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**Growth, Diversification and Upgrading
of India's Export Structure:
Lessons from an Analysis of Post Reforms Period**

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Growth, Diversification and Upgrading of India's Export Structure:

Lessons from an Analysis of Post Reforms Period*

*Aradhna Aggarwal***

[Abstract: India has embarked on the path of self-reliance with no clear roadmap. This paper highlights the need to demystify the concept and argues that any path to self-reliance would require creating new productive capabilities that would be determined not by what the country can produce but what it can export. Following the 'product space' perspective, promoted by Ricardo Hausmann and others at the Growth Lab of Harvard University, that a country's capacity to add new capabilities depends strongly on the existing ones, I assess India's export performance since 1988 along three dimensions: growth, diversification, and upgrading. The objective is to understand how well India is prepared to achieve the goal of creating new productive capabilities in this globalised world and recommend developing a well-informed export strategy to push the emerging dynamic comparative advantages in international markets to move towards self-reliance.]

1. The Context

In today's world, the development policy landscape is entangled in a web of buzzwords (Cornwall, 2010). One such buzzword that has come to dominate the development policy in India is 'self-reliance.' It has seen a meteoric rise after the Prime Minister called for a self-reliant India in May 2020 against the backdrop of the Covid-19 pandemic. The concept of self-reliance is not new to India. It was first introduced in the five-year plans when the Third Five-Year Plan (1961–66) dedicated itself to self-reliant growth as a strategic objective in the face of worsening foreign exchange reserves and heavy reliance on external assistance. It meant to progressively reduce and finally eliminate reliance on special forms of external assistance (Government of India, 1961). Even though there was an active export

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policy, there was a clearly stated focus on import substitution, which was supported by a highly regulated and protected policy regime. Self-reliance remained a key objective in India's development planning until the Ninth Five-Year Plan (Government of India, 1996). However, the concept was continuously reinvented in the policy narrative to align it with the changing macroeconomic context (Reddy, 2000). In the 1980s, for instance, when the focus was on structural change and efficiency, self-reliance was reinterpreted as technological and economic self-reliance to be achieved through the absorption and adaptation of foreign technologies (Government of India 1980, 1985). In 1991, when India transitioned from an import substituting to export oriented regime with a series of far-reaching reforms, a self-reliant economy came to be defined as one which could meet all its import requirements through exports, replacing 'import substitution' by 'promotion of exports' as the critical instrument of self-reliance (Government of India, 1992). The Ninth Plan (Government of India, 1997) endorsed this view, and highlighted the need to attract foreign investment, which would provide access to technology for modernising industry and resources to avoid a build-up of external debt to help achieve self-reliance. The concept fell into disuse after being in use for four decades with different interpretations. In recent reincarnation, its actual meaning is elusive and 'contested.' It is floating free of concrete objectives, indicators, and targets; and, shelter competing agendas of globalisation and import substitution. It is, as Cornwall (2010, p. 9) contends, "full of sound and fury but signifies nothing." The concept needs to be demystified to assign a compelling sense of vision, aspiration, and commitment. I argue that in the current context of integrated global markets, the path of self-reliance would require the creation of new productive capabilities, which would be determined not by what the country can produce but what it can export. In other words, self-reliant India needs to be internationally competitive across diverse economic sectors (Singh, 2020; and, Prasad and Roche, 2020). However, the literature suggests that a country's capacity to add new capabilities depends strongly on the existing ones. In a series of articles, Hausmann and others at the Growth Lab of Harvard University (Hausmann *et al.*, 2007; and, Hausmann and Hidalgo, 2010) argue that the countries with competitive strengths in the exports of sophisticated and complex products face better growth prospects than those with a low presence in these categories. A pertinent question, following this thought is, Is India globally competitive in highly diversified and sophisticated products to pursue the objective of self-reliance? To address this question, the present paper offers a systematic analysis of how economic liberalism embraced by the government in 1991¹ affected India's export competitiveness along three dimensions: growth, diversification, and upgrading (for past studies, see Anand *et al.*, 2015; Felipe *et al.*, 2013; Kathuria and Kedia 2015; and, Singh *et al.*, 2018). It is a two-sided analysis that examines the changes in export patterns (using export shares) as well as verifies if those changes are related to shifts in comparative advantage. It addresses five questions: (i) How

¹ The beginning of domestic economic reforms can be traced back to the early 1980s in India but it took the balance of payments difficulties later in the decade to push the government towards systemic and systematic process of liberalisation in 1991 (Panagariya, 2004, for discussion).

has India's export performance been through the increasingly liberal economic regime of the post-1991 period? (ii) Has the distribution of exports been diversifying over time, or has it been specialising? (iii) Have comparative advantages also been evolving? If so, has the evolution in comparative advantages been consistent with that in export shares? (iv) Has there been an upgrading in the export shares and revealed comparative advantages? (v) What is the way forward for India? The analysis covers 32 years from 1988 to 2019, which coincide with India's liberal trade regime period. The analysis has been mostly carried out at a highly disaggregated level of 6-digit HS products using the WITS (World Integrated Trade Solution) database, which is complemented with other relevant databases. The export upgrading analysis is based on the classification of exports by factor endowment, technology content, and product complexity using SITC 3- or 4-digit products as the basis.

