

## India-China Bilateral Trade Dynamics: An Empirical Assessment of Trade Patterns and potential.

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### Abstract

The competitiveness of bilateral trade between India and China is analyzed for the period 2004 to 2024 with the help of Revealed Comparative Advantage (RCA), Trade Complementarity Index (TCI) and Trade Intensity Index (TII) in this study. Secondary data from UN Comtrade, ITC Trade Map and WITS are used for the analysis. The results show that India has comparative advantage mainly in the niche manufactured products and the resource-based and agricultural products, where the RCA values are very high in some HS 4-digit products. The TCI results indicate upward trend in export compatibility with the demand for imports of China which shows considerable potential for exports. Persistent trade asymmetry is, however, found in India with export intensity being below unity as import intensity is always above unity, a phenomenon that indicates the continued reliance on Chinese imports, the TII points out. The study, in conclusion, notes that boosting export diversification, value addition and manufacturing competitiveness are critical to the realization of a more balanced and sustainable bilateral trade relationship...

**Keywords:** Revealed Comparative advantage, Trade Complementarity index

JEL Code: F14, F15, C43.

### INTRODUCTION

The two largest emerging economies in Asia are India and China, both of which are important contributors to trade and production in the world, and are important sources of economic growth. Bilateral trade between the two countries has increased at an unprecedented rate since the economic reforms were undertaken by both countries since 1978 and 1991 respectively, making China one of India's biggest trading partners. The bilateral trade relationship has however become more and more asymmetric, with India's trade deficit with China consistently getting wider and larger as its imports have been increasing from China while its exports have been decreasing. The structural difference in production capacities, technological development, export diversification and competitiveness of industries in the two economies underlie these imbalances (Shenkar & Song, 2006; Ghosh et al, 2019; Kalirajan, 2022). Therefore, it is crucial to understand the nature of India and China trade to assess India's export potential and design policies to make the bilateral trade relationship more balanced and sustainable. The Revealed Comparative Advantage (RCA) index developed by (Balassa, 1965) is an important measure for export specialization and competitiveness of a country. (Batra & Khan, 2005), (Wignaraja, 2011) and (Tian & Yu, 2012) have found that China had built up its comparative advantage in manufactured goods, technology-intensive goods, and India's comparative advantage was primarily in agricultural commodities, pharmaceuticals, chemicals, textiles, minerals, gems and jewellery and selected resource-based industries. Another measure of importance is the Trade Complementarity Index (TCI) which looks at how closely the export structure of one country complements the import demand of another country. The results of the previous studies suggest that India and China are moderately trade complementing countries and trade complementarity has improved slowly over the years, especially in primary goods, chemicals, textiles, pharmaceuticals and intermediate goods. But this potential is not fully realised due to limited export diversification and market access constraints and gaps in competitiveness of industries (Kang & Zhang, 2017; Ghosh et al., 2019; Kalirajan, 2022).

The Trade Intensity Index (TII) captures the level of bilateral trade which trade between two countries has more or less than what they are expected to engage in based on their size in terms of world trade. Previous research suggests that trade between India and China has been becoming more integrated and that it is still highly unequal. India exports more primary and resource based products while China exports more of machinery, electronics, chemicals and intermediate goods (Shenkar & Song, 2006; Ghosh et al., 2019; Paswan, 2021). Previous studies

have explored the relationship between India and China trade applying RCA, TCI or TII individually, but very few studies have combined the three measures based on the latest trade data. An up-to-date evaluation is needed due to changes in global production networks, supply chains and global trade patterns. Hence this study aims at exploring India–China merchandise trade between 2004 and 2024, based on RCA, TCI and TII to check the comparative advantage of India, trade complementarity and intensity of bilateral trade. Another objective of the study is to look for the opportunities for export diversification and competitiveness for a more even bilateral trade relationship.

## 2. Literature review

In this section, a brief review of selected studies has been done and is divided into three subsections. Section 2.1 gives a review of studies that employed revealed comparative advantage (RCA). 2.2 trade complementarity indices followed by studies on Trade intensity index in Sect. 2.3.

