A Comparative Analysis of China's and India's Recent Export Performances*

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Abstract
Drawing on the convergence theory, one would expect that the export performance of India (a latecomer to integrating with the global economy) would be at least on par with that of China because China's performance has happened as predicted by the theory. This study, using performance measures based on the endogenous growth theory that internalizes 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 bolstered effectively to catch up and to overtake China.

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 is, measured in terms of per capita income in current interna-

* This paper was presented at the Asian Economic Panel Meeting at the Brookings Institution, Washington, D.C., on 10 April 2007. Comments and suggestions on an earlier version by discussants Lael Brainard, Brookings Institution, and Zhang Xiaojing, Chinese Academy of Social Sciences, and participants are gratefully acknowledged. A special thanks to Wing Thye Woo for commissioning this study for this Panel Meeting.

1 Woo (1998), Sachs and Woo (2000), and Lardy (2002) have provided a comprehensive exposition about the factors behind China's successful economic performance.

tional dollars with purchasing power parity, China was lagging behind India by US$ 223 in 1980, but overtook India with a difference of US$ 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 US$ 3,320 and US$ 7,150 for India and China, respectively. The dynamic growth performance of China and the 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? Although 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. There is now a 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 opening up the economies for export-led growth through trade liberalization is a crucial factor among others, which significantly influenced the growth performance.[3]

Is China's growth performance anything special? When China's growth experience is examined against the growth patterns 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 do not seem to be any significant miracles in the growth performances of China when compared with that of Japan.[5] Nev-

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.

3 For example, some authors found differences in the political system as the key instrument creating variations 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 catch-up process for a country is based on the IMF's notion of having an annual rise in exports of more than 10 percent for 3 years continuously (IMF 2004, chapter II).

5 In this context, it is worth noting the publication *Growth without Miracles* by Garnaut and Huang (2001).

ertheless, China's growth performance looks more impressive if its integration into the global economy in terms of international trade in goods is considered.

For example, China's total merchandise trade increased from US$ 1,155 billion in 2004 to US$ 1,422 billion during 2005. The surge in China's exports has drastically changed the structure of East Asia's trade surplus with the United States and the European Union in favor of China from Japan. Drawing on the convergence theory, if, as a latecomer, China has been able to improve its export performance faster, why not India, which opened up its economy much later than China? It is in this context that this paper examines the merchandise export performances of China and India with the following three empirical questions: (1) If China's exporting environment is emulated by India, what would be the latter's export performance?; (2) If India's exporting environment is duplicated by China, what would be the latter's export performance?; and (3) How far are China and India from reaching their exports potential with their trading partners given the existing "behind the border" constraints and "beyond the border" constraints to exports?[6]

The following section briefly describes important trade policy reforms in China and India. Section 3 discusses the concept and measurements of potential exports and data, which is followed by empirical estimations of different measures of potential exports from China and India with their trading partners. This section also provides the simulation results of export performances in 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 improve its trade policy reforms.

2. Trade policy reforms of China and India

2.1 China

Trade policy in China underwent a major change between 1979 and 1980, when the central government decided to establish four Special Economic Zones (SEZs) in two coastal provinces, Guangdong and Fujian, to attract foreign direct investment and

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 and other institutional rigidities of partner countries, which generally influence the shifting of the export frontier.

new technologies (National Statistical Bureau, various years; henceforth, NBS(a)). This was the beginning of China's Open-Door Policy. 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 two-thirds of China's total exports in 1990 (China Custom Statistical Bureau 2002). The openness of the Chinese economy was accelerated in the 1990s, after Deng Xiaoping's push for faster economic reforms and openness in 1992. Twenty inland cities became "open cities" that could enjoy a series of preferential policies in 1993. Border areas in North and West China, namely, Xinjiang, Inner Mongolia, Heilongjiang, Yuannan, and Guangxi, were also opened to border trade (Wang 2004).

FDI, which was only US$ 1.7 billion in 1985, increased dramatically in the 1990s. In 1995, FDI increased to US$ 37.5 billion, and then to US$ 40.7 billion in 2000, and to US$ 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 shifted immediately from import-substitution to export-orientation. For a long period during the reform era, it was a mix of both import-substitution and export-orientation, but gradually shifted toward the East Asian growth model of export-oriented growth. High import tariffs remained in China, although the real tariff rate was far lower, due to various preferential policies and smuggling. In 1995, for example, the 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 (National Statistical Bureau, various years; henceforth NBS(b)).