2. Theoretical Predictions

According to the traditional trade theories, a country transitioning from autarky improves its export performance and specialises in products with comparative advantages (Bahar, 2016). The lowering of trade barriers enhances export performance by reducing the costs of trading and overcoming the anti-export bias of the import-substituting regime. Besides, with the dismantling of state power, market forces reallocate the resources in favour of the sectors with comparative advantages, which leads to export specialisation on the one hand and further contributes to export enhancing effects through more efficient use of resources, on the other. In contrast, new growth theories and their variants (Romer, 1994) view the flow of knowledge through FDI and trade as the key channel underlying the effects of global integration on exports and highlight the role of dynamic considerations in the theory of comparative advantages. While propelling this view, the global value chains (GVCs) literature underscores the role of global integration through GVC participation by the host country in promoting trade and FDI inflows as complementary to each other and upgrading the economic structure. The product space theory also subscribes to the view of dynamic comparative advantages but argues that comparative advantages do not change ambiguously; rather, they tend to move towards the related goods. The new trade theory establishes a systematic relationship between macro-level export performance and firm-level heterogeneities (Bernard *et al.*, 2007; and, Melitz, 2003). The argument is that significant differences exist among firms (size, age, skills, productivity, and other characteristics) within each industry. The firms with relatively higher productivity delve into exporting because their productivity edge allows them to amortise the higher costs of entering foreign markets. Trade liberalisation leads to reallocation of resources from the low to high productivity firms within each industry, exerting export-enhancing effects at the macro-level. Besides, the lowering of trade costs can encourage an increasing number of firms across diversified sectors to participate in international markets (or GVCs), driving export growth and diversification beyond comparative advantages (Melitz, 2003). However, the neo-institutional economic theories caution that much depends on

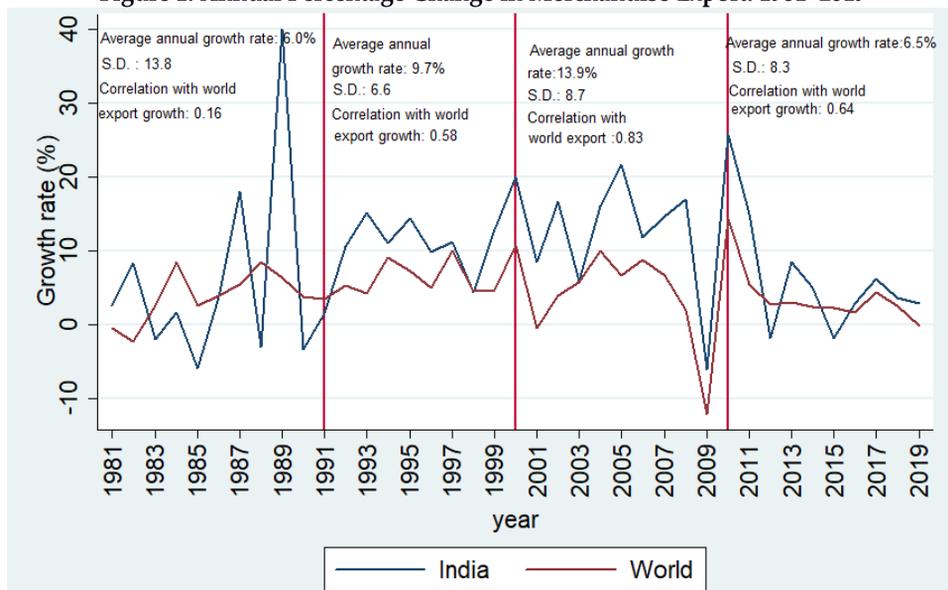
incentives and constraints faced by firms in a given institutional and political environment, which may produce different export outcomes for different countries (Baissac, 2003). Overall, the theoretical literature on the effects of economic liberalism on exports remains ambiguous. Similar ambiguity is seen in the empirical literature (Makhlouf *et al.*, 2015; UNCTAD, 2006; and, Osakwe *et al.*, 2018). This study explores the Indian experience within the theoretical frameworks discussed above. The rest of the analysis is organised into five sections covering export growth patterns, diversification and upgrading in export shares and comparative advantages, and the way forward.

3. Export Growth Patterns

To explore the export growth patterns, I present in Figure 1 the annual percentage change in export volumes from the WTO database for four decades of India's growth history, starting from 1980. Figure 1 also shows the mean and standard deviation of the annual export growth rate for each decade and the coefficients of correlation between the global and national export growth rates. The correlation coefficient is positive and has moved northwards since the 1991 reforms signifying an increasing integration of the Indian economy into the global economy. How did it impact on India's export performance? First, it may be seen that the decadal variance in export growth lowered in the post 1991 period. Second, the export growth record was also better in the 1990s and 2000s, but it could not be maintained in the long run. There was an exceptional acceleration in the export growth rate, particularly in the 2000s. During 2000–2010, India was one of the top 13 countries (out of 203) respecting export growth rate and was behind only China as a major economy. But, the global financial crisis of 2008 had a catastrophic effect on export growth in 2009. Even though the economy quickly recovered from this setback, the high export growth rate could not be sustained. It began to decelerate in the 2010s. India's ranking in the average annual export growth slipped to 83 with several other Asian countries performing better including Laos, Cambodia, Vietnam, the Philippines, and Malaysia in Southeast Asia; Bangladesh and Sri Lanka in South Asia; and, Uzbekistan and Tajikistan in Central Asia. The unprecedented acceleration in exports during 2003–2008 coincided with global boom conditions (Nagaraj, 2013). During this externally-driven demand-led episodic spurt in exports, the correlation coefficient between the global and India's export growth rate was as high as 0.83. The financial crisis, which led to global economic slump, deflated the export performance of India. Even though a V-shaped recovery took place, it was due to the expansionary monetary and fiscal policies. Post 2011, the export growth rate slumped to 6.5 percent, which was almost the same that India had achieved in the 1980s. Apparently, economic reforms did not translate into systemic growth acceleration in exports. The export growth acceleration of the 2000s could not establish India as an exporting economy. According to the World Development Indicators' data from the World Bank, in 2019, India, the fifth-largest economy in the world, ranked 14th in the global export share behind all top four economies (China, the US, Japan, and Germany) as well as other smaller economies (the Netherlands, Italy, France, Canada, South Korea, Mexico, Russia