### 2.1 RCA

(Balassa,1977) analyzed the comparative advantage patterns of the industrialized countries in the period of 1953–1971, and concluded that the export diversification was due to technological progress through the use of the Revealed Comparative Advantage (RCA) index. Using the RCA index, (Yeats, 1997) measured the effect of discriminatory trade barriers under the regional trade agreement MERCOSUR and showed how these barriers affected trade flows. (Richardson and Zhang, 1999) examined the change in trade between the U.S., other countries and between different levels of aggregation of data using the RCA index. (Yue,2001) found that the export mix of China gradually changed towards products where it had a greater comparative advantage, or in which it was more competitive. (Batra and Khan ,2005), (Wignaraja, 2011) and (Tian and Yu ,2012) have used the RCA index to analyse comparative advantage in bilateral trade, focusing on India and China. At the level of product disaggregation, there are also significant differences in comparative advantage, as (Batra and Khan, 2005) found in 2004, and (Wignaraja ,2011) discovered the 2009 patterns of comparative advantage between India and China. (Tian and Yu ,2012) also found that India had a more stable structure of comparative advantage when compared with China during the period 2000–2006. Between 1991 and 2004, there were different degrees of comparative advantage of agricultural products between India and Asia, as analysed by (Shinoj and Mathur ,2008). (Chandaran ,2011) examined the concept of trade complementarity and trade similarity between India and ASEAN using trade intensity and RCA indices with particular focus on the impact of region formal trade agreements on the trade pattern. Likewise, (Kocourek ,2015) used the index of Revealed Symmetric Comparative Advantage (RSCA) to determine the comparative advantage between the economies of the BRICS, and he noted an overall movement from primary commodities to more complex manufactured products over the last 20 years.

### 2.2 Trade Complementarity Index

The Trade Complementarity Index (TCI) has emerged as a valuable analytical tool to evaluate the degree of trade compatibility between the export structure of a country and the import demand of another country, as a measure of the potential for mutually beneficial trade. Based on their study, (Kang and Zhang ,2017) concluded that India and China have moderate trade complementarity, as India exports primary commodities, chemicals, and textiles to China, and China exports machinery and manufactured goods to India. The study did, however, find that the overall level of complementarity between the two economies was constrained by increasing competition in manufacturing industries. Likewise, (Paswan ,2023) found that while trade complementarity between India and China has been increasing over time, it has been unevenly distributed, with relatively higher complementarity in the pharmaceuticals, chemicals and intermediate goods sectors compared to high-technology manufacturing. While (Ghosh et al. ,2019) did not directly use TCI, the two countries' export structures shown in their analysis offer theoretical support for the application of TCI because they indicate that there were opportunities for complementary trade due to differences in specialization levels among the two. Similarly, ( Kalirajan ,2022) suggested that the presence of complementary trade links does not necessarily imply a balanced bilateral trade unless India improves its infrastructure, export competitiveness, manufacturing capabilities, and industrial productivity. The literature reviewed suggests that there is a tremendous complementarities of trade between India and China, but can only be fully realised if there is export diversification, improvement of the industrial competitiveness, facilitation of trade and supportive policy measures. The results further highlight the need for new empirical research based on the most recent trade data, to explore the impact of the changing geopolitical situation and the transformation of international trade in the last decade on the trade complementarity between the two nations.

### 2.3 Trade Intensity Index (TII)

The literature on the India–China relationship in trade has come to emphasized the growing importance of the bilateral trade, but has also pointed to continued structural imbalance and not equal trade intensity between the two economies. The Trade Intensity Index (TII) has been widely adopted as an indicator of the intensity of bilateral trade, compared to the proportion of each country's total trade. However, economic reforms and trade liberalization appear to have significantly improved the degree of trade intensity between India and China, but the overall trade pattern remained largely inter-industry, as there is a gap in the production structure and comparative

advantages between the two countries (Shenkar and Song 2006). An examination of bilateral trade by (Ghosh, Agarwal and Banerjee, 2019) revealed that while India-China trade has grown significantly and long-run relationship are stable, it remained very asymmetric with China exporting a wide variety of manufactured goods and India's exports continuing to be dominated by primary commodities and intermediate products. (Kalirajan ,2022) pointed out that though India and China have huge scope for trade, merely increasing the volume of trade is not enough to decrease India's persistent trade deficit using a stochastic frontier gravity model. The study highlighted the need to improve export competitiveness, diversify export basket and structural policy reform to provide a more balanced export performance. In the study, (Paswan ,2021) applied the Trade Intensity Index and found that bilateral trade picked up steadily from 2008 to 2017, but the trend was highly skewed, with Indian imports always surpassing exports with China. It also showed that India had become more dependent on China imports with the rise of the Trade Reciprocity Index. All these studies indicate that although the trade integration between India and China has increased over the years, an increase in the trade intensity has not led to fair trade benefits for India and hence there is scope to further examine the issue through more recent Trade Intensity Index analysis along with other calculations of trade competitiveness.