In the 1980s and 1990s, there were also trade-related investment measures (TRIMs) such as the requirement of domestic components in production, and foreign exchange balance requirements. Despite these measures, the foreign-invested industries were not foreign-exchange earners in the 1980s and the early-to-mid 1990s because their exports could not exceed their imports before 1998, though they did contribute to economic growth, employment generation, and an increase in foreign trade (Wang 2004).

7 This includes four Minority Autonomous Regions and three Central-Administrated Municipalities. The total number became 31 later (NBS(a)).

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. From 1982–92, the nominal tariff rate, as an average, reduced from 56 percent to 43 percent. From 1992–03, it further reduced from 43 percent to 11 percent (Wu 2003).[8] The average tariff in 2005 was 9.9 percent. Non-tariff barriers, for example, import licensing and other requirements for special import approvals, were reduced in the 1990s and eliminated in the early 2000s as the government's commitment toward joining the WTO grew.

There were major changes after the WTO accession in 2001, too. Concerning TRIMs, mainly requirements on domestic components, export performance, and foreign exchange balance of foreign enterprises, were removed. Upon China's WTO accession in 2001, the banking/insurance and telecommunication sectors, which were not opened to FDI before, were opened.[9] Not only were the trade policies relating to FDI changed, trade liberalization also occurred in the domestic sectors. More and more manufacturers that produced export goods were also permitted to directly purchase inputs and sell products overseas. 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 2 decades.[10]

Nevertheless, there is room 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 favors FDI, has resulted in rent-seeking behavior and inefficiencies. In addition, there are needs for further policy reform toward

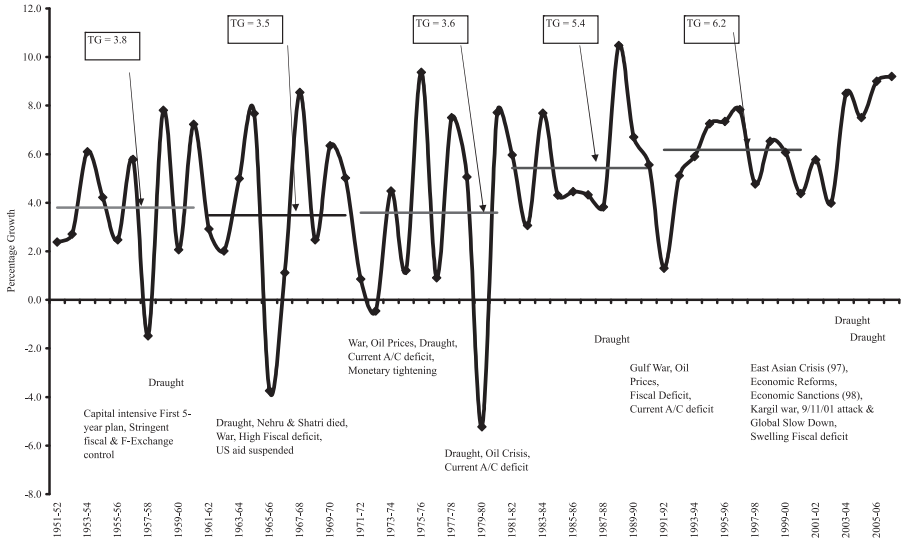
8 As mentioned earlier, the actual tariff rate in the 1990s should be far below the officially announced rate because of various tariff exemptions and deductions, and smuggling. This should not be the case in the early 1980s, because the coverage of policy preferences on tariff deduction was only limited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

9 Sachs and Woo (2003) 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.

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

11 Drysdale, Huang, and Kalirajan (2000) argued for the need for more trade policy reforms to enhance China's trade efficiency. Gang Fan and Xiaojing Zhang (2003) discussed how the further reform agenda can be designed to achieve another period of 2 decades of high growth.

