



A Study of Diversification in Exports of China and India

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Introduction

A detailed study of the orientation of country's exports over a long period enables us to understand whether the trade structure is conducive to economic growth. Examining the trends in growth, changes in the share or composition of exports gives important information about the competitiveness of a country's export basket. The trade-to-GDP ratio is one of the basic indicators of openness to foreign trade and economic integration. It shows the combine importance of exports and imports in an economy. The ratio gives an indication of dependence of domestic producers and consumers on foreign demand and supply and vice-versa. The trade-to-GDP ratio of China increased from 30.5 percent in 1993 to 50 percent in 2010, while that of India more than doubled from 15.6 percent in 1993 to 35.5 percent in 2010. The share of China's merchandise exports and imports in total world trade increased from 2.4 percent in 1993 to 11.1 percent in 2010, while that of India increased marginally from 0.56 percent to 1.59 percent during the same period. Indicators such as index of export market penetration, which measures the extent to which a country's exports reach already proven markets, and export diversification index which, is a measure of dispersion across different economic activity gives basic information about a country's competitiveness. The value of index of export market penetration of China almost doubled from 32.9 in 1993 to 62.1 in 2010, and that of India increased from 21 to 35.1 during the same period. A higher value of the index indicates greater penetration of a country's exports to more markets. The export diversification index of China was 0.44 in 1993, which declined to 0.29 in 2010, and for India values of the index were 0.53 and 0.38 respectively. Lower value of the export diversification index, indicate lower dependence on a smaller number of products and hence, lower risk and vulnerability arising from too much reliance on a narrow range of products. These indicators give an overall picture of the changing export structure of a country, but do not tell us: How has the geographical distribution and composition of exports of China and India evolved over time? Which are the commodities in which they enjoy comparative advantage? Has the growth in exports taken place along intensive or extensive margins? The questions which the paper addresses are: Have China and India moved up the export ladder by exporting more of technology intensive goods and more of new variety of goods? The rest of the paper is organized as follows. Section 2 examines the geographical distribution of exports of the two countries. Section 3

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analyses the changes in the composition of exports using the Revealed Comparative Advantage index. Section 4 studies the Intensive and Extensive margins of trade and Section 5 brings out the main conclusions of the study. The data for the analyses has been accessed from WITS and UNcomtrade data base.

2.0 Direction of exports of China and India

An important question concerning the exports from China and India is, whether significant changes in the share and direction of exchange has taken place or not. Export share to a region/country, tells us how important a particular trade partner is in terms of the overall profile of an economy. Changes in the export shares over time may indicate that the economies in question are becoming more integrated. A high value for a region indicates greater importance of selected region.

We examine the changes in the direction of exports in three steps: i) following the World Bank classification, we group the countries on the basis of income for which we have eight groups of countries, ii) following the classification by Hinloopen and Marrewijk (2004) as in Empirical Trade Analysis (ETA) the products are grouped into 5 main categories at SITC 3 digit level code (Rev. 2). The 5 main groups/categories are: Product A group: Primary Products (83 Sections), Product B group: Natural Resource Intensive Products (21 Sections), Product C group: Unskilled Labour Intensive Products (26 Section), Product D group: Technology Intensive Products (62 Sections), and Product E group: Human Capital Intensive Products (43 Sections) and Sectors not classified according to factor intensity (5 sections). For the purpose of our study we consider product groups A, B, C, D and E group. Sectors not classified elsewhere are not included in the study as it includes only 5 sections, covering a minuscule proportion of trade and, iii) we then examine the country / product group intersection to study the changes in the share of five product groups going to eight groups of countries. The results of the changes in country/commodity intersection i.e. changes in the share of five products going to eight country groups from China and India are presented in Table 1

Some of the major observations are:

- The share of High income OECD plus non-OECD countries in total exports of China and India has declined, but they still continue to absorb the largest shares in all five product groups. The share of this group of countries in total exports of China declined from 81.7 percent in 1993 to 68.7 percent in 2010. During the same period the share of this group of countries in total exports of India fell from 66.48 percent in 42.7 percent. A similar trend can also be observed in the share of low and middle income Europe in total exports of India, which declined from 4.17 percent in 1993 to 2.47 percent in 2010.
- The share of Low and Middle income Asia and Pacific countries in total exports of China increased from 4.09 percent to 7.08 percent between 1993 and 2010. During the same period the share of these countries in total exports of India tripled to 14.6 percent in 2010.