### 3 Data and methodology

#### 3.1 Data

In this study, we tried to analyze the trade in goods between India and China for the period 2004–2024. The trade statistics required for the study are extracted from UN Comtrade, International Trade Centre (ITC), World Integrated Trade Solutions (WITS) Database.

#### 3.2 Methodology

In this study, three different sets of methodologies are employed—revealed comparative advantage index (RCA), trade complementarity index (TCI) and Trade Intensity index.

##### 3.2.1 Revealed comparative advantage (RCA)

One of the most popular indicators to measure a country's comparative advantage in the export of certain goods is the Revealed Comparative Advantage (RCA) index (Balassa's, 1965). The index compares the specialisation of a nation with the world level of specialisation in exporting a given commodity. The RCA index is defined as:

$$RCA_{ij} = (X_{ij} / X_{it}) / (X_{wj} / X_{wt})$$

where:  $RCA_{ij}$  = Specialization of country  $i$  in product  $j$ ;

$X_{ij}$  = exports of product  $j$  from COUNTRY  $i$ ;

$X_{it}$  = exports of country  $i$  to country  $j$ ;

$X_{wj}$  = world exports of good  $j$ ;

$X_{wt}$  = total world exports.

If the value of RCA is higher than 1, it means the country has a revealed comparative advantage in the export of the product, which means that the country is relatively more competitive in the product than the world average. A value of RCA below 1 on the other hand suggests a revealed comparative disadvantage. An important advantage of the RCA index is that it captures the specialization of a country's exports in a specific product over time, taking into account changes in factor endowments, production efficiency, and productivity (Batra, 2005). The index, therefore, can be used as a useful indicator of the global competitiveness of a country in individual export industries.

##### 3.2.2 Trade Complementarity Index (TCI)

The Trade Complementarity Index (TCI) of (Michaely ,1996) is used to measure the degree of trade complementarity between India and each of the BRICS countries that evaluate the extent to which two countries can be classified as "natural trading partners. Countries  $k$  and  $j$  have a TCI equal to:

$$TC_{kj} = 100(1 - \sum (|m_{ik} - x_{ij}| / 2))$$

Where  $X_{ij}$  is the share of product  $i$  in the exports of country  $j$  and  $M_{ik}$  is the share of product  $i$  in the imports of country  $k$ .

The index is a range of 0-100. The number 0 means that there is no complementarity in the export structure of one country in the export structure of another country, which means that countries do not trade with each other. A value of 100, on the other hand, indicates the utmost compatibility, with the export composition of one country perfectly matching the import composition of the other.

##### 3.2.3 Trade Intensity Index

The Trade Intensity Index (TII) is used to assess if the volume of trade that two countries engage in is high or low when compared to their share in world trade (World Bank, 2016c). The Trade Intensity Index employed in this study refers to the one developed by WITS (2013) which represents the trade intensity between one country and another respective to the other country's share in total world trade. The index is calculated as:

$$TII_{ij} = (X_{ij} / X_{it}) / (X_{wj} / X_{wt})$$

where:

$TII_{ij}$  = Trade Intensity Index of country  $i$  with country  $j$ ;

$X_{ij}$  = exports of country  $i$  to country  $j$ ;

$X_{it}$  = values of the country  $i$ 's total exports

$X_{wj}$  = total exports of country  $j$  to the rest of the world; and

$X_{wt}$  = total world exports.

The range of the Trade Intensity Index is  $[0, \infty)$  (infinity). The numbers greater than 1 mean that bilateral trade between the two countries is more intensive than the proportion of the partner country's trade in the world indicates, which denotes a fairly high level of trade relationship. If the figure is below 1, on the other hand, then bilateral trade is less intensive than expected, which suggests less trade intensity between the two countries. The closer the value is to 1, the more similar the trade intensity is to that of the partner country's relative importance in world trade.