Figure 1. Pattern of economic growth of India



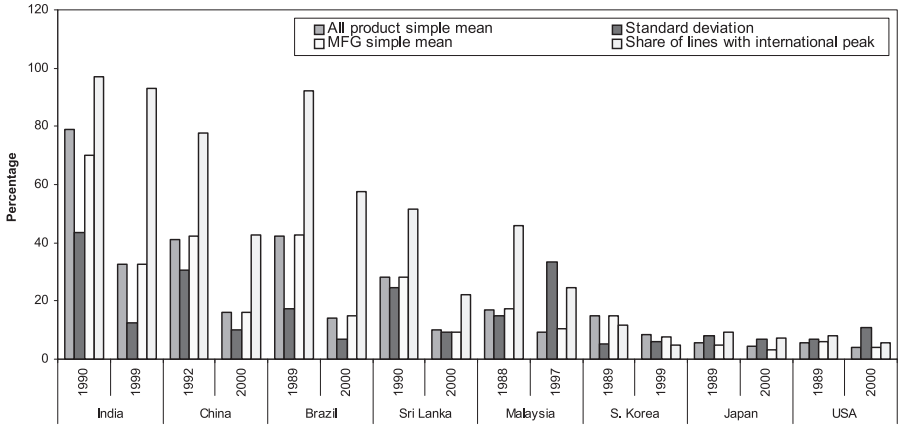
transparency and better business environment (Sachs and Woo 2003; Huang and Khanna 2003).

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 events responsible for slowdown episodes and includes 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 China. Customs tariffs are now lower and quantitative restrictions on imports have been eliminated. Export restrictions have been reduced along with the implementation of various export promotion measures. However, the pace of tariff reforms slowed after 1996–97. Whereas the peak rate of duty has been reduced gradually, the average tariff rate remained broadly unchanged at about 30 percent during 1997–02, though the average tariff was about 18 percent in 2005, which is almost double that of China. This tariff rate is also high by the current world standards.

Figure 2 shows plots of four indicators of tariff-related trade barriers, all-products simple mean, standard deviation of tariff lines, simple mean of tariff lines for manu-

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



Source: *World Development Indicator, 2002.*

factured 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-products 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 tariff without much analysis.

There are also concerns about the institutional role in determining tariffs. At least four institutions are assigned the role of fixing tariffs in one way or the other. Among them, the Tariff Commission is the most relevant. The commission has resources to determine tariffs with more techno-economic analysis, but it has never been involved in tariff determination or regulation since its inception in September 1997. Then, there is the Tariff Research Unit (TRU) (presumably the most effective in determining tariffs) in the revenue department of the Ministry of Finance, 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 antidumping directorate in the Ministry of Commerce to look into complaints of dumping of agricultural products such as skimmed milk powder from the European Union. Thus, lack of institutional coordination may not be overlooked.

Though the medium-term exports strategy (MTES 2002–07), which was announced in January 2002, aimed to increase India's share in world trade from about 0.7 per-

cent to 1 percent by 2006–07, the current target is to reach 1.5 percent 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 US$ 90 billion that is approximately 0.89 percent of total global exports worth US$ 10,121 billion. China's share, on the other hand, increased from 6.67 percent in 2004 to 7.52 percent in 2005 with the country exporting goods worth US$ 762 billion during the year. Although India's share in world total merchandise exports surged from 0.4 percent in 1992 to 0.8 percent in 2002, it took 3 long years for India to move another step farther. At this rate, the target of reaching 1.5 percent 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 aim higher.

The 5-year Export and Import (EXIM) Policy (2002–07) announced on 31 March 2002 intended to remove 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 with a special focus on the cottage sector, handicrafts, and assistance to states for infrastructure development for exports (ASIDE). New private sector-run SEZs were created 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 the SEZ and setting up of units, 100 percent FDI in the manufacturing sector under the automatic route, 100 percent income tax exemption for the first 5 years, and 50 percent tax exemption for 2 years thereafter. Other incentives included sub-contracting part of production abroad, reimbursement/exemption for central sales tax on domestic purchases by the SEZ units and retention of 100 percent foreign exchange earnings in the Exchange Earners Foreign Currency (EEFC) Account. In terms of financing SEZs, overseas banking units (OBUs) that were exempt from cash reserve and statutory liquidity requirements (CRR and SLR, respectively), 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 exempt from external commercial borrowing (ECB) restrictions and were allowed to make overseas investments and carry out commodity hedging. SEZs were exempt 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.

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

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 eased greatly, but investors continue to face a daunting regulatory framework beyond the foreign investment regime itself.

Although policy initiatives are yielding favorable results to some extent, the foregoing discussion indicates that there are several concerns and issues, which mainly involve behind the border constraints issues, that need to be addressed if exports are to grow faster.