Table 1 Direction of China's and India's Exports

Partners : On basis of Income	Product groups	China		India	
		1993	2010	1993	2010
All high-income (OECD plus non-OECD)	Primary	13.78	3.30	14.21	15.16
	Resource intensive	2.86	2.07	16.98	11.94
	Unskilled labour Intensive	39.17	17.46	23.96	9.52
	Technology intensive	14.72	36.16	5.26	10.52
	Human intensive	11.22	9.76	6.06	6.18
Least Developed Countries --- LDC	Primary	0.32	0.11	0.64	1.91
	Resource intensive	0.05	0.07	0.25	0.14
	Unskilled laobur Intensive	0.49	0.90	1.30	1.03
	Technology intensive	0.31	0.67	0.76	1.25
	Human intensive	0.24	0.45	1.09	1.04
Low & Middle income East Asian & Pa	Primary	1.56	0.85	2.21	7.20
	Resource intensive	0.19	0.26	1.06	2.96
	Unskilled laobur Intensive	0.58	1.53	0.27	1.22
	Technology intensive	1.15	3.23	0.80	2.32
	Human intensive	0.59	1.22	1.41	0.93
Low and Middle Income Europe --- LD	Primary	1.36	0.19	1.53	0.65
	Resource intensive	0.15	0.17	0.08	0.14
	Unskilled laobur Intensive	1.70	1.70	1.11	0.46
	Technology intensive	0.35	1.74	1.06	0.85
	Human intensive	0.16	0.73	0.40	0.37
Low and Middle income Latin America	Primary	0.20	0.28	0.15	0.90
	Resource intensive	0.02	0.12	0.01	0.04
	Unskilled laobur Intensive	0.91	1.52	0.28	0.61
	Technology intensive	0.36	2.58	0.15	0.93
	Human intensive	0.40	1.15	0.43	0.77
	Primary	0.28	0.08	0.88	1.31
Low and Middle income Middle East Africa	Resource intensive	0.01	0.10	0.06	0.11
	Unskilled laobur Intensive	0.25	0.61	0.23	0.42
	Technology intensive	0.93	0.93	0.60	0.87
	Human intensive	0.29	0.66	0.54	1.08
Low and Middle income South Asian c	Primary	0.18	0.14	0.92	2.06
	Resource intensive	0.06	0.10	0.34	0.19
	Unskilled laobur Intensive	0.16	0.68	1.11	0.87
	Technology intensive	0.63	2.15	0.63	0.83
	Human intensive	0.23	0.58	1.10	1.03
Sub-Saharan Africa SSA --- SSA	Primary	0.23	0.11	0.19	2.01
	Resource intensive	0.01	0.11	0.05	0.19
	Unskilled laobur Intensive	0.50	0.97	0.83	1.00
	Technology intensive	0.21	0.91	0.85	0.02
	Human intensive	0.22	0.63	0.82	1.35

Source: Author's calculations based on WITS data base

- The share Unskilled labour intensive group in total exports of China to High income OECD and non- OECD countries declined from 39.2 percent in 1993 to 17.5 percent 2010. The share of Technology Intensive products to these countries increased from 14.7 percent to 36.2 percent during the same period. In fact, the share of Technology intensive group to all the 8 country groups in total exports of China had increased in 2010. Thus, we see that there is a distinct shift in the composition of exports of China to this group of countries.
- Unskilled labour intensive products exported to the High income OECD plus non- OECD constituted about one third of the total exports of India in 1993, which declined to less than 10 percent of the total share in 2010.
- The share of primary products, unskilled labour intensive and Human capital intensive group in total export of India to the Sub Saharan African countries has increased.
- Thus, we see that although the High income OECD plus non- OECD countries had dominant shares in all product categories, a significant increase in the share of the remaining country groups has taken place, although from a small base, in both China as well as India.

The question which, arises is - have China and India been able to diversify their exports basket in terms of exporting more technology intensive goods or are they still exporting traditional Primary /Resource based products. The following section answers these questions.

3.0 The Revealed Comparative Advantage Index of Exports of China and India

In this section we examine the percentage share of world, China and India in a particular product group in total exports and also compute the Revealed comparative advantage index(RCA) for China and India . The increase in the share of a particular product group in the world total exports over time enables us to identify product groups which have potential for growth from the point of view of the exporting country.

The RCA index of Balassa (1965) is a measure of export structure of a country. It identifies the 'strong' sectors by analyzing the actual export flows i.e. the exports flows 'reveal' the country's strong sectors. It is calculated as the ratio of two ratios – the ratio of exports for each sector in an economy to that economy's total exports, relative to the ratio of world exports for each corresponding sector to total world exports. It reveals the relative pattern of export specialization for an economy relative to worldwide pattern. Tracking the structure of RCAs over time reveal an economy's comparative advantage development and importantly its export upgrading process, this contributes to sustained and future growth (ADB 2002).

It is defined as :

$$\text{RCA index} = \frac{X_{ij}/X_j}{X_{iw}/X_w}$$

Where X_{ij} = exports of commodity i by country j
 X_j = total exports by country j
 X_{iw} = world exports of commodity i
 X_w = total exports of world

An RCA index of 1 means that the share of commodity 'i' in country 'j's total exports equal to the share of commodity i in the world exports. With RCA index of greater than unity, commodity i is more important in country j's exports than it is in total world trade, implying that the country has a revealed comparative advantage in the product. The converse holds for a ratio smaller than unity. The higher the index for a given commodity, the higher it is assumed to be in the ranking of goods by comparative advantage.

