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A Comparative Analysis of India's and China's Export Structure

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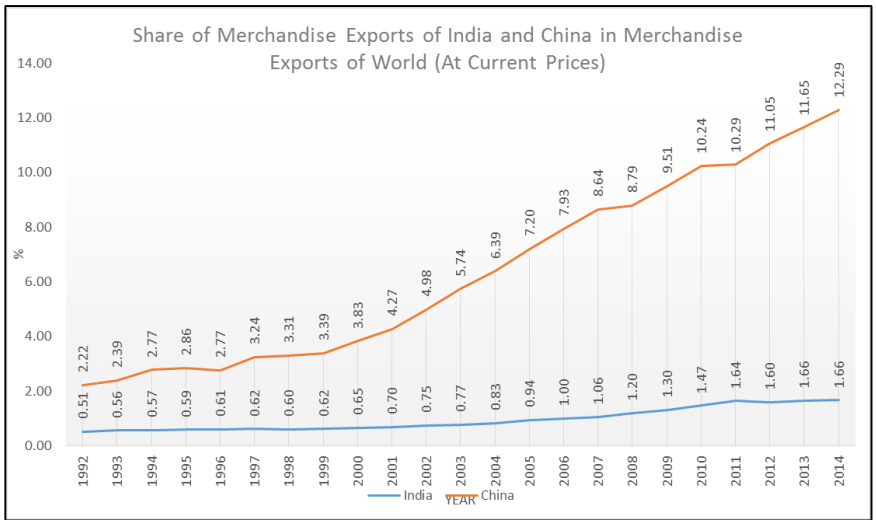
Abstract
China has achieved rapid export growth over time since the adoption of an open - door policy in 1978, India has started opening its economy in 1980s; particularly new economic policy was adopted in 1991. Though both the countries shared many common features in the beginning of the process of integration with the world economy like following the policies of import substitution and heavy industrialization etc., still India's export growth has been modest than China's export growth. Along with this India and China are viewed at par in terms of factor endowments and export specialization, with these similarities it becomes important to examine how the structure of exports of two countries differ. The paper examine and compare structure of exports in terms of export diversification, composition, degree of Intra-Industry Trade and comparative advantage of exports of India and China vis-à-vis rest of the world, along with it the level of competitiveness between India and China is also measured. The study uses various indexes to analyze export structure of India and China. The finding reveals that there are several differences between India's and China's export structure. In particular China's exports is more diversified compare to India's exports, but over time diversification of India's exports is increasing. Comparing RCA of India and China at SITC-1 digit level which categorize total merchandize exports in ten commodity groups, India possess comparative advantage in six commodity groups whereas China enjoys only in three out of which two are common to both the countries as per 2014 analysis.

Keywords: Exports, Concentration, Sophistication, Revealed Comparative Advantage, Competitiveness, JEL Classification: F10, F13, F14

1. Introduction
Export plays an import role in economic development of a country through providing external market for domestically produced goods, employment generation, earning foreign exchange and increase in GDP as a result of which both saving and investment increases. For any developing country, improvement in export performance is a key objective.

India and China being developing countries, export growth occupies a place of strategic importance in the context of economic development which has lead to various remarkable changes in foreign trade policy of these countries. China began to open its centrally planned, non-market economy in 1978 whereas India already had large private sector and functioning markets but they were subject to rigid state controls until the starting of piecemeal reforms in 1980s. These reforms became systematic and far broader through new economic policy of 1991 [1].

Figure 1 depicts that there is a huge gap between exports of India and China in terms of their share in world exports and over time this gap is increasing. We intend to investigate the export structure of India and China vis-à-vis rest of the world for the time period of 1992-2014, so that we can come up with the factors behind the spectacular performance of China relative to India.



Source: IFS database

Fig 1: Merchandise Exports of India and China (In million Dollar)

India followed the policy of Import substitution for over four decades since independence. During this period India's export performance was stagnant. Despite wave of export promotion in global context, India remained a small player in the world trade [2]. Till late 1970s India's trade policy heavily relied on quotas, import licensing etc. A slow and sustained relaxation of import controls started with the export-import policy of 1977-78. There was a shift in trade policy from import substitution to export promotion since the early 1980s. The shift in trade policy took place considering importance of export promotion in employment generation, increase in output, earning foreign currency and mobilizing domestic resources etc. Significant growth in exports was recorded in mid 1980s as a result of introduction of many export incentives and tying imports with exports.

