspect through policy measures that increase the incentive to innovate to have an impact on the long-run growth rate of an economy. In line with the above arguments, potential exports can be measured by following either a general

equilibrium approach or a disequilibrium framework. In the former approach, home country's exports to all its trading partners, which may be exhaustive and represent a general equilibrium framework, would be estimated and added up to arrive at total values of exports. Alternatively, drawing on Kalirajan (1999), in a disequilibirum framework in which home country's actual exports are assumed to differ from its potential exports with respect to each trading partner and the partner-specific export gap is explictily included in the model explaining export flows and the specific estimation method yield potential exports. While there are several studies following the former approach, studies using the latter approach are scanty in the literature. The gravity model has been established in the literature as a popular methodology to measure potential trade between countries.

The gravity model, which is defined following Newton's Law of Gravitation, explains trade flows between two countries as directly proportional to the product of each country's 'economic mass' that can be measured by gross domestic product (GDP) and inversely proportional to the distance between the countries (Bergstrand, 1985). It is one of the most frequently estimated empirical relationships in economics. Earlier studies have estimated the difference between observed values and the predicted values that are calculated from OLS estimates of the gravity model as potential exports (Baldwin, 1994; and Nilsson, 2000). A simple baseline gravity model can be written as equation (1).

$$X_{ij} = C\, Y_i^{\beta}\, Y_j^{\gamma}\, D_{ij}^{-\delta} \qquad (1)$$

Where C, β, δ, and γ are positive coefficients to be determined empirically. X_{ij} is the exports of country i to country j. Y_i and Y_j are the national gross domestic products of

countries i and j respectively; D_{ij} is distance between capital cities. Taking log, the base line equation (1) can be conveniently represented in log-linear form as equation (2).

$$\ln X_{ij} = \alpha + \beta \ln Y_i + \gamma \ln Y_j - \delta \ln D_{ij} \qquad (2)$$

The real world situation is too complex to be represented by a simple equation as (2). The geographical size, population, trade policies and openness to trade of importing country are also important factors affecting exports from any country. It is a bilateral relationship and representing such factors by a vector of variables Z_{ij}, and an error term (ε_{ij}) representing other left out variables and the deviation of the selected functional form from the actual relationship whose impact on export is considered to be on average negligible. An important assumption in this model is that the exporting environment in the home country does not impose any restrictions on home country's exports. In other words, this model assumes that there are no significant 'behind the border constraints' to export in the home country due to effective trade policy and economic reforms. Thus, the gravity equation (2) can be written in a more general form as (3). For simplicity of exposition, the time subscript is avoided. Thus, equation (3) in general can be estimated taking panel of data across time and across countries.

$$\ln X_{ij} = \alpha + \beta \ln Y_i + \gamma \ln Y_j - \delta \ln D_{ij} + \lambda Z_j + \varepsilon_{ij} \qquad (3)$$

Researchers have used a number of dummy variables in the set of Z_{ij} variable to augment the model. Particularly, effects of regional trading arrangements, connectivity by road/sea, language affinities, historical relationships, and product preferences shown through brand names have been included. OLS methods or variants of OLS can be used to estimate models such as (3).

3.2. Methodology II

In Methodology I, it was assumed that 'behind the border constraints' to export are not significantly affecting export flows from home country (China and India). This means that the impact of 'behind the border constraints' to export on export flows from China and India are merged with the statistical error term "ε" with 'normal' characteristics in equation (3). However, such an assumption may be restrictive and may not be in line with reality. We would like to elaborate on this by concentrating on important means to promote trade flows between countries. One such means is trade liberalization. Trade liberalization, from a theoretical viewpoint, promotes efficiency by re-allocating resources to productive uses, stimulates competition, increases factor productivity, increases trade flows and thereby promotes economic growth (Wacziarg, 1997). However, empirical facts on trade flows across countries do not always support this theoretical viewpoint. This shows that either the implementation of trade liberalization policies in home country have fully not removed the constraints that exist prior to the reforms, which may be named as 'behind the border constraints' to export or trade openness is not effective in partner countries, which may be named as 'beyond the border constraints' to export. The impact of the latter constraints can be measured from the gravity model, which can be augmented by variables such as non-tariff barriers and weighted average tariffs. On the other hand, identifying and measuring 'behind the border constraints' of home country are very difficult and could be due to socio-economic, institutional and political factors in the home country. For example, large government size (Rodrik, 1998), weak and inefficient institutions in the home country in terms of, for example, custom and regulatory environments, port efficiency and e-business (Bhagwati, 1993; Rodrik, 2000; Wilson et al. 2004; Levchenko, 2004), and political influences

through powerful lobbying by organised interest groups (Gawande and Krishna, 2001) have been found to affect export flows, among other things. Nevertheless, the combined effects of 'behind the border constraints' to export, which may be interpreted as 'economic distance' factor referred by Anderson (1979) and Roemer (1977), on export flows can be measured. This means that the error term of the standard gravity model (3) will be decomposed into "u" indicating the impact of 'behind the border constraints' and "v" indicating 'normal' statistical errors. Thus, apart from the geographical distance constraint, the 'behind the border constraints' need to be included explicitly into the standard gravity model. Such constraints are country-specific constraints (home country), which are due to social-political and institutional factors. Unfortunately, most of the empirical trade models do not consider this deficiency, as they do not incorporate these 'behind the border constraints' into their trade model.