Federation, Singapore, and Hong Kong, China). Further, in the late 1970s, both India and China had a global export share of less than 1 percent. Since then, China has become the largest exporter globally with a 13 percent share, whereas India increased its share to 1.7 percent. India's performance remains particularly dismal if the exports to GDP ratio is used as an indicator of export performance. She was in the bottom decile of 157 countries in 1990. The high export growth of the 2000s upgraded her to the bottom third decile in 2010, but she slipped to the bottom second decile in 2019. This leads us to the institutionalists' perspective, which highlights the role of chronic lack of capable institutional actors and infrastructure in developing countries in hampering their prospects of competing in the international markets. India improved its doing business ranking by 79 positions but it was not sufficient to overcome the production and market failures facing the firms in the economy, in general.

Figure 1: Annual Percentage Change in Merchandise Export: 1981–2019



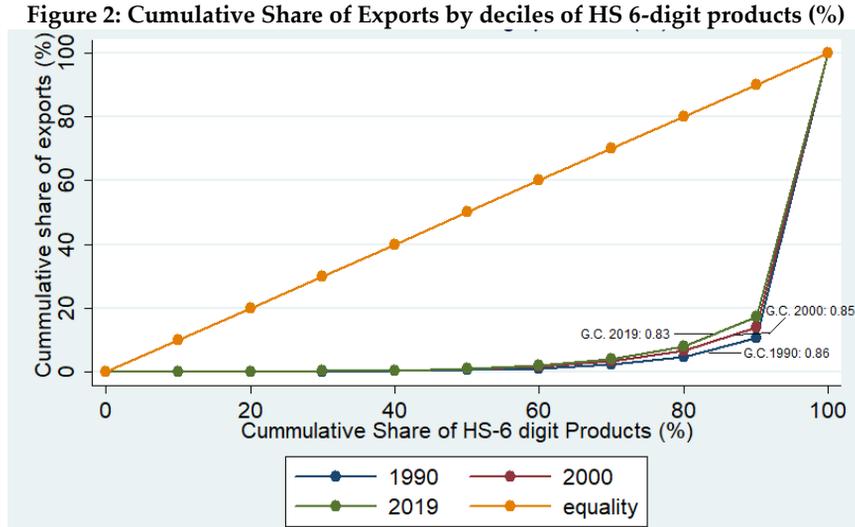
Source: Based on WTO Data.

4. The Composition of Export Shares at HS 6-Digit Level: Specialised or Diversified?

While addressing the second question of whether post-liberalisation India's exports have specialised or diversified, we focus on (i) the distribution of export shares, and (ii) the variety of exports.

4.1 The distribution of export shares

Figure 2 presents Lorenz curves for three years: 1990, 2000, and 2019, depicting the cumulative proportion of exports on the vertical axis and the cumulative proportion of 6-digit products arranged in increasing order of export shares by deciles on the x-axis. The line of equality represents perfect equality in export distribution. Figure 2 shows that the distribution of export shares across 6-digit products has been highly unequal in India. In 1990, the top 10 per cent of 6-digit products accounted for nearly 90 per cent of exports. Over time, their share declined to around 83 percent. However, this reshuffling occurred from the top- to the mid- to upper-decile products (i.e. the ninth to sixth deciles), increasing their share to 16 percent from 10 percent. The bottom five deciles remained almost unaffected. The gini coefficient (GC), measured by the area between the line of equality and Lorenz curve shows a marginal decline to 0.85 in 2000 and then 0.83 in 2019 from 0.86 in 1990. There is thus strong evidence that post liberalism, India's export basket did not specialise. Rather, it diversified *albeit* marginally.



Source: Calculations based on WITS database.

4.2 Variety of export products: Intensive v/s extensive margin

We used a decomposition analysis of export growth to assess the contribution of extensive (width of exports) and intensive margins (depth of exports) to export growth, as shown in (i)

$$\sum_{i \in I_t} V_{i,t} - \sum_{i \in I_{t-1}} V_{i,t-1} = \overbrace{\sum_{i \in I} V_{i,t} - \sum_{i \in I} V_{i,t-1}}^a + \overbrace{\sum_{i \in I^N} V_{i,t} - \sum_{i \in I^N} V_{i,t-1}}^b + \overbrace{\sum_{i \in I^{OLD}} V_{i,t} - \sum_{i \in I^{OLD}} V_{i,t-1}}^c \dots \dots (i)$$

where, I_t and I_{t-1} denote the total number of products in the two terminal years, and I is the set of varieties available in both periods, $I \subseteq (I_t \cap I_{t-1})$. V , i and t denote the value of exports, the product group, and the year, respectively. Equation (i) is an identity where the total change in exports is decomposed into three components: (a) the change in the value of exports of the products that were exported in both periods (called surviving

products); (b) the increase in exports due to the export of new products; and, (c) the reduction in exports due to products no longer exported (disappearing goods). While (a) is known as the intensive margin, the share of trade due to the new goods share less the disappearing goods, (b)-(c) is defined as the extensive margin. For the decomposition analysis, we deflate the export data by the US Consumer Price Index (CPI; the base year 2010) to get the values in constant US dollars. The analysis covers the entire period of 1990 to 2019 with five-year intervals.

