

# India's International Trade of Carbon Black in the Recent Past – Some Insights

## Preface

The study uses trade indicators to analyze merchandise export and import data in a way that should be useful for the purpose of formulation of policy. The indicators provide a glimpse of the trade patterns of the world and the performance of India in comparison to various other countries. They have been used in the case of India's exports of carbon black, to indicate the possible directions policy may take.

The data used in this study has been sourced from the United Nations Comtrade Database, the Export Import Data Bank and the Department of Commerce, Government of India. Computations are primarily based on data at the ITC-HS six-digit level (ITC-HS Code 280300) and the latest finalized data available on the UN Comtrade Database up to year 2019. In several cases, trends from 2015 to 2019 have been shown.

The layout of the study is as follows:

**Section 1:** An introduction to Carbon Black

**Section 2:** An overview of the Carbon Black industry in India

**Section 3:** International Trends in the imports and exports of Carbon Black (HS-280300) worldwide

**Section 4:** Deals with India's Export Intensity of the commodity chapter with respect to various countries. Countries where market-specific policies can be implemented to boost exports are identified and the complete list is presented in Appendix A.

**Section 5:** Analysis using the Revealed Comparative Advantage and the Revealed Comparative Import Inclinations indices.

**Section 6:** Using the Competitiveness Index, this section discusses the dominating patterns of the major exporters of Inorganic Chemicals in the international markets as well as Intra-Industry Trade Values between India and major chemical (inorganic) importers.

**Section 7:** Discusses India's export of the commodity to the ASEAN, the BRICS, and the EU.

**Section 8:** Provides relevant data for India's export of carbon black and YoY changes, country wise at the ITC-HS 6-digit level.

**Section 9:** Compares and analyses the unit value of Indian exports of the commodity with that of other major exporters.

**Section 10:** Summary.

**Appendix A:** List of countries deserving market-specific export promotion policies.

**Appendix B:** The formulae of the trade indicators used.

## **Section 1: Introduction**

Carbon black (subtypes are acetylene black, channel black, furnace black, lamp black and thermal black) is a material produced by the incomplete combustion of heavy petroleum products such as FCC tar, coal tar, ethylene cracking tar, or vegetable matter. Carbon black is a form of paracrystalline carbon that has a high surface-area-to-volume ratio, albeit lower than that of activated carbon. It is dissimilar to soot in its much higher surface-area-to-volume ratio and significantly lower (negligible and non-bioavailable) polycyclic aromatic hydrocarbon (PAH) content. However, carbon black is widely used as a model compound for diesel soot for diesel oxidation experiments. Carbon black is an important raw material used as a reinforcing filler in the manufacture of tyres and other rubber products. In plastics, paints and inks, carbon black is used as a colour pigment. It is used in some places, such as the EU, as a food colourant if produced from vegetable matter (E153).

The current International Agency for Research on Cancer (IARC) evaluation is that, "Carbon black is possibly carcinogenic to humans (Group 2B)". Short-term exposure to high concentrations of carbon black dust may produce discomfort to the upper respiratory tract, through mechanical irritation.

The most common use (70%) of carbon black is as a pigment and reinforcing phase in automobile tires. Carbon black also helps conduct heat away from the tread and belt area of the tire, reducing thermal damage and increasing tire life. About 20% of world production goes into belts, hoses, and other non-tire rubber goods. The balance is mainly used as a pigment in inks, coatings and plastics.

This study focuses on carbon black in the wake of a recent news (January 2021) on India's Finance Ministry deciding not to impose anti-dumping duty on imports of carbon black (used in rubber applications, including tyres) from China and Russia. The government posited that the move is expected to bring down the cost of imports of carbon black for tyre makers, small and medium-sized rubber goods manufacturers, while reducing the protection levels for domestic makers of carbon black such as Philips Carbon, Birla Carbon and Himadri Speciality. The non-tyre rubber industry is highly vulnerable to supply disruptions and a fair pricing of these essential raw materials is key to the growth of the industry. Hence, this move may favour the domestic players, including MSMEs, as far as the Indian rubber goods industry is concerned. Therefore, it is important to investigate the prospects of expansion of trade and of increasing the gains achieved from trade for carbon-black.

## **Section 2: Carbon Black Industry in India**

The demand for carbon black in India stood at 984.63 thousand tonnes in 2018 and is projected to grow at a CAGR of 5.82% during 2019-2030 to reach 1853.84 thousand tonnes by 2030. Growth in the Indian packaging industry has increased the demand for carbon black in food packaging, industrial film, lamination and carrier bags and high-quality protective packaging applications. Furthermore, the Indian government's mission to make India a 100% electric vehicle nation by 2030 under the new National Electric Mobility Mission Plan is expected to push the demand for automobiles in the coming years. This demand in turn would aid growth in ancillary industries such as tire industry, which use carbon black as their primary raw material. Moreover, the demand for industrial rubber such as in conveyor belts and hoses is anticipated to positively influence the demand for carbon black in India during 2019-2030.

In this report, we will see various analyses and aspects of India’s export trade of carbon black. However, before that, we need to understand the classification of data structures available for international comparison and analysis. According to the ITC HS system, the code 280300 is assigned to indicate the trade of “Carbon (carbon blacks and other forms of carbon, nes)” in India. We work with the ITC-HS six-digit level (HS-280300) and the latest finalized data available on the UN Comtrade Database up to year 2019, enabling global comparisons. Table 1 outlines the relevant categories along with their description. Henceforth, we will use both the 2-digit code, i.e. ITC-HS Chapter 28 for “Inorganic chemicals, precious metal compound, isotopes” and 6-digit codes, ITC-HS 280300, as stated above, for our analysis, as appropriate.

*Table 1: ITC HS Classification of Carbon Black*

<b>ITC HS Code</b>	<b>Name/Description</b>
2803	Name: Carbon (carbon blacks and other forms of carbon, nes) Description: Carbon (carbon blacks and other forms of carbon not elsewhere specified or included).
280300	Name: Carbon (carbon blacks and other forms of carbon, nes) Description: Carbon (carbon blacks and other forms of carbon not elsewhere specified or included).

### **Section 3: Trends in International Trade i.e. Exports and Imports of Coffee**

A glimpse of the top twenty exporters of Carbon Black (ITCHS 280300) in the world is given in table 2 below.

*Table 2: Exports of Carbon Black (ITCHS 280300) in billion US dollars*

<b>Country</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>Grand Total</b>
China	0.60	0.50	0.69	1.07	0.83	3.68
Russian Federation	0.37	0.29	0.47	0.68	0.69	2.50
Germany	0.28	0.28	0.32	0.36	0.32	1.55
USA	0.29	0.26	0.31	0.36	0.32	1.54
Rep. of Korea	0.19	0.17	0.21	0.30	0.30	1.16
Canada	0.19	0.16	0.19	0.20	0.19	0.93
Poland	0.15	0.10	0.12	0.21	0.26	0.83
Hungary	0.12	0.10	0.17	0.22	0.19	0.81
Italy	0.14	0.11	0.16	0.20	0.18	0.80
Japan	0.12	0.14	0.15	0.18	0.18	0.78
Netherlands	0.16	0.14	0.14	0.15	0.14	0.73
Egypt	0.15	0.09	0.13	0.20	0.12	0.67
Thailand	0.09	0.10	0.11	0.14	0.15	0.60
India	0.09	0.08	0.11	0.13	0.16	0.58
Czechia	0.08	0.08	0.12	0.15	0.14	0.57

Belgium	0.10	0.07	0.07	0.08	0.08	0.40
France	0.10	0.08	0.07	0.08	0.07	0.40
Ukraine	0.03	0.02	0.04	0.07	0.07	0.23
Other Asia, nes	0.05	0.04	0.04	0.05	0.04	0.22
Singapore	0.04	0.03	0.04	0.04	0.05	0.21
Others	0.22	0.20	0.29	0.43	0.31	1.45
<b>Total Export Value</b>	<b>3.55</b>	<b>3.05</b>	<b>3.96</b>	<b>5.30</b>	<b>4.79</b>	<b>20.64</b>

Source: Computed from UN Comtrade database

Tables 2 and 3 show the top twenty exporters of Carbon Black (ITCHS 280300) and their percentage shares. China, Russia, Germany, USA and South Korea are the top five exporters of Carbon Black from 2015 to 2019. Together, these five countries covered around 50 per cent of export value in 2019. India is among the top 20 Carbon Black exporters (14<sup>th</sup> rank) accounting for 3 per cent of the global exports.