The Revealed comparative advantage index of Balassa (1965) has been used extensively in economic literature to study the changing pattern of comparative advantage of countries over time. Amiti (1997) has used the RCA index to identify specialization patterns, which are consistent with trade theories in the European Union countries. Marconi and Rolli (2007) employ the RCA index together with the LAFAY index to study linkages between the patterns of international trade specialization as a driving factor of the competitiveness structure of the domestic manufacturing sector. Porter (1990) uses it to identify strong sectoral clusters; Hinloopen and Marrewijk (2004) use it to analyze the dynamics of Chinese comparative advantage. In Kaminski's (1999) study, the RCA index was used to measure the competitive advantage of Hungarian firms in the European Union markets. Hoekman and Djankov (1997) have used the RCA index together with other variables to measure the changing export structure across central and eastern European countries between 1990 and 1995. Batra (2005) evaluates the similarities of the pattern of revealed comparative advantage for India and China in the global market through systematic use of the index. In this paper we have used the RCA index to track the changes in comparative advantage of exports of China and India in the five product groups (see section 2 for classification) between 1993 and 2010.

The product classification given in section 2 has been used here to compute the Revealed comparative advantage index to study the changes in the composition of exports. The RCA index was computed for all the commodities classified in the five product categories (section 2) at SITC 3digit level of disaggregation for the years 1993, 2000 and 2010. The changes in the RCA indices and changes in the percentage of each product category in total exports of China, India and World is presented in tables below.

A few observations from each of the product groups are given below:

- **Product group A: Primary Products**

Table 2 : China's & India's Comparative Advantage on basis of Factor Intensity

Product Group A: Primary Products(At SITC 3 digit level)

SITC code	China			India			SITC code	China			India		
	1993	2000	2010	1993	2000	2010		1993	2000	2010	1993	2000	2010
1	2.02	1.07	0.22	0.028	0.02	0.05	223	2.17	0.68	0.32	4.121	7.37	1.14
11	0.40	0.49	0.10	0.535	1.06	1.28	232	0.06	0.00	0.03	0.007	0.10	0.14
12	0.30	0.21	0.00	0.020	0.04	0.05	233	0.17	0.21	0.29	0.124	0.11	0.29
14	2.46	2.16	0.77	0.013	0.02	0.17	244	0.08	0.31	0.04	0.035	0.12	0.26
22	0.10	0.09	0.01	0.037	0.12	0.14	245	1.36	3.57	0.34	0.207	0.74	0.49
23	0.00	0.00	0.01	0.052	0.26	0.39	246	1.77	1.59	0.01	-	0.01	0.00
24	0.00	0.00	0.00	0.000	0.00	0.02	247	0.41	0.03	0.01	-	0.02	0.01
25	0.96	0.62	0.30	0.394	1.82	1.02	248	0.26	0.26	0.27	0.001	0.00	0.04
34	1.11	1.53	1.05	1.107	2.01	0.96	251	0.01	0.01	0.03	0.003	0.01	0.00
35	1.13	1.07	0.70	0.142	0.42	0.21	261	29.71	20.01	7.31	0.468	3.55	1.34
36	2.40	1.23	0.99	9.068	9.13	3.70	263	2.19	1.18	0.01	8.304	1.05	13.50
37	1.66	3.61	1.95	0.055	0.07	0.77	264	3.33	0.33	0.01	1.247	2.27	29.53
41	0.02	0.00	0.00	0.001	0.04	0.00	265	2.44	0.50	0.11	0.110	0.63	5.58
42	2.13	2.14	0.19	14.269	14.14	7.50	266	0.08	0.20	1.14	0.468	1.14	2.63
43	-	-	0.01	-	0.00	0.10	267	0.04	0.06	0.57	0.235	0.44	2.58
44	5.07	2.91	0.01	0.056	0.07	1.49	268	3.00	2.56	0.89	0.032	0.14	0.07
45	1.49	0.54	0.30	0.822	0.20	2.13	269	0.15	0.17	0.04	0.036	0.43	1.12
46	0.72	0.63	0.25	0.062	1.13	0.26	271	1.09	2.81	0.41	0.028	0.09	0.03
47	0.40	0.32	0.03	0.332	0.42	1.12	273	1.44	0.85	0.17	8.426	10.07	4.58
48	0.28	0.18	0.12	0.250	0.31	0.32	274	0.07	0.07	0.05	0.023	0.04	0.66
54	2.15	1.50	0.96	0.864	1.54	0.99	277	0.60	0.47	0.94	1.662	4.36	5.34
56	4.42	3.31	2.08	0.666	1.16	0.92	278	3.03	2.95	1.31	0.880	1.06	1.88
57	0.64	0.32	0.31	3.113	2.99	1.00	281	0.00	0.00	0.00	9.995	5.50	3.84
58	1.03	1.46	1.01	0.558	0.97	0.24	282	0.03	0.02	0.03	0.018	0.01	0.01
61	2.72	0.45	0.19	0.965	1.14	1.95	287	0.24	0.10	0.06	1.964	1.00	1.43
62	0.68	0.48	0.54	0.049	0.11	0.33	288	0.21	0.08	0.01	0.008	0.03	0.05
71	0.02	0.04	0.04	3.835	3.35	1.27	289	0.00	0.02	0.05	0.000	0.01	1.20
72	0.54	0.12	0.05	0.024	0.00	0.05	291	5.62	5.44	1.76	2.523	1.80	0.68
73	0.08	0.04	0.05	0.013	0.04	0.04	292	1.32	0.79	0.47	2.355	3.73	0.93
74	5.86	2.98	1.14	22.481	18.06	7.24	322	1.66	2.05	0.19	0.204	0.27	0.05
75	3.33	1.46	1.19	18.085	14.11	10.24	323	4.21	9.83	1.54	0.032	0.05	1.73
81	0.96	0.37	0.31	6.511	3.41	2.30	333	0.78	0.15	0.02	-	-	0.00
91	0.02	0.22	0.02	0.384	0.53	0.04	334	0.33	0.33	0.23	0.870	1.24	3.57
98	0.57	0.91	0.43	0.192	0.34	0.22	335	1.67	1.21	0.42	0.038	0.48	1.58
111	1.83	1.50	0.26	0.025	0.01	0.03	341	0.00	0.07	0.05	0.431	0.01	0.03
112	0.21	0.11	0.06	0.091	0.08	0.12	351	0.06	1.47	0.32	0.000	0.00	0.00
121	1.11	0.68	0.52	3.973	3.57	4.29	411	0.02	0.17	0.21	0.018	0.23	0.30
122	1.44	0.25	0.16	0.348	0.40	0.48	423	0.56	0.20	0.03	0.018	0.08	0.03
211	0.24	0.03	0.01	0.036	0.01	0.05	424	0.87	0.11	0.02	2.994	4.15	1.09
212	0.60	0.11	0.00	-	0.00	0.00	431	0.11	0.10	0.11	0.654	1.57	0.85
222	1.66	0.71	0.10	1.211	1.91	1.04	941	2.62	0.72	0.41	-	0.03	0.00