Table 1: A decomposition analysis of export growth at five-year time intervals: 1990–2019

Year	Contribution of surviving products or intensive margin (%)	Contribution of new products in year <i>t</i> in % (entry effects)	Contribution of disappearing products in year <i>t-1</i> in % (exit effects)	The net contribution of extensive margin (%)
1990–1995	94.78 (3510)	5.55 (738)	0.33 (158)	5.22 (580)
1995–2000	108.4(4066)	3.50 (434)	11.90 (182)	-8.40 (252)
2000–2005	99.58 (4381)	0.89 (314)	0.47 (119)	0.42(195)
2005–2010	100.93 (4366)	0.42 (95)	1.35 (329)	-0.93 (-234)
2010–2015	98.78 (4324)	3.33 (99)	2.11 (137)	1.22 (-38)
2015–2019	101.54 (4318)	2.86 (123)	4.40 (105)	-1.54 (+18)

Note: Parentheses show the number of 6-digit products.

Source: WITS database.

The results presented in Table 1 show that export growth has been driven essentially by intensive margin and that the contribution of extensive margin remained marginal except between 1995 and 2000 when India lost almost 12 percent of export growth due to the disappearing products. It could be attributed to a highly diversified export portfolio comprising 3671 out of 5000 odd 6-digit HS products (73.4 percent) that India managed to develop by 1988, following self-reliance as a key objective *albeit* with a highly skewed distribution (Felipe *et al.*, 2013). The transition from autarky in 1991 was expected to initiate the process of creative destruction with new products replacing the old ones. More specifically, considering the unprecedented acceleration in globalisation in the 1990s, one would expect the exit of many products from the export basket that might not be able to compete internationally. In contrast, the export basket expanded with a positive net entry of products until 2005 when the trend somewhat reversed. In 2019, India's export portfolio covered 4441 products. However, the entry and exit effects on export growth remained small, and the extensive margin did not have a sustained positive or negative effect on export growth. Clearly, the expansion in the export basket did not contribute significantly or systematically to export growth. Most reshuffling occurred in export shares within the existing export basket and as seen above, at the top levels.

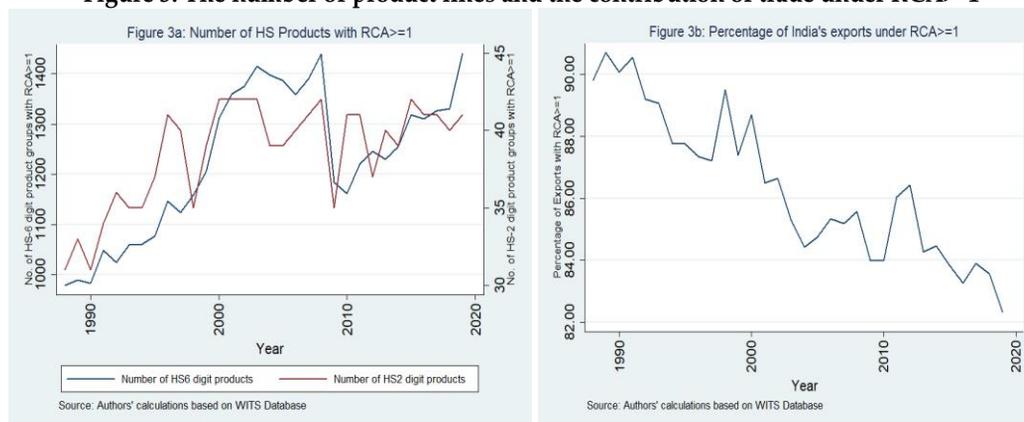
5. The Revealed Comparative Advantages and their Linkages with Export Shares

The RCA index of country i for product j is measured by the product's share in the country's exports concerning its share in world trade:

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

where, x_{ij} and x_{wj} are the values of country i 's exports of product j and world exports of product j and where X_{it} and X_{wt} refer to the country's total exports and total world exports. If the index exceeds unity for a product, the country is said to have a revealed comparative advantage in that product.

Figure 3: The number of product lines and the contribution of trade under $RCA \geq 1$



Source: WITS database

The RCA indices do not reveal the natural comparative advantages but the advantages as revealed by actual trade. Trade distortions such as tariffs, quotas, licensing, and a broad range of industrial policies targeting import-substituting industries under autarky can bias the measure towards a large number of products. As an economy transitions to an open and export-oriented regime, the structure of RCA indices may get more aligned to the natural comparative advantages and tend to specialise around them. Contrary to this expectation, our analysis shows that the number of products with $RCA \geq 1$ increased at both the 2- and 6-digit levels, indicating diversification in comparative advantages (Figure 3a). The increase is relatively more prominent at the 6-digit level, which means deepening of comparative advantages. However, this is accompanied by a gradual loss of export shares of RCA products (Figure 3b). This situation poses a concern of inconsistency between the RCA and export shares patterns in India (Government of India, 2021).

Table 2: Distribution of exports shares of HS 6-digit products by RCA values (%)

RCA	1990	2000	2010	2019
RCA \geq 10	54.71 (248:27.0)	54.31 (273:29.6)	29.09 (154:19.5)	21.74 (211:18.2)
6.5 \leq RCA<10	14.2 (103:8.1)	9.07 (120:8.0)	7.5 (107:8.0)	10.26 (126:7.9)
3 \leq RCA<6.5	12.74 (233:4.5)	10.24 (317:4.4)	33.51 (287:4.4)	28.17 (379:4.4)
1 \leq RCA<3	8.41 (399:1.8)	15.08 (601:1.7)	13.87 (613:1.8)	22.16 (725:1.7)
0.5 \leq RCA<1	5.15 (353:0.7)	4.27 (489:0.7)	8.91 (537:0.7)	9.02 (621:0.7)
RCA<0.5	4.79 (2335:0.1)	7.03 (2700:0.1)	7.11 (2763:0.1)	8.64 (2379:0.1)

