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Working Paper No. 20-01

August 2020

**India's Revealed Comparative Advantages in
Merchandise Trade with Country Groups at
Different Levels of Development**

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Abstract

This paper uses annual trade data for 16 product groups to analyze India's comparative advantage (CA) in merchandise trade with high, middle income, and least developed countries during 2003-2018. The results suggest that India has always had CA over all three groups of countries in animal, food products, and textiles and clothing, and had comparative disadvantage (CDA) in wood. There are important variations in its CA/CDA for other items across country groups. These results are largely robust to alternative CA measures and to restricted subsamples of countries within each group. The analysis of distributional dynamics indicates that India's CA over least developed countries is more persistent than over other two groups. In contrast, India's CDA over middle income countries is more persistent than over other groups. In general, the probabilities of switching from CDA to CA are higher than those for shifting from CA to CDA for all three groups. India's CA in various products are likely to result from the availability of certain natural resources including climatic condition and geographic location, relative abundance of cheap unskilled, semi-skilled, and highly skilled labor, together with the market-oriented reforms and trade liberalization. The results have specific implications for India's policies to promote industries and trade.

Keywords: Merchandise Trade; Comparative Advantage (CA); Comparative Disadvantage (CDA); Revealed Comparative Advantage (RCA); Revealed Symmetric Comparative Advantage (RSCA); Nonparametric Methodology; Distributional Dynamics; India

JEL Codes: F14; O57

Acknowledgments: An earlier version entitled "India's Comparative Advantages in Merchandise Trade with High, Middle, and Low Income Countries" was presented at the 87th International Atlantic Economic Conference in Athens, Greece in March 2019. The authors would like to thank Dr. Bogdan Mróz and the members of the audience for their comments. The usual disclaimer applies.

India's Revealed Comparative Advantages in Merchandise Trade with Country Groups at Different Levels of Development

1. Introduction

For most of its post-independence period, India pursued inward-oriented policies with high tariff and non-tariff barriers on international trade. Consequently, total trade – exports *plus* imports – as a percentage of gross domestic product (GDP) was relatively low until the early 1990s. However, since the introduction of the market oriented reforms and trade liberalization in 1991, the trade share has grown more than three-folds from about 17 % in 1991 to a maximum of 56% in 2012 although it has declined since then to about 43% in 2018 (See Figure 1). Merchandise trade accounts for more than two-thirds of India's international trade.¹ India has been a net importer in merchandise trade and, as a consequence, has been experiencing overall trade deficits.² In fact, the merchandise trade deficit has widened in recent years.

[Insert Figures 1 & 2]

One of the interesting aspects of India's recent international trade policy initiatives has been its increased involvement in various bilateral and regional trade agreements (RTAs). However, this is no different from the global trend, as the world has witnessed an unprecedented proliferation of RTAs (Feasel 2018). Furthermore, with the Make in India campaign and relevant policy initiatives of the current government at the center, there has been a push to reinvigorate the manufacturing sector.³ As India marches on with these new initiatives, it is extremely important that the country knows where its comparative advantages lie and against which countries. It is in this context that this paper intends to examine the patterns and evolution of India's comparative advantage (CA) and comparative disadvantage (CDA) in various disaggregated merchandise trade items with three groups of countries, namely high income country (HIC), middle income country (MIC), and least developed country (LDC). One of the primary objectives is to highlight the differences in the patterns and evolutions of India's CA/CDA over these country groups that could be useful for trade policies.

¹ However, this share has declined over the years from more than 80% in the mid-1970s as services trade gained prominence in the late 1990s rising up to a level that accounted for about 30 % of total trade during 2004-07. Please see Figure 2.

² In contrast, India has been earning trade surpluses in services trade since 1998 with the only exception of 2001.

³ The Government of India launched the Make in India campaign, covering 25 sectors of the Indian economy, on September 25, 2014, to encourage companies to manufacture their products in India and to enthruse with dedicated investments into manufacturing.

In general, as some studies (e.g. Shirotori et al. 2010) suggest, countries belonging to different income groups have different levels of relative factor endowments. Accordingly, HICs are relatively more abundant in physical and human capital, and MICs and LDCs are relatively more abundant in labor. India is a lower middle income country with abundant labor and scarce physical and human capital. The differences in relative factor abundance between India and different income groups of countries may explain its trade patterns with those groups and corresponding CA/CDA positions. Furthermore, the consumption baskets and the capital goods requirements of the countries vary according to their level of development.⁴ For example, nondurable basic consumption goods may be a significant part of the LDCs' basket while durable goods may be in high demand in rapidly growing MICs. Similarly, the consumption basket of HICs may include a large number of luxury items. These differences may lead to trade patterns based on underlying CAs of India and different income groups of countries. Furthermore, the new trade theory also predicts India's exports to and its CA over countries in the same income group if the economies of scale are the basis for trade.

There is a large empirical literature on CA measures for different countries. Examples of this literature include Balassa (1965, 1986), Carolan et al. (1998), Bender and Li (2002), Ferto and Hubbard (2003), Benedictis (2005), Beyene (2014), and Laursen (2015). To the best of our knowledge, there are only a few studies that examine India's CA or CDA in merchandise trade. Batra and Khan (2005), Veeramani (2008) conduct comparative analyses of CAs in merchandise trade in China and India. Singla (2015) examines India's increasing merchandise trade with China. He notes that China has become India's second largest trading partner, only after United Arab Emirates (UAE). However, India's exports to China are dominated by resource-based raw materials or semi-finished manufactured products which - according to the author - does not augur well for the future of India's trade. Pohit and Basu (2012) evaluate India's export performance in high technology merchandise exports. They conclude that India's performance has not been impressive except of pharmaceuticals and comment that the country could have done better had it concentrated on products that have low non-tariff barriers (NTB), a strategy China has gainfully employed. Singh (2011) gives an account of India's export performance during and following the global financial crisis. None of these studies, however, looked at the evolution and dynamics of India's revealed comparative advantages in various merchandise trade items. The current study is intended to fill this gap.

⁴ That stone and glass with an average share of about 25% of India's exports to HIC, chemicals with an average share of about 15% of exports to MIC, and fuels with an average share of about 18% of exports to LDC during the sample period are the largest export items to these three income groups of countries is a pointer to this fact.

Using annual data on export and import for 16 commodity categories, we examine the patterns and evolution of CA in India’s merchandise trade with HIC, MIC, and LDC from 2003 to 2018. Our results indicate that India has always had CA over all three groups of countries in animal products, food products, and textiles and clothing and had CDA in wood. Further, India has had persistent CA over MIC and LDC in plastic and rubber and transportation equipment. Similarly, it has persistent CA over HIC and MIC in hides and skin and footwear. India has also been in advantageous position vis-à-vis LDC with respect to machines and electrical machinery and miscellaneous products. India has gained CA over all three groups of countries in chemicals and over HIC in transportation equipment. In contrast, the country has lost its CA over all three groups of countries in fuels and over HIC in minerals. These conclusions are robust to the use of alternative CA measures and mostly so to subsamples of the largest trading partner countries within each group. Furthermore, the analysis of distribution dynamics indicates that India’s CA over LDC is more persistent than over HIC and MIC in the long-run. In contrast, India’s CDA over MIC is more persistent than over the two other groups of countries. Finally, in general, the probabilities of switching from CDA to CA are higher than those for a shift from CA to CDA for all three groups. However, the probability of India losing CA to HIC is higher than that to two other groups.

The relative abundance of cheap labor is a common source while availability of natural resources including climatic condition and geographic location, semi-skilled and highly skilled labor are some of the product-specific determinants of India’s revealed comparative advantage. In recent years, government policies leading to market-oriented reforms and trade and capital liberalization, industry specific initiatives, and trade agreements also seem to have helped certain industries with the export performance in their respective product categories.

The rest of the paper is organized as follows. The methodology and data are discussed in Section 2. Section 3 presents the main empirical results. A discussion of the results is included in Section 4. Finally, Section 5 presents our concluding remarks.

2. Methodology and Data

2.1 Methodology

In international trade theory, CA is defined in terms of relative autarkic prices. However, autarkic prices cannot be observed after trade takes place and it poses formidable challenges to any attempt at measuring CA. Nevertheless, the empirical literature typically uses relative export performance as a proxy for CA. Note that such a measure reflects both relative costs and

differences in factor intensities. The revealed comparative advantage (RCA) index proposed by Balassa (1965) is such a measure that has been widely used. It is a ratio that represents the share of a given product in a country's total exports relative to the share of that product in the total world exports. If the share of a particular commodity in a country's total exports is relatively larger than its share in total world (or a group of countries') exports, the country is said to have CA in that commodity.⁵ Since this measure is based on *ex-post* export performance, some authors (e.g. Laursen 2015) would term it as a measure of international specialization rather than of international competitiveness.

The RCA index for India's merchandise trade with a specific group of countries (HIC, MIC, and LDC) is constructed as follows:

$$RCA_{India,k,j} = \frac{\left(\frac{X_{India,k,j}}{\sum_{j=1}^n X_{India,k,j}} \right)}{\left(\frac{X_{India,k,j} + M_{India,k,j}}{\sum_{j=1}^n X_{India,k,j} + \sum_{j=1}^n M_{India,k,j}} \right)} \quad (1)$$

where, $X_{India,k,j}$ denotes the value of India's exports of commodity j ($j = 1, \dots, n$) to the countries in group k ($k = HIC, MIC, \text{ \& } LDC$) and $M_{India,k,j}$ is the value of commodity j exports from the same country group to India (i.e., India's imports). RCA index expresses the share of a given commodity in total Indian exports to k^{th} group of countries relative to the trade share of the same commodity in the k^{th} group's total trade with India.⁶ The possible values of this index range from 0 to infinity. A value greater than 1 indicates that commodity j is more important in Indian merchandise exports than in the total trade between the k^{th} group of countries and India. Therefore, India has CA in that commodity vis-à-vis that specific group. In contrast, values between 0 and 1 suggest that India has CDA vis-à-vis the k group of countries.

Balassa's RCA index is often criticized for two major problems. *First*, the measure is asymmetric: the values on one side of unity cannot be compared with those on the other side.^{7,8} Dalum et al. (1998) suggest the following transformation of the RCA index to fix this problem.

⁵ Since the RCA measures are not strictly based on the concept of comparative advantage as explained in the international trade theories, they are often criticized. Costinot et al. (2012) proposes an empirical strategy for measuring Ricardian comparative advantage. It is based on the theoretical foundations and focuses on revealed productivity measures.

⁶ This involves a modification to Balassa's RCA index, similar to the case of bilateral trade in Nath et al. (2015). Intuitively, it considers trade between India and a group of countries as stand-alone exchanges independent of the rest of the world. It also does not consider trade among the countries within the group and their trade with the rest of the world.

⁷ If we were simply interested in knowing the commodity items for which India has CA over the rest of the world, this would not be a serious problem. Symmetry is important because we also investigate the distributional dynamics of the CA measure in order to shed lights on the evolution of CA.

⁸ Laursen (2015) also shows how using asymmetric RCA in econometric analysis (e.g. regression analysis) leads to biases by assigning larger weights to values above 1 compared to those below.

$$RSCA_{India,k,j} = \frac{RCA_{India,k,j-1}}{RCA_{India,k,j+1}} \quad (2)$$

The values of RSCA - revealed symmetric comparative advantage - range between -1 and +1. While a positive value indicates that India has a CA, a negative value is an indication of India's CDA over the specific group of countries in commodity j .

The other problem is that RCA focuses exclusively on relative export performance and utterly neglects the net trade flows and intra-industry trade. Bugamelli (2001) proposed the following modification of Lafay's (1992) trade balance index (TBI) in order to address this issue:

$$TBI_{India,k,j} = \left[\frac{(X_{India,k,j} - M_{India,k,j})}{(X_{India,k,j} + M_{India,k,j})} - \frac{(\sum_j X_{India,k,j} - \sum_j M_{India,k,j})}{(\sum_j X_{India,k,j} + \sum_j M_{India,k,j})} \right] \times \frac{(X_{India,k,j} + M_{India,k,j})}{(\sum_j X_{India,k,j} + \sum_j M_{India,k,j})} \times 100 \quad (3)$$

The TBI index captures commodity j 's contribution to India's overall balances in merchandise trade with the k^{th} group of countries and its value ranges between -50 and +50. A positive (negative) value indicates that India is a net exporter (net importer) and therefore has CA (CDA) vis-à-vis k^{th} group of countries in providing commodity j relative to all other commodities.