How effective have these trade policy reforms been in improving the 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 times and compare it with another time within the country, or compare 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 compare it with its own actual exports. Such a measure provides a better understanding of the link between trade policies and export performance, which is explained in the following.

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, 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." The endogenous growth theory popularized by Romer (1986) and Lucas (1988) facilitates the assumption of internalization of the "within" aspect through policy measures that increase the incentive to innovate and to have an impact on the long-run growth rate of an economy (Roberts and Setterfield 2007). In line with these arguments, potential exports can be measured by following either a general equilibrium approach or a disequilibrium framework. In the former approach, a 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 disequilibrium framework where a 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

explicitly included in the model explaining export flows and the specific estimation method yield potential exports. Whereas there are several studies following the former approach, studies using the latter approach are sparse in the literature.[13] The gravity model has been established in both approaches 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 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; Nilsson 2000). A simple baseline gravity model can be written as equation (1).

$$X_{ij} C Y_i^{\beta} Y_j^{\gamma} D_{ij}^{-\delta}, \tag{1}$$

where C, β, δ, and γ are positive coefficients to be determined empirically. X_{ij} refers to 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 the distance between country i and country j relative to the average distance between country i and all its trading partners. For simplicity of exposition, the time subscript is avoided. Taking the logarithm, the base line of equation (1) can be conveniently represented in log-linear form as equation (2).

$$\ln X_{ij} = \alpha + \beta \ln Y_i + \gamma \ln Y_j - \delta \ln D_{ij}. \tag{2}$$

The real-world situation is too complex to be represented by a simple equation like (2). The geographical size, population, trade policies, and openness to trade of the 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. Thus, the gravity equation (2) can be written in a more general form as equation (3). Thus, equation (3) in general can be estimated taking panel of data across time and across countries.

13 Drysdale, Huang, and Kalirajan (2000) used the disequilibrium framework to evaluate the efficiency of China's bilateral trade with its 57 trading partners for the period 1991–95, and Kalirajan (2000) used it to examine Australia's export efficiency with its trading partners in IOR-ARC.

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

Researchers have used a number of dummy variables in the set of Z_{ij} to augment the model. An important assumption in this model is that the exporting environment in the home country does not impose any restrictions on the home country's exports. In other words, this model although admitting that there are behind the border constraints in the home country and also that the home country faces beyond the border constraints in partner countries, these constraints are not important and are randomly distributed across observations. In other words, the assumption is equivalent to saying that there are no significant behind and beyond the border constraints for exports of home country. However, effects of regional trading arrangements, connectivity by road/sea, language affinities, historical relationships, and product preferences shown through brand names have been included in the gravity of equation (3). OLS methods or variants of OLS have been used to estimate models such as equation (3).

3.2 Methodology II

In Methodology I, it was assumed that behind and beyond the border constraints to export are not significantly affecting export flows from the home country (China and India). This means that the impact of behind and beyond 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. Export flows are constrained by three factors: (a) natural constraints, which are geographical distance and transport cost; (b) behind the border constraints, which are institutional and infrastructure rigidities that exist in exporting countries; and (c) beyond the border constraints, which are institutional and infrastructure rigidities that exist in importing countries. The impact of the latter constraints can be divided into two groups, namely, "explicit beyond the border" constraints and "implicit beyond the border" constraints. Beyond the border constraints, which are explicit, are mainly tariffs and exchange rate. The impacts of these constraints on the home country's exports may be measured from the coefficients of variables such as average tariffs and real exchange rate, which can be included directly into the gravity model. On the other hand, identifying and measuring implicit beyond the border constraints that

emanate from institutional and policy rigidities of importing countries are very difficult, and are considered as "given" for the present study.

Nevertheless, these implicit beyond the border constraints can be reduced or eliminated through multilateral and bilateral negotiations to a considerable extent. Behind the border constraints in the home country could arise 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 inefficiency, and inadequate e-business (Bhagwati 1993; Rodrik 2000; Levchenko 2004), and political influences through powerful lobbying by organized interest groups (Gawande and Krishna 2001) have been found to affect export flows, among other things. The combined effects of behind the border constraints to export, however, which may be interpreted as an "economic distance" factor referred to by Anderson (1979) and Roemer (1977) can be measured on export flows. This requires that the error term of the standard gravity model (3) needs to be decomposed into u, indicating the impact of behind the border constraints, and v, indicating "normal" statistical errors and implicit beyond the border constraints.