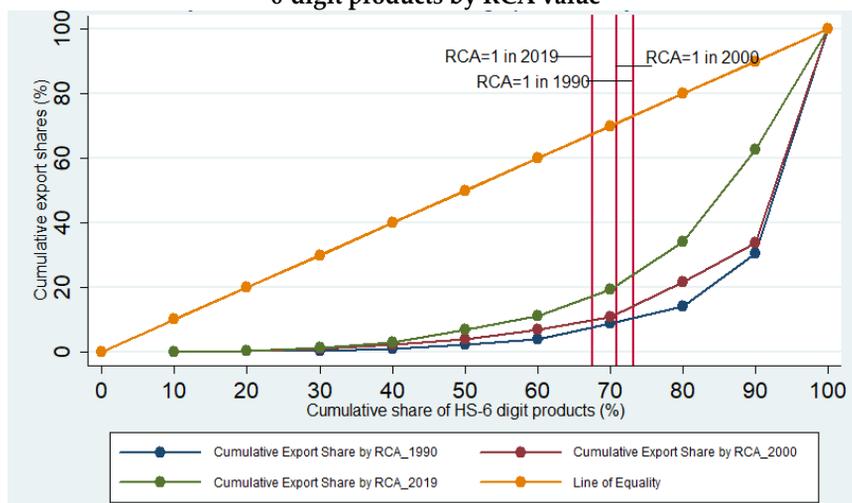
Note: Parentheses show the number of HS 6-digit products: average RCA value.

Source: WITS database.

To dive deeper into it, I constructed a distribution of export shares by RCA indices for four years: 1990, 2000, 2010, and 2019 (Table 2). Six classes of RCA indices are distinguished, based on our observations of their 1990 distribution. It shows that the top two categories of RCA indices accounted for over 69 percent of exports in 1990 and covered 9.6 percent (351) of products with an average RCA of 21.5. There were around 31 items with RCA greater than even 50, which included niche textile, agricultural, mica, leather, and chemical products. Over the years, however, export shares in these categories drastically declined to 32 percent. So did the average RCA (14.5) and the number of products (from 351 to 337). On the other side, the share of exports in the next two RCA categories (6.5-3 and 3-1) increased to over 50 percent from 21 percent, but it could not offset the decline in the export shares of the top two categories of RCA. As a result, there was a decline in the export shares of the products with RCA \geq 1. India has indeed lost a competitive edge in those top exporting products where the RCA values were rather high with a decline in the average and mode values of RCA. Yet, there is little evidence of a structural shift in the export shares towards the products where the country does not have comparative advantages. The share of products having RCA \geq 1 in the total number of products has, in fact, increased to 32 percent in 2019 from 27 percent in 1990.

Figure 4, which depicts the Lorenz curve of cumulative distribution of export shares by cumulative distribution of HS 6-digit products by RCA value, shows that the distribution of export shares by RCA value has become less skewed over time, particularly after 2000. There has been an evolution in the distribution of comparative advantages with an increasing number of 6-digit products competing with RCA \geq 1 but with the distribution of export shares shifting towards lower RCA values. There is thus relatively greater diversification in the distribution of export shares by RCA values than that by products. The next question is whether India managed to shift towards more complex products in this reshuffling of the export shares.

Figure 4: Cumulative distribution of export shares by cumulative distribution 6-digit products by RCA value



Source: Based on WITS database.

6. Upgrading of Exports

With most global trade and production becoming increasingly organised through global value chains where the design, manufacturing, and assembly of products involve many countries, gross exports of a country may fail to reflect upgrading of the exports. A country may appear as the official exporter of complex products according to national customs practices, yet its contribution to these products may be limited to low-end processing and assembly activities (Amity and Freund, 2008 for China). Notwithstanding, I decided to use gross export flows for the analysis for two reasons. One, according to the OECD data (OECD, 2021), import content share of gross exports in India was as low as 16.1 percent in 2016. Not only that, it has declined steadily by 9 percent point between 2011 and 2016 (OECD, 2018). The industries with most import content in their exports are coke and refined petroleum products (47 percent), basic metals (38 percent), and ICT and electronics products (36.8 percent). In other industries, it remains below 30 percent. Two, even if the contribution of a country is low in export value added due to a high degree of downstreamness in the initial stages, participation in complex GVCs allows it to build capabilities to move up the value chains or to shift to more complex value chains. As a matter of fact, a shift to GVCs of more complex products itself means export upgrading which is not universal (Ignatenko *et al.*, 2019).

I begin the analysis of export upgrading by reclassifying the HS 6-digit products into 21 HS- Sections. Table 3 presents the distribution of export shares and RCA indices for the top ten sections, which account for 90 percent of the total exports, for three years: 1988, 2003, and 2019. Export shares diversified within this group, mostly from the top to the next top five sections, maintaining the top ten sections' export share at almost 90 percent. This

result confirms the above findings (Figure 2). Importantly, this diversification is associated with upgrading of exports. The share of the traditional export products such as textiles, natural/cultured pearls, vegetable products, animal products, prepared foodstuff, and hides and leather declined. In contrast, non-traditional products (machinery, base metals, chemicals, transport, rubber and plastics) progressively increased. Prepared foodstuff, hides, and leather exited and were replaced by transportation and rubber/plastics in the top ten groups. Correspondingly, the RCA indices also declined for the traditional products and increased for the non-traditional ones. While the base metals reached the threshold level of $RCA \geq 1$, the other non-traditional product groups lagged. Chemicals and allied sectors increased their share but with little improvement in the RCA values.