Source: Author's calculations based on WITS data base

The percentage share of world exports of primary products increased from 20 percent in 1993 to 26 percent in 2010. Of the 83 products in this category, China reported RCA values of greater than one in 36 products in 1993 and in 9 products in 2010. The percentage share of these products in total exports declined from 18 percent in 1993 to 5.15 percentage in 2010. Textile fabrics like silk (SITC 261) reported very high values of RCA in 1993. India had comparative advantage in 19 primary products in the year 1993, which increased to 29 products in 2010, thus covering 35 percent of the products in this category. Not only did the number of products having RCA values of greater than unity increase, but the share of primary products in total exports of India more than doubled from 13.5 percent in 1993 to 29.5 percentage in 2010. The value of RCA indices for cotton (SITC 263) and Jute (SITC 264) increased from 1.05 to 13.50, and from 2.27 to 29.53 in 2010 respectively.

- **Product group B: Natural Resource Intensive Products:**

Table 3: China's & India's Comparative Advantage on basis of factor Intensity
Product Group B: Natural Resource Intensive Products (At SITC 3 digit level)

SITC code	China			India		
	1993	2000	2010	1993	2000	2010
524	1.13	0.96	1.02	0	0.01	0.002
611	0.48	0.90	0.17	0.43	0.33	0.24
612	0.13	2.10	0.57	0.81	0.90	0.232
613	3.96	3.65	2.38	0		0
633	0.16	0.09	0.1	0	0.03	0.007
634	0.18	0.48	2.04	0.05	0.16	0.01
635	1.92	2.00	1.16	0.01	0.01	0.025
661	1.79	2.15	1.75	0.34	0.32	0.258
662	0.31	0.61	2.23	0.03	0.03	0.063
663	0.57	0.49	0.84	0.02	0.05	0.041
667	0.2	0.31	0.23	2.07	7.25	1.616
671	3.94	3.22	0.68	0.56	0.04	0.447
681	0.04	0.20	0.21	0.01	0.03	0.004
682	0.26	0.56	0.3	0.01	0.10	0.271
683	0.04	0.25	0.59	0	0.00	0.009
684	0.2	0.31	0.82	0.08	0.48	0.066
685	1.66	3.95	0.26	0.01	0.00	0.139
686	2.11	3.12	0.09	0.01	0.05	0.379
687	6.51	6.83	0.07	0.01	0.03	0.006
688	-			0.01		0.013
689	3.98	3.18	2.49	0	0.02	0.016

- Source: Author's calculations based on WITS data base

The percentage share of Natural resource intensive products in total world exports remained at around 4.5 percent. The number of commodities which, had comparative advantage and the percentage share of this product group (4.5 percent) in China's total exports remained at almost the same level for the period under study, but there was some churning in the value of the indices. A number of products, which enjoyed comparative advantage in 1993 such as- Pig and Sponge (SITC 671), Lead (SITC685), Zinc (SITC 686) and Tin (SITC 687) had lost advantage in 2010. India had comparative advantage only in Pearl, Precious and Semi-Precious stone (SITC 667). The share of products in this category in total exports of India reduced from 21 percent in 1993 to 15 percent in 2010.