The symmetry of RSCA or TBI facilitates the use of a nonparametric methodology for investigating the shape and dynamics of the cross-sectional distribution of these indices (e.g., see Nath et al. 2015; Nath and Goswami 2018). Therefore, we estimate the probability densities for RSCA using kernel functions. Let $X_1, \dots, X_n$ be a sample of n independent and identically distributed observations on a random variable X (RSCA in this case).⁹ We use the following kernel density estimator to estimate the density value, $f(x)$, at a given point x :

$$\hat{f}(x) = \frac{1}{nh} \sum_{i=1}^n K\left(\frac{x - X_i}{h}\right) \quad (4)$$

where, h is the interval bandwidth around x and K is the kernel function.¹⁰ The weight assigned by the Kernel estimator to an observation in the interval around x is inversely proportional to the distance between the observation and x . The vertical sum of frequencies at each observation yields the density estimate. This exercise results in a smooth curve that helps us visualize the shape of the CA distribution across commodity items and study its evolution over time.

⁹ Nath et al. (2015) use a similar methodology for investigating the US bilateral CA/CDA over India and China.

¹⁰ Data-driven bandwidth selection (likelihood cross validation) and a Gaussian kernel are used.

In order to examine the distributional dynamics, we further estimate the probability of India's gaining or losing its CA in merchandise trade against a specific group of countries among its trading partners. Thus, we estimate a transition probability matrix. Denoting the distribution of the RSCA index across commodities at time t by Q_t , we can represent the evolution of the distribution at time $t + \tau$ as follows:

$$Q_{t+\tau} = M \times Q_t \quad (5)$$

where, M , a finite discrete Markov transition matrix, maps Q_t into $Q_{t+\tau}$ and completely describes the underlying distributional dynamics. The transition matrix is given by

$$M = \begin{pmatrix} p_{11} & \cdots & p_{1N} \\ \vdots & \ddots & \vdots \\ p_{N1} & \cdots & p_{NN} \end{pmatrix} \quad (6)$$

where p_{lm} with $l, m = 1, \dots, N$ is the probability of transition from an initial state of l in year t to a state m in year $t + \tau$. The diagonal elements of the matrix represent the probabilities of no changes between time periods and therefore are measures of persistence. Note that there are two states (i.e. $N = 2$), CA and CDA respectively. We study the transition dynamics over two different time horizons ($\tau = 3, 10$).

2.2 Data

We obtain annual data on India's merchandise trade with high, low and middle income, and least developed countries from the World Integrated Trade Solution (WITS) database of the World Bank for the period from 2003 to 2018. Since this database uses the Harmonized System (HS) 2002 Classification, data are available only since 2003. Further, it provides commodity trade data for each country's trade with these three groups of countries for 16 standard product groups. These groups - based on the 2002 HS 2-digit commodity classifications - are: animal (01-05), vegetable (06-15), food products (16-24), minerals (25-26), fuels (27), chemicals (28-38), plastic and rubber (39-40), hides and skin (41-43), wood (44-49), textiles and clothing (50-63), footwear (64-67), stone and glass (68-71), metals (72-83), machines and electrical (84-85), transportation (86-89), and miscellaneous (90-99).¹¹ The availability of data primarily dictates the choices of the level of aggregation of product groups and the sample period. Note that the group of low and middle income countries and that of least developed countries are not mutually exclusive in the WITS database. That is, the former includes the latter group as a subset. For our analysis, we subtract the total export and import figures for the least developed countries from the

¹¹ Each group includes HS 2-digit level products as indicated by the 2-digit codes. For example, the group 'animal' (01-05) includes products with 2-digit codes from 01 to 05. For details, see Appendix A.

corresponding totals for the low and middle income countries to make these two groups mutually exclusive. After these adjustments of data, we call these three groups high income (HIC), middle income (MIC), and least developed countries (LDC) respectively. Our sample includes 49 HICs, 81 MICs, and 45 LDCs that trade with India.¹²

[Insert Tables 1 & 2]

Table 1 presents the summary statistics of India's trade in 16 product groups with the rest of the world, and Table 2 provides the same with HIC, MIC, and LDC. There are a few important observations that we can make from the table. *First*, textiles and clothing is a major export item from India to all three groups of countries. *Second*, there are commodities that India exports as well as imports in large quantities. For example, both exports and imports of fuels to and from these three groups of countries are large. This is in large part due to the imports of crude oil and exports of refined petroleum products. *Third*, India exports large amounts of animal products to HIC and MIC. *Finally*, India's imports of machine and electrical machinery from the first two groups of countries are large.

3. Empirical Results

3.1 Comparative Advantage Measures

3.1.1 Baseline Measure: Revealed Symmetric Comparative Advantage (RSCA)

To get a better benchmark perspective, we first examine India's CA/CDA vis-à-vis the rest of the world. Table 3 presents the summary conclusions we can draw from the RSCA measures for India's trade in 16 product groups with the rest of the world, HIC, MIC, & LDC. Appendix Tables A.1 – A.4 present the detailed RSCA values by product groups and years for the world and these three groups of countries. Column (1) of Table 3 indicates that India has CA over the rest of the world in eight product categories, namely, animal, vegetable, food products, chemicals, hides and skin, textiles and clothing, footwear, and metals for the entire sample period. In contrast, India has had persistent CDA in fuels, wood, and machines and electrical machinery. Furthermore, India lost its CA in minerals to the rest of the world during the recent years. For remaining four merchandise items, RSCA does not exhibit any persistent patterns.

[Insert Table 3]

¹² The lists of these three categories of countries are included in Appendix B. In each of these groups, there may be other countries that trade negligible amounts or sporadically with India.

When we classify India's trading partner countries by HIC, MIC, and LDC, we observe certain important differences in India's CA vis-à-vis those groups of countries. We present the summary of RSCA measures for India's trade in 16 product categories with HIC in Column (2) of Table 3. India has CA over HIC in six items, namely, animal, vegetable, food products, hides and skin, textiles and clothing, and footwear for the entire sample period. In contrast, India has persistent CDA over HIC in plastic and rubber, wood, machines and electrical machinery, and miscellaneous commodities. Furthermore, India lost CA in minerals and fuels to HIC only after a few years into the sample period. In contrast, India gained and maintained CA over this group in chemicals and transportation equipment since 2007 and 2010 respectively. India is in a comparatively advantageous position in metals and disadvantageous position in stone and glass for most years during the sample period.

Column (3) of Table 3 presents the summary of RSCA measures for India's merchandise trade with MIC. India has CA over this group of countries in eight product groups, namely, animal, food products, chemicals, plastic or rubber, hides and skins, textiles and clothing, footwear, and transportation equipment for the entire sample period. India has CA in metals for most years except 2005. In cases of wood, stone and glass, and machine and electrical machinery, India has CDA over those countries during the entire sample period. It also has persistent CDA in miscellaneous products for all but the first year. In fuels, India has lost its CA vis-à-vis MIC in recent years. For vegetable and minerals, there is no persistent pattern in India's CA or CDA over MIC during the sample period.

Column (4) of Table 3 presents the RSCA measures summary for India's trade in 16 commodity items with LDC. India has CA over LDC in seven product groups, namely, animal, food products, plastic and rubber, textiles and clothing, machines and electrical machinery, transportation equipment, and miscellaneous categories, throughout the sample period. It also has CA over this group in metals and footwear for most years (15 and 13 years respectively). In contrast, India has persistent CDA vis-a-vis LDC in minerals, hides and skin, and wood. India has not been able to regain its CA in fuels over this group since it lost it in 2006. Further, India gained and maintained CA in chemicals. Interestingly, India first gained CA over LDCs in stone and glass and then lost it in most recent years.

3.1.2 Robustness Results: Alternative Measure

To investigate the robustness of our baseline results, we calculate TBI, an alternative CA measure. By taking into account not only the relative performance of exports but also of

imports, this alternative measure corrects for the biases that could arise due to the presence of intra-industry trade

[Insert Table 4]

Table 4 presents the number of concurrences between RSCA and TBI for each product group during the 16 years of the sample period for the world, HIC, MIC, and LDC. The last two rows give the total number of concurrences and its percentage in total number of product-year cases, i.e. 256 (=16 products $\times$ 16 years). The fact that the number of concurrences accounts for 100% for the world and MIC, and 99.2% for HIC and LDC suggest that India's revealed CA/CDA in the 16 product categories over the world and the three groups of countries are robust to the use of alternative measures of CA. It seems to indicate that the potential biases in RSCA measure due to intra-industry trade is of little consequence for determining India's comparative advantages over the world and any of the country groups. The detailed TBI measures are presented in Appendix Tables A.5-A.8.

3.1.3 Robustness Results: RSCA for a Subsample of Countries

As an additional robustness exercise, we now calculate RSCA for India's trade with only five countries that have the largest shares in its exports to their respective income groups. However, we exclude the countries that serve as entrepots, from the subsamples. Because of their strategic location and importance in maritime freight transportation (e.g. Hong Kong, Macau, Singapore) or international commerce friendly government policies (e.g. Virgin Islands, Panama, and Bermuda), some countries act as entrepots for other countries. However, the existence of these entrepots may mask the actual flows of goods between countries that belong to different country groups.¹³ If the country importing goods belongs to the same group as the entrepot, this will not influence India's CA/CDA measures. However, if they belong to different groups (e.g. Hong Kong and Singapore are HIC while China is an MIC), the CA/CDA measures for these groups may be affected: they may lead to wrong conclusions about India's CA/CDA. Our selection criteria pick the US, the UAE, the UK, Germany, and the Netherlands in the HIC group; China, Vietnam, Sri Lanka, Malaysia, and Indonesia in the MIC group; and Bangladesh, Nepal, Tanzania, Mozambique, and Yemen in the LDC group.¹⁴ These countries account for 53.6%,

¹³ For example, Hong Kong is India's third largest trading partner. However, more than half of India's trade with Hong Kong's is intended for China. That is, a significant portion of India's exports to that country is re-exported to China. Similarly, imports from China may come indirectly via Hong Kong.

¹⁴ Both Hong Kong and Singapore are among the top five destinations for India's merchandise exports and they are dropped because they often act as entrepots.

41.2%, and 63.8% respectively of India's exports to their corresponding country groups, on an average, during the sample period.

[Insert Table 5]

Table 5 presents the number of concurrences between RSCA for full sample and the restricted subsample for each product group during the 16 years of the sample period for HIC, MIC, and LDC. Like in the previous exercise, the last two rows give the total number of concurrences and its proportion in total number of product-year cases. It ranges from 69% for LDC to about 94% for HIC. The discordance is stark for stone and glass in trade with HIC, for chemicals with MIC, and extremely so for animal, minerals, wood, and footwear with LDC. In case of trade in stone and glass, India's overwhelming CDA vis-à-vis HIC full sample turned overwhelming CA vis-à-vis the five largest HICs excluding the entrepots. This seems to suggest that re-exports from the entrepots may have influenced the results for the full sample.

There are no entrepots among the top five export destinations in the MIC and LDC group. However, the presence of entrepots in the HIC group may have an impact on the RSCA measures for MIC and LDC as well. To illustrate, suppose Hong Kong acts as the entrepot for India's export of product A to China. In the data, we see it as India's export to Hong Kong and not to China. This overestimates India's exports to HIC and underestimates that to MIC. Under this scenario, if RSCA measure indicates that India has a CA in product A vis-à-vis MIC, correcting the underestimation would make the conclusion even stronger because India would have much larger exports to MIC. In this exercise, we do not make such a correction in case of MIC and LDC— which is beyond the scope of this paper. Thus, the cases where India has had CA and there is no reversal after this robustness exercise, the entrepot-effect is inconsequential. In case of chemicals, India's CA position vis-à-vis MIC gets reversed, which may have reflected the entrepot-effect. The reversal from CDA to CA in case of India's trade in minerals and wood vis-à-vis LDC could partly reflect the entrepot-effect, particularly if India uses entrepots for exporting those items to countries excluded from the subsample. Similar arguments can be made for the reversal of India's CA position to CDA in animal and footwear. Note that these explanations are educated guess at the best and need further empirical investigation.

We can draw the following general conclusions from our results. *First*, although India has always had CA in eight and CDA in three product categories vis-a-vis the world, there are important differences in its CA/CDA with different groups of countries based on the level of economic development. *Second*, there are three commodity categories, namely, animal, food products, and textiles and clothing over which India has always had CA, and there is one commodity, i.e. wood, over which India has always had CDA for all three groups of countries.