Table 3: Shares of countries in % in world exports of Carbon Black (ITCHS 280300)

Country	2015	2016	2017	2018	2019
China	16.91	16.47	17.38	20.19	17.22
Russian Federation	10.52	9.65	11.76	12.85	14.38
Germany	7.87	9.11	7.99	6.78	6.66
USA	8.09	8.61	7.87	6.88	6.64
Rep. of Korea	5.36	5.55	5.30	5.65	6.17
Canada	5.33	5.10	4.68	3.84	4.01
Poland	4.13	3.29	2.97	3.95	5.43
Hungary	3.33	3.33	4.41	4.17	4.06
Italy	3.84	3.65	4.01	3.86	3.86
Japan	3.48	4.58	3.85	3.41	3.84
Netherlands	4.42	4.69	3.66	2.74	2.88
Egypt	4.12	2.93	3.22	3.70	2.41
Thailand	2.66	3.22	2.84	2.70	3.19
India	2.66	2.59	2.90	2.50	3.28
Czechia	2.30	2.47	2.99	2.83	2.97
Belgium	2.77	2.32	1.81	1.42	1.75
France	2.70	2.71	1.83	1.45	1.48
Ukraine	0.74	0.82	1.08	1.25	1.41
Other Asia, nes	1.29	1.25	1.08	0.91	0.86
Singapore	1.22	1.11	0.97	0.80	0.99
Others	6.23	6.57	7.40	8.09	6.51
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Computed from UN Comtrade database

We compute similar tables for the top importers of the commodity in the world. Tables 4 and 5 below show the total import values of Carbon Black by the top twenty countries and their percentage shares respectively. The top five importers in the list consist of Germany, Thailand, USA, Poland and Indonesia.

*Table 4: Imports of Carbon Black (ITCHS 280300) in billion US dollars*

Country	2015	2016	2017	2018	2019	Grand Total
Germany	0.26	0.21	0.29	0.38	0.33	1.46
Thailand	0.20	0.21	0.28	0.41	0.34	1.45
USA	0.30	0.23	0.26	0.28	0.30	1.37
Poland	0.19	0.16	0.24	0.34	0.37	1.30
Indonesia	0.18	0.18	0.25	0.33	0.27	1.21
China	0.21	0.22	0.25	0.26	0.22	1.15
Japan	0.20	0.17	0.20	0.24	0.25	1.07
India	0.14	0.12	0.17	0.38	0.25	1.06
Turkey	0.17	0.14	0.20	0.26	0.25	1.03
Spain	0.14	0.11	0.14	0.19	0.18	0.76
France	0.15	0.13	0.14	0.15	0.15	0.73
Viet Nam	0.09	0.09	0.14	0.20	0.19	0.71
Czechia	0.07	0.08	0.12	0.15	0.16	0.58
Italy	0.08	0.07	0.10	0.13	0.12	0.49
Hungary	0.06	0.06	0.10	0.13	0.12	0.47
Slovakia	0.06	0.06	0.09	0.13	0.12	0.46
Other Asia, nes	0.09	0.08	0.09	0.11	0.09	0.45
Rep. of Korea	0.10	0.08	0.08	0.08	0.09	0.44
Malaysia	0.08	0.07	0.08	0.10	0.09	0.41
Canada	0.09	0.07	0.07	0.09	0.10	0.40
Others	0.86	0.77	0.92	1.11	1.03	4.69
<b>Total Import Value</b>	<b>3.73</b>	<b>3.28</b>	<b>4.20</b>	<b>5.44</b>	<b>5.01</b>	<b>21.66</b>

Source: Computed from UN Comtrade database

*Table 5: Shares of countries in % in world imports of Carbon Black (ITCHS 280300)*

Country	2015	2016	2017	2018	2019
Germany	6.94	6.41	6.85	6.91	6.58
Thailand	5.46	6.36	6.73	7.48	6.85
USA	7.95	6.89	6.07	5.22	6.06
Poland	5.21	4.85	5.73	6.20	7.29
Indonesia	4.75	5.39	6.03	6.08	5.48
China	5.55	6.68	5.86	4.74	4.36
Japan	5.32	5.21	4.83	4.49	4.98
India	3.81	3.54	3.97	6.95	5.04

Turkey	4.66	4.28	4.82	4.76	5.04
Spain	3.84	3.35	3.41	3.43	3.52
France	4.10	4.08	3.22	2.84	2.98
Viet Nam	2.35	2.71	3.28	3.65	3.85
Czechia	2.00	2.29	2.76	2.71	3.26
Italy	2.03	2.11	2.27	2.35	2.35
Hungary	1.70	1.89	2.46	2.37	2.34
Slovakia	1.73	1.69	2.12	2.42	2.30
Other Asia, nes	2.39	2.34	2.12	2.04	1.70
Rep. of Korea	2.76	2.53	1.95	1.56	1.80
Malaysia	2.02	2.01	1.97	1.82	1.79
Canada	2.30	1.99	1.55	1.56	1.93
Others	23.13	23.39	21.99	20.42	20.52
<b>Total Import Value</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Computed from UN Comtrade database

Tables 6 and 7 below show the top twenty destinations for Indian exports of Carbon Black, denoting the values and percentage shares respectively. Sri Lanka, Vietnam, South Korea, Japan and Indonesia, are the countries which constituted the largest markets for India's Carbon Black exports from 2015-2019 with export-value shares of 18%, 15%, 9%, 10% and 8% respectively in the year 2019.

