India's International Trade of Rubber 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 rubber, to indicate the possible directions policy may take. This study focuses on rubber, because this commodity (natural rubber) is one of India's traditional produce and has been facing recently competition from 'dumped' imports of rubber items. It has high export potential, to generate substantial revenue earnings. Therefore, it is important to investigate the prospects of expansion of trade and of increasing the gains achieved from trade for rubber.

India's stands sixth place in the production of natural rubber and second place in world consumption[1]. With globalization and its interlinkages with the international business environment, the scope of exports of rubber from India has increased tremendously and hence there is need to reframe international - trade strategies for India to penetrate in the export market, making a niche of its own. This mandates improvement in quality, competitive pricing, aggressive marketing policies and adherence to delivery commitments.

Recently, the Commerce Ministry recommended extension of anti-dumping duty for five years on carbon black used in the rubber and tyre industry from China and Russia (December 2020), with a view to guard domestic players from cheap imports from these two countries. The ministry's investigation arm, Directorate General of Trade Remedies (DGTR) found "positive" evidence of likelihood of dumping of "carbon black used in rubber applications" and injury to the domestic industry if the existing anti-dumping duty would be removed. The directorate has recommended two duties, USD 494 per tonne for imports coming from China and USD 36.17 per tonne from Russia. The finance ministry takes the final decision to impose this duty. In international trade parlance, dumping happens when a country or a firm exports an item at a price lower than the price of that product in its domestic market, causing injury to domestic industry. In the wake of the recent developments, it would be intriguing to further deep-dive into the nuances of international trade (export and import) performance of rubber in the last few years as well as the areas of possibilities and prospects to improve rubber exports and "Make in India for the World", in alignment with the Central Government's vision of "Vocal for Local" to cater to domestic demand and attain a higher standing the in the export value chain.

The data used in this study has been sourced from the United Nations Comtrade Database, the Rubber Board of India, Export Import Data Bank, Department of Commerce and the FAOSTAT database. Computations are primarily based on data at the ITC-HS two-digit level (HS-40) and ITC-HS four-digit

[1] *Source: National Rubber Policy, 2019*
https://commerce.gov.in/wp-content/uploads/2020/02/NTESCL636871126727394221_National-Rubber-Policy-2019.pdf

level (HS-4001. HS-4002) 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 of the Commodity Rubber and its Regulatory Authority in India

Section 2: An overview of the rubber industry in India

Section 3: Socio-Economic Scenario of Rubber Industry/Production in India

Section 4: An overview of agricultural production value of natural rubber in India as well as its trends in Area, Production and Consumption.

Section 5: International Trends in the imports and exports of the Rubber and Articles thereof (HS-40) worldwide

Section 6: Deals with India's Export Intensity of the commodity 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 7: Analysis using the Revealed Comparative Advantage and the Revealed Comparative Import Inclinations indices.

Section 8: Using the Competitiveness Index, this section discusses the dominating patterns of the major exporters of rubber in the international markets as well as Intra-Industry Trade Values between India and major rubber importers.

Section 9: Discusses India's export of the commodity to the ASEAN, the BRICS, and the EU.

Section 10: Provides relevant data for India's export of rubber and YoY changes, country wise at the ITC-HS 2-digit level.

Section 11: Compares and analyses the unit value of Indian exports of the commodity with that of other major exporters.

Section 12: Summary.

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

Appendix B: The formulae of the trade indicators used.

Section 1: Introduction

Natural rubber, consists of polymers of the organic compound isoprene with minor impurities of other organic compounds, plus water. Thailand and Indonesia are two of the leading rubber producers. Rubber is mainly harvested mainly in the form of the latex from rubber trees (*Hevea brasiliensis*) which then is refined into rubber ti make it ready for commercial processing. Natural rubber, has a large stretch ratio and high resilience, and is extremely waterproof. Neoprene (also polychloroprene) is a family of synthetic rubbers with good chemical stability and maintains flexibility over a wide temperature range. Neoprene is used in a wide variety of applications, such as laptop sleeves, orthopaedic braces (wrist, knee, etc.), electrical insulation, liquid and sheet-applied elastomeric membranes or flashings, and automotive fan belts.