A major programme of economic reform and liberalization started in 1991 with emphasis on external sector. This reform included reduction in import tariffs, reducing anti-export bias of existed policy regime. This enabled increased integration of Indian economy with rest of the world [3]. In case of China, in 1979 the country switched to "open-door" policy after a decade of inward looking policy.

After decade of inward oriented trade and foreign investment policies, in 1979, China switched to an "open-door" policy. Since then, country has gradually moved to liberalized trade and foreign investment regime. A variety of instruments were employed to promote exports like set-up of special economic zones (SEZs), production networks for exports (PNEs) and higher exchange retention rights to targeted exports etc. PNEs means bring the leading factories with the targeted sectors into a network and support them through subsidies for various inputs. Apart from this liberalization policy also included liberal foreign investment regime and duty exemptions.

2. Objectives

As mentioned above there is a huge gap between Exports of India and China both in value and growth terms, we intend to investigate the reasons behind the gap, our objectives are:

- To measure the level of diversification of exports of India and China
- To Study the structural change in composition of exports over the study period.
- To find out commodity groups where India and china have revealed comparative advantage
- To measure trade competitiveness between India and China

3. Methodology

3.1 Diversification

The extent of diversification or Specialization of trade can be measured using Herfindahl Index.

$H_J = \sum_i (S_i^j)^2$ where $S_i^j = \frac{x_i^j}{\sum_i x_i^j}$

Where x_i^j denotes Country j's export of SITC subsidiary heading i (5 digits), S_i^j is share of good i in country j's exports. Where summation is taken over all SITC subsidiary headings. H takes value in (0, 1] range. Higher value implies specialization in production of few products.

3.2 Revealed Comparative Advantage

Balassa index of Revealed Comparative Advantage (RCA) (Balassa 1989) [1] has been used to explore the dynamics of specialization in the exports of India and China for the ten industrial clusters classified by SITC-1 digit level classification. The index is defined as:

$$RCA_{ij} = \left(\frac{X_{ij}}{X_{wj}}\right) \Big/ \left(\frac{X_i}{X_w}\right)$$

Where

X_{ij} = ith country's export of commodity j

X_{wj} = world exports of commodity j

X_i = total exports of country i

X_w = total world exports

Where x_{ij} and x_{wj} denote the export of product j from country i and the total export of Product j for the whole world, and X_i and X_w refer to the total exports of country i and the world respectively. In this share of a sector in a country's total export is compared with the share of the same sector in world's total exports. If RCA is greater than unity indicates that the country specializes in a product j but if less than one it implies that the country has a revealed comparative disadvantage in product j.

3.3 Intra Industry Trade

(Grubel and Lloyd 1975) provided the empirical study to measure Intra Industry Trade and its importance. This Index is known as Grubel-Lloyd index is calculated as:

$$B_i = \frac{(X_i + M_i) - |X_i - M_i|}{X_i + M_i} \times 100$$

Where:
Bi = Index of intra-industry trade of the ith industry.
Xi = Export of the ith industry,
Mi = Imports of the ith industry
Intra Industry Trade Index ranges from 0 to 100 where 0 indicates no IIT (i.e. one of (Xi or Mi) is zero) and index value of 100 indicate complete intra-industry trade (both Xi and Mi are equal).

3.4 Trade competition and complementarities

To evaluate the trade challenges posed by India and China to each other as well as to the rest of the world, we construct well-known indices coefficient of conformity (CC), defined as follows:

$$CC = \frac{\sum_n a_{ni} a_{nj}}{\sqrt{\sum_n (a_{ni})^2 \sum_n (a_{nj})^2}}$$

Where ani and anj represent the share of good n in the total exports of countries i and j. If the indices is equal to 1, it indicates intense competition between two countries. However when equal to 0, it indicates totally dissimilar exporting structures between two countries, which indicates absence of competition.

