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TRADE CONCENTRATION VS. DIVERSIFICATION: A STUDY OF CHINA AND INDIA (2001-2023)

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ABSTRACT

The primary objective of this study is to analyze trade relations between China and India. It utilizes indicators such as the trade intensity index, concentration index, and diversification index to assess their trade dynamics. The analysis is based on secondary data from WITS and UN Comtrade, covering the period from 2001 to 2023. The findings indicate that China has a highly diversified export structure, allowing it to adapt to global economic changes, whereas India's exports remain concentrated in a limited number of industries. Despite efforts to enhance trade relations, the study highlights India's continued structural dependence on Chinese imports as a key economic challenge.

Keywords: Exports, Imports, Concentration Index, Diversification Index, Intensity index

JEL Code: F10, F18, F41, F62

1. INTRODUCTION

The relationship between China and India, two of the world's biggest economies, is complicated but hostile. With $88.5 billion in imports and $15.1 billion in commodity exports to China, India's trade imbalance in 2023 was estimated to be at $83 billion (Koveos et al., 2007). Since most of China's exports are manufactured items that need a lot of technology, the country has a low Herfindahl-Hirschman Index (HHI) and a high export intensity (Wu & Chen, 2021). On the other hand, India is more susceptible to supply chain interruptions and global economic swings due to its exports being concentrated in important industries like medicines, textiles, and petroleum goods. China's exports are widely distributed across multiple industries and markets, reducing dependence on any single sector. In contrast, India's exports remain concentrated in a few key industries and trading partners (Wani & Grover, 2023). However, Export diversification plays a crucial role in discussions on how developing nations can enhance economic performance and achieve higher income levels. A more diversified export base is linked to reduced output volatility and improved macroeconomic stability (Lederman & Maloney, 2003; Agosin et al., 2012). Expanding the range of exported goods, a key

aspect of export diversification, can boost productivity, as exporters tend to be more efficient than non-exporters (Melitz, 2003).

Moreover, trade intensity analysis reveals that while China maintains strong trade ties with India, India's export intensity to China remains lower compared to its engagement with other major global partners, reflecting structural trade imbalances (Koveos et al., 2007). Research on export-import trends, trade concentration, and trade intensity indicates that China and India have quite different trading systems. Although the bulk of India's exports still originate from conventional manufacturing, the country's economy is progressively shifting toward high-tech sectors (Wu & Chen, 2021). Nonetheless, China's export structure is more diverse, which results in a lower concentration score (Vahalík, 2015). Studies on the diversification of energy trade further demonstrate that China's trade resilience is enhanced by its wider energy import network than India's (Vivoda, 2019). According to Long and Zhang (2012), India should expand its export markets and pursue high-value enterprises in a manner akin to China's industrial clustering and specialization strategy.

The present attempt main objective is that explore the India and China biliteral trade relationship. The study's second objective is to analyze the concentration index, diversification index, and trade intensity index to assess the trade performance of India and China. It is structured into four sections: Section 2 outlines the research methodology, Section 3 investigates trends in bilateral trade along with the concentration, diversification, and trade intensity indices, and Section 4 presents the conclusions.

2. RESEARCH METHODOLOGY

The study based on secondary data sourced from WITS, Trade Map, and UNCTAD for the period between 2001 and 2023. To analyze the trade patterns of India and China, it examines key indicators such as the Export and Import Concentration Index, Export and Import Diversification Index, and Export and Import Intensity Index.

Concentration/ Diversification Index

One instrument for assessing transaction concentration is the Herfindahl-Hirschman Index (HHI), also referred to as the Concentration Index.

Values close to 0 indicate a more diverse distribution throughout a range of goods or industries, as opposed to values close to 1, which indicate a high concentration of imports or exports in a limited number of commodities or sectors. The normalized HHI has a range of 0 to 1 ((Hall & Tideman, 1967).

A modified Finger-Kreinin measure, the Diversification Index evaluates the degree to which a nation's trade structure deviates from the pattern of international commerce. It gives information about the degree of export or import diversification and is computed using the absolute disparities between a nation's trade composition and the global trade structure. The Diversification Index ranges from 0 to 1, with values closer to 1 indicating a greater deviation from the global trade pattern, while values near 0 suggest a trade structure more aligned with the world average (Walt &Persson, 1993).

Formula:

$Sj = (\text{sum } |h_{ij} - h_i|) / 2$

Where:

Hij represents the share of a specific product i in the total exports or imports of a particular country or country group j; hi denotes the share of the same product i in total global exports or imports.

Export intensity index

It's the percentage of a country's total exports to a partner country.

Formula: $EIIij = (Xij / Xi) / (Ij / (Iw - Ii)) * 100$

Where Xij = value of exports from nation I to nation J; Xi = value of country I's global exports;

Ij = country j's total imports; Iw = world's total imports; Ii = country I's total imports

Import intensity index

It is the proportion of a nation's imports to its share of global imports from a partner nation.