#### 4 Estimation results

##### 4.1 India's Revealed comparative advantage with China

**Table 4.1: India's RCA with China**

| Commodity             | 2004  | 2008 | 2012  | 2016 | 2020 | 2024  |
|-----------------------|-------|------|-------|------|------|-------|
| Animal                | 0.94  | 0.85 | 0.92  | 0.58 | 1.62 | 3.94  |
| Chemicals             | 1.19  | 0.86 | 1.35  | 1.75 | 2.01 | 1.93  |
| Food Products         | 1.08  | 2.35 | 0.29  | 0.14 | 0.36 | 3.49  |
| Footwear              | 5.9   | 5.56 | 11.36 | 7.52 | 4.56 | 11.82 |
| Fuels                 | 0.05  | 0.07 | 0.13  | 0.13 | 0.06 | 0.42  |
| Hides and Skins       | 1.53  | 1.75 | 4.22  | 4.89 | 1.46 | 1.08  |
| Mach and Elec         | 0.07  | 0.07 | 0.14  | 0.24 | 0.22 | 0.41  |
| Metals                | 1.14  | 0.4  | 2.32  | 2.24 | 3.22 | 1.21  |
| Minerals              | 17.36 | 8.91 | 3.33  | 2.72 | 2.61 | 2.2   |
| Miscellaneous         | 0.07  | 0.07 | 0.1   | 0.25 | 0.16 | 0.52  |
| Plastic or Rubber     | 1.01  | 0.32 | 0.73  | 0.54 | 1.44 | 0.84  |
| Stone and Glass       | 2.92  | 2.18 | 5.95  | 3.89 | 3.02 | 0.08  |
| Textiles and Clothing | 0.93  | 2.72 | 10.36 | 7.75 | 4.28 | 4.09  |
| Transportation        | 0.09  | 0.02 | 0.08  | 0.09 | 0.12 | 0.66  |
| Vegetable             | 0.49  | 2.39 | 1.2   | 1    | 1.55 | 1.6   |
| Wood                  | 0.12  | 0.01 | 0.02  | 0.1  | 0.57 | 0.15  |

Source: WITS Database

Based on the RCA analysis, it is clearly inferred that the comparative advantage in Indian exports to China is limited to certain sectors and has shifted over time. If the value of the RCA is greater than 1 the country is in a position of comparative advantage and if it is less than 1 the country is in a position of comparative disadvantage. Despite the sharp decrease from 10.36 in 2012 to 4.09 in 2024, Textiles and Clothing remained highly competitive, with India maintaining a strong comparative advantage in this sector with the RCA standing at 4.09 in 2024. Footwear also experienced a high comparative advantage in India with the RCA at 11.82 in 2024, up from 5.90 in 2004. In 2004, minerals had the highest RCA of 17.36, but this has steadily decreased to 2.20 in 2024, which still suggests a strong competitive advantage but less pronounced. Even so, Chemicals, Animal Products, Vegetables and Metals also have comparative advantage over recent years, with the comparative advantage of Animal Products growing significantly from 0.94 in 2004 to 3.94 in 2024 and Food Products recovering substantially from 0.14 in 2016 to 3.49 in 2024. By contrast, Machinery and Electrical goods, Transportation, Fuels, Wood and Miscellaneous products consistently had RCA values below 1, indicating a comparative disadvantage, although there is some improvement indicated in 2024 in Machinery and Electrical goods and Transportation. Comparative advantage for Hides and Skins, as well as Stone and Glass, was significantly reduced over this time period, with that of Stone and Glass dropping from 5.95 in 2012 to 0.08 in 2024. Overall, the findings indicate that India's export competitiveness in China is still limited to the labor-intensive resource-based and select traditional manufacturing industries, and is comparatively weak in the technology-intensive and capital-intensive industries, suggesting that more export diversification and competitiveness in higher value-added products is needed.