$$\ln X_{ij} = \alpha + \beta \ln Y_i + \gamma \ln Y_j - \delta \ln D_{ij} + \gamma Z_j - u_{ij} + v_{ij} . \quad (4)$$

Thus, apart from the geographical distance constraint, the behind the border constraints and explicit beyond the border constraints need to be included explicitly into the standard gravity model. Unfortunately, most of the empirical trade models do not consider this argument, as they do not incorporate these constraints into their trade model.[14]

However, OLS estimation of the gravity equation (4) leads to biased results. Drawing on Kalirajan (2007), the procedures developed for estimating stochastic frontier production functions (Aigner, Lovell, and Schmidt 1977; Meeusen and van den Broeck 1977), which do not require the researchers to have information on the exact components of u, can be used to estimate the modified gravity equation that includes the impact of behind the border constraints and explicit beyond the border constraints to export for a given level of implicit beyond the border constraints.

14 Recently, Anderson and van Wincoop (2003) suggested an approach to tackle this problem, which they name as "multilateral resistance." However, their suggested method suffers from a number of limitations. For example, they assumed symmetric trade costs to solve their model, which is an unrealistic assumption. Also, their modeling of multilateral resistance, as a function of distance and tariffs only, ignores the presence and impact of variation in behind the border trade resisting factors in home country, and the implicit beyond the border constraints in respective importing countries.

The estimation procedure requires the assumption, which may be verified statistically, that u is a truncated (at zero) normal with mean μ and variance σ_u^2 and takes values either 0 or greater than 0. 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 that the influence of v is not significant (i.e., $v = 0$). When u takes the value other than zero, this means that the effects of behind the border constraints are important and they reduce potential exports depending on the value of u. Thus, the term u represents the difference between potential and actual exports in logarithmic values, which 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 errors and implicit beyond the border constraints that are not under the control of the exporting country and 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. Computer programs such as STATA and FRONTIER 4.1 can be used to estimate the modified gravity model.[15]

3.3 Data

The trade data are taken from the Direction of Trade Statistics of the IMF. Data on real GDP, which is a proxy for the size of the economy; population (POP), area (AREA), and tariff barriers are taken from the World Development Indicators (WDI) 2004 and WDI CD-ROM 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 a 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 1–7 where lower values of index indicate higher non-tariff barrier. Thus, the expected sign of NTBI is positive. Factors such as the macroeconomic environment, the quality of public institutions, and technology are also important determinants, and are likely to affect the intensity of import across countries. WEF publishes a growth competitiveness index (GCI) on a scale of 1–7 where a higher value indicates a higher level of competitiveness. The GCI is founded on the previous 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.

15 Details of the estimation procedure of FRONTIER 4.1 are given in Coelli (1996).

4. Empirical results and discussion

4.1 Absence of behind the border constraints

Both models estimated in this study for China and India separately were as follows:

$$\ln X_{ij} = \alpha + \beta \ln GDP_j + \gamma \ln DIS_{ij} + \delta \ln POP_j + \epsilon_{ij}\,, \tag{5}$$

$$\ln X_{ij} = \alpha + \beta \ln GDP_j + \gamma \ln DIS_{ij} + \delta_1 \ln POP_j + \delta_2 TRDGZ + \delta_3 LAREA + \delta_4 TBPR + \delta_5 NTBI + \epsilon_{ij}\,. \tag{6}$$

The variables are as defined earlier. Over a small span of time the relative size of the trading partners and the exporting environment in the home country are not expected to change significantly. Therefore, for the purpose of analyzing trading characteristics of the countries concerned during the recent period, the average values of exports during 2000–03 and average size of economies for 2000–02 are considered appropriate.[16] 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. In the place of NTBI, the variable GCI was also used in the estimation for India. The selected sample sizes of the partner countries, which are the same 77 countries for both China and India, 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 models for these economies in a general equilibrium framework.[17] All the equations were estimated by OLS and a complete diagnostic result is provided in the respective tables. A series of estimations have been completed to delineate the strengths and weaknesses of both countries. At the outset, the basic model (5) with GDP, distance, and population with respect to partner countries was estimated for China and India and the results are reported in Table 1. The base model was further expanded to include the proxies of openness and explicit beyond the border constraints and the results are presented in Table 2.