4. Empirical findings

4.1 Comparing Composition of Exports

As per Table 1 top three product groups in terms of their share in total merchandize exports of India are : Manufactured goods, Mineral fuel/lubricants and Machinery/transport equipment and as per Table 2 top three product groups in terms of their share in total merchandize exports of China are: Machinery/transport equipment, Miscellaneous manufacturing arts and Manufactured goods. Comparing the export composition of two countries, it can be seen that though Machinery/transport equipment is part of top three product groups for both the countries, its importance differs, Machinery/transport equipment form around 45% share of China's exports in 2014 whereas its contribution in India's share is around one third of it i.e. 15%. It is also found that "Mineral fuel/lubricants" is a major contributor to India's exports whereas its contribution to China's exports is very nominal. Miscellaneous manufacturing arts is also a significant contributor in the total exports of both the countries but its share is decreasing over time for both India and China.
Comparing the structure of exports of two countries it can be said that China's exports is majorly dominated by Manufacturing Goods whereas India's exports is good mix of manufacturing and natural resource based goods.

Table 1: Share of Products (SITC-1 digit) in total merchandise exports of India.

C	Product group	1992	1996	2000	2004	2008	2012	2013	2014
6	Manufactured goods	39.22	36.63	39.94	34.87	27.36	23.19	24.67	24.20
3	Mineral fuel/lubricants	2.83	1.55	3.41	8.07	18.06	18.78	20.67	19.63
7	Machinery/transp equipmt	7.01	8.19	7.31	9.87	13.56	13.72	13.70	15.30
8	Miscellaneous manuf arts	21.25	18.97	21.08	18.35	11.99	14.91	11.57	13.32
5	Chemicals/products n.e.s	6.73	9.01	10.25	11.65	11.25	11.92	11.71	11.69
0	Food & live animals	14.73	16.72	11.25	9.04	8.72	9.27	9.97	10.07
2	Crude mater.ex food/fuel	5.38	6.00	3.76	6.14	6.70	6.55	4.77	4.02
9	Commodities nes	1.63	1.67	1.99	1.18	1.58	0.91	2.22	1.08
1	Beverages and tobacco	0.93	0.68	0.46	0.39	0.43	0.39	0.39	0.37
4	Animal/veg oil/fat/wax	0.28	0.58	0.56	0.45	0.35	0.36	0.33	0.32

Table 2: Share of Products (SITC-1 digit) in total merchandise exports of China

C	Product Groups	1992	1996	2000	2004	2008	2012	2013	2014
7	Machinery/transp. equipmt	15.54	23.38	33.15	45.21	47.11	47.12	47.06	45.76
8	Miscellaneous manuf. arts	39.85	37.25	34.51	26.36	23.43	26.05	26.21	26.44
6	Manufactured goods	19.00	18.87	17.07	16.96	18.34	16.31	16.38	17.15
5	Chemicals/products n.e.s	5.12	5.88	4.85	4.44	5.54	5.54	5.41	5.74
0	Food & live animals	9.78	6.77	4.93	3.18	2.29	2.54	2.52	2.52
3	Mineral fuel/lubricants	5.52	3.93	3.15	2.44	2.22	1.51	1.53	1.47
2	Crude mater.ex food/fuel	3.69	2.67	1.79	0.98	0.79	0.70	0.66	0.68
1	Beverages and tobacco	0.85	0.89	0.30	0.20	0.11	0.13	0.12	0.12
9	Commodities nes	0.48	0.12	0.21	0.19	0.12	0.07	0.08	0.10
4	Animal/veg oil/fat/wax	0.16	0.25	0.05	0.02	0.04	0.03	0.03	0.03

4.2 Comparing structure of Revealed Comparative Advantage

Out of ten product groups at SITC-1 digit level, India has comparative advantage in six product groups whereas China has it only in three product groups as per 2014 analysis. Looking at the commonality between two countries in terms of comparative advantage, Out of three product groups in which China possess comparative advantage, two are common to both the countries that are "Miscellaneous manufactured articles" and "Manufactured goods classified chiefly by material". But "Machinery and transport equipment" is a product group in which only China possess the comparative advantage.

Comparing the structure of comparative advantage in 1992 and 2014, it can be seen that there has been little change in structure in terms of comparative advantage i.e. India over time has gained comparative advantage in two goods in which it was missing in 1992, that are "Mineral fuels, lubricants and related materials" and "Chemicals and related products, n.e.s." rest remaining same whereas China has gained comparative advantage in "Machinery and transport equipment" and lost it in "Food and live animals" between 1992 and 2014 rest remaining same.