Natural Rubber is a commercial plantation crop from the tree species, Hevea brasiliens.Natural Rubber is grown in tropical humid climatic conditions. Thailand, Indonesia, Malaysia, Vietnam, China and India are the major NR producers globally. The current world production and consumption of NR is around 12.40 million tonnes and 12.60 million tonnes respectively. The major NR consumers are China, India, USA, Japan, Thailand, Indonesia and Malaysia. Rubber is largely perceived as a strategic industrial raw material and accorded special status globally for defence, national security and industrial development. Major consuming countries keep strategic reserves of NR. Rubber is an internationally traded commodity and price of rubber is influenced *inter alia* by trends in economic growth, production in major producing countries and demand in major consuming countries. Domestic NR prices generally follow the trends in the international market and is therefore, subjected to fluctuations in price.

Rubber Board is a statutory body under the Ministry of Commerce & Industry, Government of India. It was constituted as per the Rubber Act, 1947 and Rubber Rules 1955 for the overall development of the rubber industry in the country. Head Office of the Board is located at Kottayam in the state of Kerala.

Section 2: Rubber Industry in India

In India, there is a well-established rubber production sector and a fast growing rubber products manufacturing and consuming sector. The Rubber Industry value chain begins from NR plantations and ends with a huge range of dry rubber and latex based products. Historically, NR was a regulated commodity with strong tariff protection and domestic market regulations. The key factors which have contributed to the growth of Indian rubber industry are positive intervention of institutional agencies aiming at self-sufficiency and import substitution. Most of the rubber products including tyres require blends of NR and synthetic rubber (SR). Consumption of SR in India in rubber products manufacturing sector increased from 411,830 tonne in 2010-11 to 633,975 tonne in 2017-18. Styrene Butadiene Rubber and Poly Butadiene Rubber accounted for 63% and 34% of SR production in the country. Import of SR amounted to 338,189 tonne in 2017-18. Consumption of SR in India is projected to reach 1.2 million tonne by 2025.

The National Rubber Policy (NRP), 2019 envisages a well-developed value-chain of environmentally sustainable and globally competitive rubber industry, comprising natural and other forms of rubber and products thereof and ancillary sectors, capable of supplying materials and products of international standards to domestic and world markets, with focus on welfare of the entire stakeholder community and national economic progress.

Section 3: Socio-Economic Scenario

Globally and locally NR is largely grown by small landholders and 91% of rubber planted area and 92% of production is in smallholding sector (below 10 hectares). There are around 1.3 million rubber growers and 0.6 million workers in rubber plantation sector in India. Average size of holding is the lowest in India among the major NR producing countries at 0.57 hectares (ha). Most of the growers in the non-traditional rubber growing regions are from tribal and other resource poor communities.

In this report, we will see various analyses and aspects of India's export trade of Rubber. 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 40 is assigned to indicate the trade of "Rubber and articles thereof" in India. We work with the ITC-HS two-digit level (HS-40) and ITC-HS four-digit level (HS-4001. HS-4002) codes and the latest finalized data available on the UN Comtrade Database up to year 2019. 4-digit classification codes used in our analysis are HS-4001 that indicates "Natural rubber and gums, in primary form, plates, etc" and HS-4002 that stands for "Synthetic rubber", enabling global comparisons. Table1 outlines the relevant categories along with their description. Henceforth, we will use both the 2-digit and 4-digit codes for our analysis, as appropriate.

Table 1: ITCHS Classification of Rubber

ITC HS Code	Name/Description
40	Rubber and articles thereof
4001	Natural rubber and gums, in primary form, plates, etc
4002	Synthetic rubber
4003	Reclaimed rubber in primary forms or in sheets
4004	Rubber waste, parings and scrap (except hard rubber)
4005	Compounded unvulcanised rubber, in primary forms
4006	Unvulcanised rubber as rods, tubes, discs, rings, etc
4007	Vulcanised rubber thread and cord
4008	Rubber plate, sheet, strip, rod etc, except hard
4009	Rubber tube, pipe, hose, except hard rubber
4010	Conveyor and similar belts or belting of rubber
4011	New pneumatic tyres, of rubber
4012	Tyres nes, retreaded, used pneumatic, solid, cushioned
4013	Inner tubes of rubber
4014	Hygienic or pharmaceutical articles of rubber
4015	Rubber clothing and accessories, except hard rubber
4016	Articles of vulcanised rubber except hard rubber, nes
4017	Hard rubber (eg ebonite) in all forms, articles, scrap