In this situation of decomposing the error term of the gravity model (3) into "u" and "v", OLS estimation leads to biased results. The procedures developed for estimating stochastic frontier production functions (Aigner, Lovell, and Schmidt, 1977; and Meeusen and van den Broeck, 1977), which do not require the researchers to have information on the exact structure of "u", can be used to estimate the modified gravity equation that includes the impact of 'behind the border constraints' to export.

The estimation procedure requires the assumption, which may be verified statistically, that "u" is a truncated normal with mean μ and variance σ_u^2 and takes values between 0 and 1. When "u" takes the value 0, this means that the impact of 'behind the border constraints' are not important and the actual exports and potential exports are the same, assuming there are no statistical errors ("v" = 0). When u takes the value other than 0 (but

less than or equal to 1), this means that the combined effects of 'behind the border constraints' are important and they constrain actual exports from reaching potential exports. Thus, the term "-u" represents the difference between potential and actual output in logarithmic values that is a function of the inefficiencies that are within the exporting countries' control. It is also assumed that error term "v" captures the influence on trade flows of other variables, including measurement error that are randomly distributed across observations in the sample.

Maximum likelihood methods can be used to estimate the above modified gravity model and the magnitude of "u". The computer program FRONTIER 4.1 can be used to estimate the modified gravity model[13].

3.3. Data

Over a small span of time the relative size of the trading partners and the exporting environment in home country are not expected to change significantly. Therefore, for the purpose of analysing trading characteristics of the countries concerned during the recent period, average values of exports during 2000-03 and average size of economies over 2000-02 is considered appropriate.[14] Data on trade restrictions and openness to trade are also taken for the period 2000-02. Thus, there is an inbuilt lag in the value of explanatory variables. The trade data is taken from Direction of Trade Statistics of International Monetary Fund (IMF). Data on real gross domestic product (GDP), which is a proxy for the size of the economy; population (POP), area (AREA), and tariff barriers are taken

[13] Details of the estimation procedure of FRONTIER 4.1 is given in Coelli (1996).

[14] Since 2001 is characterised for a number of political and terrorist disturbances, including data of 2000 is expected to provide a better average, while considering the most recent available consistent data for countries of interest. Further, there are statistical advantages in taking average values as it reduces the problems of heteroscedasticity and functional forms leading to more reliable interpretation of the relationships.

from the World Development Indicators (WDI) 2004 and WDI-CDROM 2004. The most recent information on weighted average tariff rate for the primary products (TBPR), manufactured products (TBMFG) and all products (TBALL) have been used. Openness to trade is measured by trade in goods taken as fraction of the gross domestic product (TRDGZ). Perception about prevailing restrictions on imports published in World Competitiveness Report 2004 of World Economic Forum (WEF) (Sala-i-Martin, 2004) has been used to proxy non-tariff barriers. The non-tariff barrier is calculated as an index (NTBI) on a scale of one to seven where lower values of index indicate higher non-tariff barrier. Thus, the expected sign of NTBI is positive. Factors such as macroeconomic environment, the quality of public institutions, and technology are also important determinants, which are likely to affect the intensity of import across countries. WEF publishes growth competitiveness index (GCI) on a scale of 1 to 7 where higher value indicates higher level of competitiveness. The GCI is founded on the above three factors and interestingly, GCI and NTBI are highly correlated (Sala-i-Martin, 2004). Therefore, these variables are used selectively. All variables are taken in logarithms or fractions.

4. Empirical Results and Discussions

4.1. Absence of "Behind the border constraints"

The specific models estimated in this study for China and India were as follows:

$$\ln X_{ij} = \alpha + \beta \ln GDP_j + \gamma \ln DIS_{ij} + \delta \ln POP_j + \varepsilon_{ij} \quad (4)$$

$$\ln X_{ij} = \alpha + \beta \ln GDP_j + \gamma \ln DIS_{ij} + \delta_1 \ln POP_j + \delta_2 TRDGZ + \delta_3 LAREA + \delta_4 TBPR + \delta_5 NTBI + \varepsilon_{ij} \quad (5)$$

The variables are as defined earlier. In the place of NTBI, the variable GCI was also used in the estimation for India. The selected sample sizes of the partner countries represent about 90 percent and 80 percent of exports from China, and India respectively and therefore, the estimated models can be considered to be representative model for these economies in a general equilibrium framework. The average distance of exports in the case of China is much larger as compared to India (Table 1). All the equations were estimated by OLS and a complete diagnostic result is provided in the respective tables. A series of estimations have been done to delineate the strengths and weaknesses of both countries. At the outset, the basic model (4) with GDP, distance, and population with respect to partner countries was estimated for China and India and the results are reported in Table 2. The base model was further expanded to include the proxies of openness and trade barriers and the results are presented in Table 3.