- **Product group C: Unskilled Labour Intensive products**

Table 4: China's & India's Comparative Advantage on basis of Factor Intensity
Product Group C: Unskilled Labour Intensive (At SITC 3 digit level)

SITC code	China			India		
	1993	2000	2010	1993	2000	2010
651	2.27	2.14	1.94	4.59	8.49	6.05
652	5.60	3.85	3.84	7.01	7.62	2.54
653	1.91	2.57	3.16	1.59	2.25	3.50
654	3.49	2.85	2.29	3.35	5.05	3.56
655	2.60	2.32	3.28	0.99	0.32	0.39
656	0.96	1.13	2.95	1.65	2.50	1.72
657	0.57	0.86	1.88	0.42	0.57	0.66
658	6.87	5.06	4.11	6.91	9.39	4.28
659	3.06	1.77	1.48	12.08	10.47	5.91
664	0.57	0.83	1.24	0.17	0.42	0.33
665	0.65	1.20	1.98	0.56	0.72	0.62
666	5.21	7.48	4.81	0.07	0.19	0.13
793	0.31	1.00	2.14	0.01	0.17	1.61
812	1.99	3.12	2.70	0.21	0.22	0.22
821	1.23	1.84	2.71	0.05	0.11	0.30
831	8.69	8.13	4.68	4.12	4.09	1.34
842	6.63	5.03	3.31	0.79	1.77	1.02
843	6.53	4.52	3.33	5.53	6.88	3.24
844	7.50	5.21	3.18	8.78	12.05	4.74
845	4.28	4.98	4.47	1.86	2.22	1.18
846	4.11	3.37	2.73	3.90	4.72	3.21
847	4.13	4.10	3.67	3.64	4.58	2.48
848	6.86	7.44	3.31	5.66	5.81	1.72
851	6.66	6.57	3.70	1.52	1.57	1.12
894	6.25	7.03	3.80	0.26	0.23	0.14
895	1.37	1.75	1.88	0.90	1.33	0.92

Source: Author's calculations based on WITS data base

The share of Unskilled labour intensive products in total world exports was 11.4 percent in 1993 which declined to 8.31 percent in 2010. In 2010, China had comparative advantage in all the products in this category, but the percentage share of this product group in total exports declined from a 44.7 percent in 1993 to 25 percent in 2010. To mention some of the commodities in, which China had advantage were: Made up articles of textile (SITC 658); Clothing (SITC 845), Pottery (SITC 666) and Travel Goods (SITC 851). Examining India's export basket, we find that there were 15 products in this category, which reported greater than unity values of the RCA indices in 2010. Commodities like floor covering (SITC 659, RCA index- 5.91); textile Yarn (SITC 651, RCA index-6.05) and garments (SITC 844, RCA index - 4.74) are examples of products exhibiting high RCA values. The percentage share of exports in this product group was 29 percent and 14.5 percent respectively in 1993 and 2010. The percentage share of this group in total exports of China and India remained greater than that of world share.

- **Product group D : Technology Intensive**

**Table 5 China's & India's Comparative Advantage on basis of Factor Intensity
Product Group D: Technology Intensive (At SITC 3 digit level)**

SITC code	China			India		
	1993	2000	2010	1993	2000	2010
511	0.21	0.25	0.32	0.50	1.14	1.79
512	0.70	0.45	0.27	0.63	1.49	1.01
513	0.89	0.97	1.00	0.63	1.63	1.09
514	0.51	0.88	0.89	1.31	1.57	0.80
515	0.61	0.44	0.91	0.41	0.51	0.76
516	0.65	0.77	0.71	1.52	5.09	5.03
522	1.99	1.98	1.15	0.37	0.76	0.80
523	1.97	2.23	1.51	0.80	1.07	0.83
541	0.67	0.41	0.21	1.48	1.54	1.02
562	0.20	0.62	0.94	0.07	0.07	0.05
572	5.67	5.60	1.87	0.64	0.87	0.68
582	0.08	0.24	0.49	0.24	0.50	0.73
583	0.15	0.17	0.27	0.10	0.48	0.47
584	0.16	0.25	0.47	0.14	0.42	0.36
585	1.33	1.06	0.82	0.21	0.16	5.40
591	0.46	1.07	0.70	1.28	3.29	3.23
592	0.25	0.39	0.77	0.12	0.63	0.66
598	0.35	0.39	0.57	0.20	0.60	0.40

Contd.	China			India		
711	0.40	0.99	2.95	0.42	0.59	1.34
712	0.03	0.12	1.51	0.43	0.08	0.58
713	0.10	0.17	0.34	0.43	0.40	0.46
714	0.05	0.05	0.19	0.12	0.02	0.23
716	1.52	1.88	1.47	0.20	0.37	0.66
718	0.11	0.36	0.64	0.25	0.15	0.28
721	0.13	0.21	0.61	0.12	0.28	0.23
722	0.33	0.20	0.18	0.17	0.31	2.03
723	0.11	0.26	0.82	0.09	0.06	0.48
724	0.53	0.97	1.27	0.42	0.65	0.51
725	0.14	0.13	0.55	0.14	0.20	0.24
726	0.07	0.08	0.29	0.15	0.29	0.40
727	0.18	0.28	0.45	0.47	0.52	0.65
728	0.25	0.19	0.48	0.18	0.23	0.24
736	0.48	0.37	0.46	0.31	0.31	0.34
737	0.26	0.58	1.10	0.23	0.40	0.44
741	0.11	0.74	1.54	0.14	0.17	0.71
742	0.19	0.35	0.71	0.40	0.52	0.51
743	0.18	0.23	0.79	0.17	0.23	0.44
744	0.47	0.61	1.18	0.14	0.14	0.18
745	0.11	0.38	1.02	0.16	0.23	0.27
749	0.39	0.79	1.12	0.16	0.36	0.56
751	1.03	2.92	3.55	0.04	0.13	0.07
752	0.24	1.42	4.57	0.11	0.05	0.07
759	0.47	0.98	2.12	0.13	0.13	0.10
764	0.88	1.45	3.23	0.06	0.05	0.37
771	1.79	2.75	2.46	0.25	0.39	0.77
772	0.64	0.90	1.34	0.22	0.19	0.66
773	0.55	1.10	1.40	0.20	0.42	0.40
774	0.04	0.19	0.48	0.10	0.86	0.62
775	2.01	3.09	2.96	0.10	0.15	0.14
776	0.15	0.46	1.25	0.04	0.04	0.11
778	0.83	1.50	1.87	0.23	0.31	0.34
792	0.10	0.13	0.09	0.01	0.08	0.74
871	1.26	2.11	2.71	0.03	0.04	0.02
872	0.24	0.43	0.48	0.17	0.27	0.23
873	0.46	0.55	0.97	0.01	0.40	0.50