Almost all the estimated equations are statistically consistent, and the R^2 values are reasonably high. However, the magnitudes of the coefficients are markedly different between China and India. Whether the size and significance of these variables are

16 Because 2001 is characterized by a number of political and terrorist disturbances, including data from 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 heteroskedasticity and functional forms leading to more reliable interpretation of the relationships.

17 For the purpose of the present study of comparing the performances of China and India emulating the exporting environment of each other, it is necessary to consider the same countries with which both China and India traded during the sample periods.

Table 1. Base gravity model with distance, aggregate GDP in terms of US$ at 1995 prices and population for China and India, 2000–03

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^2	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]
Heteroskedasticity	3.28 [0.07]	0.109 [0.74]

Note: *When there is problem of heteroskedasticity, White heteroskedasticity adjusted standard errors are presented. Values in parentheses () are standard errors and values in square brackets [] are p values. *Significant at the 1 percent level; **Significant at the 5 percent level; ***Significant at the 10 percent level; +Significant at the 15 percent level.*

robust or not in the presence of other variables is an important issue and is discussed later. The relative distance variables in both models of China have smaller coefficients than those of India.[18] It appears that the production process in China, which is characterized by large manufacturing volumes, is able to absorb the distance effects much more efficiently than India. The production cost in China is comparatively lower than that in India and the advantage derived from this is reflected in the size of the relative distance variable. It may be noted that the average distance of China from its trading partners is greater than that of India from its trading partners (Table 3). 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 a power shortage, which tends to increase production costs (Rajan 2006). Further, China is more concerned with other barriers to trade rather than distance. For example, in Model CHN-14 (Table 2), the relative distance variable becomes insignificant when a tariff barrier to primary sector products is introduced. In addition, as new variables are added, the coefficient of the relative distance variable in China's models continues to reduce. Therefore, it can be safely argued that China's cost advantages are great instruments to boost their exports compared to India.

18 The results could have been better, had we disaggregated exports of China and India by commodity categories such as labor-intensive, agriculture-intensive, and resource-intensive. We thank the discussant, Lael Brainard, for pointing out this issue.

Table 2. Augmented gravity model with area, openness to trade, and other trade barriers for China and India, 2000–03

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^2	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]
Heteroskedasticity	5.280 [0.02]	0.355 [0.55]	0.529 [0.47]

Note: *When there is the problem of heteroskedasticity, White heteroskedasticity adjusted standard errors are presented. Values in parentheses () are standard errors and values in square brackets [] are p values. *Significant at the 1 percent level; **Significant at the 5 percent level; and ***Significant at the 10 percent level.*

Table 3. Summary matrix of distances (kilometer) being negotiated by China and India across the sample structures of trade partners

	China	India
Sample size:	77	77
Mean	9,931.5	8,490.4
Minimum	956.2	678.6
Maximum	19,286.0	16,937.4

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 2 in comparison with Table 1). Nevertheless, the coefficient of GDP is larger for China than for India. This means that clearly India has to progress significantly 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, and it can be argued to have independent demand side effects also. For example, subsistent economies also need basic livelihood amenities such as cheap clothing and food. Countries such as China and India, which have a high degree of mechanized production systems with

cheap labor, could be a potential source of imports provided the importing country has a conducive trade regime. This fact is revealed when the coefficients of population variable across models are compared.

The openness to trade variable (TRDGZ) is introduced in Models CH14, IN13, and IN14 along with the area variable (Table 2). Clearly, exports flow more from both countries to those countries, which trade a 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 the growth competitiveness index act alike in affecting its exports growth. Recall that the expected sign of coefficient of NTBI is positive because a higher value of NTBI means fewer problems in importing, whereas lower values mean the opposite.

To calculate potential exports, it is important to estimate the equation in a general equilibrium framework so that as many trading partners as possible, indicating as much distance as possible, are covered. Nevertheless, such a general equilibrium framework may not take into account all country-specific characteristics of the home country that influence its exports. Therefore, in this exercise we put each country in the exporting environment of the other to simulate each other country's potential exports. The key difference in export performance is expected to arise due to the change in the values of the relative distance variable, as all other variables remain more or less the same across trading countries. Models CHN14 and IND14 given in Table 2 were used for simulating the exports from China and India with the assumption that they switched their exporting environments between them. Simulations were carried out by applying the coefficient of India, which proxies the exporting environment faced by India, on trade data concerning China and vice versa. The simulated gain/loss in exports is presented in Appendixes 1 and 2.