Almost all the estimated equations are statistically consistent and the R-square values are reasonably high. The magnitudes of the coefficients are markedly different between China and India. Whether, the size and significance of these variables are robust or not in the presence of other variables, is an important issue discussed latter.

The distance variables in both models of China have smaller coefficients than those of India. It appears that the production process in China, which is characterised by large manufacturing volumes, is able to absorb the distance effects much more efficiently than India. The labour cost in China is comparatively lower than that in India and the advantage derived from this is reflected in the size of the distance variable. It may be noted that average distance of China from its trading partners is greater than that of India from its trading partners. Therefore, India has to be more efficient in cost management in

order to compete with China in the same product group or else it has to design alternative strategies related to product and market. For example, empirical studies examining the costs of doing business in India often have cited that private firms have to have their own power generators in order to avoid the problem of power shortage, which tend to increase their production costs (Rajan, 2006). Further, China is more concerned with other barriers to trade rather than distance. For example in Model CHN-14 (Table 3), the distance variable becomes insignificant, when tariff barrier to primary sector products is introduced. Also as new variables are added, the coefficient of distance variable in China's models go on reducing. Therefore, it can be safely argued that China's cost advantages are great instruments to boost their exports compared to India.

The coefficient of size of the economy measured by GDP is consistently significant in all formulations. The size of this coefficient is larger for China than that for India in both models. However, when variables such as openness to trade and growth competitiveness are added in the model, the size of coefficient of GDP reduces for China and India (See Table 3 in comparison with Table 2). Nevertheless, the coefficient of GDP is larger for China than for India. This means that clearly India has to go a long way ahead to manufacture and export premium products consumed in richer countries as compared to the manufacturing activities in China.

Population is indirectly covered in the size of the economy, it can be argued to have independent effects also. For example, subsistent economies also need basic amenities of livelihood such as cheap clothing and food. Countries such as China and India, which have fairly high degree of mechanised production system with cheap labour could be

potential source of imports provided the importing country has conducive trade regime. This fact is revealed on comparing the coefficients of population variable across models. Openness to trade variable (TRDGZ) is introduced in model (5) along with the area variable. Clearly, exports flow more from both countries to those countries, which trade higher proportion of their GDP. The coefficient of TRDGZ is almost equal for both China and India. In the case of China, GCI is not a significant variable. Instead tariff barriers to primary sector products are more important in reducing its exports. Even non-tariff barriers are insignificant in affecting China's exports. On the other hand, in the case of India, non-tariff barriers and growth competitiveness index act alike in affecting its exports growth. It may be recalled that expected sign of coefficient of NTBI is positive because higher value of NTBI means lesser problems in importing while lower values mean the opposite.

To calculate potential trade, it is important to estimate the equation in a general equilibrium framework so that as many trading partners as possible indicating as much distances as possible are covered. Nevertheless, such a general equilibrium framework may not be suitable to identify which of the two countries is negotiating the distances more efficiently, given several other factors affecting trade. Therefore, in this exercise we put one country in the shoes of the other and see the simulated exports. However, it is not denied that such exercises may lead to even completely impossible results in the case of individual countries. Therefore, the calculated values are in the case of estimated potential exports. Nevertheless, the interest is in the direction of movement of the aggregate exports. The key difference in export performance is expected to arise due to the change in the values of the distance variable, as all other variables remain more or

less the same across trading countries. Models CHN-14 and IND-14 given in Table 3 were used for simulating the exports from each of these countries given the coefficient of the other. The simulated gain/loss in exports is presented in Appendix 1 and 2.

As a summary, when the coefficients of China are applied to calculate India's exports, it results in very high values for India (672.9%) implying that if India enjoys China's exporting environment, it would increase its exports drastically. On the other hand, when India's coefficients are applied to China, it leads to lowering of exports from China by 91.7%, clearly indicating that China has been operating at much higher efficiency levels than India. Thus, there is much for India to learn from China to improve its export performance. This result also implies that there are significant 'behind the border constraints' to export more in India than in China, which is examined in the next section.