Third, India has had persistent CA over MIC and LDC in plastic and rubber and transportation equipment. Similarly, it has persistent CA over HIC and MIC in hides and skin and footwear. India has also been in advantageous position vis-à-vis LDC with respect to machines and electrical machinery and miscellaneous products. Finally, India has gained CA over MIC in chemicals and gained CA over HIC in chemicals and transportation equipment. In contrast, the country has lost its CA over all three groups of countries in fuels and over high and low and middle income countries in minerals. These results are robust to the use of an alternative CA measure and largely so to the subsamples of the largest trading partners within each group.

3.2 Distribution Dynamics

Since India's CA/CDAs over all three groups of countries in 16 different product groups during the sample period are robust to the use of alternative measures, we now entirely focus on RSCA index for our analysis of trade advantage dynamics in this subsection. Besides, as Laursen (2015) shows, RSCA "is the best measure of comparative advantage" among several alternatives used in the literature. Furthermore, as mentioned earlier, the RSCA index being a symmetric measure of CA, the nonparametric methodology can be conveniently applied for examining the shape and dynamics of its distribution over various products. The kernel density distributions of the RSCA index for the world, HIC, MIC, and LDC are presented at 5-yearly intervals in Figures 3, 4, 5, & 6 respectively. Note that this analysis considers each country group as a market and examines the dynamics of India's CA/CDA over the group in that market. In contrast, our analysis of India's CA/CDA vis-à-vis the rest of the world – which provides a benchmark – considers a global market for India's exports.

[Insert Figure 3]

Figure 3 shows that the probability mass was concentrated around the value of 0.1 in 2003 indicating India's CA over the rest of the world in most commodity items in the beginning of the sample period. A smaller peak between -0.4 and -0.5 indicates that India has had CDA over the rest of the world in a relatively smaller number of items. In the subsequent years, the two distinct modes appeared, one with probability mass concentrated between -0.1 and -0.2 and the other around 0.3. This indicates that India has both CA and CDA in roughly equal number of commodities by the end of the sample period. That is, over time, India lost its CA in several commodities to the rest of the world.

[Insert Figure 4]

In Figure 4, there is a concentration of the probability mass around the value slightly above 0.2 in 2003, which indicates that India had CA over HIC in most commodity items in the beginning of the sample period. In the subsequent years, the two distinct modes appeared, one with probability mass concentrated around -0.1 and the other around 0.3. This may indicate that India is focusing more on specializing and gaining CA over HIC in a relatively smaller number of commodities. In fact, the probability mass over the negative value is larger than that over the positive value by 2018. That is, over time, India lost its CA in several commodities to the high income countries.

[Insert Figure 5]

Figure 5 illustrates the evolution of India's CAs over MIC. Clearly, India has had CA over this group in most commodity items in the beginning of the sample period. However, over time it gradually lost its advantages in a number of items giving rise to twin peaks with the relatively smaller peak around -0.3 (indicating CDA) and the larger one around 0.2 (indicating CA).

[Insert Figure 6]

The kernel density distributions in Figure 6 indicate that India has CA over LDC in most commodities throughout the sample period. However, the variance seems to have increased over the years as reflected in wider expanse of the distribution in recent years. Further, the appearance of a smaller mode on the left tail of the distribution indicates that by 2018, India lost its CA to LDC, albeit over only a few items. The evolution of a multimodal distribution from one with a prominent single mode in all three cases – more prominently for trade with HIC and MIC - may indicate resource mobilization around a few specialized commodities at the cost of some others.

Furthermore, we estimate the probability of India maintaining, gaining or losing its CA over two different time horizons in order to examine the distribution dynamics. Panel A of Table 6 presents the corresponding transition matrices for India's trade with the rest of the world. The probability of India's maintaining the initial CA or CDA in trade with the rest of the world (presented along the diagonals in the matrices in Table 6) varies between 88.81% and 77.14%. The probability of India maintaining CA decreases from 88.81% in 3-year to 77.14% in a 10-year time horizon. However, India's CDA over the rest of the world seems to be more persistent as indicated by a much smaller decrease in probability of maintaining CDA from 86.15% in 3-year to 84.62% in 10-year. Thus, the probability of India switching from CA to CDA increases more rapidly during a 10-year time horizon.

[Insert Table 6]

Panel B of Table 6 presents the transition probabilities for HIC. While the probability of India maintaining CA decreases from 90.4% in 3-year time horizon to 75% in 10-year horizon, that of it maintaining CDA declined from 87.2% to 75% during the same time period. These measures suggest that the probability of India switching from CA to CDA is the same as that of switching from CDA to CA in the long-run.

The transition probabilities for India's CA or CDA over MIC are presented in Panel C of Table 6. The probability of India maintaining the initial CA or CDA in trade over this group ranges from 92.75% to 87.1%. While the probability of India maintaining CA decreases from 92.75% in 3-year time horizon to 87.69% in 10-year horizon, that of it maintaining CDA declined from 88.57% to 87.19% during the same time period. Again, like in the case of HIC, the probability of India switching from CA to CDA is almost the same as the probability of switching from CDA to CA in the long-run.

Finally, Panel D of Table 6 presents the transition probabilities for India's CA or CDA over LDC. The probability of India maintaining the initial CA or CDA in trade over this group of countries ranges from 92.54% to 83.78%. While the probability of India maintaining CA decreases from 92.54% in 3-year time horizon to 91.53% in 10-year horizon, that of it maintaining CDA declined from 85.14% to 83.78% during the same time period. Thus, India's CA over LDC is quite persistent. Further, the probability of India switching from CDA to CA is much higher than the probability of switching from CA to CDA in the long-run.

The international trade theories underscore the importance of differences in factor endowments and technology for CA. Since changes in these structural features do not take place frequently, any CA measure consistent with the theory has to be stable over time. Interestingly, the analysis of distribution dynamics could be a tool for assessing the extent to which the RSCA measures satisfy this stability condition. As indicated by our results, the RSCA measures for India are quite persistent (at least in the short-run) and they are unlikely to change quickly. Accordingly, the RSCA measures in the current study seem to be consistent with the theoretical concept of CA that is driven by the underlying differences in factor endowments.

Overall, we can draw the following conclusions from the analysis of distribution dynamics. *First*, India has lost its CA in certain industries, more prominently to HIC. *Second*, India's CA over LDC is more persistent than over HIC and MIC in the long-run. Further, India's CDA over MIC is more persistent than over the two other groups of countries. Finally, in general, the probabilities of switching from CDA to CA are higher than those for a shift from CA to CDA for all three groups. However, the probability of losing CA to HIC is higher than that to the two other groups.

4. Discussion

The theories of international trade highlight the factors that may potentially determine or influence a country's comparative advantage. Existing theories suggest that natural resources, relative abundance of factors of production, economies of large-scale production, and product cycle could be the sources of CA.¹⁵ Government policies can also give a country trade advantages over partner countries. However, any attempt at conducting a formal analysis of all these potential determinants of India's CA in merchandise trade items as indicated by our results using relevant data is fraught with a number of challenges. First, it is difficult to map the HS product classification – used for international trade – exactly to the industrial classification – typically used for measuring economic, social, environmental and other phenomena.¹⁶ Second, the availability and quality of the underlying data on a number of potentially important variables such as labor and capital stock also pose formidable challenges. A large portion of the Indian economy depends on informal labor market and, as such, obtaining reliable time series data on labor for different industries – that may consist of firms in both organized and unorganized sectors – is almost impossible. The problems of measuring capital due to vintages and depreciation are well-known (see, for example, Jorgenson and Fraumeni 1989). These problems are even more acute in developing countries like India. Combining labor and capital data across countries within each income group of countries is another daunting task that is outside the scope of the present study. Therefore, we resort to a somewhat informal discussion that is based on facts and arguments provided by various sources and studies that seem to substantiate some of the relevant theoretical predictions for different product categories. We focus on the product groups in which India has CA and pivot our discussions around three coalescing points: natural resources, relative factor endowments, and government policy. This discussion is, by no means, exhaustive and, we believe, there is scope for more rigorous future research.

¹⁵ Any undergraduate textbook in international trade covers these theories. For a quick reference, please take a look at the entry on international trade in Encyclopaedia Britannica (2019).

¹⁶ The HS is a system of international nomenclature for the classification of products. It allows participating countries to classify traded goods on a common basis for customs purposes. In contrast, industrial classification is a system of classifying economic activities. Such a system groups enterprises based on similarity of goods or service or that of processes (i.e. the same raw materials, process of production, skills or technology). India developed an industrial classification system as early as 1962 (then known as the Standard Industrial Classification – SIC) and later revised in 1970 (renamed as National Industrial Classification - NIC), 1987, 1998, 2004, and 2008. These revisions took into account the changing nature and needs of various economic activities and conformed to the changes made to the United Nations (UN) International Standard Industrial Classification (ISIC) system (for a discussion on NIC, see CSO 2008, pp. 4-11). There is no official mapping or concordance between the HS product classification and NIC. Individual researchers (e.g. Rijesh 2017; Nath et al. 2015) have attempted to create concordance between these two systems. However, aggregating output and inputs across NIC categories (specifically, capital) is often challenging.

4.1 Natural Resources

A country richly endowed with a natural resource is likely to have an advantage in that resource or in a product that the country produces using that resource as a critical input. India has vast endowments of several metallic minerals. According to the Ministry of Mines (2017-18), it produces 10 metallic minerals in significant quantities, which give India an advantage in the product category of metals.¹⁷ Similarly, that India is one of the largest producers of natural rubber partly explains its advantage in the product category of plastic and rubber. The large production of good quality cotton and jute aided by the climatic conditions is one of the sources of India's CA in textiles and clothing. Further, a wide range of weather conditions across a vast geographic scale and varied topography allow India to produce a broad variety of fruits and vegetables in large quantities that, despite its enormous domestic demand, can satisfy substantial external demand. India's geographical location – another natural factor – is also conducive to the export of fruits and vegetables to its major export destinations: the UAE, Sri Lanka, the Netherlands, Bangladesh, Malaysia, Nepal, the UK, Saudi Arabia, and Qatar (APEDA 2019). The topography and climatic conditions – both gifts of nature – may also partly explain India's advantage in rearing large quantities of livestock and in international trade in animal.¹⁸

4.2 Relative Factor Endowments

The Heckscher-Ohlin (H-O) model of international trade suggests that a country with abundant labor (capital) endowment should specialize and export labor-intensive (capital-intensive) products. With the world's second largest population of 1.3 billion, it is obvious that India is a labor-abundant country and, therefore, should have CA in labor-intensive products. A formal analysis of data on 95 countries conducted by Shirotori et al (2010) indicates that India belongs to the lowest cluster of countries in terms of physical and human capital endowments. Since the study measures

¹⁷ India was the largest producer of sheet mica, 3rd largest producer of steel, and had the 7th largest bauxite reserves in 2017 (Ministry of Mines 2017-18).

¹⁸ The export of animal from India includes buffalo meat (for which there has been a sudden surge in international demand), sheep/goat meat, poultry products, animal casings, milk and milk products and honey. India has emerged as the largest producer of milk with 20.17% share in total milk production in the world. India accounts for about 5.65% of the global egg production and also the largest population of milch animal in the world, with 110 million buffaloes, 133 million goats, and 63 million sheep. India has 20% and 10% of the cattle & buffalo and goat & sheep population in the world. Buffalo meat is the dominant animal product accounting for over 89.08% of India's exports of this category. Socialist Republic of Vietnam, Malaysia, Arab Republic of Egypt, Iraq and Saudi Arabia are the major destination countries for India's export of buffalo meat and other animal products. (Agricultural & Processed Food Products Export Development Authority (India) website:

http://apeda.gov.in/apedawebsite/six_head_product/animal.htm, accessed on March 2, 2019).

physical and human capital endowment in per worker basis, it also implies that India belongs to the highest relative labor endowment cluster of countries. The same study broadly concludes that HICs have the highest and low income countries (LDCs in our classification) have the lowest physical and human capital per worker. Although India is a middle income country, it is more aligned with the LDCs in relative factor endowments. These differences in India's relative factor endowments with HIC and MIC could be a potential source of its CA in labor-intensive products over these two groups of countries.¹⁹

Some existing studies (e.g. Nath et al. 2015) suggest that labor abundance could, in fact, be a source of India's CA. The availability of cheap labor gives a cost advantage to India over its trading partners. This seems to be the case for certain products for which, as our evidence suggests, India has CA. According to Shirotori et al (2010), animal, food products, textiles and clothing, hides and skin, and footwear have low revealed capital intensity (RCI) worldwide, which also suggest that their production is relatively more labor-intensive.²⁰ Thus, India's CA in these product categories could be partly explained by relative labor abundance.