Section 4: Trends in Production and Consumption of Rubber

India is currently the sixth largest producer of NR in the world with one of the highest productivity (694,000 tonnes in 2017-18). The production capacity in India is around 900,000 tonnes, of which around 75% is tapped. Out of the total area under rubber in India of around 8 822,000 ha, 614500 ha is a mature yielding crop. Traditional rubber-growing states comprising Kerala and Tamil Nadu account for 81% of production. Major non-traditional rubber growing regions are the North Eastern states of Tripura, Assam and Meghalaya, Odisha, Karnataka, Maharashtra and West Bengal. Sheet rubber is the most preferred form of processing accounting for around 70% of processed rubber. Block rubber and latex comprise17% and 12% respectively of rubber production in the country. India is the 2nd largest consumer of NR globally with current consumption of around 1.1 million tonnes. Sheet rubber, block rubber and latex account for 47%, 43% and 8% respectively in NR consumption. Around 40% of the total NR consumption in India is at present met from import of rubber. 68% of NR consumption in India is in the automotive tyre sector.

Table 2 shows the largest producers of natural rubber (valued at current million US$) in the world for the years 2015 to 2019 wherein Thailand, China, Indonesia, Vietnam, India and Malaysia are ranked in descending order of magnitude.

Table 2: Countries with largest value of agricultural production (current million US$) of rubber, natural in USD from 2014-2018

Country	2014	2015	2016	2017	2018	Grand Total
Thailand	7581.89	5759.98	6263.87	7564.16	6014.33	33184.22
China	3413.17	3326.24	3222.84	3087.75	-	13050.00
Indonesia	1960.71	1584.75	1584.45	1995.03	1757.88	8882.82
Viet Nam	1565.63	1269.67	1073.00	1377.22	1103.97	6389.49
India	1191.94	1215.17	1221.18	1334.79	1283.70	6246.80
Malaysia	1129.99	964.99	922.93	1211.14	1053.40	5282.44
Côte d'Ivoire	630.55	693.38	914.81	1168.30	966.82	4373.87
Philippines	269.13	177.70	170.50	235.61	190.78	1043.71
Sri Lanka	250.36	148.60	115.13	137.07	116.99	768.15
Cameroon	136.35	100.33	100.49	104.08	116.57	557.82
Brazil	142.80	71.28	79.32	82.43	64.61	440.45
Mexico	79.04	51.02	36.74	50.06	46.07	262.93
Nigeria	93.11	63.03	39.18	28.97	30.57	254.86
Ghana	34.57	24.54	24.89	22.32	23.43	129.74
Bolivia (Plurinational State of)	16.78	17.56	19.82	21.74	22.25	98.15
Ecuador	15.74	15.28	15.73	15.81	16.42	78.99
Cambodia	9.34	9.16	9.21	9.41	9.60	46.71
Guinea	5.97	5.80	4.58	5.13	5.58	27.06
Bangladesh	2.45	2.73	3.04	3.13	3.15	14.50
Congo	0.63	0.48	0.52	0.45	0.71	2.79
Dominican Republic	0.05	0.06	0.06	0.05	0.05	0.26

Source: Computed from FAOSTAT database

Table 3: Annual Trends in Area, Production, Consumption, Import, Export and Average Prices of Natural Rubber in India

Year (April to March)	Rubber area (ha)	Tappable Rubber area (ha)	Production (tonne)	Average yield (kg/ha)	Consumption (tonne)	Import (tonne)	Export (tonne)	Average price of RSS-4 at Kottayam (Rs/100kg)
2005-06	597,610	447,015	802,625	1,796	801,110	45,285	73,830	6,699
2006-07	615,200	454,020	852,895	1,879	820,305	89,799	56,545	9,204
2007-08	635,400	458,830	825,345	1,799	861,455	86,394	60,353	9,085
2008-09	661,980	463,130	864,500	1,867	871,720	77,762	46,926	10,112
2009-10	686,515	468,480	831,400	1,775	930,565	177,130	25,090	11,498
2010-11	711,560	477,230	861,950	1,806	947,715	190,692	29,851	19,003
2011-12	734,780	490,970	903,700	1,841	964,415	214,433	27,145	20,805
2012-13	757,520	504,040	913,700	1,813	972,705	262,753	30,594	17,682
2013-14	778,400	518,100	774,000	1,629	981,520	360,263	5,398	16,602
2014-15	795,135	533,675	645,000	1,443	1,020,910	442,130	1,002	13,257
2015-16	810,800	558,900	562,000	1,437	994,415	458,374	865	11,306
2016-17	818,000	584,600	691,000	1,553	1,044,075	426,188	20,920	13,549
2017-18	820,900	612,000	694,000	1,458	1,112,210	469,760	5,072	12,980
2018-19	822,000	637,900	651,000	1,453	1,211,940	582,351	4,551	12,595
2019-20p	822,300	663,700	712,000	1,459	1,134,120	457223	12,872	13,522