Table 6: India's exports of Carbon Black (ITCHS 280300) to various countries (in billion US dollars)

Partner Country	2015	2016	2017	2018	2019	Total Export Value
Sri Lanka	0.02	0.02	0.03	0.02	0.03	0.12
Viet Nam	0.02	0.02	0.02	0.01	0.02	0.09
Rep. of Korea	0.01	0.01	0.01	0.02	0.01	0.07
Japan	0.01	0.01	0.01	0.01	0.01	0.06
Indonesia	0.01	0.01	0.01	0.01	0.01	0.05
United Arab Emirates	0.00	0.01	0.01	0.01	0.01	0.03
Thailand	0.00	0.00	0.01	0.01	0.01	0.03
Bangladesh	0.01	0.01	0.01	0.00	0.01	0.03
Turkey	0.01	0.01	0.00	0.00	0.00	0.03
Malaysia	0.00	0.00	0.00	0.00	0.00	0.01
Nepal	0.00	0.00	0.00	0.00	0.00	0.01
Australia	0.00	0.00	0.00	0.00	0.00	0.01
Saudi Arabia	0.00	0.00	0.00	0.00	0.00	0.01
United Kingdom	0.00	0.00	0.00	0.00	0.00	0.01
Portugal	0.00	0.00	0.01	0.00	0.00	0.01
Netherlands	0.00	0.00	0.00	0.00	0.00	0.01

USA	0.00	0.00	0.00	0.00	0.00	0.01
Other Asia, nes	0.00	0.00	0.00	0.00	0.00	0.01
Italy	0.00	0.00	0.00	0.00	0.00	0.01
China	0.00	0.00	0.00	0.00	0.00	0.00
Others	0.01	0.01	0.01	0.00	0.01	0.03
<b>Total</b>	<b>0.11</b>	<b>0.12</b>	<b>0.13</b>	<b>0.11</b>	<b>0.14</b>	<b>0.62</b>

Source: Computed from UN Comtrade database

Table 7: Various countries' share (in %) in Indian exports of Carbon Black (ITCHS 280300)

<b>Partner Country</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
Sri Lanka	19.05	17.54	20.31	21.14	18.29
Viet Nam	13.57	14.67	15.43	10.97	15.02
Rep. of Korea	13.03	10.61	11.23	15.06	9.12
Japan	9.72	7.87	7.94	9.62	9.76
Indonesia	4.79	6.84	7.42	9.36	8.19
United Arab Emirates	3.70	4.93	4.58	6.87	6.75
Thailand	0.75	3.14	3.92	6.78	9.09
Bangladesh	5.25	5.63	4.30	3.61	4.77
Turkey	8.83	8.25	2.93	2.08	1.62
Malaysia	1.32	1.53	2.12	2.64	2.47
Nepal	0.98	2.93	2.83	1.69	1.25
Australia	1.24	1.08	1.11	2.43	2.92
Saudi Arabia	2.56	1.51	2.28	0.87	0.95
United Kingdom	3.87	1.08	0.74	0.35	0.37
Portugal	0.00	0.00	5.12	0.26	0.17
Netherlands	1.12	2.00	0.93	1.17	0.68
USA	0.76	1.33	1.19	0.58	1.35
Other Asia, nes	0.66	1.25	1.04	0.77	1.01
Italy	2.46	1.21	0.37	0.38	0.17
China	0.71	0.22	0.22	0.54	1.68
Others	5.63	6.35	4.01	2.82	4.37
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Computed from UN Comtrade database

In similar vein, tables 8 and 9 below show the top twenty source countries for Indian imports of Carbon Black, denoting the values and percentage shares respectively. China, South Korea, USA, Russia and Egypt are the countries from which India imported Carbon Black, in descending order of magnitude of import-values from 2015-2019, with import-value shares of 33%, 27%, 7%, 6% and 2% respectively in 2019. Thus, Indian Carbon Black imports of value around 75% were sourced from these five countries in 2019.

*Table 8: India's imports of Carbon Black (ITCHS 280300) from various countries (in billion US dollars)*

<b>Partner Country</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>Total Import Value</b>
China	0.06	0.04	0.05	0.14	0.08	0.37
Rep. of Korea	0.03	0.02	0.03	0.07	0.07	0.22
USA	0.02	0.02	0.02	0.02	0.02	0.10
Russian Federation	0.01	0.01	0.02	0.03	0.02	0.08
Egypt	0.00	0.00	0.01	0.02	0.01	0.04
Germany	0.01	0.01	0.01	0.01	0.00	0.04
Japan	0.01	0.01	0.01	0.01	0.01	0.03
United Arab Emirates	0.00	0.00	0.00	0.01	0.01	0.02
Netherlands	0.00	0.00	0.00	0.01	0.01	0.02
Indonesia	0.00	0.00	0.00	0.01	0.00	0.02
Thailand	0.00	0.00	0.00	0.01	0.01	0.02
Italy	0.00	0.00	0.00	0.00	0.00	0.01
Iran	0.00	0.00	0.00	0.01	0.00	0.01
South Africa	0.00	0.00	0.00	0.01	0.00	0.01
Canada	0.00	0.00	0.00	0.00	0.00	0.01
Saudi Arabia	0.00	0.00	0.00	0.00	0.01	0.01
Singapore	0.00	0.00	0.00	0.00	0.00	0.01
Colombia	0.00	0.00	0.00	0.00	0.01	0.01
Mexico	0.00	0.00	0.00	0.00	0.00	0.00
United Kingdom	0.00	0.00	0.00	0.00	0.00	0.00
Others	0.00	0.00	0.00	0.01	0.01	0.03
<b>Total</b>	<b>0.14</b>	<b>0.12</b>	<b>0.17</b>	<b>0.38</b>	<b>0.25</b>	<b>1.06</b>

*Source: Computed from UN Comtrade database*

*Table 9: Various countries' share in % in Indian imports of Carbon Black (ITCHS 280300)*

<b>Partner Country</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
China	42.49	31.20	29.97	37.36	32.74
Rep. of Korea	20.21	19.21	19.70	18.30	27.02
USA	14.06	15.85	12.64	6.18	7.19
Russian Federation	3.71	6.63	10.88	9.21	6.34



Egypt	1.10	1.82	3.86	6.45	1.99
Germany	4.65	7.63	5.77	1.84	1.69
Japan	3.71	4.46	3.44	1.44	2.16
United Arab Emirates	0.07	0.26	0.54	3.21	3.09
Netherlands	0.51	1.02	1.62	1.72	2.93
Indonesia	2.66	2.71	1.34	1.53	1.34
Thailand	0.50	0.61	1.09	1.87	2.72
Italy	1.37	2.26	2.48	0.91	0.02
Iran	0.06	1.18	1.47	1.77	0.18
South Africa	0.01	0.02	1.05	1.97	0.39
Canada	1.53	1.75	0.97	0.47	0.71
Saudi Arabia	0.00	0.17	0.58	0.68	2.02
Singapore	0.83	0.71	0.72	0.58	0.91
Colombia	0.00	0.05	0.10	0.14	2.19
Mexico	0.01	0.04	0.31	0.75	0.36
United Kingdom	0.55	0.68	0.41	0.20	0.34
Others	1.99	1.76	1.07	3.44	3.70
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: Computed from UN Comtrade database

While the supply-side of Carbon Black in the international market is strong, we need to assess the countries which have a significant share of the commodity in their import basket but do not give enough importance to India as a source country. To do this, we resort to the Export Intensity Index, explained in the following section.

#### Section 4: Export Intensity Index

Export Trade Intensity Index (ETII) of a country with respect to an importing country is the share of the exporting country's merchandise going to that particular importing country divided by the share of world exports going to that importing country. In other words, it is the importance of that importing country as a destination for the exporting country's merchandise outflow, as compared to the importance that importing country enjoys as a destination of world exports. But algebraically, it is equal to the exporting country's share in the importer's market as compared to the same country's market share in the world market. Table 10 shows the trade indices of some countries with reference to India, for trade in inorganic chemicals .