##### 4.2 India's RCA of top 10 products in 2024

**Table:4.2 India's RCA of top 10 products in 2024**

| HS 2 digit | RCA  | Products                                                                                            | HS 4 digit | RCA    | Category                                                                                             |
|------------|------|-----------------------------------------------------------------------------------------------------|------------|--------|------------------------------------------------------------------------------------------------------|
| 02         | 1.27 | Meat and edible meat offal                                                                          | 2706       | 194.74 | Tar distilled from coal, from lignite or from peat, and other mineral tars, whether or not . .       |
| 03         | 2.39 | Fish and crustaceans, molluscs and other aquatic invertebrates                                      | 2715       | 63.57  | Bituminous mastics, cut-backs and other bituminous mixtures based on natural asphalt, on natural . . |
| 05         | 1.31 | Products of animal origin, not elsewhere specified or included                                      | 0501       | 51.16  | Human hair, unworked, whether or not washed or scoured; waste of human hair                          |
| 10         | 4.27 | Cereals                                                                                             | 2802       | 47.45  | Sulphur, sublimed or precipitated; colloidal sulphur                                                 |
| 13         | 6.11 | Lac; gums, resins and other vegetable saps and extracts                                             | 2605       | 42.44  | Cobalt ores and concentrates                                                                         |
| 27         | 1.38 | Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral .    | 2621       | 32.49  | Slag and ash, incl. seaweed ash "kelp"; ash and residues from the incineration of municipa           |
| 29         | 2.32 | Organic chemicals                                                                                   | 2530       | 26.92  | Vermiculite, perlite and other mineral substances, n.e.s.                                            |
| 30         | 1.40 | Pharmaceutical products                                                                             | 1508       | 28.41  | Groundnut oil and its fractions, whether or not refined, but not chemically modified                 |
| 32         | 2.62 | Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring . . . | 0909       | 28.61  | Seeds of anis, badian, fennel, coriander, cumin or caraway; juniper berries                          |
| 38         | 1.35 | Miscellaneous chemical products                                                                     | 2516       | 21.14  | Granite, porphyry, basalt, sandstone and other monumental or building stone, whether or not . . .    |

Source: Trade Map

Table shows the country's revealed comparative advantage (RCA) at the HS 2 digits (sectoral) and HS 4 digits (product-specific) level which gives insights into export specialization pattern. All the sectors reported at the aggregated HS 2-digit level have RCA values exceeding one, suggesting the country has a comparative advantage in these export categories. Cereals (RCA = 4.27) and Lac, gums, resins and other vegetable saps and extracts (RCA = 6.11) are the most competitive broad sectors, followed by Tanning or dyeing extracts (RCA = 2.62), Fish and aquatic products (RCA = 2.39), and Organic chemicals (RCA = 2.32). The other sectors showing comparative advantage also show relatively moderate RCA values (1.27 – 1.40) except for Miscellaneous chemical products. The other sectors showing comparative advantage also show relatively moderate RCA values (1.27 – 1.40) except Miscellaneous chemical products. The disaggregated HS 4-digit analysis, on the other hand, shows a much greater level of product specialization in exports. Exceptionally high RCA values are observed for Tar distilled from coal, lignite or peat (RCA = 194.74), Bituminous mastics and mixtures (RCA = 63.57), Human hair, unworked (RCA = 51.16), Sulphur (RCA = 47.45), Cobalt ores and concentrates (RCA = 42.44), and Slag and ash (RCA = 32.49). Likewise, other products like Groundnut oil, Seeds of anis, fennel, coriander, cumin or caraway, Vermiculite and perlite, and Granite and other building stones also have considerable RCA values, above 20. The findings are overall that the country is more competitive in a few very narrowly defined products than in other sectors of its exportable products, but the country has overall a wide raft of comparative advantages in exportable products. The pattern indicates that the export capacity is limited to niche products, indicating niche export promotion and value addition opportunities.

#### 4.3 India's RCA of top 10 products in 2004

Table:4.3 India's RCA of top 10 products in 2004

| HS 2 digit | RCA           | Products                                                                                              | HS 4 digit | RCA              | Category                                                                                               |
|------------|---------------|-------------------------------------------------------------------------------------------------------|------------|------------------|--------------------------------------------------------------------------------------------------------|
| 16         | 53.081<br>249 | Preparations of meat, of fish, of crustaceans, molluscs or other aquatic invertebrates, or ...        | 252<br>6   | 240<br>05.0<br>7 | Natural steatite, whether or not roughly trimmed or merely cut, by sawing or otherwise, into ...       |
| 97         | 48.328<br>661 | Works of art, collectors' pieces and antiques                                                         | 2512       | 3873.547         | Siliceous fossil meals, e.g. kieselguhr, tripolite and diatomite, and similar siliceous earths, ...    |
| 67         | 47.620<br>719 | Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles ... | 7206       | 2778.181         | Waste and scrap, of aluminium (excluding slags, scale and the like from iron and steel production, ... |
| 13         | 26.854<br>295 | Lac; gums, resins and other vegetable saps and extracts                                               | 2942       | 1731.719         | Separate chemically defined organic compounds, n.e.s.                                                  |
| 26         | 14.355<br>145 | Ores, slag and ash                                                                                    | 7116       | 1229.513         | Articles of natural or cultured pearls, precious or semi-precious stones "natural, synthetic ...       |
| 25         | 9.6600<br>106 | Salt; sulphur; earths and stone; plastering materials, lime and cement                                | 2814       | 1116.628         | Ammonia, anhydrous or in aqueous solution                                                              |
| 28         | 6.1941<br>465 | Inorganic chemicals; organic or inorganic compounds of precious metals,                               | 2302       | 743.0501         | Bran, sharps and other residues, whether or not in the form of pellets, derived from the sifting, ...  |