However, additional comments and explanations are warranted with respect to some of these product groups as they are characterized by some specific features. For example, India's textile industry has a dual structure: a labor-intensive traditional hand-woven and small-scale power-loom sector that employs 45 million people; and a modern capital-intensive mill sector that consists of 3,400 textile mills with 50 million spindles and 8,42,000 rotors (Ministry of Textiles 2017-18).²¹ The history of Indian textiles dates back to 3000 BC. For many centuries, before the British colonial policies destroyed it, India's unique textile products attracted buyers from all parts of the world. After independence, the Indian government has taken numerous steps to reclaim its previous glory. Thus, availability of relatively cheap labor, quality raw materials of diverse types, and manufacturing strength along the entire supply chain (Verma 2000), and the

¹⁹ Some studies (e.g. Panagariya 2008, Hasan et al. 2013) make a puzzling observation that India's large manufacturing firms tend to be more capital-intensive. Hasan et al (2013) attributes this to stringent labor regulation and credit market imperfections.

²⁰ Calculations based on Appendix Tables A6 & A7 of Shirotori et al (2010) indicate that about 51% of industries producing live animal, 61% of those producing food products, 77% of those producing textiles and apparel, 74% of those producing hides and skin, and 92% of those producing footwear belong to the lowest two clusters of RCI. Since RCI of an industry is a weighted average of physical capital per worker across countries, a low RCI value indicates a relatively more intensive use of labor. For RCI measure, please see Shirotori et al. (2010) and Maclaren et al (2019). Data on revealed factor intensity for detailed industries are available from the UNCTAD website.

²¹ In terms of installed capacity, the capital-intensive mill sector is the second largest in the world. As per the Annual Report, 2017-18 of the Ministry of Textiles of the Government of India, the textile sector contributes 2% of GDP and 15% of India's exports earnings.

historical brand value are the sources of India's persistent CA in textiles and clothing vis-à-vis all three groups of countries.²²

Footwear is another labor-intensive industry that employs more than 1.1 million workers. In addition to labor, availability of abundant raw materials and skilled man-power at competitive wage rate that contribute to lower production costs, innovative technology, support from allied industries and increasing industry compliance to international environmental standards have helped the industry's growth and exports.²³

In case of chemicals, which are relatively more capital-intensive, India's large pool of cheap semi-skilled labor has given a cost advantage to penetrate the export market. Bhat and Narayanan (2009) demonstrate that the firms engaged in in-house research and developments (R&D) have been able to cut costs even further and these cost reductions have facilitated their external market expansion. Narang and Roy Choudhury (2018) have recently made similar arguments.

The product category of transportation equipment includes rail and tram locomotives; aircraft, spacecraft, and their parts; vehicles and their components; boats, ships, floating vehicle and others. Availability of raw materials (including steel), cheap semi-skilled and skilled labor, and deep and extensive engineering capabilities give India a significant cost advantage in the production of transportation equipment.²⁴ Because of these favorable factors, India has become a part of the global supply chain in which it provides key components at low costs. As we discuss below, the economic liberalization of the early 1990s played a critical role in making good of these sources of India's comparative advantage.

²² Globally, India's total exports of textiles and clothing in value and as a share of the total have levelled off since 2013. The steady growth of China's export share since the early 2000s could partly explain India's current position.

²³ For more information on the Indian footwear and leather industry, see the website of the Council of Leather Exports, India. The data and other information presented here are obtained from this website (<http://leatherindia.org/indian-leather-industry/>) accessed on 20/06/2019.

²⁴ Critical parts for both Boeing and Airbus are manufactured in India. Hindustan Aeronautics Limited (HAL) has been manufacturing the forward passenger doors for the A-320 aircraft of Airbus and the Boeing 757 since the 1980s and the 1990s respectively. This company became the only producer of the over-wing exit doors of the same model of Boeing aircraft since 1991. India is one of the only two manufacturing centers of another important, extremely high tech component of the aircrafts: the composite beams. Similarly, Dynamatic Technologies – an Indian firm – is the only entity that supplies flat track beams used in Airbus A-320 and A-330 aircraft (Phadnist 2017). According to a newspaper report (THBL 2018), there is as high as 20 per cent cost saving in parts and components manufactured in India for the global aviation industry. Making a case for India's own venture into aircraft manufacturing, Kelkar (2019) argues that easy availability of raw materials and the necessary technical skills are two major sources of cost savings. In case of auto components industry, Indian firms save 10 – 15 per cent of their operational costs as compared to their counterparts in Europe and Latin America (IBEF, 2019). Consequently, India has become a global hub for auto-component sourcing for many global Original Equipment Manufacturers (OEMs).

Because of relative abundance of technically skilled workers and low cost of production, India also has CA in machines and electrical machinery over LDC. However, although it produces a wide range of machines and equipment and exports to MIC and LDC, it is highly dependent on China and Japan for heavy industrial machineries and electronics.

Overall, our discussion in this subsection points to evidence of relative factor abundance being the source of India's CA in certain products over the three groups of countries. Das and Gupta (2019) provide additional evidence of cost competitiveness in intermediate goods under the broad categories of chemicals, plastic and rubber, hides and skin, textiles and clothing, stone and glass, metals, and miscellaneous machine primarily over HIC.

4.3 Government Policy²⁵

As we have noted in the beginning, there was a shift in India's economic policy paradigm in the early 1990s. A mixed-economy model with a dominant presence of the public sector industries and heavy restrictions on the private sector and international flows of goods and capital with the goal of self-sufficiency characterized the erstwhile policy framework. Simultaneously, although the government actively promoted certain export-oriented industries, the purpose was defeated by import-substitution policies that, as Pursell (1992, pp. 433-34) argues, "resulted in an extremely diverse industrial structure and high degree of self-sufficiency, but ... high production costs". This not only increased the cost of domestically produced capital and intermediate goods but also their poor quality and technological backwardness eroded the comparative advantage of the low-cost, export-oriented sectors such as "the textiles, garments, leather goods, many light industries, and primary industries such as cotton (Pursell 1992, pp. 433-34).

Although the market-oriented economic reforms and trade liberalization in 1991 – triggered by a balance of payments crisis – ushered in an era of new economic policy paradigm, government efforts at piecemeal liberalization measures go back to the late 1970s and, at somewhat accelerated pace, to the time of Rajiv Gandhi's premiership during the late 1980s.²⁶ The removal of investment licensing, deregulation of public sector industries, and the introduction of an automatic approval policy for foreign direct investment (FDI) were the most significant changes announced in the industrial policy statement of 1991. Similarly, the major trade policy changes included removal of import licensing, significant reduction in tariffs (over a period of time) and export controls, and lifting of exchange controls and elimination of

²⁵ We do not discuss industry-specific policies as it requires more formal and in-depth investigation to tease out their impacts on India's CA/CDA position in broadly defined product groups that may cover multiple industries.

²⁶ Panagariya (2008) systematically argues that in Chapter 5.

overvaluation of the Indian currency.²⁷ Over time, more specific reform measures were adopted and implemented.

These policy changes unleashed the trapped potential of the Indian industries and might have helped some of them reveal their comparative advantages in the international arena. At the fundamental levels, the market-oriented industrial policy reforms were to allow prices work as a signaling device leading to better allocation of resources and more efficient production. The import and FDI policy reforms would give firms access to the state-of-art technologies and the export-promotion policies would give the competitive edge in areas where they needed help to compete with other countries. Although these theoretical predictions with respect to the potential effects of various policy reforms need comprehensive empirical validation, there is fragmentary evidence of how the trade liberalization affected different industries. Of course, these policy reforms did not affect different industries uniformly. For example, Das (2003) shows that only the capital and consumer goods producing industries experienced total factor productivity (TFP) growth during the first five years of reform after which the growth slowed. Interestingly, for more recent years since 2000, Rijesh (2017) provides evidence of a shift in Indian organized manufacturing from traditional labor-intensive industries such as food, beverages, tobacco, and textiles, to modern-skill and knowledge-intensive industries such as chemicals, machinery, and transport equipment that experienced significant TFP growth during the 2000s. This productivity growth certainly gave these industries comparative advantage by lowering average production cost.

As a member of the World Trade Organization (WTO), India has played an active role in multilateral trade negotiations. India led a coalition of the developing countries, along with Brazil and China, to block a proposal put forward by leading powers like the US and EU, and presented a counter proposal involving the demand to reduce agricultural subsidies given to farmers in the rich countries. India also played a leading role in negotiating a deal seeking protections for its agriculture sector by ways of safeguarding some special products from tariff cuts and some other products by raising tariffs through a special safeguard mechanism (see Hopewell 2018). According to the WTO trade policy review of 2002, India's average bound tariff rate in agriculture was 115.2 percent (Panagariya 2008, p. 106). However, in the wake of slow progress in multilateral trade negotiations under the aegis of WTO, countries have signed a

²⁷The significant easing of quantity restrictions on imports during the 1980s was offset by high tariffs to protect domestic industries, a phenomenon referred to as *tariffication* of import restrictions (Acharya 2012). Thus, by the beginning of the new policy paradigm, the tariff rate averaged at 113 percent (simple average) with the highest tariff rate standing at 355 percent. (Panagariya 2008, p. 105). Subsequently, a substantial compression of the top tariff and a decrease in the number of tariff rates (known as tariff rationalization) brought the top tariff rate on nonagricultural products down to 10 percent by 2007-08.

large number of bilateral and regional trade agreements to promote mutually advantageous trade. Appendix C provides a list of countries with which India has signed bilateral or/and regional trade agreements. Most countries belong to MIC and LDC group. By removing additional barriers, these agreements must have facilitated promotion of India's trade in various product items - based on its CAs - with the group that the agreement partner countries belong to. As we have discussed in the beginning of this section, a robust investigation to tease out the exact contribution of these trade agreements to product-specific CAs is almost impossible primarily due to a lack of appropriate data on a number of controls.

Furthermore, government policies leading to infrastructure and supply chain development, removal of restrictions on FDI, industry specific initiatives have also contributed to the growth of certain industries. Finally, in some cases, India's domestic market size may also help in attaining economies of scale and thereby to remain competitive.

5. Concluding Remarks

Using the data on export and import for 16 product groups, we examine the patterns and evolution of CA in India's merchandise trade with three different income groups of countries: HIC, MIC, and LDC from 2003 to 2018. Our results indicate that India has always had CA over all three groups of countries in animal, food products, and textiles and clothing, and had CDA in wood. Further, India has had persistent CA over MIC and LDC in plastic and rubber and transportation equipment. Similarly, it has persistent CA over HIC and MIC in hides and skin and footwear. India has also been in advantageous position vis-à-vis LDC with respect to machines and electrical machinery and miscellaneous products. India has gained CA over all three groups of countries in chemicals and over HIC in transportation equipment. In contrast, the country has lost its CA over all three groups of countries in fuels and over HIC and MIC in minerals. These results are robust to the use of an alternative CA measure and mostly so to a restricted subsample of largest trading partner countries within each group. Furthermore, the analysis of distribution dynamics indicates that India's CA over LDC is more persistent than over HIC and MIC in the long-run. In contrast, India's CDA over MIC is more persistent than over the two other groups of countries. Finally, in general, the probabilities of switching from CDA to CA are higher than those for a shift from CA to CDA for all three groups of countries. However, the probability of losing CA to high income countries is higher than that to two other groups.

The relative abundance of cheap labor is a common source while availability of natural resources including climatic condition and geographic location, semi-skilled and highly skilled

labor are some of the product-specific determinants of India's revealed comparative advantage. The shift in economic policy paradigm in the early 1990s leading to market-oriented reforms and trade and capital liberalization, industry specific initiatives, and trade agreements also seem to have helped certain industries with the export performance in their respective product categories.

The results presented in this paper have important policy implications. The government policy should aim at promoting the industries that produce the goods for which India has CA over a large group of countries. The results suggest that in addition to animal, food products, and textiles and clothing, India should formulate policies that will help transportation equipment (including parts and automobiles) and chemical industries to maintain their CA over their counterparts in all three different groups of countries. Further, these results are informative not only about the commodities but also about the group(s) of countries that policymakers have to keep in mind in signing new regional trade agreements. For example, the results seem to suggest that India may gain by promoting trade in minerals and machines and electronics with LDCs.