4.2. Presence of "Behind the border constraints"

The following modified augmented gravity model was estimated using data from 2000 to 2003 and the results are presented in Table 4:

$$\ln X_{ijt} = \alpha_1 + \beta \ln GDP_{jt} + \gamma \ln DIS_{ijt} + \delta_1 \ln POP_{jt} + \delta_2 TRDGZ_t + \delta_3 LAREA_t + \delta_4 TBPR_t + \delta_5 NTBI_t + v_{jt} - u_{it} \quad (6)$$

The variables are as defined earlier and t refers to time, which takes values 1,2, 3,and 4 respectively for data from 2000,2001,2002, and 2003. The variable u_i is assumed to be non-negative truncations of the normal distribution with mean, μ, and variance, σ^2. Further, the assumption that $u_{it} = \eta_{it} u_i = \{\exp[-\eta(t-T)]\}u_i$ means that 'behind the border constraints' to export have been varying over time. This assumption implies that if the estimate of η is positive then the 'behind the border constraints' decline

exponentially to its minimum value, u_i, at the last period, T of the panel. In this case, the gap between potential and actual exports has been declining.

The coefficient estimates for constant, which is larger than the estimates of equation (5) as expected, and all variables are significant at least at the 5 per cent level. Further, these coefficient estimates have the signs that concur with the theory. The coefficient γ presents a measure of the total variation that is due to country specific 'behind the border constraints' to export. The γ coefficient is an average over the time period. That is, $\gamma = [(\Sigma_t \sigma^2_{ut}) / (\Sigma_t \sigma^2_{ut} + \sigma^2_{vt})] / T$, where is σ^2_{ut} is the variance of the one-sided error term at period t, σ^2_{vt} is the variance of the random error term at period t and T is the total number of time periods. The estimate of γ is large and significant at the 1 per cent level. This means that the decomposition of the error term into u and v in equation (6) is valid for the present data set and the deviation of actual exports from potential exports is due to "behind the border constraints" and not by just random chances. It may be interesting to see how do the γ coefficients vary over time. This is equivalent to examine whether the influence of 'behind the border constraints' to export within the home country have been decreasing from one period to another or not. To put it differently, whether policy reforms towards promoting exports in China and India have been effective during the sample period. Information on the temporal behaviour of γ can be obtained by examining the η coefficient.

The η coefficient considers whether the impact of country specific 'behind the border constraints' on reaching potential exports have been decreasing from one time period to another or not. If the η coefficient were positive, then the impact of country specific 'behind the border constraints' to export would be decreasing over time. If,

however η were zero or not significant, then the impact of country specific 'behind the border constraints' to export could be considered to be constant over time. In the above model, the η coefficient is positive and significant for China, while it is positive but not significant for India. This implies that policy reforms in India do not appear to be effective in reducing 'behind the border constraints' to export during the sample period, though policy reforms seem to be effective in China.

Overall, from the above results the following can be inferred. The countries specific 'behind the border constraints' (measured by "u") contribute a large and significant proportion to the variation in the gaps between potential and actual exports in the model (6) for both China and India. This point is further emphasised by the significance of γ. In other words, country-specific factors including trade policy are important determinants of potential and actual exports. The results given in Table 4 indicate that the impact of 'behind the border constraints' to export has reduced over time during the sample period for China and not for India. With the existing trade resistance between China and its trading partners, and India and its trading partners, China has been able to reduce the gap between its potential and actual exports with majority of the member countries more than India over time. The analysis shows that on average about 86 percent of potential exports has been realized by China, while only about 68 percent of potential exports has been realized by India. This clearly indicates that there is an urgent need to design and intensify trade policy reforms to enhance its effectiveness towards reducing constraints to export in India and in this respect, India certainly can learn from China's experience, which requires a detailed study.

5. Conclusions

Thus, China's export performance contrasted with that of India over the years indicate that an important determinant of the benefits which developing countries can reap from globalization is whether 'behind the border constraints' to export can be decreased consistently through appropriate policy measures. Though this study did not explore what kind of 'behind the border constraints' need to be eliminated in India to facilitate the realization of its export potential, conjectures can be made from China's experience. The adoption of technology from abroad is important for India, which appears to be constrained by mainly lack of infrastructure.

"Catching up with China" is a worthwhile slogan for India's new millennium, along with a national commitment to grow at 10 percent a year. Both goals may be feasible and attainable, and within India's grasp, provided infrastructure and institutional reforms are intensified effectively. China has not only managed a high rate of investment, but has kept the prime lending rate (PLR) at a relatively low 8 percent; the interest rate spread between lending and deposit rates was confined to 2.6 per cent. In India, the PLR is 12 per cent, while the interest rate spread is at 3.4 percent. Clearly, China's configurations are more conducive to high domestic investment. Even though the Indian stock markets were established much before China's, in terms of market capitalisation, China is ahead a t $231.3 billion, which is 2.20 times that of India's. Chinese banks extend credit, measured as a ratio of GDP, at a rate of two-and-a-half times India's. Even in fiscal decentralisation, the Chinese Central government transfers 51.4 percent of the tax revenue to the provinces, while in India the figure is about 36.1 percent.