|     |               |                                                                                      |      |              |                                                                                                       |
|-----|---------------|--------------------------------------------------------------------------------------|------|--------------|-------------------------------------------------------------------------------------------------------|
|     |               | of rare-earth metals, ...                                                            |      |              |                                                                                                       |
| '09 | 4.4974<br>229 | Coffee, tea, maté and spices                                                         | 6702 | 729.<br>7394 | Artificial flowers, foliage and fruit and parts thereof, and articles made of artificial flowers, ... |
| '23 | 4.4615<br>849 | Residues and waste from the food industries; prepared animal fodder                  | 2209 | 668.<br>6428 | Vinegar, fermented vinegar and substitutes for vinegar obtained from acetic acid                      |
| '14 | 4.0717<br>642 | Vegetable plaiting materials; vegetable products not elsewhere specified or included | 1204 | 496.1875     | Linseed, whether or not broken                                                                        |

Source: Trade Map

Table highlights India's strongest export specializations based on the Revealed Comparative Advantage (RCA) index at both the HS 2-digit and HS 4-digit levels. At the HS 2-digit level, India demonstrates a strong comparative advantage in Preparations of meat and fish (HS 16), Works of art and antiques (HS 97), Prepared feathers and artificial flowers (HS 67), and Lac, gums and resins (HS 13), indicating the country's competitiveness in marine products, handicrafts, natural-resource-based products, and traditional industries. Significant comparative advantage is also observed in ores and minerals, inorganic chemicals, spices, food-processing residues, and vegetable products, reflecting India's strength in primary and agro-based exports. At the HS 4-digit level, the RCA values are considerably higher, with exceptional specialization in Natural steatite (HS 2526), Siliceous fossil earths (HS 2512), Aluminium waste and scrap (HS 7206), organic chemical compounds (HS 2942), articles of precious stones (HS 7116), ammonia (HS 2814), bran and cereal residues (HS 2302), artificial flowers (HS 6702), vinegar (HS 2209), and linseed (HS 1204). The exceptionally high RCA values for these products indicate that India's share in global exports of these commodities is substantially higher than the world average. Overall, the results suggest that India's export competitiveness is concentrated in a limited number of highly specialized products, particularly those based on natural resources, minerals, agricultural commodities, chemicals, gemstones, and traditional manufacturing, highlighting the country's strong comparative advantage in resource-intensive and niche export sectors.

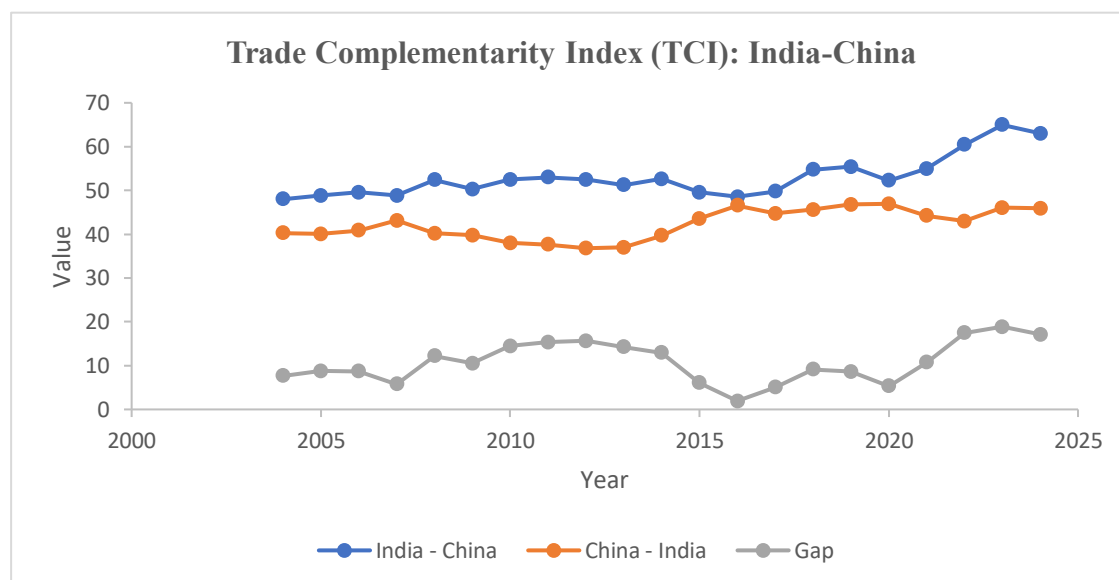
#### 4.4 Trade Complementarity Index (TCI): India-China