4.3 Comparing Intra-Industry Trade

Differences in relative prices is one major factor behind differences in export growth of two countries but many critiques have argued that in the era of technology dynamism, it is equally important for the countries to follow the line and acquire latest technologies to maintain its competitiveness in the global market. But following the global technology dynamism is a challenge for developing countries with the given resource constraints. Intra-industry trade in manufactures is seen as a way of factor movement as predicted by heckscher- ohlin trade theory. It is found that Intra-industry trade is more likely to transfer technology from one country to another as it is more likely to absorb innovations embodied in the foreign technology if it is used in the production and exports of same products.

Table 4: India's IIT for the period of 1992-2014

Code, Product details	1992	1996	2000	2004	2008	2012	2014
6,Manufactured goods	73.93	73.94	70.17	75.29	86.82	89.08	87.32
5,Chemicals/products n.e.s	57.27	75.51	96.26	98.13	74.60	87.34	87.16
7,Machinery/transp equipmt	59.07	54.42	56.89	54.82	55.24	66.92	78.76
2,Crude mater.ex food/fuel	69.18	90.91	69.21	94.27	86.20	85.26	68.06
1,Beverages and tobacco	4.31	10.70	13.20	36.19	35.62	47.59	55.81
3,Mineral fuel/lubricants	15.02	8.62	13.88	32.85	44.19	45.30	52.11
8,Miscellaneous manuf arts	30.59	28.36	36.12	42.44	53.19	59.02	51.73
0,Food & live animals	41.88	26.73	28.47	38.42	37.73	36.87	38.32
4,Animal/veg oil/fat/wax	69.65	34.27	27.76	23.74	31.05	16.98	16.96

Table 5: China's IIT for the period 1992-2014.

Code	Product Groups (SITC-1 digit)	1992	1996	2000	2004	2008	2013	2014
0	Food & live animals	54.93	71.33	55.73	65.26	59.96	85.54	88.41
5	Chemicals/products n.e.s	56.00	65.80	57.60	58.00	81.02	78.08	83.10
1	Beverages and tobacco	49.79	54.08	65.36	61.90	88.78	73.62	76.66
7	Machinery/transp equipmt	60.07	78.41	97.07	91.14	71.32	71.88	72.38
6	Manufactured goods	91.14	95.17	96.66	81.26	55.47	56.05	58.65
8	Miscellaneous manuf arts	28.08	25.93	24.89	45.35	39.51	34.06	32.64
3	Mineral fuel/lubricants	86.42	92.61	55.15	46.36	31.61	19.36	19.61
4	Animal/veg oil/fat/wax	41.83	36.27	21.26	6.79	10.57	10.83	13.60
2	Crude mater.ex food/fuel	70.42	54.81	36.49	19.10	12.72	9.68	11.08
9	Commodities nes	81.41	39.37	45.91	84.38	56.12	3.26	5.40

In India Intra-Industry trade is high in case of manufactured goods, Chemicals/products n.e.s., Machinery/transport equipment and Crude material excluding food/fuel whereas in China the Intra-Industy trade is high in case of Food & live animals, Chemicals/products n.e.s., Beverages and tobacco and Machinery/transport equipment.

4.4 Comparing Diversification

In recent years, the trade literature has provided a number of empirical evidence to support the importance of export diversification. For some developing countries diversification of their export basket has been one of the key trade policy component to stabilize the export sector growth and subsequently GDP growth. Figure 3 reveal that China's exports is more diversified compare to India's exports as it is more close to zero, that means that China's exports growth is more stable compare to India's exports growth. India's HHI is decreasing over time indicating increase in diversification of exports which is a positive sign for Export growth of India.

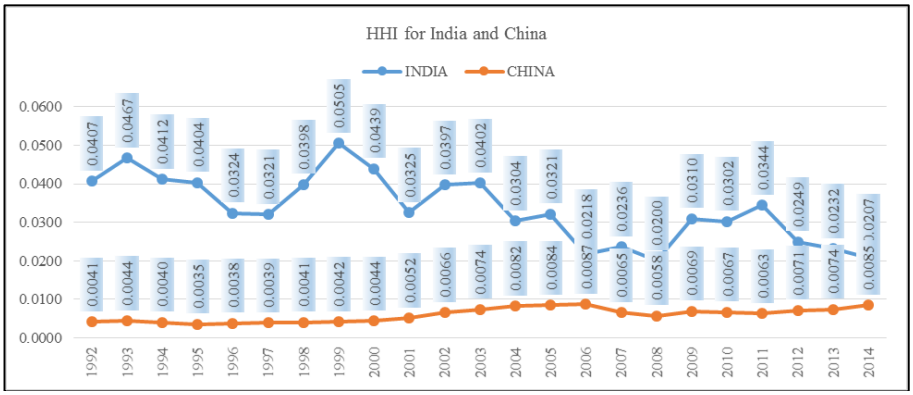


Fig 3: HHI for India and China (1992-2014)