Formula: $IIIij = (I_{ij} / Ii) / (Xj/(Xw - Xi)) * 100$

Where, Iij = value of country I's imports into country J; Ii = value of the world's imports from country I,; Xj = country j's total exports; Xw = the world's total exports; Xi = country I's total exports

3. RESULTS & DISCUSSION

3.1. INDIA'S TRADE WITH CHINA

Table:3.1 India's trade with China (US Million Dollar)

Year	India exports to China	India Imports from China	Trade Deficit	Export Share (%)	Import Share (%)
2001	923	1828	-905	2.1	3.6
2002	1532	2620	-1088	3.1	4.6
2003	2567	3615	-1048	4.3	5
2004	4099	6051	-1953	5.4	6.1
2005	7184	10167	-2983	7.2	7.2
2006	7829	15639	-7810	6.5	8.8
2007	9492	24576	-15084	6.5	11.2
2008	10094	31586	-21492	5.6	10
2009	10370	30613	-20243	5.9	11.5
2010	17440	41249	-23809	7.9	11.8
2011	16718	55483	-38765	5.5	12
2012	14729	54140	-39411	5.1	11.1
2013	16417	51635	-35219	4.9	11.1
2014	13434	58231	-44796	4.2	12.7
2015	9577	61604	-51567	3.6	15.8
2016	8916	60483	-51567	3.4	17
2017	12495	71923	-59428	4.2	16.2
2018	16366	90398	-74033	5.1	14.6
2019	17279	68402	-51123	5.3	14.3
2020	19008	58799	-39791	6.9	16
2021	23037	87535	-64499	5.8	15.3
2022	15084	102249	-87164	3.3	14
2023	16241	121929	-105688	4	18.1

Source: UNCOMTRADE

Figure:3.1.1 India-China Bilateral Trade Relationship

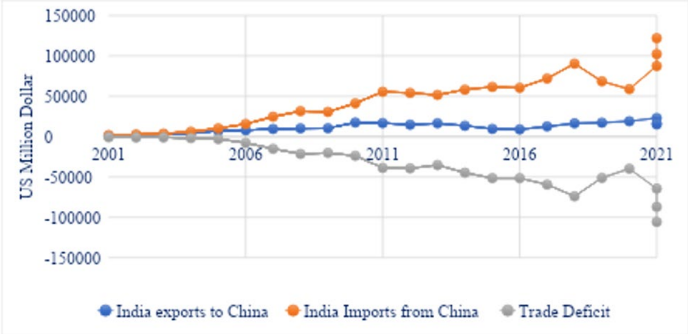


Figure:3.1.1 India; Trade Share with China

Source compiled by author using data table 1

Over the years, there has been a continuous trade deficit between India and China as imports have continuously exceeded exports. India had a $905 million trade deficit in 2001 as a result of its $923 million in exports to China and $1.8 billion in imports. Over time, imports rose sharply to $121.9 billion in 2023, while exports increased to a peak of $23 billion in 2021 before falling. As a result, the trade imbalance in 2023 reached a record-breaking $105.7 billion. China now accounts for 18.1% of India's total imports, up from 3.6% in 2001, indicating the country's increasing reliance on Chinese products. India's overall export percentage to China has fluctuated over the years, peaking at 7.9% in 2010 but remaining low in the years that followed. Notwithstanding efforts to boost exports and domestic production, the widening trade gap underscores India's increasing need on Chinese imports. Due to a reduction in cotton and iron ore exports, India's exports to China fell in 2022–2023. As China began producing domestically and discovered new markets, this occurred (Chauhan, A. K, 2024).

3.2. INDIA AND CHINA'S EXPORT DIVERSIFICATION (EDI) AND CONCENTRATION INDEX (ECI)

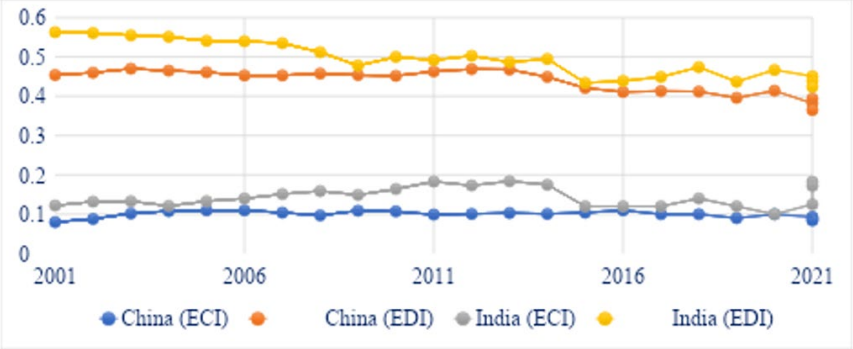
Table: 3.2 India and China's Export Diversification (EDI) and Concentration index (ECI)