**Table:4.4 Trade Complementarity Index (TCI): India-China**

| Year | India - China | China - India | Gap   |
|------|---------------|---------------|-------|
| 2004 | 47.99         | 40.29         | 7.70  |
| 2005 | 48.86         | 40.05         | 8.80  |
| 2006 | 49.57         | 40.89         | 8.68  |
| 2007 | 48.85         | 43.10         | 5.75  |
| 2008 | 52.42         | 40.21         | 12.21 |
| 2009 | 50.29         | 39.78         | 10.51 |

|      |       |       |       |
|------|-------|-------|-------|
| 2010 | 52.47 | 37.98 | 14.49 |
| 2011 | 52.98 | 37.66 | 15.32 |
| 2012 | 52.46 | 36.80 | 15.66 |
| 2013 | 51.25 | 36.97 | 14.28 |
| 2014 | 52.66 | 39.71 | 12.95 |
| 2015 | 49.59 | 43.54 | 6.05  |
| 2016 | 48.50 | 46.57 | 1.93  |
| 2017 | 49.75 | 44.71 | 5.04  |
| 2018 | 54.73 | 45.60 | 9.13  |
| 2019 | 55.39 | 46.79 | 8.60  |
| 2020 | 52.25 | 46.95 | 5.30  |
| 2021 | 54.97 | 44.22 | 10.75 |
| 2022 | 60.45 | 42.96 | 17.49 |
| 2023 | 64.95 | 46.06 | 18.89 |
| 2024 | 62.98 | 45.89 | 17.09 |

Source: Trade Map



Source: Based on Author's Calculations

The Trade Complementarity Index (TCI) quantifies the degree of similarity between the export structure of one country and the import demand of the other countries. Trade Complementarity Index (TCI) between India and China 2004–2024 is presented in table 4.4. The higher the TCI, the more compatible the two countries will be and the stronger the bilateral trade will be. India's export complementarity with China's import demand has shown a significant improvement during the period of study, ranging from 47.99 in 2004 to 62.98 in 2024, with the highest value of 64.95 in 2023. This indicates that more and more opportunities are emerging for more exports towards the Chinese market as the export basket is becoming more and more aligned with China's import basket. However, the export complementarity of China to India's import demand was relatively stable, increasing slightly from 40.29 in 2004 to 45.89 in 2024, and staying within the range of 37-47 during the entire period. The disparity between the two indices increased from 7.70 in 2004 to 17.09 in 2024, with the highest gap recorded at 18.89 in 2023, suggesting that India's exports are significantly complementing China's imports, and not vice versa. In spite of this greater complementarity, however, India's trade deficit with China remains, meaning that the export potential that can be tapped may have been constrained by market access issues, product competitiveness or structural factors. The overall pattern in the table suggests that the trade complementarity between the two economies has

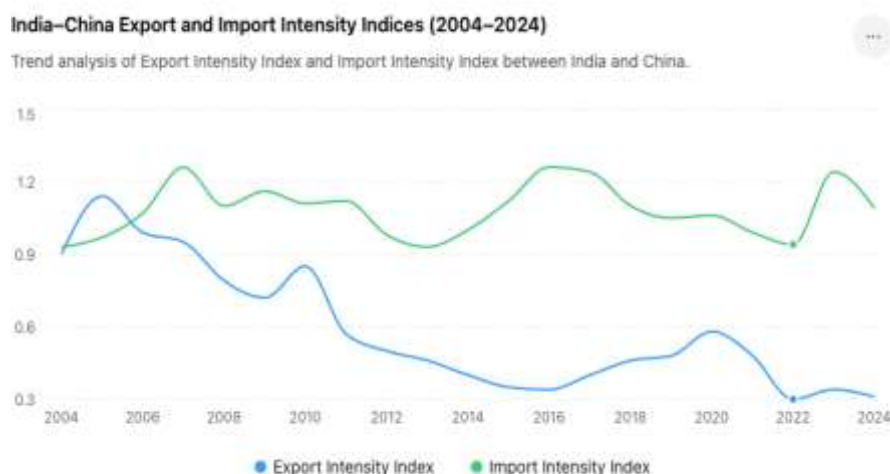
improved, especially from India's point of view, and there is a need to build on this growing compatibilities in order to create better export performance and a more balanced bilateral trade relationship.