Table 3: Patterns of export shares and RCA by HS Sections: Selected years

Top 10 sectors	1988		Top 10 sectors	2003		Top 10 sectors	2019	
	Export share (%)	RCA		Export share (%)	RCA		Export share (%)	RCA
Textiles	23.19	3.4	Textiles	21.36	3.7	Mineral Products	15.34	1.3
Natural or Cultured Pearls	22.20	13.2	Natural or Cultured Pearls	18.25	9.8	Chemicals & Allied Industries	14.94	1.4
Vegetable Products	11.40	11.0	Chemicals & Allied Industries	10.33	1.1	Machinery / Electrical	11.21	0.45
Mineral Products	7.68	3.47	Mineral Products	8.93	0.8	Natural or Cultured Pearls	11.37	3.04
Chemicals & Allied industries	6.93	0.86	Base Metals	8.81	1.0	Textiles	10.98	3.2
Share of top 5	71.40		Share of top 5	67.67		Share of top 5	60.63	
Machinery / Electrical	5.39	0.17	Machinery / Electrical	6.81	0.25	Base metals	8.00	1.2
Base Metals	3.61	0.40	Vegetable Products	6.19	1.4	Transportation	7.76	0.63
Animal & Animal Products	3.92	2.13	Plastics / Rubbers	3.02	0.7	Vegetable Products	4.96	1.6
Raw Hides, Skins, Leather, & Furs	5.34	5.34	Transportation	2.95	0.23	Plastics / Rubbers	3.28	0.71
Prepared Foodstuffs	3.18	1.89	Animal & Animal Products	2.92	1.3	Animal & Animal Products	3.16	1.31
Share of next top 5	21.45		Share of next top 5	21.89		Share of next top 5	30.43	

Top 10 sectors	1988		Top 10 sectors	2003		Top 10 sectors	2019	
	Export share (%)	RCA		Export share (%)	RCA		Export share (%)	RCA
Share of top 10 product groups	92.85		Share of top 10 product groups	89.56		Share of top 10 product groups	90.99	

Source: WITS database

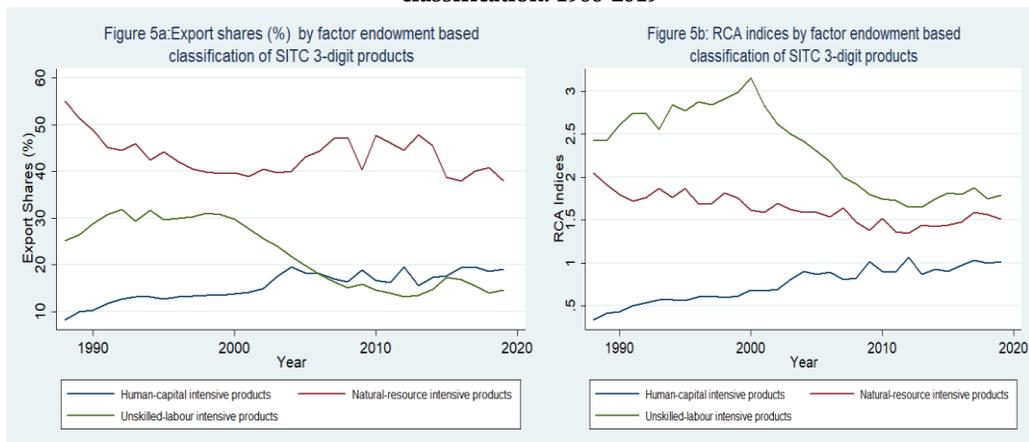
Clearly, India is losing competitive edge in the traditional export sectors. The wave of globalisation that started in the 1990s led to fierce competition for global value chains linked investment worldwide, particularly in cost-sensitive traditional products. Insertion into GVCs, which account for nearly 70 percent of global trade emerged as one of the critical drivers of trade (OECD, 2011). Most countries who successfully integrated themselves into GVCs of traditional products used special economic zones (SEZs) as the key tool with massive fiscal and non-fiscal advantages to overcome the institutional rigidities (Aggarwal, 2019). However, India's experiment with SEZs could not bring the desired outcomes. Other industrial parks, including textile, food parks, and mega food parks, remained even less successful. India eventually lost its comparative advantage in traditional products to new production centres in Southeast, South and Middle East Asia, and North Africa. On the other side, the capabilities generated during the import substituting regime might have helped dynamically productive firms in more sophisticated sectors to break into international markets by updating their technologies and competitiveness and attracting FDI once the barriers were lowered (Aggarwal, 2017). To delve deeper, I review upgrading of export shares and comparative advantages using three trade classifications based on the factor endowment, technological gap, and product space theories.

6.1 Factor endowment theory

The mainstream theory of trade attributes trade to comparative advantages that are generally identified by a nation's natural and physical resources as the basic criteria for specialisation. The factor endowment theory, which is central to the theory of comparative advantage, argues that a country exports those goods which are intensive in the country's abundant factor: labour, capital, natural resources, or human skills. To analyse the evolution of India's exports under the factor endowments, we use UNCTAD's empirical trade analysis (ETA) classification based on the SITC codes at the 3-digit level. It distinguishes export products into five categories: natural resource-intensive, primary, low skills intensive, high human skills intensive, and technology-intensive. Figures 5a and 5b depict the export shares and RCA indices respectively by ETA classification for the three categories of exports which are of interest to us here: natural resource, unskilled labour, and human skills intensive products. The primary products, which cover a wide range of agricultural and natural-resources-based products, are combined in the natural resource-

intensive products category. It shows that despite 30 years of self-reliance policies, at the time of transition in the policy regime India's export basket had been dominated by unskilled labour and natural resource-intensive products. As the economy liberalised, the share of unskilled labour-intensive products initially increased, as expected. However, soon it started declining. On the other side, following the factor endowment defying growth in exports, the share of human skill-intensive products increased (Figure 5a). The natural resource-intensive products also witnessed a decline in their share. However, they continue to dominate the export basket due to the presence of some of the top export products in this group, such as refined petroleum, and natural and cultured pearls (Table 3). Alongside export shares, RCA values also declined for natural resource- and low-skill-intensive products (Figure 5b). On the other side, the RCA indices of human skill-intensive products increased and touched the threshold level of 1. India is thus in a situation where it has established comparative advantages in natural resource and unskilled labour-intensive products on the one hand and human skill-intensive products on the other.