As a summary, when the coefficients of China are applied to calculate India's simulated potential exports, it results in very high values for India (672.9 percent), which implies 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 percent, 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.

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, 2000–03

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)
T	0.228 (0.321)	0.186 (0.202)
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 parentheses () are standard errors. *Significant at the 1 percent level; **Significant at the 5 percent level.*

4.2 Presence of behind the border constraints

Drawing on Kalirajan (2007), the following modified augmented gravity model was estimated using panel data from 2000–03 and the results are presented in Table 4:

$$\ln X_{ijt} = \alpha_1 + \beta \ln GDP_{jt} + \gamma \ln DIS_{ijt} + \delta_1 \ln POP_{jt} + \delta_2 TRDGZ_t + \delta_3 LAREA_t + \delta_4 TBPR_t + \delta_5 NTBI_t + \delta_6 T + v_{ijt} - u_{ijt}\,. \quad (7)$$

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_{ij} is assumed to be non-negative truncations of the normal distribution with mean, μ, and variance, σ^2. Further, the assumption that $u_{ijt} = \eta_{it} u_{ij} = \{ \exp[-\eta(t - T)] \} u_{ij}$ means that behind the border constraints to export have been varying over time. This assumption implies that if the estimate of η, which is provided by the computer program FRONTIER 4.1 simultaneously along with the parameters of equation (7), is positive then the behind the border constraints decline exponentially to its minimum value, u_{ij}, 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 (6) as expected due to the specification of equation (7), and most variables are significant at least at the 5-percent 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 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 periods. The estimate of γ is large and significant

at the 1 percent level. This means that the decomposition of the error term into u and v in equation (7) 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 the γ coefficients vary over time. This is equivalent to examining 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, it investigates whether policy reforms toward promoting exports in China and India have been effective during the sample period. Information on the temporal behavior 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 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 constant over time. In this model, the η coefficient is positive and significant for China, whereas 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 these results the following can be inferred. 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 equation (7) for both China and India. This point is further emphasized 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 but 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 a majority of the member countries more than India could do over time. The analysis shows that an average of approximately 86 percent of potential exports have been realized by China, whereas only about 68 percent of potential exports have been realized by India (Appendix 3). This clearly indicates that there is an urgent need to design and intensify trade policy reforms to enhance its effectiveness toward reducing constraints to export in India and in this respect, India certainly can learn from China's experience, which requires a detailed study. However, India needs to study carefully the recently debated regional income inequality problems created by China's surging export reve-

nues in order to avoid the occurrence of such social problems while increasing India's exports.[19]

5. Conclusion

Thus, China's export performance contrasted with that of India over the years indicates that an important determinant of the benefits that developing countries can reap from globalization is whether behind the border constraints to export can be decreased consistently through appropriate policy measures. However, although 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. Drawing on Hayami (1997) who argued that poor countries could structure their institutions to bring about rapid development through the borrowing of technologies, the adoption of technology from abroad is important for India, and appears to be constrained mainly by a lack of infrastructure and proper institutions.

"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 percent. In India, the PLR is 12 percent, and 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 earlier than China's, in terms of market capitalization, China is ahead at US$ 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 decentralization, the Chinese Central government transfers 51.4 percent of the tax revenue to the provinces, whereas in India the figure is about 36.1 percent.

This 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

19 We are thankful to Zhang Xiaojing for pointing out this important issue to us.

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 an increase in labor 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 signaling effects, besides reducing inefficiencies in resource allocation and operations. A relatively restrictive foreign investment regime in India needs review. FDI flows should be viewed as a vehicle of technology transfer, spill-over effects in production processes, and of increasing exports.[20] 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 business enterprises (see Appendix 4). 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 the trade sector. As argued by Rajan (2006), India has proven 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 rather than introducing new constraints

20 Unlike other studies, which are cross-country based, this study is country-specific (India vs. its trading partners and China vs. its trading partners) and therefore FDI could not be used as an explanatory variable in the gravity model estimation.

such as over-regulation of the higher education system. Yet, in order to provide sustained employment to several million people, India cannot underestimate the benefits of following the East Asian growth model of labor-intensive manufacturing, which is also causally linked with the services sector.