Contd.	China			India		
874	0.22	0.32	0.55	0.09	0.12	0.24
881	1.81	2.12	1.10	0.04	0.04	0.18
882	0.14	0.58	0.58	0.04	0.14	0.03
883	0.15	0.16	0.00	2.87	10.85	2.93
884	0.66	1.10	1.39	0.19	0.27	0.26
893	1.67	2.26	1.46	0.92	0.52	0.45
951	0.13	0.02	0.01	0.01	0.04	0.08

Source: Author's calculations based on WITS data base

The percent share of Technology intensive product group in total world exports declined marginally from 38 percent in 1993 to 37 percent in 2010. The percentage share of these products in total exports of China increased from 20.25 percent in 1993 to 50.66 percent in 2010, thus contributing to half of the foreign exchange earnings from exports of China in 2010. China reported advantage in 41 percent of the products in this category in 2010 as compared to 19 percent in 1993. To mention a few important products in this category in, which China had comparative advantage are: General industrial machinery and equipment, Telecommunication, electric machinery, Road vehicles etc. India's advantage was in Organic and inorganic chemical products, Medicinal and pharmaceutical products etc. The share of these products in total exports of India increased from 10 percent in 1993 to 19 percent in 2010, almost doubled in a span of 18 years.

- **Product group E : Human capital intensive:**

The share of this group of products in total world exports was 18.2% in 2010. China's advantage in this category increased from 38 percent of the products which reported greater than unity values of the RCA indices to 47 percent in 2010. The share of this product group in China's total export increased marginally from 13 percent to 15 percent during the 1993 and 2010. India had comparative advantage in 11 commodities out of a total of 42 products, covering 28 percent of the products in this group in 1993, which reduced to just 9 products in 2010. The percentage share of this group of products in total exports was around 11 to 12 percent.

**Table 6: China's & India's Comparative Advantage on basis of Factor Intensity
Product Group E: Human Capital Intensive (At SITC 3 digit level)**

SITC Code	China			India		
	1993	2000	2010	1993	2000	2010
531	1.19	2.16	1.78	5.77	7.66	6.66
532	0.68	0.50	0.19	0.96	1.63	1.80
533	0.33	0.36	0.33	0.17	0.19	0.42
551	0.85	0.26	0.18	1.22	1.36	1.41
553	0.35	0.29	0.29	0.81	0.84	0.44
554	0.31	0.21	0.34	0.96	0.30	0.49
621	0.24	0.24	0.38	0.39	0.30	0.42
625	0.44	1.08	1.43	1.85	1.23	0.98
628	0.51	0.64	0.70	0.61	1.02	0.81
641	0.11	0.17	0.37	0.08	0.24	0.27
642	0.83	0.74	0.90	0.10	0.22	0.34
672	0.14	1.25	0.61	1.13	0.96	0.94
673	0.20	0.35	0.68	1.52	1.05	0.84
674	0.09	0.25	0.89	0.74	1.73	1.02
676	1.17	0.89	0.91	0.51	0.15	0.96
677	1.13	0.69	1.37	1.61	2.22	1.59
678	0.46	0.88	1.18	0.69	0.98	3.38
679	2.27	3.18	0.90	2.19	4.72	4.86
691	0.61	1.27	1.88	0.99	0.87	0.70
692	0.39	0.58	0.65	0.54	0.35	0.88
693	1.45	1.43	1.49	0.94	1.54	0.91
694	1.24	1.29	1.36	0.94	0.89	0.78
695	1.53	1.33	1.27	1.17	1.20	0.78
696	3.31	5.06	3.06	1.07	1.17	0.72
697	1.99	3.71	3.28	1.56	4.02	1.91
699	1.17	1.28	1.40	0.84	0.88	0.56
761	1.65	1.13	2.07	0.16	0.09	0.16
762	4.31	4.62	2.42	0.01	0.00	0.01
763	0.87	2.10	3.42	0.01	0.04	0.01
781	0.01	0.03	0.03	0.08	0.05	0.53
782	0.07	0.01	0.31	0.11	0.16	0.46
783	0.04	0.02	0.48	0.35	0.71	0.63
784	0.08	1.32	0.51	0.35	0.32	0.45
785	1.50	3.72	2.48	2.36	1.83	1.73
786	1.87	0.48	3.31	0.45	0.08	0.08
791	0.25	0.58	0.62	0.27	0.11	0.12
885	3.69	2.05	0.94	0.18	0.45	0.10
892	0.25	1.18	0.64	0.19	0.29	0.28
896	0.30	0.06	0.10	0.03	0.04	0.32
898	0.81	1.27	1.23	0.51	1.44	0.49
899	4.68	2.75	1.82	0.43	0.63	0.43