Table 10: Export Intensity Indices for Inorganic chemicals, precious metal compound, isotopes (ITC-HS Chapter 28) of Countries w.r.t. India

Countries	2015	2016	2017	2018	2019
Brazil	0.50	0.78	0.56	0.61	0.66
China	2.50	1.25	1.01	0.48	0.83
UAE	12.83	13.46	20.76	16.18	19.82
USA	0.51	0.62	0.65	0.53	0.81
Germany	0.40	0.35	0.28	0.30	0.26
Japan	0.78	0.57	0.45	0.43	0.75
Sri Lanka	29.77	22.56	28.89	22.92	25.21
Vietnam	2.93	2.59	2.98	2.51	2.16

Source: Computed from UN Comtrade database

Table 10 shows that the Export Intensity Indices of India with respect to UAE, Sri Lanka and Vietnam are greater than 1, implying India gives much more importance to these countries as a destination for its exports of inorganic chemicals than the rest of the world does.

Rearranging the Export Intensity Index, we can comment on the regions where market (i.e. destination) specific policies need to be taken. If India has a market share in the world, for commodity P (say  $s$ ), which is greater than India's overall market share (for all commodities) in the world (say  $t$ ), there is no reason to expect that India's market share for P in Country J, say  $g < s$ .  $g < s$  can be  $< s$  only when, for some reason, Country J imports P, but not sufficiently from India. In terms of the index,  $g < s$  is algebraically equivalent to when Export Intensity Index is less than 1. In such cases, market or destination-specific promotional policies will be needed. The same will be true when Country J's share in India's export of P falls below Country J's share in total world imports of P. When both coincide, there is an even stronger case for adoption of the market-specific promotional policies. Appendix A shows the list of such countries in the case of India's exports of Carbon Black.

#### Section 4: RCA and RCII

While looking at the Export Intensity Index is one approach, the other involves the use of information regarding source countries which places high importance on its exports of Carbon Black, in terms of value, relative to the importance in world exports; and likewise, also enjoying similar relative importance in the destination country's imports. The first is known as Revealed Comparative Advantage (RCA) and the second Revealed Comparative Import Inclination (RCII). RCA index for a commodity (or commodity group) exported from the source country is higher than 1 if its importance is more in the source country's total exports than in world exports, and vice versa. Similarly, RCII index for the destination country's imports for a commodity (or commodity group) is higher than 1 if its importance is more in the destination country's overall imports than in world imports, and vice versa.

To list countries with high RCA or RCII for inorganic chemicals in a year, it is sufficient to find of the share of the commodity in the country's export or import basket respectively, since its share in the world exports or imports remains constant in a given year. Using this for the year 2019, the RCA of various countries' exports of Inorganic chemicals, precious metal compound, isotopes (ITC-HS Chapter 28) is given in table 11 below. India does not have a better relative standing compared to supply-side for exports of inorganic chemicals to the world (since  $RCA < 1$ ) as seen from table 11 below.

*Table 11: RCA of various countries' exports of Inorganic chemicals, precious metal compound, isotopes (ITC-HS Chapter 28)*

Countries	2015	2016	2017	2018	2019
China	0.91	0.97	1.06	1.36	1.06
Russian Federation	1.72	1.41	1.18	1.36	1.30
Germany	1.07	1.11	0.94	1.01	1.07
USA	1.21	1.21	1.17	1.15	1.00
Rep. of Korea	1.03	1.20	1.21	1.53	1.47
Canada	1.50	1.54	1.22	1.30	1.24
Japan	0.86	0.98	1.06	1.33	1.37
India	0.73	0.80	0.88	1.00	0.92

*Source: Computed from UN Comtrade database*

Similarly, if the RCII in the destination country is greater than 1 then the country imports inorganic chemicals to an extent more than overall world trends warrant. Therefore, if India seeks to expand its exports, these countries are the preliminary list of options. Table 16 shows the RCII indices of various countries' imports of inorganic chemicals. Table 12 below shows that Thailand, Indonesia, Japan and India have  $RCII > 1$  indicating a higher than average appetite for imports of inorganic chemicals that the rest of the world warrants.

*Table 12: RCII of various countries' imports of Inorganic chemicals, precious metal compound, isotopes (ITC-HS Chapter 28)*

Countries	2015	2016	2017	2018	2019
Germany	0.90	0.91	0.91	0.94	0.87
Thailand	1.14	1.21		1.31	1.24
USA	0.79	0.77	0.71	0.76	0.74
Poland	0.82	0.83	0.82	0.84	0.86
Indonesia	1.55	1.63	1.74	1.62	1.62
China	0.75	0.84	0.79	0.71	0.73
Japan	1.32	1.42	1.51	1.69	1.46
India	1.79	2.00	1.88	2.01	2.03

*Source: Computed from UN Comtrade database*

However, India already exports to many of these countries with a RCII greater than 1. The question that remains is, are the exports sufficiently high? If the RCA of India to these importing countries (not to the world, as was being discussed earlier) is  $> 1$ , it may be said that the exports are sufficiently high. This is applicable only because the importing countries' RCII (for the world) for the product is also  $> 1$ . On the other hand, if the RCA is  $< 1$ , then export of inorganic chemicals (in value terms) to those countries are not sufficiently high and it needs closer examination. The policy measures, in this case, must be directed towards making Indian exporters increase the share of inorganic chemicals in their export basket to these countries.

By a similar logic as given above, it can be established that if for a particular commodity, RCA for India and RCII for the importing country are both  $> 1$ , it can be expected that RCII for that commodity in that country's imports from India will be  $> 1$ . If this is not the case, the reasons thereof need to be investigated, and appropriate policy measures need to be taken. Actually, it implies that the country is not importing the particular commodity, here inorganic chemicals, in sufficient amount (in value terms) while importing from India. It is not necessarily that they are averse to buying from India in general, they may very well purchase other commodities from India, but – for some reason – not this particular product. Policies designed to make these products from India attractive to the importers of the destination country need to be adopted.

## Section 6: Competitiveness Index and Intra-Industry Trade

The idea of market dominance can be viewed from a different perspective. The competitiveness index of India's export of a commodity tells how important India's product is (in terms of market value share) with respect to its competitors in a destination country. While an index value greater than 1 is definitely good for India, a value less than 1 shows that it has been overshadowed by the products of other exporters. Table 13 shows the indices of Indian exports as well as other top exporters of carbon (China, Russia, Germany, USA and South Korea) for the top importing countries (Germany, Thailand, USA, Poland and Indonesia). For Indian exports, the index is high for Thailand and Indonesia ( $> 1$ ).

*Table 13: Competitiveness Indices (Product) of various exporter countries w.r.t Inorganic chemicals, precious metal compound, isotopes (ITC-HS Chapter 28)*

Competitiveness Index (Product) of Exporter(Reporter) to Importer(Partner) in 2019						
		Partner				
		Germany	Thailand	USA	Poland	Indonesia
Reporter	China	0.43	2.84	0.68	0.41	2.43
	Russian Federation	1.21	0.03	1.95	7.24	0.08
	Germany	N/A	0.55	0.88	2.03	0.23
	USA	0.66	0.55	N/A	0.43	1.19
	Rep. of Korea	0.09	1.00	0.24	0.07	1.79
	India	0.44	1.52	0.65	0.51	1.78

Source: Computed from UN Comtrade database

Table 14: Competitiveness Indices (Market) of various exporter countries w.r.t Inorganic chemicals, precious metal compound, isotopes (ITC-HS Chapter 28)

Competitiveness Index (Market) of Exporter(Reporter) to Importer(Partner) in 2019						
		Partner				
		Germany	Thailand	USA	Poland	Indonesia
Reporter	China	0.60	1.98	0.52	0.46	1.34
	Russian Federation	1.73	0.08	6.55	3.26	0.34
	Germany	N/A	1.78	1.48	0.82	0.98
	USA	1.00	0.77	N/A	1.33	2.28
	Rep. of Korea	0.35	1.22	0.33	0.15	1.55
	India	0.80	1.28	0.44	0.97	1.19

Source: Computed from UN Comtrade database

Intra-industry trade is of importance as it can increase and expand markets. The standard indicator is the Index of Intra-industry Trade (IIT). The index can be calculated within individual sectors as well. Intra-industry trade is generally high in case of the manufacturing sector. An increase in IIT may signify a maturing of this sector, and hence, a regular monitoring of this index may be useful. Intra-industry trade is a common world-wide phenomenon – export and import of the commodities produced by the same industry or sector. The degree to which this occurs is generally measured by the Grubel-Lloyd Index, which is the difference between the exports of the particular sector to a partner country and imports of the products of the same sector from the same partner, divided by the sum of these two, and whole thing obtained subtracted from one.