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Figure 1. Shares of exports, imports, and total trade in India's GDP: 1960 - 2018

Note: The graphs are generated using data from the World Development Indicators (WDI) database of World Bank, downloaded from <https://data.worldbank.org/country/india>, on October 6, 2019.

Figure 2. Merchandise trade shares for India: 1970-2018

Note: The graphs are generated using data from the World Development Indicators (WDI) database of World Bank, downloaded from <https://data.worldbank.org/country/india>, on October 6, 2019.

Figure 3. Kernel density distributions of the RSCA index for India’s merchandise trade with the world

Figure 4. Kernel density distributions of the RSCA index for India’s merchandise trade with high income countries

Figure 5. Kernel density distributions of the RSCA index for India's merchandise trade with middle income countries

Figure 6. Kernel density distributions of the RSCA index for India’s merchandise trade with least developed countries

Table 1. Summary statistics with the world: 2003 – 2018

Items	Exports			Imports		
	Mean (millions of USD)	Coefficient of variation (%)	Average share in total exports (%)	Mean (millions of USD)	Coefficient of variation (%)	Average share in total imports (%)
	(1)	(2)	(3)	(4)	(5)	(6)
Animal	6027.2	62.7	2.78	148.7	61.2	0.04
Vegetable	12857.6	52.7	5.93	11981.0	55.3	3.60
Food Products	5085.2	42.6	2.35	1473.3	66.8	0.44
Minerals	4921.9	40.1	2.27	6879.7	47.2	2.07
Fuels	33946.9	58.9	15.66	110606.7	52.3	33.22
Chemicals	24105.5	49.5	11.12	28672.6	49.1	8.61
Plastic and rubber	6056.9	45.8	2.79	10019.4	61.3	3.01
Hides and Skins	2688.7	30.2	1.24	692.9	46.1	0.21
Wood	1335.0	49.3	0.62	5516.1	41.8	1.66
Textiles and Clothing	27947.7	34.1	12.89	4493.6	42.5	1.35
Footwear	2153.1	40.5	0.99	354.6	74.7	0.11
Stone and Glass	33196.3	42.0	15.31	52408.7	50.5	15.74
Metals	18439.6	38.2	8.51	20188.2	46.7	6.06
Mach and Elec	17232.8	47.7	7.95	54543.2	47.9	16.38
Transportation	14468.6	59.9	6.67	11294.2	42.5	3.39
Miscellaneous	6306.9	60.7	2.91	13696.9	52.4	4.11
Total	216769.9	43.5	100.00	332969.7	47.4	100.00

Source: Authors' calculation from WITS data

Table 2. Summary statistics for high income, middle income, and least developed countries: 2003 – 2018

Commodity category	High income countries				Middle income countries				Least developed countries			
	Exports		Imports		Exports		Imports		Exports		Imports	
	Mean (millions of USD)	Coefficient of variation (%)	Mean (millions of USD)	Coefficient of variation (%)	Mean (millions of USD)	Coefficient of variation (%)	Mean (millions of USD)	Coefficient of variation (%)	Mean (millions of USD)	Coefficient of variation (%)	Mean (millions of USD)	Coefficient of variation (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Animal	2522.8	49.1	82.9	71.2	3019.0	77.5	29.9	51.1	203.4	48.9	30.8	73.1
Vegetable	5633.9	49.9	1939.0	64.9	4366.9	62.1	8390.3	55.8	1621.4	57.9	1577.1	47.8
Food Products	1932.6	42.4	544.0	73.4	1922.1	43.5	816.3	69.2	889.4	59.9	95.1	60.3
Minerals	1019.9	24.5	1744.1	50.0	3568.5	51.2	4644.0	46.6	193.3	41.1	263.3	54.7
Fuels	18290.2	55.9	32528.0	63.7	8341.3	57.8	48153.6	65.2	2726.2	65.5	4760.8	68.1
Chemicals	11970.8	49.9	12453.4	44.8	9233.9	47.3	13210.3	53.5	1792.3	58.5	354.1	49.7
Plastic and rubber	2630.1	44.9	5617.6	58.5	2558.6	45.1	3150.6	67.5	594.9	59.9	69.7	42.4
Hides and Skins	2251.4	27.9	243.4	27.0	364.2	42.9	365.9	65.6	18.4	63.7	32.9	33.2
Wood	600.5	46.3	2878.8	42.0	470.7	49.2	2078.2	46.8	203.3	60.0	439.1	44.4
Textiles and Clothing	17764.2	26.8	1336.3	39.9	6895.7	50.0	2564.6	45.2	2304.3	55.8	396.0	52.3
Footwear	1701.0	34.9	58.7	44.3	277.5	54.8	274.3	82.4	61.5	118.7	18.0	89.0
Stone and Glass	31070.3	41.5	43051.7	49.2	1457.9	46.4	7575.1	68.2	151.2	69.2	583.9	150.5
Metals	9334.7	37.5	11011.4	46.8	6232.5	42.1	7639.2	45.9	1450.4	51.5	648.7	65.0
Mach and Elec	9699.4	43.7	27511.7	36.7	5166.8	53.6	25242.3	63.9	1357.0	59.9	32.0	72.3
Transportation	6828.1	55.5	8209.6	44.2	5925.6	67.1	2584.5	66.1	1179.2	69.2	40.9	110.9
Miscellaneous	3311.0	27.7	7786.1	45.2	918.2	43.7	3977.9	64.8	236.6	71.2	13.3	108.6

Source: Authors' calculation from WITS data

Table 3. Summary of India's CA/CDA based on Revealed Symmetric Comparative Advantage (RSCA)

Commodity item	World	High income countries	Middle income countries	Least developed countries
	(1)	(2)	(3)	(4)
Animal	CA	CA	CA	CA
Vegetable	CA	CA	CA/CDA	CDA/CA
Food products	CA	CA	CA	CA
Minerals	CA→CDA	CA→CDA	CA/CDA	CDA
Fuels	CDA	CA→CDA	CA→CDA	CA→CDA
Chemicals	CA	CDA→CA	CA	CDA→CA
Plastic and rubber	CA/CDA	CDA	CA	CA
Hides and skin	CA	CA	CA	CDA
Wood	CDA	CDA	CDA	CDA
Textiles and clothing	CA	CA	CA	CA
Footwear	CA	CA	CA	CA/CDA
Stone and glass	CA/CDA	CDA/CA	CDA	CDA/CA
Metals	CA	CA/CDA	CA/CDA	CA/CDA
Machines and electrical	CDA	CDA	CDA	CA
Transportation	CA/CDA	CDA→CA	CA	CA
Miscellaneous	CDA/CA	CDA	CDA/CA	CA

Note: CA = Comparative Advantage; CDA = Comparative Disadvantage; CA→CDA = switch from CA to CDA during the sample period; CDA→CA = switch from CDA to CA; CA (CDA)/CDA (CA) = multiple switches between CA and CDA ordered according to the number of occurrences during the sample period. This summary table is based on the detailed RSCA measures presented in Appendix Table A.1 – A.4

Table 4. Robustness check results: number of concurrences in India's CA/CDA between RSCA and Trade Balance Index (TBI)

Commodity item	No. of concurrences with the baseline RSCA results			
	World	High income countries	Middle income countries	Least developed countries
	(1)	(2)	(3)	(4)
Animal	16	16	16	16
Vegetable	16	16	16	16
Food products	16	16	16	16
Minerals	16	16	16	16
Fuels	16	16	16	16
Chemicals	16	15	16	16
Plastic and rubber	16	16	16	16
Hides and skin	16	16	16	16
Wood	16	16	16	15
Textiles and clothing	16	16	16	16
Footwear	16	16	16	16
Stone and glass	16	16	16	16
Metals	16	15	16	15
Machines and electronics	16	16	16	16
Transportation	16	16	16	16
Miscellaneous	16	16	16	16
Total number of concurrences	256	254	256	256
(% of total)	(100%)	(99.2%)	(100%)	(99.2%)

Note: The number in each cell indicates the number of years for which CA/CDA conclusions are exactly the same during the 16 years between 2003 and 2018. The percentages in the last row are calculated out of a total of 256 (16 product categories $\times$ 16 years). This summary table is based on the detailed RSCA measures presented in Appendix Table A.5 – A.8

Table 5. Robustness check results: number of concurrences in India's CA/CDA between Full Sample and Subsample of Five Largest Trading Partners in each income group of countries

Commodity item	High income countries	Middle income countries	Least developed countries
	(1)	(2)	(3)
Animal	16	16	6
Vegetable	16	11	11
Food products	16	16	12
Minerals	15	12	3
Fuels	16	10	13
Chemicals	13	5	16
Plastic and rubber	16	10	13
Hides and skin	16	16	16
Wood	16	16	3
Textiles and clothing	16	15	11
Footwear	16	15	3
Stone and glass	9	16	13
Metals	13	15	9
Machines and electronics	16	16	16
Transportation	14	16	16
Miscellaneous	16	16	16
Total number of concurrences	240	221	177
% of total	93.8%	86.3%	69.1%

Note: The number in each cell indicates the number of years for which CA/CDA conclusions are exactly the same during the 16 years between 2003 and 2018. The percentages in the last row are calculated out of a total of 256 (16 product categories $\times$ 16 years). The detailed tables are not included to save space. Interested readers may obtain them from the corresponding author.

Table 6. Transition matrices for India's comparative advantage over different time horizons

Panel A: Transition probabilities with the world			Panel B: Transition probabilities with high income countries			Panel C: Transition probabilities with middle income countries			Panel D: Transition probabilities with least developed countries		
3-year time horizon			3-year time horizon			3-year time horizon			3-year time horizon		
	CA	CDA		CA	CDA		CA	CDA		CA	CDA
CA	88.81	11.19	CA	90.35	9.65	CA	92.75	7.25	CA	92.54	7.46
CDA	13.85	86.15	CDA	12.77	87.23	CDA	11.43	88.57	CDA	14.86	85.14
10-year time horizon			10-year time horizon			10-year time horizon			10-year time horizon		
	CA	CDA		CA	CDA		CA	CDA		CA	CDA
CA	77.14	22.86	CA	75.00	25.00	CA	87.69	12.31	CA	91.53	8.47
CDA	15.38	84.62	CDA	25.00	75.00	CDA	12.90	87.10	CDA	16.22	83.78

Note: CA: Comparative Advantage. CDA: Comparative Disadvantage. Each number represents the probability (in %) that the India moves from an initial state (as indicated in the far left column) to a final state (as indicated in the top row) of CA or CDA over a given time horizon (3 or 10 years). For example, the value of 88.81 in the first transition matrix indicates that if the India has CA vis-a-vis the rest of the world in a particular commodity trade, on an average, there is 88.81% probability that it will still have CA after 3 years. Similarly, the value of 11.19 indicates that there is an 11.19% probability that India will move from a position of CA to a position of CDA over the world.