YEAR	China's (ECI)	China's (EDI)	India's (ECI)	India's (EDI)
2001	0.080	0.454	0.122	0.563
2002	0.088	0.460	0.132	0.561
2003	0.102	0.470	0.133	0.555
2004	0.108	0.465	0.121	0.551
2005	0.110	0.461	0.133	0.541
2006	0.110	0.453	0.14	0.540
2007	0.104	0.453	0.151	0.535
2008	0.097	0.458	0.159	0.512

2009	0.109	0.454	0.149	0.478
2010	0.107	0.452	0.164	0.500
2011	0.099	0.463	0.183	0.492
2012	0.101	0.469	0.173	0.503
2013	0.103	0.468	0.184	0.487
2014	0.101	0.449	0.175	0.495
2015	0.104	0.421	0.120	0.434
2016	0.11	0.411	0.12	0.439
2017	0.10	0.413	0.12	0.449
2018	0.10	0.412	0.14	0.474
2019	0.09	0.396	0.12	0.437
2020	0.10	0.414	0.10	0.467
2021	0.093	0.382	0.125	0.451
2022	0.086	0.394	0.182	0.439
2023	0.084	0.365	0.171	0.424

Source UNCOMTRADE

Figure: 3.2 India and China's Export Diversification (EDI) and Concentration index (ECI)



Source Compiled by author using data table 3.2

India's and China's export concentration and diversification indexes exhibit different trends over time. Between 0.08 and 0.11, China's export concentration index has been relatively low and stable, indicating a well-diversified export basket with a wide range of commodities. China exports a wide range of goods, but the proportional distribution of these exports has become more concentrated on a few main industries, according to the country's export diversification index, which has exhibited a falling trend from 0.47 in 2003 to 0.36 in 2023. In contrast, India has seen a greater concentration of exports, reaching a peak of 0.184 in 2013 before progressively falling to 0.171 in 2023.Its export basket's narrowing spread was reflected in its export diversification index, which began at 0.563 in 2001 and rapidly declined to 0.424 in 2023. As agricultural exports were increasingly concentrated on particular markets and goods, India's diversification index decreased in 2022–2023, lowering the diversity of trade overall (G. Prabhakaran & G. Nedumaran,2022). Overall, even while both nations' diversification indices are declining, China's export base is still larger and its concentration index is lower, while India's exports are still comparatively more concentrated, despite recent advances in diversity.

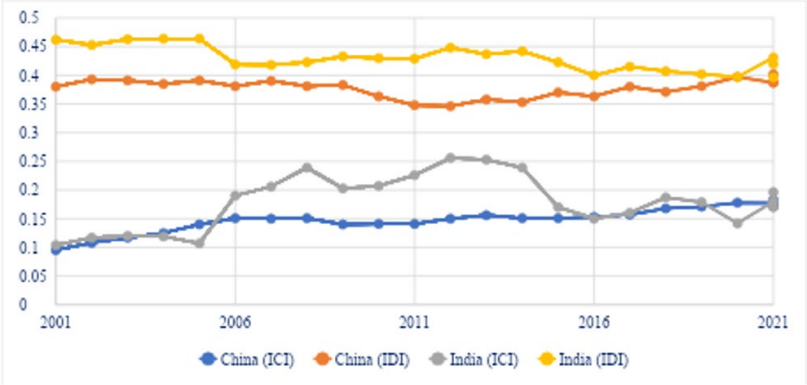
3.3. INDIA AND CHINA'S IMPORT DIVERSIFICATION (IDI) AND CONCENTRATION INDEX (ICI)

Table:3.3 India and China's import Diversification (IDI) and Concentration Index (ICI)

year	China's (ICI)	China's (IDI)	India's (ICI)	India's (IDI)
2001	0.095	0.380	0.104	0.462
2002	0.108	0.393	0.117	0.453
2003	0.117	0.391	0.120	0.463
2004	0.125	0.385	0.119	0.464
2005	0.140	0.391	0.107	0.464
2006	0.151	0.381	0.190	0.419
2007	0.150	0.390	0.206	0.418
2008	0.151	0.381	0.239	0.423
2009	0.140	0.383	0.203	0.433
2010	0.141	0.363	0.207	0.430
2011	0.141	0.348	0.226	0.429
2012	0.150	0.346	0.256	0.448
2013	0.156	0.358	0.253	0.437
2014	0.151	0.353	0.239	0.442
2015	0.151	0.370	0.170	0.423
2016	0.153	0.363	0.150	0.400
2017	0.157	0.380	0.160	0.415
2018	0.168	0.371	0.187	0.407
2019	0.171	0.381	0.179	0.402
2020	**0.178**	0.397	0.142	0.397
2021	0.177	0.387	0.180	0.431
2022	0.183	0.387	0.196	0.419
2023	0.171	0.401	0.170	0.396