The following table (Table 15) shows varying degrees of IIT between India and some major Carbon Black traders. The value is high (>0.9) between India and Thailand, showing greater interdependence (exports and imports by the same sector, ITC-HS Chapter 28) in international trade within the same industry. Intra-industry trade usually takes place in the countries that have similar social structure and economical. Meanwhile, the key factors that affecting intra-industry trade are product differentiation, human capital intensity and economies of scale (Hu & Ma, 1999). The sources of gains from intra-industry trade between similar economies—namely, the learning that comes from a high degree of specialization and splitting up the value chain and from economies of scale—are not contradictory to the earlier theory of comparative advantage. Instead, they help to broaden the concept.

Table 15: Intra-Industry Trade in Inorganic chemicals, precious metal compound, isotopes (ITC-HS Chapter 28) between India and Some Major Importing Countries in 2019

<b>IIT between India and Partner Countries (Carbon Black Exporters/Importers)</b>	
<b>Countries</b>	<b>Grubel-Lloyd Index in 2019</b>
United Arab Emirates	0.30
USA	0.45
China	0.23
Japan	0.47
Viet Nam	0.23
Thailand	0.93
Rep. of Korea	0.32
Germany	0.39
Russian Federation	0.26

Source: Computed from UN Comtrade database

## Section 7: India's exports to Trading Blocs and associations

This section discusses India's export of Carbon (Carbon Blacks and other forms nes) (ITC HS 280300) to the trading blocs, namely the EU and the ASEAN, and the members of BRICS. Table 16 shows India's export, in terms of trade value, to the aforementioned trading blocs and associations.

Table 16: India's export of Carbon (Carbon Blacks and othr forms nes) (ITC HS 280300) to ASEAN, BRICS and EU (in million US \$)

(Export Values in US Million \$)

	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>
<b>ASEAN</b>	18.76	26.81	32.04	45.50	49.82
<b>BRICS</b>	1.33	0.65	0.66	0.89	3.50
<b>EU Countries</b>	6.28	5.92	7.52	4.81	6.24

Data is sourced from Export Import Data Bank, Department of Commerce.

## Section 8: Indian Exports of Carbon Black

This section analyses the data on Indian exports of Carbon Black at the ITCHS 6-digit level showing YoY growth rate in value in Million US\$.

Table 17: Indian exports of 280300 CARBON (CARBON BLACKS AND OTHR FORMS NES) showing YoY growth rate (%) and value in Million US\$

S. No.	Country	Values in US\$ Million			Quantity in thousands		
		2018-2019	2019-2020	% Growth	2018-2019	2019-2020	% Growth
1	ALGERIA		0.07			81.68	
2	ANGOLA	0.01	0.02	89.41	5	11	120
3	ARGENTINA	0	0.11	3,840.74	0.51	110	21,468.63
4	AUSTRALIA	4.18	4.38	4.89	3,317.00	3,852.13	16.13
5	BAHARAIN IS	0.03	0.02	-32.46	20	21.05	5.25
6	BANGLADESH PR	4.83	6.26	29.61	3,994.61	7,819.38	95.75
7	BELGIUM	0.26	0.74	190.16	161	539.3	234.97
8	BHUTAN	0	0	400	0.09	0.39	324.73
9	BRAZIL	0.01	0.28	2,189.26	0.25	330.21	1,31,985.60
10	BURKINA FASO					0.03	
11	BURUNDI		0		0.04	1	2,400.00
12	BELARUS	0			0.02	0	-95
13	CAMEROON	0.01			10		
14	CANADA	0.12	0.53	352.84	72	477	562.51
15	CHAD	0.01			5		
16	TAIWAN	1.19	2.03	70.77	903.04	1,601.69	77.37
17	CHINA P RP	1.18	2.96	149.94	788.13	2,240.76	184.32
18	COLOMBIA	0	0.09	9,110.00	0.02	117.15	5,85,675.00
19	CROATIA		0.09			88.03	
20	CZECH REPUBLIC				0.02	0.03	18.18
21	DJIBOUTI	0			1.35		
22	ECUADOR		0.01			14	

23	EGYPT A RP		0.08		0.13	92.21	73,665.60
24	ESTONIA		0			0	
25	ETHIOPIA	0.1	0.02	-78.22	27.52	20.41	-25.84
26	FINLAND		0			1	
27	FIJI IS	0	0	800	0.23	0.15	-35.06
28	FRANCE	0.11	0.09	-20.66	104	82.22	-20.95
29	GABON	0.01			10		
30	GAMBIA	0			0.5		
31	GERMANY	0.24	0.64	163.61	157.38	370.67	135.53
32	GHANA	0.01	0.01	-33.98	1.85	10.1	445.95
33	GREECE	0.55	0.67	22.56	472	700.25	48.36
34	GUATEMALA	0.01	0.13	1,135.24	10	140	1,300.00
35	GUINEA	0.01			10		
36	HONG KONG	0					
37	HUNGARY	0			0		
38	INDONESIA	12.36	11.47	-7.23	10,915.29	11,589.56	6.18
39	IRAN	0.45	0.02	-96.55	200.86	8	-96.02
40	IRAQ		0			0.02	
41	IRELAND					0	
42	ISRAEL		0.08			76	
43	ITALY	0.49	0.35	-27.23	369.67	395.03	6.86
44	COTE D'IVOIRE		0.01			3.99	
45	JAPAN	15.68	15.38	-1.9	12,286.72	11,882.65	-3.29
46	JORDAN	0.02	0.02	18.95	13.1	13.09	-0.08
47	KENYA	0.04	0.04	-12.36	18.93	37.75	99.42
48	KOREA RP	18.7	11.84	-36.67	17,883.70	11,781.50	-34.12
49	KUWAIT	0.06	0.07	14.22	53	66.05	24.63
50	LEBANON	0.01	0.11	1,145.65	6.1	98.05	1,507.41
51	LIBERIA	0.01			2.5		
52	LUXEMBOURG				0		
53	MADAGASCAR	0	0	105	3	4.1	36.67
54	MALAWI		0			0.4	
55	MALAYSIA	3.75	3.86	3.03	3,307.40	3,960.46	19.75
56	MALI		0			0.15	
57	MAURITIUS	0	0	60	1	1.11	11.3
58	MYANMAR	0.04	0.01	-65.71	60.2	24	-60.13