Figure 5: Patterns of export shares and RCA indices by factor endowment-based trade classification: 1988-2019



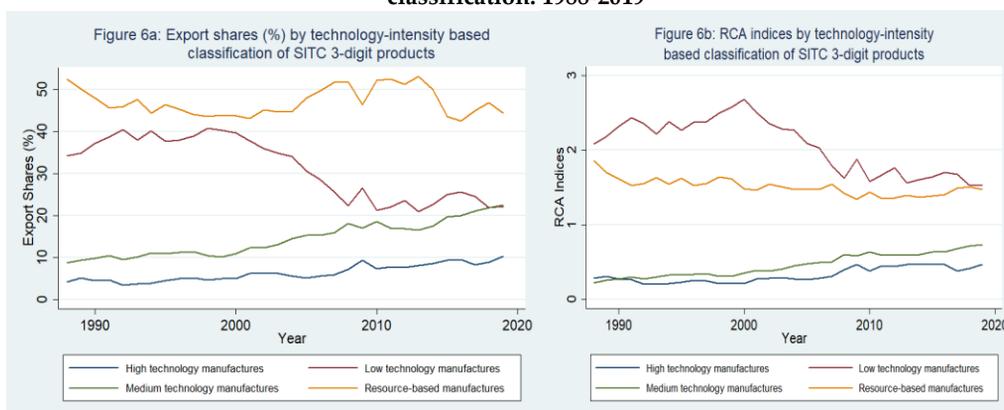
Source: WITS Database & ETA Classifications

6.2 Comparative advantage: Technology content

Posner (1961) brought out, for the first time, the role of technology-based comparative advantages in determining trade. Over time, a large body of literature, both empirical and theoretical, emerged, which focused on trade and technology (Lall, 2000; and, Berkum and Meijl, 1998, for review). The argument is that comparative advantage depends more on the national ability to master and use technologies than on factor endowments (Lall, 2000). According to this perspective, developing countries do not have a comparative advantage in technology-intensive products. They are likely to specialise in labour or resource-intensive products with low technology intensity.

To assess the technology content of India's export basket, I use the classification provided by Lall (2000). He identifies five categories of SITC 3-digit products: natural resource-intensive; primary products; and low, medium, and high technology-intensive products. Primary products are integrated into the resource-based products' category, as above (Figure 6). It may be seen that as in the previous cases, both the RCA values and export shares depict similar patterns, but the latter change relatively faster. Further, the resource-based products' patterns have been almost the same as that of natural resource-intensive products shown in Figures 5a and 5b. These products continue to dominate the exports basket. On the other side, low technology-intensive products, which contributed 34 percent of exports in 1988, lost the share and the competitive edge (RCA values) post 2000. Low technology-intensive products seem to have been replaced by medium technology products, increasing their share to over 20 percent from 10 percent in the export basket. High technology products also grew in importance, but post-2010, their share stabilised at 10 percent. The RCA values improved for both medium and high technology products but have not yet exceeded 0.7 and 0.5 respectively, despite an upward movement. Thus, the rapid rise in export shares of medium and high technology products has not yet translated into structural shifts in the patterns of RCA values.

Figure 6: Patterns of export shares and RCA indices by technology-intensity based trade classification: 1988-2019



Source: WITS database & Lall's Classification

6.3 Comparative advantage: Product complexity approach

Hausmann, Hwang, and Rodrik (2007) argue that comparative advantages are determined by the overall complexity of a country's productive capabilities. In a series of papers, Hausmann and others have shown that the major exporters of the more complex products are the high-income countries, while the low-income countries export relatively less complex products. They propose an empirical measure of product complexity called PRODY, which is calculated as a weighted average of the income per capita of the countries that export the said products, with RCA values as weight. Based on this measure, the product complexity index (PCI) has been developed for SITC 4-digit products for 249

countries for each year since 1962, which is provided on the website of Harvard's Centre for International Development (CID) (Hausmann *et al.*, 2013). Using Hausmann and Hidalgo's (2010) measures of product and country complexity, Felipe *et al.* (2012) rank 5107, 4-digit SITC products and 124 countries. Their analysis shows that the most complex products are in machinery, chemicals, and metals, while the least complex products are raw materials and commodities, wood, textiles, and agricultural products. Table 4 shows the distribution of PCI for those SITC 4-digit products where India enjoys a comparative advantage. It shows that the share of products with $RCA \geq 1$ increased in each category of PCI. The most pronounced increase was in the most complex product category, where it increased to 21.6 percent in 2018 from only 9 percent in 1990. In contrast, the products with $PCI < -1$ increased to around 48 percent from 47 percent, just a 1 percent point increase. The export shares of products with $PCI > 0$ increased to 46 percent by 2018 from around 19 percent in the pre-liberalisation period. India is clearly moving towards exports of some more complex products and comparative advantages therein.