Source: Authors' estimation using the RSCA measures calculated from the WITS database

APPENDIX TABLES

Table A.1. India's revealed symmetric comparative advantage (RSCA) with the world: 2003 - 2018

	Animal	Vegetable	Food Products	Minerals	Fuels	Chemicals	Plastic and Rubber	Hides and Skin	Wood	Textiles and Clothing	Footwear	Stone And Glass	Metals	Mach and Elec	Transportation	Misc.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
2003	0.37	0.06	0.32	0.17	-0.52	0.05	0.08	0.31	-0.44	0.32	0.36	0.02	0.14	-0.31	-0.05	0.00
2004	0.38	0.13	0.27	0.22	-0.45	0.05	0.12	0.33	-0.43	0.34	0.37	-0.01	0.14	-0.32	0.00	0.02
2005	0.40	0.15	0.27	0.28	-0.38	0.05	0.09	0.34	-0.38	0.35	0.38	0.00	0.10	-0.31	0.03	-0.03
2006	0.41	0.15	0.38	0.10	-0.28	0.07	0.11	0.35	-0.38	0.37	0.38	0.03	0.14	-0.30	-0.12	-0.07
2007	0.42	0.15	0.39	0.15	-0.24	0.06	0.04	0.34	-0.39	0.37	0.39	0.02	0.09	-0.31	0.02	-0.07
2008	0.45	0.24	0.43	0.16	-0.25	0.02	0.07	0.38	-0.36	0.41	0.42	0.01	0.15	-0.23	-0.05	-0.12
2009	0.41	0.09	0.28	0.18	-0.28	0.03	-0.07	0.34	-0.36	0.37	0.39	0.05	0.05	-0.21	0.09	0.09
2010	0.42	0.11	0.32	0.15	-0.20	0.06	-0.06	0.34	-0.36	0.39	0.38	-0.08	0.15	-0.23	0.20	-0.11
2011	0.41	0.15	0.38	0.02	-0.20	0.04	0.02	0.34	-0.38	0.38	0.37	-0.06	0.06	-0.23	0.25	0.08
2012	0.45	0.23	0.38	-0.06	-0.24	0.10	0.00	0.37	-0.34	0.40	0.39	-0.03	0.09	-0.20	0.21	-0.22
2013	0.40	0.18	0.33	-0.18	-0.21	0.08	-0.01	0.32	-0.34	0.36	0.35	-0.02	0.10	-0.19	0.18	-0.14
2014	0.41	0.15	0.30	-0.25	-0.22	0.07	-0.07	0.32	-0.37	0.36	0.36	0.01	0.09	-0.22	0.25	-0.30
2015	0.42	0.07	0.29	-0.29	-0.27	0.07	-0.08	0.32	-0.31	0.36	0.36	0.00	0.05	-0.26	0.22	-0.23
2016	0.40	0.02	0.24	-0.10	-0.28	0.08	-0.10	0.30	-0.31	0.34	0.33	0.06	0.04	-0.28	0.18	-0.30
2017	0.42	0.06	0.26	-0.10	-0.28	0.10	-0.06	0.32	-0.31	0.36	0.34	-0.04	0.13	-0.26	0.22	-0.20
2018	0.48	0.15	0.32	-0.12	-0.28	0.12	-0.03	0.35	-0.23	0.40	0.38	0.00	0.08	-0.22	0.26	-0.16
Mean	0.42	0.13	0.32	0.02	-0.29	0.07	0.00	0.33	-0.36	0.37	0.37	0.00	0.10	-0.26	0.12	-0.11
Std dev	0.03	0.06	0.05	0.18	0.09	0.03	0.07	0.02	0.05	0.02	0.02	0.04	0.04	0.04	0.13	0.12

Source: Authors' calculation from WITS data

Table A.2. India's revealed symmetric comparative advantage (RSCA) with high income countries (HIC): 2003 - 2018

	Animal	Vegetable	Food Products	Minerals	Fuels	Chemicals	Plastic and Rubber	Hides and Skin	Wood	Textiles and Clothing	Footwear	Stone And Glass	Metals	Mach and Elec	Transportatio n	Misc.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
2003	0.30	0.22	0.25	0.16	0.03	-0.05	-0.14	0.27	-0.55	0.27	0.30	-0.02	-0.01	-0.44	-0.31	-0.10
2004	0.32	0.26	0.24	0.15	0.10	-0.05	-0.09	0.29	-0.53	0.30	0.32	-0.08	0.07	-0.44	-0.22	-0.07
2005	0.33	0.25	0.24	0.16	0.14	-0.05	-0.10	0.29	-0.50	0.31	0.32	-0.07	0.01	-0.41	-0.19	-0.13
2006	0.36	0.27	0.30	0.02	-0.04	-0.01	-0.04	0.32	-0.50	0.34	0.35	-0.02	0.09	-0.37	-0.36	-0.12
2007	0.38	0.20	0.32	0.04	-0.07	0.01	-0.07	0.33	-0.44	0.36	0.37	-0.01	0.05	-0.35	-0.18	-0.12
2008	0.42	0.33	0.37	-0.05	-0.11	0.00	-0.06	0.38	-0.44	0.40	0.41	-0.01	0.12	-0.26	-0.21	-0.17
2009	0.37	0.26	0.32	0.13	-0.10	0.01	-0.21	0.34	-0.43	0.37	0.38	0.01	-0.08	-0.26	-0.07	-0.17
2010	0.37	0.28	0.31	-0.15	0.00	0.05	-0.17	0.36	-0.46	0.38	0.39	-0.10	0.04	-0.23	0.04	-0.21
2011	0.37	0.31	0.31	-0.21	-0.06	0.05	-0.09	0.35	-0.47	0.37	0.38	-0.07	0.00	-0.24	0.20	-0.32
2012	0.39	0.34	0.32	-0.21	-0.10	0.10	-0.16	0.37	-0.43	0.38	0.40	-0.06	0.00	-0.23	0.06	-0.34
2013	0.36	0.27	0.28	-0.26	-0.09	0.06	-0.17	0.33	-0.42	0.34	0.36	-0.04	0.02	-0.20	0.04	-0.32
2014	0.36	0.25	0.24	-0.24	-0.17	0.06	-0.22	0.33	-0.47	0.34	0.36	-0.02	0.01	-0.21	0.10	-0.21
2015	0.35	0.17	0.22	-0.27	-0.19	0.07	-0.23	0.32	-0.41	0.33	0.35	-0.02	-0.05	-0.25	0.07	-0.10
2016	0.33	0.12	0.19	-0.23	-0.18	0.05	-0.23	0.29	-0.42	0.30	0.32	0.03	-0.04	-0.28	0.03	-0.19
2017	0.35	0.13	0.21	-0.15	-0.15	0.05	-0.20	0.32	-0.41	0.32	0.34	-0.03	0.04	-0.22	0.04	-0.19
2018	0.41	0.27	0.25	-0.22	-0.14	0.07	-0.19	0.38	-0.41	0.38	0.40	0.00	-0.02	-0.23	0.12	-0.18
Mean	0.36	0.25	0.27	-0.08	-0.07	0.03	-0.15	0.33	-0.46	0.34	0.36	-0.03	0.02	-0.29	-0.05	-0.18
Std dev	0.03	0.06	0.05	0.17	0.10	0.05	0.07	0.03	0.04	0.04	0.03	0.04	0.05	0.08	0.17	0.08

Source: Authors' calculation from WITS data

Table A.3. India's revealed symmetric comparative advantage (RSCA) with middle income countries (MIC): 2003 - 2018

	Animal	Vegetable	Food Products	Minerals	Fuels	Chemicals	Plastic and Rubber	Hides and Skin	Wood	Textiles and Clothing	Footwear	Stone and Glass	Metals	Mach and Elec	Transportation	Misc.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
2003	0.32	-0.33	0.28	0.07	0.18	0.00	0.17	0.13	-0.47	0.18	0.22	-0.46	0.14	-0.28	0.23	0.00
2004	0.32	-0.26	0.16	0.15	0.11	0.03	0.19	0.14	-0.50	0.17	0.18	-0.35	0.01	-0.33	0.19	-0.03
2005	0.35	-0.21	0.14	0.24	0.09	0.01	0.17	0.13	-0.39	0.13	0.15	-0.43	-0.02	-0.40	0.21	-0.07
2006	0.46	-0.05	0.44	0.17	-0.31	0.15	0.26	0.24	-0.29	0.31	0.26	-0.22	0.10	-0.36	0.27	-0.14
2007	0.49	0.03	0.46	0.24	-0.30	0.13	0.20	0.28	-0.36	0.36	0.30	-0.21	0.07	-0.37	0.33	-0.03
2008	0.53	0.10	0.50	0.28	-0.32	0.05	0.24	0.31	-0.31	0.40	0.31	-0.25	0.15	-0.29	0.31	-0.06
2009	0.51	-0.02	0.29	0.30	-0.49	0.11	0.17	0.23	-0.28	0.38	0.33	0.00	0.18	-0.18	0.39	-0.18
2010	0.48	-0.05	0.32	0.26	-0.38	0.09	0.09	0.19	-0.25	0.38	0.19	-0.38	0.23	-0.32	0.34	-0.45
2011	0.52	0.08	0.47	0.18	-0.31	0.09	0.21	0.26	-0.25	0.42	0.23	-0.44	0.17	-0.23	0.34	-0.49
2012	0.53	0.13	0.44	0.08	-0.39	0.14	0.20	0.29	-0.24	0.44	0.26	-0.32	0.19	-0.23	0.40	-0.42
2013	0.48	0.12	0.41	-0.08	-0.39	0.13	0.19	0.23	-0.25	0.40	0.25	-0.24	0.21	-0.25	0.37	-0.22
2014	0.50	0.07	0.35	-0.21	-0.30	0.10	0.13	0.20	-0.29	0.39	0.22	-0.24	0.16	-0.30	0.39	-0.29
2015	0.53	0.01	0.33	-0.21	-0.39	0.11	0.13	0.21	-0.25	0.40	0.24	-0.38	0.15	-0.34	0.40	-0.25
2016	0.53	-0.02	0.21	0.06	-0.47	0.16	0.10	0.20	-0.28	0.39	0.22	-0.32	0.13	-0.34	0.38	-0.14
2017	0.55	0.02	0.24	0.03	-0.44	0.20	0.13	0.19	-0.27	0.41	0.21	-0.45	0.24	-0.36	0.43	-0.24
2018	0.59	0.09	0.35	-0.01	-0.42	0.22	0.19	0.16	-0.11	0.44	0.18	-0.36	0.17	-0.29	0.42	-0.26
Mean	0.48	-0.02	0.34	0.10	-0.28	0.11	0.17	0.21	-0.30	0.35	0.23	-0.32	0.14	-0.30	0.34	-0.20
Std dev	0.08	0.14	0.11	0.16	0.21	0.06	0.05	0.06	0.09	0.10	0.05	0.12	0.07	0.06	0.08	0.15

Source: Authors' calculation from WITS data

Table A.4. India's revealed symmetric comparative advantage (RSCA) with least developed countries (LDC): 2003 - 2018

	Animal	Vegetable	Food Products	Minerals	Fuels	Chemicals	Plastic and Rubber	Hides and Skin	Wood	Textiles and Clothing	Footwear	Stone and Glass	Metals	Mach and Elec	Transportation	Misc
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
2003	0.08	-0.12	0.10	-0.02	0.11	-0.05	0.08	-0.64	-0.48	0.03	-0.02	-0.09	0.06	0.13	0.14	0.12
2004	0.08	-0.11	0.06	-0.06	0.13	-0.05	0.05	-0.53	-0.49	0.05	0.01	-0.12	0.04	0.14	0.13	0.11
2005	0.11	-0.10	0.03	-0.01	0.16	-0.07	0.05	-0.58	-0.55	0.08	-0.09	-0.10	0.01	0.15	0.10	0.13
2006	0.19	-0.14	0.20	-0.15	-0.15	0.12	0.20	-0.49	-0.42	0.17	0.12	-0.03	0.08	0.23	0.07	0.21
2007	0.22	-0.03	0.23	-0.16	-0.22	0.13	0.19	-0.37	-0.49	0.18	0.00	-0.05	0.08	0.25	0.26	0.25
2008	0.13	-0.12	0.20	-0.15	-0.22	0.11	0.15	-0.34	-0.43	0.14	0.00	0.03	0.05	0.23	0.20	0.21
2009	0.23	-0.27	0.23	-0.12	-0.33	0.21	0.25	-0.30	-0.35	0.23	0.06	0.14	0.19	0.31	0.28	0.29
2010	0.23	-0.19	0.29	-0.10	-0.43	0.26	0.26	-0.38	-0.40	0.27	0.01	0.18	0.16	0.32	0.32	0.29
2011	0.07	-0.20	0.26	-0.13	-0.32	0.18	0.22	-0.32	-0.43	0.21	-0.03	0.16	0.08	0.26	0.28	0.19
2012	0.23	0.04	0.26	-0.30	-0.44	0.21	0.25	-0.10	-0.43	0.23	0.07	0.07	0.11	0.28	0.29	0.27
2013	0.21	0.01	0.17	-0.23	-0.24	0.19	0.19	-0.18	-0.43	0.16	0.05	-0.36	0.07	0.22	0.22	0.19
2014	0.17	-0.07	0.14	-0.38	-0.16	0.17	0.16	-0.26	-0.40	0.14	0.08	-0.55	0.06	0.20	0.20	0.20
2015	0.15	-0.17	0.17	-0.38	-0.22	0.18	0.17	-0.23	-0.19	0.15	0.11	-0.64	0.02	0.21	0.19	0.21
2016	0.13	-0.24	0.14	-0.21	-0.19	0.13	0.15	-0.20	-0.12	0.10	0.08	-0.55	-0.02	0.18	0.17	0.18
2017	0.16	-0.10	0.17	-0.16	-0.22	0.14	0.19	-0.12	-0.09	0.15	0.15	-0.73	0.00	0.21	0.21	0.21
2018	0.19	-0.09	0.17	-0.04	-0.23	0.12	0.18	-0.18	-0.02	0.14	0.13	-0.65	0.03	0.22	0.22	0.22
Mean	0.16	-0.12	0.18	-0.16	-0.19	0.12	0.17	-0.33	-0.36	0.15	0.04	-0.21	0.06	0.22	0.21	0.20
Std dev	0.06	0.08	0.07	0.11	0.18	0.10	0.06	0.16	0.16	0.07	0.07	0.32	0.06	0.05	0.07	0.05