Source UNCOMTRADE

Figure: 3.3. India and China's import Diversification (IDI) and Concentration Index (ICI)



Source Compiled by author using data table 3.3

From 2001 to 2023, China's and India's import structures show different developments according to the Import Concentration Index (ICI) and Import Diversification Index (IDI). From 0.095 in 2001 to a peak of 0.183 in 2022, China's ICI shows a steady rise before dipping slightly to 0.171 in 2023. This implies that over time, China's imports have been a little more concentrated, indicating a reliance on fewer significant trading partners or specific products. In contrast, China's IDI, which ranged from 0.380 in 2001 to 0.401 in 2023, demonstrated a far better but still steady range of import sources while still exhibiting a slight increasing trend. The trajectory of India's ICI, on the other hand, is less clear; it peaked in 2012 at 0.256 and then fell to 0.170 in 2023. On the other hand, India's ICI shows a more erratic trend, peaking at 0.256 in 2012 and then falling to 0.170 in 2023, indicating that India has progressively increased the sources of its imports. India's IDI thus demonstrated a decrease in diversification, gradually falling from 0.462 in 2001 to 0.396 in 2023. India's import diversity score decreased in 2023 as its reliance on imports from a select few nations, particularly South Africa, grew. This increased trade concentration led to a decline in overall diversification (Prasad et al., 2023).

3.4. INDIA'S TRADE INTENSITY INDEX WITH CHINA

Table: 3.4. India's Trade Intensity Index with China

Year	Export intensity index	Import intensity index
2001	0.53	0.92
2002	0.67	1.01
2003	0.79	0.96
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

Source UNCOMTRADE

Figure: 3.4 India's Trade Intensity Index with China

Source compiled by author using data table 3.4

The 2001–2023 export and import intensity index data shows notable changes in the dynamics of trade over time. With a steady growth from 2001 to 2005 and a peak of 1.14 in 2005, export intensity demonstrated robust export performance in relation to economic output. Following 2005, however, export intensity started to steadily decline and reached its lowest point of 0.30 in 2022, indicating a significant decline in the nation's export contribution. Although export intensity marginally improved to 0.34 in 2023, it was still at a historically low level, suggesting that exports were still sluggish. Import intensity, meanwhile, varied, peaking at 1.26 in 2007 and 2016, then levelling out at 1.00 to 1.12 in the years that followed. High import reliance returned in 2023 when import intensity spiked once more to 1.24. With exports falling and imports staying relatively high, the trend shows a widening trade imbalance that may be a sign of structural economic issues like dwindling export competitiveness or a greater reliance on imports. The import intensity index rose in 2023, mostly as a result of increased South African imports.

4. CONCLUSION

The persistent trade deficit between India and China highlights India's growing dependence on Chinese imports despite efforts to enhance exports and domestic production. Over the years, India's imports from China have surged significantly, whereas exports have remained volatile, leading to a record-breaking trade imbalance in 2023. The decline in India's exports, particularly in cotton and iron ore, reflects both China's shift toward domestic production and its exploration of alternative markets. Because of this, India's dependence on Chinese commodities keeps increasing, underscoring the necessity of taking calculated steps to increase exports, diversify trading partners, and support domestic manufacturing in order to close the growing trade gap.

The developments in export diversification and concentration between China and India point to significant distinctions in their trading arrangements. China's proportionate reliance on a few important industries has grown over time, despite the fact that its export base is still well-diversified. In contrast, despite a slow but steady increase in diversification, India's exports have become more concentrated. Although the export diversification indices of both nations have declined, China's more diverse export base and lower concentration index suggest a more balanced trading portfolio. India's increased levels of concentration, especially in agricultural exports, point to the need for additional diversification in order to improve trade resilience and lessen reliance on certain commodities and markets.

Between 2001 and 2023, the import structures of China and India changed in distinct ways. China's overall diversification has been gradually increasing, but its imports have become somewhat more concentrated, depending on fewer important partners or items. India, on the other hand, has seen swings in both import diversification and concentration; its import base is larger, but its diversification index is falling. China has been steadily diversifying its imports, while India's changing trade policy and increasing dependence on a few nations, such South Africa, have made import diversity less overall.

Trends in trade intensity from 2001 to 2023 show that the trade deficit is growing. After peaking in 2005, export intensity fell progressively until it hit a record low in 2022. In 2023, it only slightly improved, indicating poor export

performance. On the other hand, import intensity varied but stayed high, rising once more in 2023 as a result of higher imports, especially from South Africa. This widening disparity points to structural economic issues, such as a decline in export competitiveness and an increase in reliance on imports.

CONFLICT OF INTERESTS

None.

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