Appendix 1. Simulated annual potential exports of China using coefficients from the 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	1,825.9	−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	5,197.4	−91.33
Jordan	41.9	−89.43
Kenya	41.9	−80.25
Korea RP (S)	2,947.7	−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
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
Philippines	548.8	−86.85
Poland	245.7	−82.36
Portugal	144.7	−66.64
Romania	79.2	−77.56

Appendix 1. ***(continued)***

	Simulated potential exports (US$ million)	Percentage difference of simulated potential exports over actual average exports
	CHN as IND	CHN as IND
Russia	370.0	−90.37
Senegal	17.6	−78.49
Singapore	1,212.1	−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	1,101.0	−92.84
United States	3,611.7	−96.74
Uruguay	11.7	−94.77
Venezuela	46.5	−89.64
Zambia	12.4	−66.47
Zimbabwe	15.4	−61.37

Source: *Author's estimation from the results of Table 3.*

Appendix 2. Simulated annual exports of India using coefficients from the 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	2,417.0	412.9
Austria	3,158.2	3,286.5
Bangladesh	968.9	−14.2
Bolivia	58.9	1,635.3
Brazil	4,155.2	911.0
Cameroon	89.4	462.0
Canada	4,682.1	530.2
Chad	13.4	350.4
Chile	711.6	790.5
Colombia	596.5	754.8
Costa Rica	171.3	1,529.2
Denmark	2,602.5	1,257.1
Dominican Republic	254.9	1,640.3
Ecuador	166.4	1,617.1
Egypt	1,030.4	239.2
El Salvador	180.4	3,586.1
Ethiopia	193.1	166.7
Finland	1,979.9	2,850.7
France	14,365.2	1,209.8
Germany	27,411.3	1,181.0
Ghana	104.0	15.7
Greece	1,462.5	904.4
Guatemala	162.3	674.2
Honduras	54.9	249.9
Hong Kong	15,387.4	511.9
Hungary	1,259.7	1,874.0
Indonesia	3,828.3	522.9
Italy	10,234.4	632.0
Jamaica	70.2	816.2
Japan	40,031.6	2,055.9
Jordan	189.8	113.9
Kenya	151.0	−9.2

Appendix 2. ***(continued)***

	Simulated potential exports (US$ million)	Percentage difference of simulated potential exports over actual average exports
	IND as CHN	IND as CHN
Korea RP (S)	9,952.2	1,095.2
Madagascar	82.3	611.1
Malawi	48.5	97.0
Malaysia	5,286.0	680.6
Mali	40.5	67.9
Mauritius	113.3	−32.8
Mexico	3,057.8	833.6
Morocco	295.0	331.5
Mozambique	60.2	47.4
Netherlands	9,688.7	925.4
New Zealand	611.2	721.1
Nicaragua	43.0	1,725.0
Nigeria	469.9	28.2
Norway	1,401.1	1,759.7
Pakistan	1,962.5	885.1
Panama	82.1	134.3
Paraguay	61.5	704.7
Peru	338.1	861.5
Philippines	2,308.9	695.0
Poland	2,004.6	1,434.3
Portugal	1,655.4	965.9
Romania	477.3	1,343.1
Russia	3,162.9	392.0
Senegal	92.0	227.4
Singapore	15,646.4	1,193.6
South Africa	1,996.9	424.8
Spain	6,681.6	785.7
Sri Lanka	425.4	−45.6
Sweden	3,210.8	1,626.6
Switzerland	3,121.1	753.4
Tanzania	117.9	8.7
Thailand	5,243.0	698.9
Trinidad And Tobago	114.8	843.6
Tunisia	245.6	382.2
Turkey	2,353.7	471.8
Uganda	160.7	156.8
United Kingdom	14,061.0	453.9
United States	50,080.9	388.1
Uruguay	139.0	479.7
Venezuela	377.5	944.5
Zambia	54.9	95.9
Zimbabwe	93.2	510.7

Source: *Author's estimation from the results of Table 3.*

Appendix 3. Realization of potential exports (%) of China and India with partner countries

	Number of partner countries	
Realization of potential exports (%)	China	India
40–49	6	10
50–59	9	13
60–69	12	31
70–79	16	15
80–89	30	6
90–100	4	2
	China	India
Mean level of realization of potential exports, %	86	68

Source: *Author's estimation from the results of Table 4.*

Appendix 4. 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

Source: *Global Competitiveness Report 2003–2004, World Economic Forum.*

Note: *Total number of countries considered = 102. Score of 1 = underdeveloped and 7 = as extensive and efficient as world's best.*

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