Table 4: Distribution of PCI by SITC 4-digit products with $RCA \geq 1$: Selected years

	1990		2000		2014		2018	
	$RCA \geq 1$ (%)	Total (Number)						
$PCI > 1$	9.0	133	15.2	132	13.6	141	21.6	134
$PCI > 0$ but < 1	17.3	266	24.5	257	26.0	264	29.7	266
$PCI < 0$ but > -1	33.0	215	39.6	227	38.6	224	38.4	219
$PCI < -1$	47.1	138	53.1	143	52.5	144	48.2	141
Total	25.8	752	32.8	759	32.2	773	34.2	760

Source: Based on the SITC 4- digit data provided by harvard.atlas.edu

7. Major Findings and Recommendations

The impact of economic liberalism initiated in 1991 on India's export competitiveness has been mixed. There is evidence of reduction in volatility of export growth rate. Further, exports recorded better growth in the 1990s and 2000s. As a matter of fact, riding on the wave of global boom conditions, India had an unprecedented episodic export acceleration in the 2000s. However, the dark spot is that it could not be translated into trend export acceleration. The export growth rate declined sharply in the post 2011 period. Further, India remained in the bottom deciles in terms of exports to GDP ratio. The country performed better in terms of diversification of the export basket. She managed to diversify her export basket irrespective of which indicator we use: export shares, RCA values, or the number of products. Despite low export growth rate in the post 2011 period, the share of products exported under RCA equal to and greater than 1 increased after a sharp fall in 2010 and attained the previous peak level. The distribution of the RCA values has also become more equal with a decline in the highly skewed RCA values of traditional products and increase in the share of products exported under $RCA \geq 1$. On the negative side,

however; the distribution of export shares remains highly skewed, with the top 10 percent of 6-digit products accounting for around 83 percent of exports even in 2019. Further, the export basket expanded until 2005 but the new products have marginal impacts on export growth. Export growth has been accounted for by mainly the existing products (the intensive margin) rather than new varieties (the extensive margin). The most encouraging dimension of India's export performance is the upgrading of the compositional structure of exports with both export shares and RCA showing similar patterns. The analysis of secular trends of structural change in exports shows that the Indian economy is in transition. It is no longer a factor-driven economy. The export shares of human skills and technology-intensive complex products have grown with comparative advantages increasing in these categories. On the other side, India is losing both export shares and RCAs in traditional, low skill, low technology-intensive, and less complex products that dominated the export basket with highly skewed RCA indices in 1991. This study attributes these patterns to firm-level heterogeneities that might have played a central role in diversifying and upgrading the export basket of India. Typically, neoclassical trade theory with its emphasis on factor endowment based comparative advantage provides no role for firm dynamics in exports while the literature on heterogeneous firms emphasizes the latter but ignores the former. This study shows that even though the factor endowment-based advantages are still relevant, dynamic comparative advantages have been emerging which can be attributed to more dynamic high productivity firms. Many such firms might have accumulated productive capabilities during the protected regime in comparative advantage defying patterns of growth. Economic liberalism unlocked their potential, and they reaped the benefits and managed to overcome the institutional constraints to play a crucial role in the upgrading of exports. There is vast literature that associates the industry-level productivity growth with large incumbent firms (Aggarwal and Sato, 2011 for survey). Whilst age and size play a key role for external competitiveness, other critical firm-level aspects, especially those related to strategic profiles such as GVC participation, multinationality, technological capabilities, and 'proactive' behaviour are also found to be critical in triggering superior performances. Notwithstanding, the growth of non-traditional exports could not offset the erosion in competitive strengths in traditional sectors which pulled down the export growth rate on the one hand and restricted diversification of exports on the other. Further, this situation has created a policy trade-off between promoting specialisation according to the existing RCA and strengthening dynamic comparative advantages. There is a strong view in policy and academic circles that India must focus on promoting labour intensive exports. It is also argued that China is vacating low skill export space offering India an opportunity to move into it (Subramanian and Chatterjee, 2020). To give a policy push to low-skill labour-intensive exports, new labour laws are being formalised both at the centre and state levels, and mega textiles and food parks are being promoted/planned irrespective of the fact that

these parks have made little headway despite being in implementation for a long time.² The easing of labour laws may also not give a push to low skill labour intensive industries in the current contexts when aspirations of the young population have been changing in the country due to their exposure to information and education. I contend that the employment potential of the industries where dynamic comparative advantages are emerging needs to be recognised and a major thrust should be provided to them. India is losing comparative advantages in low skilled labour-intensive exports, the genesis of which lie in the import substituting era when systematic efforts were made to build production capabilities in capital intensive complex heavy industries. Understanding this reality is important for formulating effective export and employment policies. The youth needs to be prepared in terms of both skill attainment and employability for more complex tasks.

Overall, if India is to move in the direction of self-reliance, she needs to adopt a well-formulated export strategy with a vision, goals, and targets covering both export development and promotion actions in consultation with the industry and taking into consideration the changing context of export and labour markets. Export development measures need to place development of productive capacities, and industrial and export ecosystems at the centre of this strategy. Piecemeal reforms may not work. It must also be pointed out that the SEZs have the best chance of promoting exports and FDI due to secured working environment and insulation from bureaucratic hassles (if facilitated). However, the SEZs have failed to fulfil their potential due to the government flip-flop over SEZ policy and the bureaucratic set up surrounding them. They need to be revamped, based on the recommendation made by the Baba Kalyani report. Finally, and most importantly, it is crucial to place international competitiveness at the core of the official rhetoric of self-reliance.

² For instance, a review of the performance of textile parks which have been in operation since 2005 shows the total employment of around 67,900 workers across 30 such parks (Government of India, 2016). In contrast, Sri City, an integrated business city, in a backward area of Andhra Pradesh, which is coming up as a hub of engineering industries, reports the total employment of 50,000 workers within a short span of time.

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