The foregone discussion has revealed important findings, which can be helpful in making strategies with respect to trade policy in India. The cost competitiveness of China appears to help its exports in negotiating large distances. India needs to learn from China. It has to develop cost advantage and product process so that high value markets can be captured. Duties and taxes are still on the higher side as compared to world standards, and they need to be reduced further, as higher duties and taxes lead to higher domestic prices and reduced market size by reducing domestic consumption, and hence deprive the scale-of-economy effect and make Indian firms less competitive. A larger consumption base will lead to increase in labour productivity through competition and provide backstop to domestic producers against external shocks. Duties merit reduction on several other grounds also. The proven technological potential of the country can best be exploited and made robust by exposing the economy to external competition by strategically reducing tariffs. Low-level tariffs have strong signalling effects, besides reducing inefficiencies in resource allocation and operations. A relatively restrictive foreign investment regime needs review. FDI flows should be viewed as a vehicle of technology transfer and spillover effects in production process. Analyses indicate that FDI is helpful in increasing exports. Continuation of small-scale industry reservation in the case of many sectors of production deprives the benefits of scale economy and a strategic decision of de-reservation should be taken for all the products where export potential exists. The poor quality of public infrastructure including power and transport remains a key problem for foreign investment, as also domestic production and related costs. The sooner it is rectified the better and, therefore, it is argued that the government should continue its efforts in building infrastructure instead of managing production units. Relatively

sluggish clearing at ports and customs houses and rampant corruption are increasing costs to domestic manufactures and they must be addressed through technological measures and a greater participation of the private sector. The state-owned port trust is extremely inefficient and the government has rightly assigned some responsibilities to international operators recently.

It is not that India has not proved its successful performance in trade sector. As argued by Rajan (2006) India has proved that it could compete in the services trade sector despite the poor infrastructure in high-value-added, high-skill industries where the output is relatively lightweight and relatively less dependent on ports and electricity. For example, during the 1990s, India's service sector grew at an average annual rate of 9 percent, contributing to nearly 60 percent of the overall growth rate of the economy. Further, India's exports of services grew annually on average at 17 percent per year in the 1990s, which is about two and a half times faster than the domestically focused part of the services sector (Hoekman, 2004). Thus, it is argued that India should nurture this comparative advantage effectively by relaxing 'behind the border constraints' such as over regulation of higher education system. The question of how much India should follow the East Asian growth model of labour intensive manufacturing needs a careful study in the light of India's surging export performance of its software industry and the existing causality between services sector and manufacturing.

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Table1: Summary matrix of distances (kilometre) being negotiated by China and India across the sample structures of trade partners

Sample size	China 77	India 77
Mean	9931.5	8490.4
Minimum	956.2	678.6
Maximum	19286.0	16937.4

Table 2: Base Gravity model with distance, aggregate gross domestic product (GDP) in terms of US$ at 1995 prices and population for China and India, 2000-2003

Code	China	India
Model Number	CH-9	IN-9
Sample size	77	77
CONSTANT	-7.071** (2.951)	-4.398*** (2.437)
LDIST	-0.773* (0.180)	-1.021* (0.175)
LGDP	0.882* (0.068)	0.633* (0.059)
LPOP	-0.076 (0.097)	0.149+ (0.095)
R-Squared	0.836	0.793
S.E.	0.870	0.856
Diagnostic Test		
Serial Correlation	0.386 [0.53]	0.08 [0.7]
Function Form	1.072 [0.30]	0.791 [0.37]
Normality	28.126 [0.0]	0.252 [0.88]
Heteroscedasticity	3.28 [0.07]	0.109 [0.74]

Note: When there is problem of heteroscedasticity, White heteroscedasticity adjusted standard errors are presented. Values in parenthesis () are standard errors and values in square brackets [] Are P-values. * Significant at the per cent level; ** significant at the 5 per cent level, and *** significant at the 10 per cent level and +significant at the15 per cent level.

Table 3: Augmented Gravity model with area, openness to trade and other trade barriers for China and India, 2000-2003.

Code	China	India	India
Model Number	CH-14	IN-13	IN-14
Sample size	77	77	77
CONSTANT	-13.858* (3.395)	-11.680* (2.616)	-10.94* (2.540)
LDIST	-0.269 (0.202)	-0.567* (0.182)	-0.542* (0.184)
LGDP	0.641* (0.132)	0.409* (0.086)	0.300** (0.123)
LPOP	0.432*** (0.229)	0.666* (0.150)	0.742* (0.169)
TRDGZ	0.007* (0.0025)	0.0060** (0.0027)	0.0056** (0.0027)
LAREA	-0.141 (0.093)	-0.145*** (0.078)	-0.160** (0.079)
TBPR	-0.032*** (0.018)		
NTBI		0.355** (0.146)	
GCI	0.313 (0.240)		0.560** (0.228)
R-Squared	0.870	0.846	0.846
S.E.	0.790	0.750	0.75
Diagnostic Test			
Serial Correlation	0.006 [0.94]	0.319 [0.57]	0.71 [0.40]
Function Form	0.910 [0.34]	0.093 [0.70]	0.195 [0.66]
Normality	56.90 [0.00]	3.011 [0.22]	0.591 [0.74]
Heteroscedasticity	5.280 [0.02]	0.355 [0.55]	0.529 [0.47]