59	MEXICO	0	0.09	2,809.68	0.4	97.26	24,214.50
60	MOROCCO	0			1		
61	NEPAL	0.62	0.55	-10.98	1,530.03	1,755.20	14.72
62	NETHERLAND	2.26	1.17	-48.23	1,383.31	1,048.23	-24.22
63	NETHERLANDAN TIL	0.02	0	-81.82	22	3.6	-83.64
64	NEW ZEALAND	0.03	0.06	78.16	25	46	84
65	NIGER	0			0.1		
66	NIGERIA	0.38	0.17	-56.41	473.35	117.53	-75.17
67	NORWAY		0.02			21	
68	OMAN	0.09	0.03	-60.91	80.1	41.15	-48.63
69	PAKISTAN IR	0.01			14.06		
70	PANAMA REPUBLIC				0		
71	PARAGUAY	0	0	9.76	1.65	1.52	-7.58
72	PERU	0	0.01	5,750.00	0.15	9	5,900.00
73	PHILIPPINES	0.35	0.58	66.25	324	710.21	119.2
74	POLAND	0.07	0.66	889.04	45.38	803	1,669.46
75	PORTUGAL	0.53	0.16	-69.18	418	154.01	-63.16
76	QATAR	0.29	0.28	-4.87	304.5	277.23	-8.96
77	ROMANIA	0.14	0.17	17.29	131	174	32.82
78	RUSSIA	0	0.05	1,876.00	0.03	31.21	91,702.93
79	SAUDI ARAB	1.75	1.17	-33.08	1,154.34	1,081.32	-6.33
80	SERBIA				0		
81	SENEGAL	0.02			20		
82	SEYCHELLES						
83	SLOVAK REP		0.03			22	
84	SINGAPORE	0.28	0.34	20.64	302	349.83	15.84
85	SLOVENIA		0.1			88	
86	SOMALIA		0			0.3	
87	SOUTH AFRICA	0.03	0.06	74.77	22.05	47.01	113.2
88	SPAIN	0.17	1.36	716.69	160.14	1,592.27	894.29
89	SRI LANKA DSR	29.31	24.58	-16.12	24,006.94	26,961.66	12.31
90	SUDAN	0.04	0.01	-79.66	25	5.85	-76.6
91	SWEDEN	0				0	

92	SWITZERLAND	0					
93	SYRIA	0	0	-7.69	1	1	0
94	TANZANIA REP	0	0.03	684.21	2.02	38.18	1,788.08
95	THAILAND	13.2	15.13	14.66	9,608.09	13,367.54	39.13
96	TUNISIA	0.05	0.02	-51.38	44	31.05	-29.43
97	TURKEY	3.14	1.96	-37.51	2,836.60	2,413.63	-14.91
98	UGANDA	0.01	0.02	107.59	4.15	9.89	138.03
99	U ARAB EMTS	12.5	11.13	-10.99	9,402.06	8,872.56	-5.63
100	U K	0.56	0.64	15.13	350.04	613.67	75.31
101	UKRAINE	0.1	0.02	-84.33	66	3.23	-95.11
102	U S A	1.82	4.43	143.07	885.21	3,425.09	286.92
103	UZBEKISTAN		0			0.75	
104	VIETNAM SOC REP	15.52	18.42	18.68	13,992.33	21,127.63	50.99
105	YEMEN REPUBLIC	0	0.01	139.13	2.5	5	100
106	CONGO D. REP.	0.01	0.05	410.53	14.26	2.41	-83.06
107	ZAMBIA	0.01	0.01	-53.51	10.75	4.14	-61.48
	<b>Total</b>	<b>147.83</b>	<b>146.03</b>	<b>-1.21</b>			
	<b>India's Total</b>	<b>3,30,078.09</b>	<b>3,13,361.04</b>	<b>-5.06</b>			
	<b>%Share</b>	<b>0.0448</b>	<b>0.0466</b>				

Source: Export Import Data Bank, Department of Commerce

## Section 9: Unit values

Demand for an item is inversely related to its own price and directly related to the prices of its substitutes. Considering that the exports from other countries can be a replacement for Indian exports of Carbon (Carbon Blacks and other forms nes) (ITC HS 280300), if the prices of these substitutes fall relative to the prices of Indian exports, then the demand for Indian exports will fall as well. The absolute values are given in Table 18. Among the top exporters of carbon black, we find that India ranks 25<sup>th</sup> (arranged from lowest to highest unit value) which means for the first 24 countries, carbon black export unit values are lower than Indian unit values, implying higher demand and competitive edge in exports of carbon black by these countries compared to India.

Table 18: Unit values of Carbon Black (ITCHS 280300) exports from exporting countries (in US\$/kg)

Rank in Terms of Lowest Unit Value	Exporting Country	2015	2016	2017	2018	2019	Average Unit Value (US\$/kg)	Unit Value relative to India
1	Dem. Rep. of the Congo				0.02		0.02	0.02
2	Iceland	0.07					0.07	0.08
3	Bahrain			0.13	0.05		0.09	0.10
4	Nepal	0.18	0.09	0.07			0.11	0.12
5	Bangladesh	0.12					0.12	0.13
6	Eswatini		0.16				0.16	0.17
7	Zambia					0.23	0.23	0.25
8	Trinidad and Tobago	0.34					0.34	0.37
9	Senegal			0.34			0.34	0.37
10	Togo					0.51	0.51	0.55
11	Saudi Arabia	0.07	0.35	0.59	0.79	1.02	0.56	0.61
12	Ukraine	0.57	0.43	0.68		0.88	0.64	0.69
13	Russian Federation	0.64	0.48	0.70	0.91		0.68	0.74
14	Estonia	0.74	0.56	0.71	0.97	0.90	0.77	0.83
15	Rep. of Moldova			0.80			0.80	0.87
16	Turkey	1.13	0.82	1.05	0.49	0.61	0.82	0.88
17	Burkina Faso			0.38	1.28		0.83	0.90
18	Poland	0.82	0.60	0.82	1.10	1.06	0.88	0.95
19	Colombia	0.86	0.71	0.82	0.98	1.02	0.88	0.95
20	Romania	0.75	0.67	0.83	1.02	1.14	0.88	0.95
21	Kuwait				0.88		0.88	0.95
22	Lithuania	0.95	0.83	0.34	1.20	1.11	0.89	0.95
23	Hungary	0.80	0.63	0.94	1.20		0.89	0.96
24	Slovakia	0.93	0.58	0.81	1.10	1.15	0.91	0.98
25	India	0.84	0.65	0.86	1.19	1.09	0.93	1.00
26	Iran	1.00	0.84	0.93	0.96		0.93	1.01
27	China	0.82	0.68	0.94	1.22	1.02	0.94	1.01
28	Sri Lanka	1.39	0.94	0.48			0.94	1.01
29	South Africa	1.20	0.92	1.04		0.59	0.94	1.01
30	Uruguay				0.23	1.75	0.99	1.07
31	United Rep. of Tanzania		0.44	2.40	0.20		1.01	1.09
32	Indonesia	0.88	0.69	0.89	1.34	1.28	1.02	1.10