Source: Author's calculations based on WITS data base

To get sharper results we compute the correlation coefficient, which measures changes in the composition of exports by calculating the correlation between values of RCA indices for China and India between the years 1993 and 2010. A higher correlation indicates that less change has occurred in the composition of exports. Despite the fact that number of products in the Primary product group of China, which reported greater than unity RCA indices in the 2010 had declined, the correlation coefficient of correlation was 0.90, pointing out that the structure / composition of exports in this product group remained unchanged between the two time periods. On the other hand, the Pearson correlation coefficient of India for this group of products was (0.44) quite low, implying that some changes in the composition of exports had taken place. In the unskilled labour intensive group, the Pearson coefficient was 0.72 and 0.81 for China and India respectively. The Pearson coefficient for Technology intensive group of products for China was 0.31, implying that considerable changes had taken place in the composition of exports in this product group during a span of 18 years. The value of the coefficient was 0.55 for India, implying that the export basket of these goods had not changed much when compared to that of China. In the Human Resource product group the correlation coefficient values were 0.51 for China and 0.85 for India. Thus, we can say that, China has moved up the export ladder in terms of exporting technology intensive products, but the same cannot be said for India.

So, the next question is: Has the growth in exports been in the same goods or are they exporting new commodities? The Intensive and the Extensive margins of trade throws light on this aspect of trade.

4.0 Intensive and Extensive Margins of Trade

It was only recently that trade in new goods, i.e. at 'extensive margins' has begun to attract a great deal of attention. In the classical trade theory, the number of goods is fixed to begin with, so that the issue of extensive margins does not arise at all. Moreover, it is only recently that rich data sets, needed to study the extensive margins of trade are available in detail.

Ricardo (1817) introduced the concept of comparative advantage as an explanation of trade and international pattern of specialization. Accordingly countries specialize in the production of goods in which, they have greater comparative advantage or less comparative disadvantage. Differences in labour productivity across countries accompanied by constant return to scale, technology condition which, are exogenous to the model, explain the comparative advantage of the Nation. In the two — factor economy of the Heckscher — Ohlin model, comparative advantages are entirely due to differences in factor endowment or the relative abundance of factors of production. Thus, under the assumption of given identical techniques across countries and constant returns to scale, the model predicts that countries will tend to specialize in the exports of goods whose production is intensive in factors in which they are abundantly endowed. In the decades, following the Second World War there was an enormous growth in the trade. It became clear that all features of international trade

were not explained by abundance of factor endowment or any other comparative advantage. Moreover, growth in trade was in similar goods (manufactured) between relatively similar countries (developed countries). Grubel and Llyod (1975) provided empirical evidence for trade within industries rather than between them, using the intra industry index. Given these empirical findings, the stage has set for a new theoretical direction. The notion of differentiated variety first arose in 'new' trade theory, by Krugman (1979, 1980) which introduced increasing return and a monopolistically competitive market structure, resulting in differentiated goods that meet with a 'love — for — variety' on the demand side .

4.1 Review of Literature

There is abundant literature, which provides empirical evidence linking greater variety of products to trade liberalization, country size and levels of per capita income and diversification in pattern of trade. Feenstra and Kee (2005) find significant increase in Mexico's export variety, since NAFTA went into effect and also find evidence that china was catching up in terms of increase in exporting product variety. Kandagon (2003) analyzing the increase in transition countries exports to their non-traditional partners, report not only increased specialization but also an increase in variety in product categories. Hillbery and McDaniel (2002) found that commodities that were not exported to NAFTA markets in 1993 were exported and industries in the USA were facing competition from the NAFTA markets. Besedeus and Prusa (2011) decompose the aggregate growth of exports into extensive margins, survival and deepening intensive margins for 27 developed and developing countries for a period from 1973 to 2003, and find that all countries experienced an increase in extensive margins, and that the survival of exports of the USA and East Asian tigers was much larger than that of the developing countries & Latin America. Felbermayr and Kohler (2006) conclude that gains from trade could be reaped through expansion of extensive margins of trade, which remained low, inspite of the spectacular growth in trade. Hummels and Klenow (2004) found that the larger economies exported higher volumes of each good (intensive margins), a wider set of goods (the extensive margins), and exported higher quality of goods. Funke and Ruhwedel (2003) analyze the impact of increasing product variety on the per capita income of East European Transition Economies and found that the index of relative export variety across countries significantly correlated with relative per capita income levels, although they observed a wide heterogeneity across countries. Amiti and Freund (2010) decompose China's exports along intensive and extensive margins for the period from 1992 to 2006 and conclude that exports growth was largely the result of intensive margins, where as the share of extensive margin i.e. new products and new markets comprised 5 percent to 15 percent of export growth.