Note: When there is the problem of heteroscedasticity, White heteroscedasticity adjusted standard errors are presented. Values in parenthesis () are standard errors and values in square brackets [] Are P-values. * Significant at the1 per cent level; ** significant at the 5 per cent level, and *** significant at the10 per cent level and +significant at the 15 per cent level.

Table 4: Modified Augmented Gravity model with area, openness to trade, other trade barriers, and 'behind the border constraints' to export for China and India, 2000-2003.

Code	China	India
Sample size	77	77
CONSTANT	-12.675* (3.262)	-8.56* (2.228)
LDIST	-0.258 (0.208)	-0.549* (0.178)
LGDP	0.644* (0.138)	0.314** (0.118)
LPOP	0.429** (0.217)	0.728* (0.175)
TRDGZ	0.006* (0.0023)	0.006** (0.003)
LAREA	-0.139 (0.096)	-0.147** (0.072)
TBPR	-0.036** (0.016)	
GCI	0.322 (0.254)	0.566** (0.232)
Sigma square	0.543*(0.115)	0.642*(0.221)
Gamma	0.834*(0.226)	0.875*(0.232)
Eta	0.138**(0.068)	0.067(0.121)
Mu	0.43**(0.22)	0.56**(0.272)
Loglikelihood	-157.68	-120.67

Note: Values in parenthesis () are standard errors. * Significant at the1 per cent level; and ** significant at the 5 per cent level.

Figure 1: Pattern of Economic Growth of India

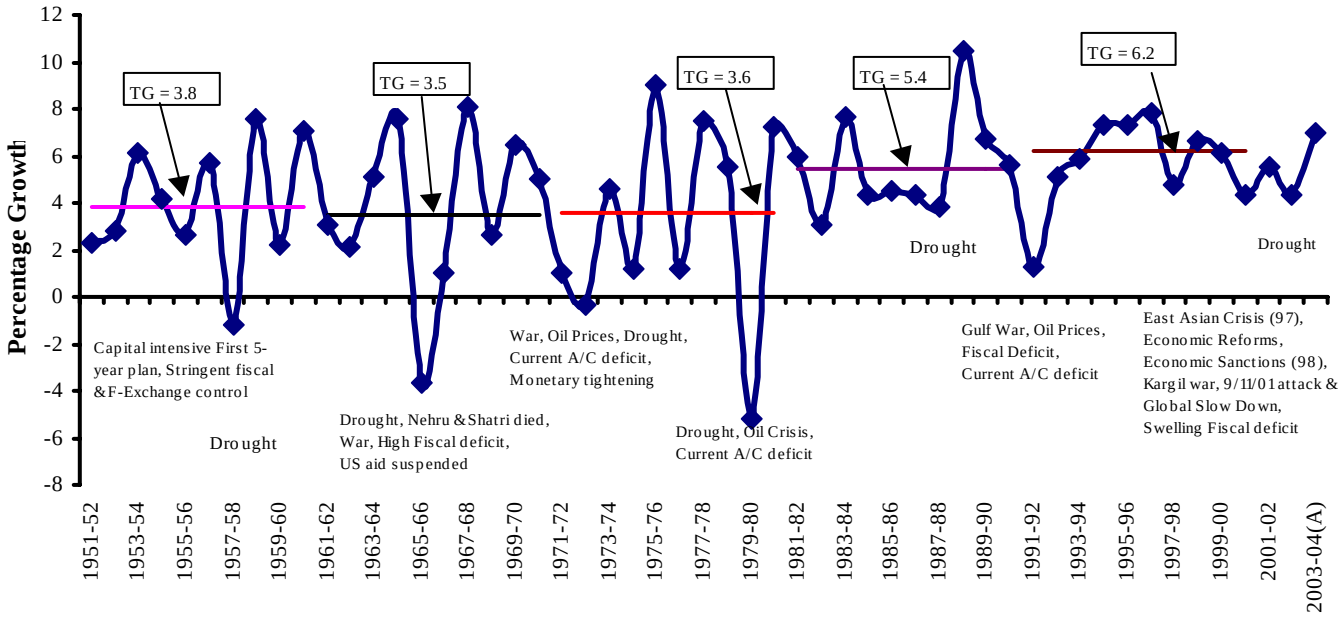
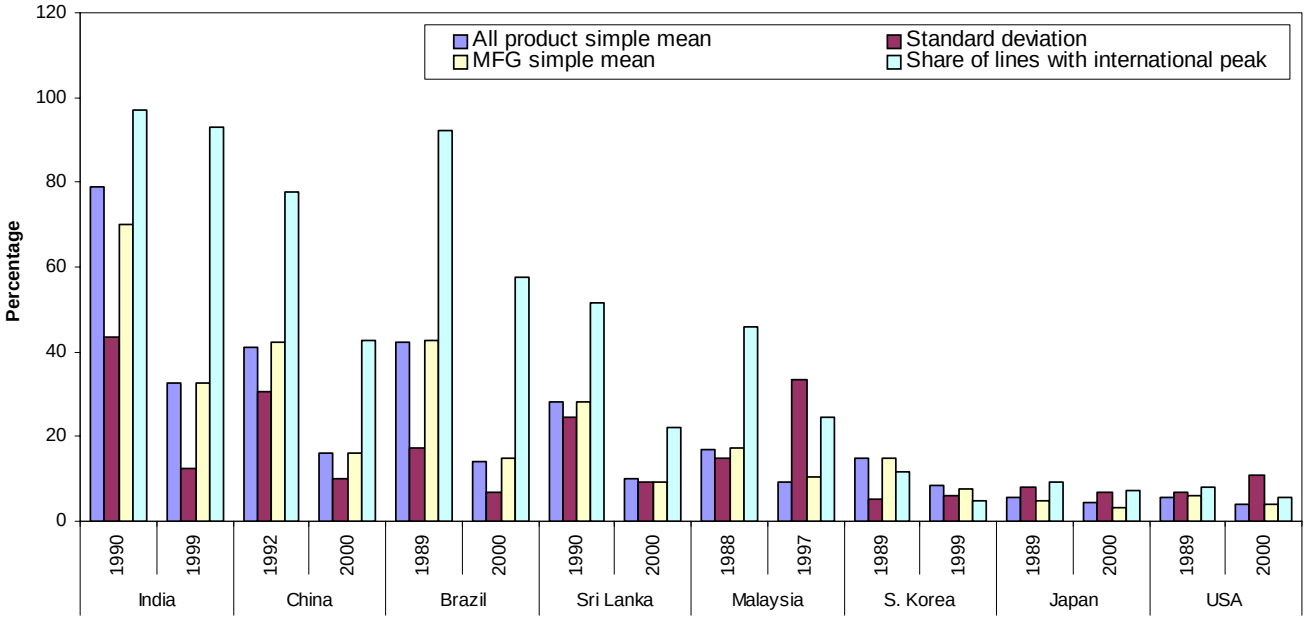