#### 4.5 India's Trade Intensity Index with China

**Table 4.5: India's Trade Intensity Index with China**

| Year | Export intensity index | Import intensity index |
|------|------------------------|------------------------|
| 2004 | 0.90                   | 0.93                   |
| 2005 | 1.14                   | 0.97                   |
| 2006 | 0.99                   | 1.07                   |
| 2007 | 0.95                   | 1.26                   |
| 2008 | 0.79                   | 1.10                   |
| 2009 | 0.72                   | 1.16                   |
| 2010 | 0.85                   | 1.11                   |
| 2011 | 0.57                   | 1.12                   |
| 2012 | 0.50                   | 0.98                   |
| 2013 | 0.46                   | 0.93                   |
| 2014 | 0.40                   | 1.00                   |
| 2015 | 0.35                   | 1.12                   |
| 2016 | 0.34                   | 1.26                   |
| 2017 | 0.40                   | 1.24                   |
| 2018 | 0.46                   | 1.10                   |
| 2019 | 0.48                   | 1.05                   |
| 2020 | 0.58                   | 1.06                   |
| 2021 | 0.48                   | 0.99                   |
| 2022 | 0.30                   | 0.94                   |
| 2023 | 0.34                   | 1.24                   |
| 2024 | 0.31                   | 1.09                   |

Source: Trade Map



Source: Based on Author's Calculations

The Trade Intensity Index with China over the years 2004-2024 is presented in Table 4.5 which shows the evolution of trade intensity between India and China. The overall pattern of Export Intensity Index is decreasing and it has fallen from 0.90 in 2004 to 0.31 in 2024, and only touched the unity level in 2005 (1.14). This has highlighted that India's exports to China has been consistently lower than expected level given the share of China in imports and shows an erosion in export linkages and lack of deep market access. Conversely, the Import Intensity Index stayed near or above one for most of the time with the highest point at 1.26 during 2007 and 2016 and 1.24 during 2023. The levels of these indicate that India imports from China more than expected, indicating a continued reliance on Chinese products especially machinery, electronics, chemicals, and intermediate goods. The increasing trade disparity between the India's export intensity and its constant high import intensity is an indication of the nature of India – China trade as India has become more dependent on imports from China, the export activity in India has not significantly increased with the country. The widening trade disparity between the India's export intensity and its consistently high import intensity is an indication of the nature of India – China trade, as the exports from India with China have not increased significantly as compared to its dependence on imports from China.

## Conclusions

The present study focuses on the merchandise trade between India and China for the period 2004-2024 and applies the tools of Revealed Comparative Advantage (RCA), Trade Complementarity Index (TCI) and Trade Intensity Index (TII). The RCA analysis indicates that India has comparative advantage in some niche agricultural, resource based, chemical, textile, footwear, mineral based etc. products. Additionally, the overall product-level results for 2024 confirm the presence of very high comparative advantages in selected products, highlighting India's export strengths in certain product categories. Concurrently, the high density of these benefits on the narrow spectrum of products indicates the importance of increasing the export diversification and value addition of products. The results of TCI indicate that the overall structure of exports from India has become much closer to the structure of imports into China, as the India-China TCI has increased from 47.99 in 2004 to 62.98 in 2024, and 64.95 in 2023. This suggests a huge potential for further exports of Indian products to China. But, the TII results show that this potential is not coming to fruition. The export intensity fell from 0.90 in 2004 to 0.31 in 2024, and the import intensity for the majority of years is either close to or greater than unity, suggesting that India continues to be highly dependent on Chinese imports. Overall, it shows that there is a huge gap between the potential exports and actual exports of India with China. India has comparative advantages and trade complementarity is growing, but this has not been reflected in the corresponding growth in exports. Hence, the diversification of exports, value addition and boosting the competitiveness of the manufacturing sector and enhancing market access are vital for India to maximize the benefits of its existing comparative advantage and to develop a more balanced and sustainable bilateral trade.

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