4.2 Methodology and Results

Following Amiti & Freund (2007) and Feenstra (2005) we decompose the growth in exports of China and India along the intensive and the extensive margins and derive

the index of variety. Intensive margins is defined as export growth due to expanding trade of existing goods and extensive margins is due to exports of new products and to new markets. Most studies, while studying extensive margins look at both the exports of new products and to new markets. We have not explored extensive margin of China and India defined as new market or new geographical destination. We confine our study to intensive (existing goods) and extensive margin (new goods). We use data recorded SITC Revision 3, at 5 digit level of disaggregation for the years 1993, 2000 & 2010. While the Harmonized system of classification has been widely used because it contains highly disaggregated data, there have been frequent revisions. We therefore, prefer to use SITC due to better consistency. Our source for the data is WITS data base. The decomposition of trade growth is as follows:

$$\frac{\sum_i V_{ti} - \sum_i V_{oi}}{\sum_i V_{oi}} = \frac{\sum V_{ti} (I_{to}^E) - \sum V_{oi} (I_{to}^E)}{\sum V_{oi}} - \frac{\sum V_{oi} (I_{to}^D)}{\sum V_{oi}} + \frac{\sum V_{ti} (I_{to}^N)}{\sum V_{oi}} \quad \text{.....2}$$

ΣV

V_{ti} = Value of trade at time t in Product i ($V_{ti} = p_{ti}q_{ti}$)

I_{to}^E = Indicator variable that is one if the product was exported in both period t and period o
(existing products)

I_{to}^D = Indicator variable that is one if the product was exported in period o and not in period t (disappearing products)

I_{to}^N = Indicator variable that is one if the product was exported in period t and not in period o (new products)

This is an identity where total growth in trade relative to the base period is decomposed into three parts: (i) the growth in products that were exported in both periods, the intensive margin; (ii) the reduction in export growth due to products no longer exported, disappearing goods; and (iii) the increase in export growth due to the export of new products. This decomposition indicates the extent to which churning has taken place in the exports of a country. In order to measure increase or decrease in the variety of commodities exported we employ the Feenstra index of variety, which is defined as follows:

$$\frac{\frac{\sum V_{ti} (I_{to}^E)}{\sum V_{ti}}}{\frac{\sum V_{oi} (I_{to}^E)}{\sum V_{oi}}}$$

The Feenstra index of variety:3

The index will be equal to one if there is no growth in varieties relative to the base period and less (greater) than one if the number of varieties has grown (declined). Variety growth is 1/Feenstra index.

A very simple product count and comparing these differences between two periods can tell us roughly the number of new products which have been added to the existing export basket. Accordingly, China exported 59 new products at SITC 5 digit level codes (Rev. 3) in 2010, which were not exported in 2000. On the other hand, India exported 156 new products, which it did not export in 2000. These numbers give a broad picture of the kind of churning that has taken place in the respective export baskets of a country.

We decompose the growth in exports along the intensive and the extensive margins as defined earlier in this section. The total growth in China's export between 1993 & 2000 and 2000 & 2010 was 176 percent and 463 percent respectively. The growth of exports in China was along intensive margins. New or extensive margins contributed only 0.82 percent of total exports of China between 2000 & 2010. Even the disappearing margins were very low. Our estimates of the extensive margin in trade are considerably smaller than has been found in the previous literature. The total growth in India's export between the years 1993 and 2000, and between 2000 and 2010 was 90 percent and 318 percent respectively. Again, even in case of India, we find that most of the growth in exports during the period 1993-2000 was along the intensive margins. New or extensive margins contributed to 2.76 percent of total exports (higher than that of China) in 2010. The Feenstra's Index of variety was less than unity, implying that growth in variety had taken place during this period in India.

**Table 7 Intensive & Extensive Margin of China's Export
1993-2010**

China				
Share of total Export Growth from				
Year	Intensive	Extensive	Total Export Growth %	Feenstra Index
1993-2000	99.91	.08	176	1.003
2000-2010	99.18	0.8	463.4	1.06

Source: Author's calculation based on WITS data base

**Table 8 Intensive & Extensive Margin of India's Export
1993-2010**

India				
Share of total Export Growth from				
Year	Intensive	Extensive	Total Export Growth %	Feenstra Index
1993-2000	99.4	0.59	90.2	1.008
2000-2010	97.7	2.76	325	0.99

Source: Author's calculation based on WITS data base

5 Conclusions

We have undertaken a detailed analysis of the geographical distribution and composition of exports of China and India for a period from 1993 to 2010. Although the High income OECD plus non- OECD countries continue to enjoy dominant shares of exports in all the five product categories, a significant increase in the share of the remaining seven country groups classified on the basis of income has taken place, although from a small base, in both China as well as India. Moreover, the share of Technology intensive group in total exports of China to all the 8 regions had increased in 2010. The share of technology intensive products in total exports of China in 2010 was 50 percent, which was highest among all the product groups and about 40 percent of the products in this category had greater than unity RCA values. The growth of exports in China was along intensive margins. New or extensive margins contributed only 0.82 percent of total exports of China between 2000 & 2010. Even the disappearing margins are very low. Exports of Primary products constituted almost one third of the total exports of India, and it continues to have advantage in exporting unskilled labour intensive products. In case of India, we find that most of the growth in exports during the period 1993-2000 was along the intensive margins and the New or extensive margins contributed to 2.76 percent of total exports in 2010. China has moved up the export ladder in terms of exporting technology intensive products, but the same cannot be said for India.

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