Source: Authors' calculation from WITS data

Table A.5. India's trade balance index (TBI) with the world: 2003 - 2018

	Animal	Vegetable	Food Products	Minerals	Fuels	Chemicals	Plastic and Rubber	Hides and Skin	Wood	Textiles and Clothing	Footwear	Stone and Glass	Metals	Mach and Elec	Transportation	Misc.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
2003	1.39	0.64	1.09	0.72	-11.87	0.82	0.39	1.02	-0.95	9.10	0.61	0.69	1.95	-5.32	-0.30	0.02
2004	1.10	1.29	0.83	1.34	-11.50	0.89	0.64	0.96	-0.86	8.14	0.58	-0.37	2.09	-5.24	0.01	0.10
2005	1.11	1.22	0.64	2.12	-10.90	0.83	0.45	0.77	-0.66	7.33	0.52	0.01	1.50	-5.02	0.20	-0.14
2006	0.94	0.94	1.14	0.71	-9.45	1.14	0.51	0.67	-0.59	6.85	0.50	0.75	2.20	-5.10	-0.85	-0.34
2007	0.88	1.04	1.22	0.99	-8.31	0.88	0.16	0.60	-0.60	6.23	0.49	0.50	1.47	-5.41	0.15	-0.31
2008	0.75	1.50	1.48	0.86	-8.64	0.27	0.22	0.54	-0.45	5.26	0.43	0.21	2.04	-3.63	-0.39	-0.45
2009	0.75	0.63	0.74	0.96	-8.36	0.49	-0.24	0.45	-0.47	5.37	0.43	1.35	0.50	-4.13	0.81	0.74
2010	0.88	0.67	0.90	0.73	-6.84	0.93	-0.22	0.40	-0.46	5.31	0.36	-2.15	1.96	-3.60	1.73	-0.60
2011	0.97	1.13	1.04	0.07	-7.30	0.60	0.08	0.40	-0.47	4.78	0.33	-1.63	0.65	-3.43	2.07	0.72
2012	1.09	2.23	1.06	-0.17	-8.97	1.49	-0.02	0.43	-0.41	4.78	0.33	-0.69	0.93	-2.77	1.65	-0.96
2013	1.47	1.70	1.01	-0.49	-9.18	1.25	-0.07	0.47	-0.47	5.25	0.39	-0.48	1.19	-2.92	1.64	-0.76
2014	1.66	1.44	0.78	-0.57	-9.13	1.08	-0.34	0.49	-0.55	5.26	0.45	0.12	1.09	-3.20	2.66	-1.25
2015	1.68	0.70	0.78	-0.61	-7.18	1.37	-0.41	0.52	-0.52	6.05	0.50	-0.09	0.59	-4.52	2.41	-1.28
2016	1.78	0.18	0.73	-0.22	-7.02	1.69	-0.53	0.48	-0.57	5.81	0.49	1.61	0.53	-5.42	2.15	-1.69
2017	1.83	0.54	0.70	-0.23	-7.45	1.88	-0.33	0.43	-0.49	5.35	0.42	-1.05	1.72	-4.79	2.26	-0.78
2018	1.47	0.99	0.70	-0.23	-8.17	1.98	-0.14	0.36	-0.35	4.53	0.36	-0.03	0.81	-3.92	2.14	-0.50
Mean	1.23	1.05	0.93	0.37	-8.77	1.10	0.01	0.56	-0.55	5.96	0.45	-0.08	1.33	-4.28	1.15	-0.47
Stan dev	0.37	0.51	0.23	0.79	1.56	0.49	0.36	0.20	0.16	1.29	0.08	1.00	0.62	0.94	1.17	0.67

Source: Authors' calculation from WITS data

Table A.6. India's trade balance index (TBI) with high income countries (HIC): 2003 - 2018

	Animal	Vegetable	Food Products	Minerals	Fuels	Chemicals	Plastic and Rubber	Hides and Skin	Wood	Textiles and Clothing	Footwear	Stone and Glass	Metals	Mach and Elec	Transportation	Misc.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
2003	1.50	1.73	0.58	0.49	0.29	-0.82	-0.63	1.42	-1.18	10.72	0.84	-1.45	-0.17	-10.44	-2.01	-0.89
2004	1.17	1.99	0.53	0.51	1.18	-0.85	-0.42	1.38	-1.04	9.92	0.81	-4.28	1.10	-9.77	-1.64	-0.59
2005	1.11	1.61	0.46	0.51	2.47	-0.74	-0.46	1.11	-0.93	9.51	0.75	-3.67	0.21	-9.42	-1.43	-1.07
2006	0.94	1.42	0.61	0.05	-0.99	-0.14	-0.18	0.99	-0.83	8.73	0.73	-0.64	1.44	-8.12	-3.15	-0.85
2007	0.86	1.17	0.68	0.10	-2.05	0.21	-0.26	0.90	-0.71	7.66	0.73	-0.49	0.89	-7.52	-1.32	-0.83
2008	0.62	1.72	0.92	-0.09	-3.32	-0.02	-0.19	0.85	-0.55	6.46	0.65	-0.27	1.75	-5.15	-2.51	-0.85
2009	0.60	1.26	0.64	0.26	-2.56	0.09	-0.69	0.72	-0.53	6.70	0.64	0.68	-0.79	-5.25	-0.68	-1.08
2010	0.66	1.29	0.60	-0.21	-0.12	0.65	-0.60	0.65	-0.56	5.88	0.57	-4.63	0.52	-3.81	0.34	-1.24
2011	0.65	1.82	0.57	-0.27	-1.90	0.69	-0.36	0.65	-0.55	5.33	0.53	-3.66	-0.03	-3.87	1.93	-1.54
2012	0.71	2.90	0.64	-0.28	-3.32	1.51	-0.58	0.67	-0.51	4.98	0.50	-2.64	0.00	-3.37	0.45	-1.67
2013	0.93	1.88	0.62	-0.39	-3.38	1.05	-0.75	0.80	-0.60	5.71	0.61	-2.00	0.22	-3.10	0.36	-1.97
2014	1.17	1.83	0.48	-0.32	-5.82	0.98	-1.04	0.85	-0.81	6.21	0.73	-0.98	0.17	-3.43	1.00	-1.02
2015	1.15	1.23	0.49	-0.30	-4.27	1.39	-1.22	0.86	-0.73	7.13	0.75	-1.18	-0.66	-4.66	0.72	-0.70
2016	1.18	0.92	0.48	-0.24	-3.98	1.12	-1.37	0.78	-0.82	6.84	0.70	1.44	-0.56	-5.59	0.29	-1.18
2017	1.29	0.94	0.52	-0.18	-3.83	0.99	-1.11	0.72	-0.70	6.24	0.62	-1.30	0.58	-4.23	0.46	-1.01
2018	1.11	1.26	0.53	-0.24	-3.94	1.16	-1.01	0.65	-0.68	5.35	0.57	0.12	-0.29	-4.71	0.98	-0.87
Mean	0.98	1.56	0.58	-0.04	-2.22	0.45	-0.68	0.87	-0.73	7.09	0.67	-1.56	0.27	-5.78	-0.39	-1.09
Stan dev	0.27	0.49	0.11	0.32	2.24	0.79	0.37	0.24	0.19	1.75	0.10	1.79	0.74	2.46	1.45	0.37

Source: Authors' calculation from WITS data

Table A.7. India's trade balance index (TBI) with middle income countries (MIC): 2003 - 2018

	Animal	Vegetable	Food	Minerals	Fuels	Chemicals	Plastic	Hides and	Wood	Textiles	Footwear	Stone	Metals	Mach	Transportation	Misc
			Products				and	Skin		and		and		and		
							Rubber			Clothing		Glass		Elec		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
2003	1.36	-6.69	1.96	0.74	3.47	0.09	1.61	0.23	-1.78	4.26	0.16	-5.26	3.58	-5.30	1.60	-0.01
2004	1.06	-4.31	1.14	2.97	2.33	1.00	2.17	0.21	-1.83	3.49	0.12	-3.06	0.23	-6.89	1.47	-0.11
2005	1.19	-2.55	0.78	6.05	1.73	0.32	1.49	0.16	-1.15	2.00	0.09	-3.39	-0.45	-7.89	1.87	-0.24
2006	0.97	-0.36	2.15	2.60	-10.56	2.99	1.57	0.18	-0.45	3.54	0.12	-0.86	1.63	-4.80	1.64	-0.34
2007	0.89	0.20	1.91	3.45	-10.47	2.27	0.91	0.19	-0.49	4.11	0.14	-0.75	1.01	-5.06	1.75	-0.08
2008	0.98	0.54	2.17	3.34	-10.72	0.87	0.81	0.17	-0.35	3.32	0.11	-0.81	1.64	-3.50	1.55	-0.13
2009	1.09	-0.12	1.03	3.37	-11.95	1.86	0.61	0.10	-0.35	3.42	0.14	0.03	2.00	-3.42	2.78	-0.60
2010	1.26	-0.38	1.26	2.91	-10.97	1.55	0.40	0.10	-0.33	4.44	0.07	-1.54	3.74	-4.83	3.66	-1.34
2011	1.78	0.71	1.52	1.26	-9.59	1.43	0.96	0.14	-0.31	4.52	0.08	-2.01	1.75	-3.40	2.50	-1.35
2012	1.83	1.37	1.27	0.36	-12.02	2.02	0.84	0.16	-0.26	4.54	0.10	-1.18	1.83	-3.06	3.30	-1.12
2013	2.68	1.32	1.40	-0.38	-13.57	2.15	0.96	0.15	-0.30	5.13	0.13	-0.92	2.31	-3.83	3.48	-0.68
2014	2.78	0.72	0.86	-0.70	-10.73	1.62	0.57	0.14	-0.35	4.17	0.10	-0.90	1.67	-4.15	4.85	-0.64
2015	2.89	0.12	0.68	-0.62	-8.18	1.83	0.55	0.15	-0.37	4.32	0.13	-1.88	1.65	-5.54	4.88	-0.62
2016	3.27	-0.20	0.43	0.21	-8.44	2.95	0.47	0.14	-0.41	3.92	0.14	-1.54	1.12	-6.21	4.55	-0.40
2017	3.14	0.14	0.42	0.11	-8.65	3.32	0.55	0.11	-0.36	3.55	0.12	-2.39	2.63	-6.20	4.02	-0.52
2018	2.29	0.60	0.51	-0.04	-9.02	3.48	0.80	0.07	-0.13	3.12	0.08	-1.53	1.26	-4.17	3.14	-0.47
average	1.84	-0.56	1.22	1.60	-7.96	1.86	0.95	0.15	-0.58	3.86	0.11	-1.75	1.72	-4.89	2.94	-0.54
stdv	0.86	2.17	0.60	1.96	5.39	1.00	0.50	0.04	0.53	0.74	0.03	1.29	1.06	1.39	1.23	0.42

Source: Authors' calculation from WITS data

Table A.8. India's trade balance index (TBI) with least developed countries (LDC): 2003 - 2018