4.5 Complementarity Index

It can be seen through the Figure 4 that the coefficient of conformity index was high in 1992 but over the time it has decreased from .437 in 1992 to .212 in 2014, getting closer to zero. It indicates that over the time the export structure of two countries is becoming dissimilar. It can also be confirmed by looking at composition of exports, resource based exports is a major contributor to India's exports with increasing share over time whereas in case of China, high-tech. exports have made significant contribution to its total exports with increasing significance over time. Hence we can say that the exports are becoming more compatible over time rather than becoming competitive.

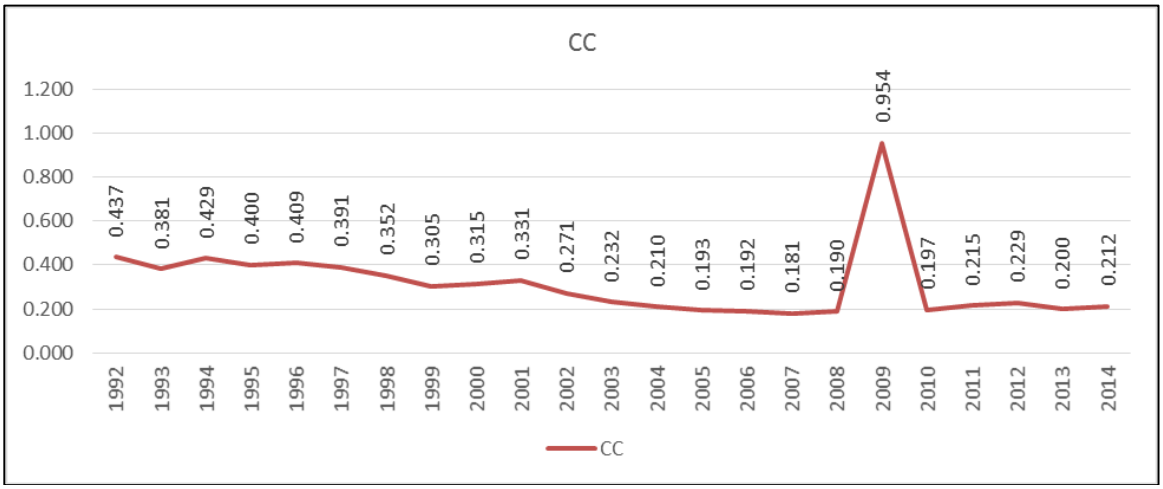


Fig 4: Trade competition and complementarities between India and China (cc)

5. Conclusion

The paper is an attempt to evaluate the similarities of the pattern of reveled comparative advantage for India and China in the Global market and it is found that out of ten product groups, there are only two groups common to both the countries in terms of having comparative advantage as per 2014 analysis.

Another important finding is that, according to Ricardian theory of trade Countries tend to trade on the basis of comparative advantage but the analysis results contradict with this statement. In case of India, "Machinery and transport equipment" consist of significant share of India's total Merchandise exports whereas India doesn't possess comparative advantage in it, this can be justified on ground of having high IIT in it i.e. importing the raw material/parts of Machinery and transport equipment and reselling in global market after assembling in India. In terms of diversification also China's exports is more diversified compared to India's hence export growth is more stable in nature in China than in India.

India should emphasize more on the growth of production and exports of manufacturing goods as the competition in resource based goods is stiff in the global market and India being a country with abundance of labour, can enjoy comparative advantage in the world market of manufacturing goods with the help cheap labour cost. It would also help in reducing the problem of unemployment in the country. India can also gain the latest technology and can improve technological intensity of exports by allowing more Foreign Direct Investment in the Country as FDI will also bring the latest technology with it. Like China, India need to further diversify its exports to stabilize export growth.

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