33	Serbia	0.82	0.89	0.91	1.23	1.24	1.02	1.10
34	Brazil	0.95	0.83	0.86	1.13	1.36	1.03	1.11
35	Rep. of Korea	1.02	0.89			1.19	1.03	1.11
36	Czechia	0.95	0.78	1.02	1.24	1.23	1.04	1.12
37	Italy	1.05	0.86	1.07	1.29		1.07	1.15
38	Thailand	0.99	0.75	0.98	1.30	1.45	1.09	1.18
39	United Kingdom	0.88	0.90			1.56	1.11	1.20
40	France	1.09	0.89		1.44	1.08	1.12	1.21
41	Sweden	0.99	0.83	1.08	1.34	1.39	1.12	1.21
42	Other Asia, nes	1.16	1.00	1.11	1.32	1.18	1.15	1.24
43	Canada	1.27	1.04	1.13	1.26	1.26	1.19	1.28
44	Jordan		0.05	0.77		2.78	1.20	1.29
45	Pakistan		1.04	1.68	1.08	1.02	1.21	1.30
46	Viet Nam	1.38	1.00	1.05	1.44	1.56	1.29	1.39
47	Chile	1.27	1.16	0.93	1.33	1.91	1.32	1.42
48	Egypt	2.60	0.68	0.98	1.21	1.26	1.34	1.45
49	Solomon Isds	1.35					1.35	1.46
50	Argentina	1.18	0.93	0.87	1.04	2.82	1.37	1.47
51	Myanmar					1.45	1.45	1.56
52	Belize		1.58				1.58	1.70
53	North Macedonia	0.06	4.53			0.17	1.58	1.71
54	Kazakhstan			1.23	1.95		1.59	1.71
55	Germany	1.55	1.39	1.63	1.79	1.82	1.64	1.76
56	Mexico	1.63	1.42	1.60	1.85	1.69	1.64	1.77
57	Austria	0.90	0.87	1.50	2.76	2.63	1.73	1.86
58	Qatar	2.65			0.99		1.82	1.96
59	Belarus	1.54	2.23	2.64		0.90	1.83	1.97
60	USA	1.90	1.73	1.88	1.94	1.90	1.87	2.01
61	Peru	1.60	1.26	1.12	2.00	3.45	1.89	2.03
62	Netherlands	2.20	1.78	1.92	2.07	1.97	1.99	2.14
63	Bosnia Herzegovina	0.16	3.82				1.99	2.14
64	Iraq		2.00				2.00	2.15
65	Bulgaria	1.08	6.25	1.01	1.31	1.39	2.21	2.38
66	Slovenia	1.22	2.24	3.41	1.54	3.07	2.29	2.47
67	Bolivia (Plurinational State of)		3.49	1.83	1.71		2.35	2.53
68	Uganda	0.37	2.02	3.67	3.53		2.40	2.58
69	Finland	5.06	2.01	2.00	1.41	1.71	2.44	2.63

70	United Arab Emirates	5.05	2.59	1.26	1.70	1.59	2.44	2.63
71	Dominican Rep.	0.67		1.44	5.29		2.47	2.66
72	Paraguay		3.48		1.47		2.48	2.67
73	Japan	2.56	2.80				2.68	2.89
74	Zimbabwe	2.13	3.01	3.30			2.82	3.03
75	Israel	3.37	4.14	3.58	1.44	1.56	2.82	3.03
76	Malaysia	2.79	2.80	3.00		2.90	2.87	3.09
77	Australia	3.66	3.60	0.53	4.34	2.35	2.89	3.12
78	Philippines	2.25	2.59	2.54	3.70	3.89	3.00	3.23
79	Tunisia	1.78	3.22	5.32	2.91	2.20	3.09	3.33
80	Lebanon	4.65	3.43	0.93	3.69		3.18	3.42
81	Kenya	2.54	5.63	0.98	1.16	5.91	3.24	3.49
82	Switzerland	3.89	2.94	2.98			3.27	3.52
83	Belgium	1.50	3.35	3.82	4.08	4.20	3.39	3.65
84	Singapore		3.22	3.02	3.48	3.88	3.40	3.67
85	Luxembourg	6.88	2.49	2.54	2.77	2.53	3.44	3.71
86	Malta			3.46			3.46	3.73
87	Guatemala	4.96	2.68	2.16	3.61	4.23	3.53	3.80
88	Namibia	3.71	6.80	2.68	1.43		3.65	3.94
89	Mali		3.85	3.65			3.75	4.04
90	Costa Rica	8.01	5.61	3.32	1.57	1.59	4.02	4.33
91	El Salvador		2.95		5.24		4.10	4.41
92	Portugal	5.94	1.40	3.56	7.07	2.89	4.17	4.49
93	Croatia	5.82	6.03		3.48	1.93	4.32	4.65
94	Ghana	6.40	2.67	0.30	9.50	2.77	4.33	4.66
95	Greece	2.79	2.01	4.68	8.53	5.44	4.69	5.05
96	Morocco	0.91	1.93	1.66	16.06	3.71	4.85	5.23
97	China, Hong Kong SAR	3.98	4.50	4.42	5.71	6.90	5.10	5.50
98	Jamaica				5.45		5.45	5.87
99	Botswana		10.17			1.16	5.67	6.10
100	New Zealand	7.39		6.46	6.17		6.67	7.19
101	Denmark	5.21	6.53	8.32	7.05	7.92	7.00	7.54
102	Latvia	0.94	1.33	4.34	5.65	24.54	7.36	7.93
103	Ecuador	4.49	1.50	3.33	8.32	19.83	7.49	8.07
104	Fiji	5.53			9.32	9.16	8.00	8.62
105	Mozambique			10.12			10.12	10.90
106	Mauritius		10.93				10.93	11.77
107	Rwanda				11.85		11.85	12.76

108	Brunei Darussalam		12.64				12.64	13.61
109	Cyprus		28.07			0.13	14.10	15.19
110	Cameroon			19.61			19.61	21.12
111	Honduras		9.04	30.89			19.96	21.50
112	Côte d'Ivoire	20.28					20.28	21.85
113	Norway	12.04	10.04	12.04		60.95	23.77	25.60
114	Ireland	2.36	21.25	51.43	60.46	53.09	37.72	40.63
115	Aruba	40.50					40.50	43.63
116	Panama	90.98					90.98	98.01
117	Angola	195.80	0.10				97.95	105.52
118	Nigeria		0.97	1.44	1208.98		403.80	434.99

Source: Computed from UN Comtrade database

## Section 10: Summary

India is among the top 20 Carbon Black exporters (14<sup>th</sup> rank) accounting for 3 per cent of the global exports. China, Russia, Germany, USA and South Korea are the top five exporters of Carbon Black from 2015 to 2019. Together, these five countries covered around 50 per cent of export value in 2019. The top five importers in the list consist of Germany, Thailand, USA, Poland and Indonesia. India is the 8<sup>th</sup> largest importer of Carbon Black in the world, averaged from 2015 to 2019.

Sri Lanka, Vietnam, South Korea, Japan and Indonesia, are the countries which constituted the largest markets for India's Carbon Black exports from 2015-2019 with export-value shares of 18%, 15%, 9%, 10% and 8% respectively in the year 2019. China, South Korea, USA, Russia and Egypt are the countries from which India imported Carbon Black, in descending order of magnitude of import-values from 2015-2019, with import-value shares of 33%, 27%, 7%, 6% and 2% respectively in 2019. Thus, Indian Carbon Black imports of value around 75% were sourced from these five countries in 2019.

The market indicators for India in terms of carbon black trade can be improved with respect to other major importers. The low values of Export Trade Intensity with respect to Brazil, USA, Germany and Japan is a testimony to this. Lower values of the Competitiveness index between India and Germany, USA and Poland in Inorganic Chemicals are also a testament to the untapped possibility of Indian exports of carbon black. From Unit values analysis, it is seen that among the exporters of carbon black, India ranks 25<sup>th</sup> (arranged from lowest to highest unit value) thus implying that the price competitiveness for Indian carbon black exports may have to be examined, for capturing markets for Indian exports of the commodity by outcompeting other major export players. Therefore, it is recommended that appropriate policies should be taken in order to expand exports to new markets, increase the stability of exports, and meet international standards of high-value markets.