	Animal	Vegetable	Food Products	Minerals	Fuels	Chemicals	Plastic and Rubber	Hides and Skin	Wood	Textiles and Clothing	Footwear	Stone and Glass	Metals	Mach and Elec	Transportation	Misc.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
2003	0.28	-7.01	1.62	-0.12	2.15	-1.73	1.00	-0.50	-4.60	1.25	-0.01	-0.39	2.10	2.94	2.16	0.86
2004	0.38	-6.30	0.67	-0.39	4.07	-1.76	0.53	-0.39	-5.27	2.06	0.00	-0.38	1.76	2.62	2.00	0.41
2005	0.71	-5.64	0.19	-0.08	5.01	-2.69	0.51	-0.36	-5.86	2.86	-0.02	-0.26	0.38	3.21	1.50	0.54
2006	0.78	-4.04	1.89	-0.95	-10.60	3.03	1.53	-0.22	-2.69	4.42	0.03	-0.06	1.60	3.71	0.94	0.62
2007	0.85	-1.00	2.98	-0.72	-15.90	2.75	1.21	-0.17	-2.54	4.45	0.00	-0.07	1.66	3.43	2.44	0.64
2008	0.51	-3.41	3.26	-0.78	-13.91	2.55	1.01	-0.17	-2.45	4.77	0.00	0.05	1.18	4.00	2.75	0.63
2009	0.71	-5.52	1.54	-0.58	-20.35	4.79	1.52	-0.09	-1.51	6.16	0.01	0.20	3.95	5.09	3.27	0.80
2010	0.74	-3.07	2.50	-0.31	-26.12	4.78	1.63	-0.12	-1.51	7.75	0.00	0.23	2.90	4.40	5.32	0.88
2011	0.18	-3.68	4.45	-0.55	-20.34	4.08	1.66	-0.12	-2.22	6.49	-0.01	0.34	1.62	4.46	3.16	0.48
2012	0.57	1.03	3.54	-0.86	-25.51	4.34	1.79	-0.03	-1.99	6.54	0.03	0.17	2.14	4.33	3.26	0.64
2013	0.72	0.24	1.74	-0.62	-18.83	4.43	1.48	-0.06	-2.21	5.25	0.03	-1.18	1.36	3.44	3.02	1.20
2014	0.58	-2.20	1.44	-1.46	-12.44	4.01	1.30	-0.12	-1.76	4.81	0.09	-2.73	1.20	3.47	3.27	0.54
2015	0.32	-5.57	2.28	-1.46	-11.04	5.07	1.60	-0.12	-0.81	5.88	0.21	-4.79	0.33	4.13	3.28	0.70
2016	0.19	-7.93	3.18	-0.96	-10.27	4.80	1.71	-0.11	-0.57	3.49	0.18	-4.34	0.13	4.77	4.53	0.60
2017	0.25	-2.78	2.24	-0.59	-9.63	4.79	1.72	-0.06	-0.33	5.24	0.25	-7.31	0.84	4.85	4.89	0.49
2018	0.52	-1.96	1.82	-0.12	-10.23	4.04	1.86	-0.07	0.02	4.80	0.18	-5.23	1.99	4.96	4.93	0.59
Mean	0.52	-3.68	2.21	-0.66	-12.12	2.95	1.38	-0.17	-2.27	4.76	0.06	-1.61	1.57	3.99	3.17	0.66
Stan dev	0.23	2.56	1.09	0.42	9.48	2.61	0.42	0.14	1.70	1.71	0.09	2.46	0.97	0.76	1.25	0.19

Source: Authors' calculation from WITS data

APPENDIX A

Description of the standard product groups as per HS 2002 classifications

Code	Product group	Included products and their codes
01-05	Animal	Live animals (01) Meat and edible meat offal (02) Fish & crustacean, mollusc & other aquatic invert (03) Dairy prod; birds' eggs; natural honey; edible pr (04) Products of animal origin, nes or included (05)
06-15	Vegetable	Live tree & other plant; bulb, root; cut flowers (06) Edible vegetables and certain roots and tubers (07) Edible fruit and nuts; peel of citrus fruit or me (08) Coffee, tea, mate and spices (09) Cereals (10) Prod.mill.indust; malt; starches; inulin; wheat g (11) Oil seed, oleagi fruits; miscellaneous grain, seed, fruit (12) Lac; gums, resins & other vegetable saps & extract (13) Vegetable plaiting materials; vegetable products (14) Animal/veg fats & oils & their cleavage products (15)
16-24	Food products	Prep of meat, fish or crustaceans, molluscs etc (16) Sugars and sugar confectionery (17) Cocoa and cocoa preparations (18) Prep.of cereal, flour, starch/milk; pastrycooks' (19) Prep of vegetable, fruit, nuts or other parts of (20) Miscellaneous edible preparations (21) Beverages, spirits and vinegar (22) Residues & waste from the food indust; prepr ani (23) Tobacco and manufactured tobacco substitutes (24)
25-26	Minerals	Salt; sulphur; earth & ston; plastering mat; lime (25) Ores, slag and ash (26)
27-27	Fuels	Mineral fuels, oils & product of their distillation (27)
28-38	Chemicals	Inorgn chem; compds of prec mtl, radioact element (18) Organic chemicals (29) Pharmaceutical products (30) Fertilisers (31) Tanning/dyeing extract; tannins & derivs; pigm et (32) Essential oils & resinoids; perf, cosmetic/toilet (33) Soap, organic surface-active agents, washing prep (34) Albuminoidal subs; modified starches; glues; enzy (35) Explosives; pyrotechnic prod; matches; pyrop allo (36) Photographic or cinematographic goods (37) Miscellaneous chemical products (38)
39-40	Plastic and Rubber	Plastics and articles thereof (39) Rubber and articles thereof (40)

41-43	Hides and Skins	Raw hides and skins (other than furskins) and lea (41) Articles of leather; saddlery/harness; travel goo (42) Furskins and artificial fur; manufactures thereof (43)
44-49	Wood	Wood and articles of wood; wood charcoal (44) Cork and articles of cork (45) Manufactures of straw, esparto/other plaiting mat (46) Pulp of wood/of other fibrous cellulosic mat; was (47) Paper & paperboard; art of paper pulp, paper/pape (48) Printed books, newspapers, pictures & other produ (49)
50-63	Textiles and clothing	Silk. (50) Wool, fine/coarse animal hair, horsehair yarn & f (51) Cotton. (52) Other vegetable textiles fibres; paper yarn & wove (53) Man-made filaments. (54) Man-made staple fibres. (55) Wadding, felt & nonwoven; yarns; twine, cordage, (56) Carpets and other textiles floor coverings. (57) Special woven fab; tufted tex fab; lace; tapestry (58) Impregnated, coated, cover/laminated textiles fabr (59) Knitted or crocheted fabrics. (60) Art of apparel & clothing access, knitted or croc (61) Art of apparel & clothing access, not knitted/cro (62) Other made up textiles articles; sets; worn clothi (63)
64-67	Footwear	Footwear, gaiters and the like; parts of such art (64) Headgear and parts thereof. (65) Umbrellas, walking-sticks, seat-sticks, whips, et (66) Prepr feathers & down; arti flower; articles huma (67)
68-71	Stone and glass	Art of stone, plaster, cement, asbestos, mica/sim (68) Ceramic products. (69) Glass and glassware. (70) Natural/cultured pearls, prec stones & metals, co (71)
72-83	Metals	Iron and steel. (72) Articles of iron or steel. (73) Copper and articles thereof. (74) Nickel and articles thereof. (75) Aluminium and articles thereof. (76) Lead and articles thereof. (78) Zinc and articles thereof. (79) Tin and articles thereof. (80) Other base metals; cermets; articles thereof. (81) Tool, implement, cutlery, spoon & fork, of base m (82) Miscellaneous articles of base metal. (83)
84-85	MachElec	Nuclear reactors, boilers, mchy & mech appliance; (84) Electrical mchy equip parts thereof; sound record (85)
86-89	Transportation	Railw/tramw locom, rolling-stock & parts thereof; (86)

		Vehicles o/t railw/tramw roll-stock, pts & access (87)
		Aircraft, spacecraft, and parts thereof. (88)
		Ships, boats and floating structures. (89)
90-99	Miscellan	Optical, photo, cine, meas, checking, precision, (90)
		Clocks and watches and parts thereof. (91)
		Musical instruments; parts and access of such art (92)
		Arms and ammunition; parts and accessories thereo (93)
		Furniture; bedding, mattress, matt support, cushi (94)
		Toys, games & sports requisites; parts & access t (95)
		Miscellaneous manufactured articles.(96)
		Works of art, collectors' pieces and antiques. (97)

Source: Compiled from the WITS database and the United Nations International Trade Statistics Knowledgebase (<https://unstats.un.org/unsd/tradekb/Knowledgebase/50043/HS-2002-Classification-by-Section>)

APPENDIX B

List of India's Trading Partners by Income Groups

HIC: High Income Country (49 Countries)

Australia, Austria, Bahrain, Barbados, Belgium, Brunei, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Republic of Korea, Kuwait, Latvia, Luxembourg, Macao, Malta, Netherlands, New Zealand, New Caledonia, Norway, Oman, Poland, Portugal, Qatar, Sweden, Saudi Arabia, Singapore, Slovenia, Slovak Republic, Spain, Switzerland, Trinidad and Tobago, United States, United Arab Emirates, United Kingdom, Virgin Islands (U.S).

MIC: Middle Income Country (81 countries)

Albania, Algeria, American Samoa, Argentina, Armenia, Azerbaijan, Belarus, Belize, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Cameroon, Chile, China, Colombia, Costa Rica, Cote d'Ivoire, Cuba, Dominica, Dominican Republic, Ecuador, Arab Republic of Egypt, El Salvador, Fiji, Gabon, Georgia, Ghana, Guatemala, Guyana, Honduras, Indonesia, Islamic Republic of Iran, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Democratic Republic of Korea, Kyrgyz Republic, Lebanon, Libya, Lithuania, Macedonia, Malaysia, Maldives, Mauritius, Mexico, Moldova, Mongolia, Morocco, Namibia, Nicaragua, Nigeria, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Russian Federation, Serbia, Seychelles, South Africa, Sri Lanka, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Thailand, Tunisia, Turkey, Turkmenistan, Ukraine, Uruguay, Uzbekistan, Venezuela, Vietnam, Zimbabwe.

LDC: Least Developed Country (45 countries)

Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Congo, Democratic Republic of Congo, Djibouti, East Timor, Equatorial Guinea, Eritrea, Ethiopia (excludes Eritrea), The Gambia, Guinea, Guinea-Bissau, Haiti, Lao PDR, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Senegal, Sierra Leone, Solomon Islands, Somalia, Tanzania, Togo, Uganda, Vanuatu, Yemen, Zambia.

Source: Compiled from the World Integrated Trade Solution (WITS) Database, World Bank

APPENDIX C

India's Bilateral and Regional Trade Agreement Countries*

Type of Trade Agreement	Group	Countries
Bilateral Trade Agreement	HIC	Finland (2010); Japan (2011); Singapore (2007)
		Argentina (1966, 1981, 2009); Botswana (2001); Brazil (1968); Cameroon (1968); Cote d'Ivoire (1993); Ghana (1981); Chile (1956, 1960, 1972, 2005, 2017); Colombia (1970, 2010); Cuba (1979); Ecuador (2015);
	MIC	Guatemala (1981); Republic of Korea (2009); Malaysia (2011); Mauritius (2000); Nigeria (1983); Peru (1971); Senegal (1974); Seychelles (1998); South Africa (1994); Sri Lanka (2000); Swaziland (2002); Zimbabwe (1981)
		Afghanistan (2003); Angola (1986); Bhutan (2016); Democratic Republic of Congo (formerly Zaire) (1988); Liberia (1999); Mozambique (1982); Nepal (1999, 2009); Rwanda (1990); Tanzania (2000); Uganda (1981); Zambia (2003)
	LDC	
Regional Trade Agreement	SAARC Preferential Trading Agreement – SAPTA 1993	Afghanistan, Bangladesh, Bhutan, the Maldives, Nepal, Pakistan, and Sri Lanka
	India MERCOSUR PTA 2004	Argentina, Brazil, Paraguay, and Uruguay
	India ASEAN Agreements 2003	Brunei, Cambodia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Vietnam
	South Asia Free Trade Area – SAFTA 2004	Bangladesh, Bhutan, the Maldives, Nepal, Pakistan, and Sri Lanka
	Asia Pacific Trade Agreement – APTA 2005	Bangladesh, China, Republic of Korea, Sri Lanka
	SAARC Agreement on Trade in Services- SATIS 2010	Afghanistan, Bangladesh, Bhutan, the Maldives, Nepal, Pakistan, and Sri Lanka

Source: Authors' compilation based on information available at the Department of Commerce, Ministry of Commerce and Industry, Government of India website (<https://commerce.gov.in/InnerContent.aspx?Type=InternationalTrademenu&Id=32>, accessed on May 13, 2020)

Note: * this list may not include all of India's trade agreements.