Figure 2: Trade reforms in terms of tariff policy across selected countries



Source: World Development Indicator, 2002

Appendix -1

Simulated Annual Potential Exports of China using Coefficients from India Model

	Simulated potential exports (US$ million)	Percentage difference of simulated potential exports over actual average exports
	CHN as IND	CHN as IND
Algeria	63.6	-82.31
Argentina	63.4	-90.11
Australia	193.7	-97.21
Austria	213.3	-76.11
Bangladesh	342.4	-77.45
Bolivia	9.1	-16.65
Brazil	346.7	-84.04
Cameroon	20.3	-66.43
Canada	321.0	-95.49
Chad	4.7	313.41
Chile	80.2	-94.08
Colombia	92.0	-73.70
Costa.Rica	22.0	-80.32
Denmark	207.0	-87.59
Dominican.Republic	36.6	-71.85
Ecuador	23.2	-88.02
Egypt	170.3	-83.61
El.Salvador	32.2	-82.25
Ethiopia	52.1	-46.23
Finland	186.4	-88.15
France	898.8	-88.36
Germany	1825.9	-90.36
Ghana	40.9	-80.69
Greece	119.2	-87.97
Guatemala	23.4	-91.83
Honduras	10.6	-90.21
Hungary	155.9	-91.47
Indonesia	599.2	-86.29
Italy	639.3	-90.91
Jamaica	11.1	-88.00
Japan	5197.4	-91.33
Jordan	41.9	-89.43
Kenya	41.9	-80.25
Korea.RP.(S)	2947.7	-84.29
Madagascar	15.3	-89.25
Malawi	16.1	53.63
Malaysia	651.3	-89.27
Mali	9.3	-79.37
Mauritius	15.9	-91.89