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## Appendix A

Countries requiring market-specific export-promotion policies. This list of destination countries for India with respect to export of Carbon Black (at the 6-digit ITC- HS level) is based on the UN Comtrade data for year 2019.

To Partner Country	Reporter Country	Commodity Code 6
BELARUS	INDIA	280300
BELGIUM	INDIA	280300
CZECH REPUBLIC	INDIA	280300
GERMANY	INDIA	280300
HUNGARY	INDIA	280300
INDONESIA	INDIA	280300
JAPAN	INDIA	280300
MALAYSIA	INDIA	280300
OTHER ASIA, NES	INDIA	280300
PHILIPPINES	INDIA	280300
POLAND	INDIA	280300
PORTUGAL	INDIA	280300
ROMANIA	INDIA	280300
SERBIA	INDIA	280300
SLOVAK REP	INDIA	280300
SPAIN	INDIA	280300
SRI LANKA DSR	INDIA	280300
THAILAND	INDIA	280300
TURKEY	INDIA	280300
VIETNAM SOC REP	INDIA	280300

## Appendix B

1. Revealed Comparative Advantage Index (RCA): RCA for a commodity exported from a country means the importance of this commodity in the export trade of the country in comparison with the importance of the commodity in world exports. Mathematically,

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

where  $x_{ij}$  = country  $i$ 's exports of commodity  $j$

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

$x_{wj}$  = world exports of commodity  $j$

$X_{wt}$  = total world exports.

When  $RCA_{ij} > 1$ , i.e. when  $j$ 's weight in  $i$ 's exports ( $x_{ij}/X_{it}$ ) is more than  $j$ 's weight in world exports ( $x_{wj}/X_{wt}$ ), country  $i$  is said to have a revealed comparative advantage in commodity  $j$ . There is a revealed comparative disadvantage if  $RCA_{ij} < 1$ . When  $RCA_{ij} = 1$ , there is neither comparative advantage or disadvantage.

By studying the RCA for a commodity exported from a country over time, it can be seen whether the country in question is gaining in comparative advantage regarding a particular commodity. If RCA is falling, the reasons require investigation. ( $x_{ij}/X_{it}$ ) may have risen less or fallen more than proportionately than ( $x_{wj}/X_{wt}$ ).

2. One way of checking the reasons for a fall in RCA for a particular commodity is seeing which markets are responsible for this fall. This can be seen from another, slightly different, indicator called Export Specialization Index (ESI).

$$ESI = (x_{ij}/X_{it}) / (m_{kj}/M_{kt}), \text{ where}$$

$m_{kj}$  = import of commodity  $j$  to market  $k$

$M_{kt}$  = world imports of commodity  $k$ .

( $m_{kj}/M_{kt}$ ) gives the weight of  $j$  in market  $k$ . So, if  $RCA_{ij}$  is seen to fall, then it can be found out for which markets ESI has fallen. Special attention may then be given to those markets regarding the commodity in question.

3. Like RCA, the revealed comparative import intensity (RCII) can also be measured.

$$RCII = (m_{ij}/M_{it}) / (m_{wj}/M_{wt})$$

where  $m_{ij}$  = country  $i$ 's imports of commodity  $j$

$M_{it}$  = country  $i$ 's total imports

$m_{wj}$  = world imports of commodity  $j$

$M_{wt}$  = total world imports.

This gives an idea whether the proportion of imports of any commodity is more than expected, in terms of the share of that commodity in world imports.



4. Bilateral trade between countries is an important area of trade policy in that bilateral trade agreements are signed to increase trade. However, some points require to be examined before entering into these agreements. Firstly, it is necessary to see whether there is trade complementarity between the two countries. That is, whether the exports of one country match with the imports of the other, and vice versa. Naturally, when trade complementarity is high between two countries, it is beneficial to enter into a trade agreement. If a partner country does not import what India generally exports, there is little point in entering into a trade agreement with that country. The Trade Complementarity Index (TCI) is given as follows:

$$TCI = 1 - \sum ( | m_{ik} - x_{ij} | / 2 ), \text{ where}$$

$m_{ik}$  = share of commodity  $i$  in the imports of market  $k$

$x_{ij}$  = share of commodity  $i$  in the exports of country  $j$ .

It is evident that TCI can have values between 0 and 1. When these shares, are  $m_{ik}$  and  $x_{ij}$  are close to each other, (i.e. when trade complementarity increases) TCI is close to 1. As their difference increases, TCI falls.

TCIW = TCI between a country and the World.

RTCI (Relative Trade Complementarity Index) between country  $k$  and country  $j$  = (TCI between country  $k$  and country  $j$ ) / (TCI between country  $k$  and the world)

RTCI gives a measure of the complementarity between two countries as compared to the complementarity between the first country and the world.

5. But another fact may be checked while proceeding to enter into a trade agreement. The trade between the two countries may already be quite high. This can be measured by the Export Intensity Index (EII).

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

where  $x_{ij}$  = country  $i$ 's exports to country  $j$

$X_{it}$  = country  $i$ 's exports to the world

$x_{wj}$  = world exports to country  $j$

$X_{wt}$  = total world exports.

This essentially measures the relative importance of country  $j$  in country  $i$ 's export trade, in comparison with country  $j$ 's importance as world export destination.  $EII < 1$  or  $> 1$  implies less than or more than expected bilateral trade, respectively. If EII is already high, there is little scope of further increasing bilateral trade between  $i$  and  $j$ . But if it is low, and if TCI is high, bilateral trade can very well be increased through trade agreements.

6. A related indicator is the Export Similarity Index (XSI), which helps us identify a country's competitors.

$$XSI = \sum [ \min (X_{ij}, X_{ik}) * 100 ]$$

where  $X_{ij}$  = share of commodity  $i$  in exports of country  $j$

$X_{ik}$  = share of commodity  $i$  in exports of country  $k$

XSI can vary between 0 and 100. It will be seen that when  $X_{ij} = X_{ik}$  for all  $i$ 's,  $XSI = 100$ , which means complete export similarity between countries  $j$  and  $k$ . As  $X_{ij}$  and  $X_{ik}$  start to differ, XSI falls. Countries

exporting the same commodities are competitors in the world market, and export strategies, taking in to account such competition, have to be designed accordingly.

7. It is necessary to know whether the exports of a country are concentrated in a few products. A high concentration, while enabling a country to reap the benefits of specialization and economies of scale, also exposes a country to the risks arising from the vicissitudes of global trade. The Hirschman Index (HI), used by UNCTAD, is a handy measure for monitoring export concentration.

$$HI = \sqrt{[\sum Sq(x_i/X_t)]}$$

where  $x_i$  is the country's exports of commodity  $i$

$X_t$  is the country's total exports.

HI ranges from  $(1/n)$  to 1. The higher the value of HI, the higher the concentration of exports.

8. Intraindustry trade is of importance as it can increase and expand markets. The standard indicator is the Index of Intraindustry Trade (IIT).

$$IIT_{jk} = 1 - [\sum |X_{ijk} - M_{ijk}| / (X_{ijk} + M_{ijk})]$$

where  $X_{ijk}$  = exports of products of industry  $i$  from country  $j$  to country  $k$

$M_{ijk}$  = imports of products of industry  $i$  from country  $k$  to country  $j$ .

IIT can take values from 1 (extremely high intra-industry trade, exports equaling imports) to 0 (no interindustry trade at all).

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