	Simulated potential exports (US$ million)	Percentage difference of simulated potential exports over actual average exports
	CHN as IND	CHN as IND
Mexico	363.7	-89.75
Morocco	88.4	-81.06
Mozambique	15.5	-55.61
Netherlands	663.2	-94.68
New.Zealand	54.1	-93.84
Nicaragua	7.7	-89.03
Nigeria	149.2	-87.94
Norway	105.3	-88.28
Pakistan	378.0	-68.84
Panama	10.3	-99.51
Paraguay	6.8	-96.83
Peru	53.9	-80.98
Phillipines	548.8	-86.85
Poland	245.7	-82.36
Portugal	144.7	-66.64
Romania	79.2	-77.56
Russia	370.0	-90.37
Senegal	17.6	-78.49
Singapore	1212.1	-89.12
South.Africa	190.4	-89.68
Spain	501.2	-88.20
Sri.Lanka	89.1	-88.81
Sweden	272.5	-84.38
Switzerland	276.8	-84.13
Tanzania	39.3	-71.01
Thailand	921.5	-81.27
Trinidad.And.Tobago	12.6	-75.40
Tunisia	72.5	-50.66
Turkey	267.8	-82.85
Uganda	37.2	13.15
United Kingdom	1101.0	-92.84
United States	3611.7	-96.74
Uruguay	11.7	-94.77
Venezuela	46.5	-89.64
Zambia	12.4	-66.47
Zimbabwe	15.4	-61.37

Appendix 2

Simulated Annual Exports of India using Coefficients from China Model

	Simulated potential exports (US$ million)	Percentage difference of simulated potential exports over actual average exports
	IND as CHN	IND as CHN
Algeria	401.8	574.4
Argentina	917.0	834.8
Australia	2417.0	412.9
Austria	3158.2	3286.5
Bangladesh	968.9	-14.2
Bolivia	58.9	1635.3
Brazil	4155.2	911.0
Cameroon	89.4	462.0
Canada	4682.1	530.2
Chad	13.4	350.4
Chile	711.6	790.5
Colombia	596.5	754.8
Costa.Rica	171.3	1529.2
Denmark	2602.5	1257.1
Dominican.Republic	254.9	1640.3
Ecuador	166.4	1617.1
Egypt	1030.4	239.2
El.Salvador	180.4	3586.1
Ethiopia	193.1	166.7
Finland	1979.9	2850.7
France	14365.2	1209.8
Germany	27411.3	1181.0
Ghana	104.0	15.7
Greece	1462.5	904.4
Guatemala	162.3	674.2
Honduras	54.9	249.9
Hong.Kong	15387.4	511.9
Hungary	1259.7	1874.0
Indonesia	3828.3	522.9
Italy	10234.4	632.0
Jamaica	70.2	816.2
Japan	40031.6	2055.9
Jordan	189.8	113.9
Kenya	151.0	-9.2
Korea.RP.(S)	9952.2	1095.2
Madagascar	82.3	611.1
Malawi	48.5	97.0
Malaysia	5286.0	680.6
Mali	40.5	67.9
Mauritius	113.3	-32.8
Mexico	3057.8	833.6
Morocco	295.0	331.5

	Simulated potential exports (US$ million)	Percentage difference of simulated potential exports over actual average exports
	IND as CHN	IND as CHN
Mozambique	60.2	47.4
Netherlands	9688.7	925.4
New.Zealand	611.2	721.1
Nicaragua	43.0	1725.0
Nigeria	469.9	28.2
Norway	1401.1	1759.7
Pakistan	1962.5	885.1
Panama	82.1	134.3
Paraguay	61.5	704.7
Peru	338.1	861.5
Phillipines	2308.9	695.0
Poland	2004.6	1434.3
Portugal	1655.4	965.9
Romania	477.3	1343.1
Russia	3162.9	392.0
Senegal	92.0	227.4
Singapore	15646.4	1193.6
South.Africa	1996.9	424.8
Spain	6681.6	785.7
Sri.Lanka	425.4	-45.6
Sweden	3210.8	1626.6
Switzerland	3121.1	753.4
Tanzania	117.9	8.7
Thailand	5243.0	698.9
Trinidad.And.Tobago	114.8	843.6
Tunisia	245.6	382.2
Turkey	2353.7	471.8
Uganda	160.7	156.8
United Kingdom	14061.0	453.9
United States	50080.9	388.1
Uruguay	139.0	479.7
Venezuela	377.5	944.5
Zambia	54.9	95.9
Zimbabwe	93.2	510.7

Appendix 3

Relative competitiveness index of infrastructure quality across selected countries

	Overall Infrastructure quality		Air Transport Infrastructure quality		Railroad Infrastructure quality		Port Infrastructure quality		Electricity supply quality		Telephone Infrastructure quality		Postal Infrastructure quality	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
India	3.2	69	4.8	47	4.7	20	3.2	69	3.0	85	6.0	45	4.3	51
China	3.7	54	3.9	68	3.7	37	3.7	54	4.2	60	5.4	57	4.7	47
Japan	5.6	16	5.3	31	6.7	2	5.6	16	6.8	8	6.8	6	6.8	3

Note: Total number of countries considered 102. Score of 1 =underdeveloped and 7 = as extensive and efficient as World's best. Source: Global Competitiveness Report 2003-04, World Economic Forum.