P: provisional

Source: Rubber Board, India

Table 4: Monthly Trends in Production, Consumption, Import, Export and Average Prices of Natural Rubber in India

	Production (tonne)		Consumption (tonne)		Import (tonne)		Export (tonne)		Average price of RSS- 4 at Kottayam (Rs/100 kg)	
	2017-18	2018-19p	2017-18	2018-19p	2017-18	2018-19p	2017-18	2018-19p	2017-18	2018-19
April	48000	40000	89000	98500	24289	38055	2240	329	14339	12012
May	50000	42000	88700	103000	37256	47393	1247	24	13073	12419
June	45000	44000	86680	102550	33437	43910	134	178	12238	12646
July	58000	46000	89500	105490	35560	39627	301	202	13300	12919
Aug	58000	40000	88400	101500	44787	59588	262	417	13063	13267
Sep	61000	65000	86680	103000	49844	70887	24	694	13424	13048
Oct	62000	67000	89000	102560	38048	71142	479	202	13060	12780
Nov	64000	65000	96500	99860	33964	51576	284	1157	12587	12156
Dec	78000	81000	99600	105480	36136	42618	20	517	13082	12196
Jan	73000	78000	99350	98000	42018	43481	29	8	12746	12466
Feb	52000	50000	95800	92000	45722	36883	33	218	12413	12433
Mar	45000	33000	103000	100000	48699	37191	19	605	12438	12802
Year	**694000**	**651000**	**1112210**	**1211940**	**469760**	**582351**	**5072**	**4551**	**12980**	**12595**

Source: Rubber Board, India

Section 5: Trends in International Trade i.e. Exports and Imports of Rubber

A glimpse of the top twenty exporters of rubber (ITCHS 40) in the world is given in 5 below.

Table 5: Exports of Rubber (ITCHS 40) in million US dollars

Country	**2015**	**2016**	**2017**	**2018**	**2019**
China	20347.64	18728.64	20654.47	22276.12	22160.54
Germany	15293.01	15475.76	17116.68	17983.89	16612.35
Thailand	12450.53	12237.13	16279.82	15626.45	15381.61
USA	13663.65	12595.90	13438.22	13977.98	13206.99
Japan	10286.78	9802.26	10297.52	10630.24	10343.24
Rep. of Korea	6842.04	6880.27	7768.22	7932.51	7285.27
Malaysia	6237.04	5760.53	7235.60	7486.19	7105.58
France	6461.35	6007.20	6495.69	6736.75	6367.88
Indonesia	5913.51	5663.36	7743.06	6381.28	6025.63
Poland	4466.97	4559.77	5228.58	5827.49	5254.82
Italy	4566.59	4588.99	5094.58	5441.95	5076.30
Belgium	4289.45	4414.89	4693.33	5084.46	4733.06
Netherlands	3977.36	4080.52	4328.68	4532.81	4379.59
Spain	3683.52	3693.91	3991.23	4454.92	4176.45
Czechia	3546.16	3550.86	3905.27	4155.30	3895.23
Viet Nam	2539.57	2845.96	3817.12	3842.29	4263.33
Canada	3282.66	3163.27	3168.37	3295.31	3287.14
Russian Federation	2493.21	2818.93	3530.42	3162.37	3034.64
Mexico	2570.34	2505.76	2831.53	3150.89	3273.01
India	2361.58	2407.85	2845.32	3160.16	3227.11
Others	31711.39	30987.21	35614.93	36168.70	35190.50
Total Export Value	***166984.33***	***162768.97***	***186078.62***	***191308.07***	***184280.25***

Source: Computed from UN Comtrade database

NR is not a traditional export-oriented commodity, more so because of the deficit in production. Export of NR happens to adjust temporary demand-supply imbalances in the NR domestic market. There is a huge export potential for rubber products in the country, which if promoted, shall indirectly increase the demand for domestic NR as also the export earnings.

Tables 5 and 6 show the top twenty exporters of rubber and their percentage shares. China, Germany, Thailand, USA, Japan and Rep. of Korea are the top six exporters of rubber from 2015 to 2019. Together, these six countries cover around 46 per cent of exports. India is among the top 20 rubber exporters accounting for 1.75 per cent of the global exports.

Table 6: Shares of countries in world exports of Rubber (ITCHS 40)

Country	2015	2016	2017	2018	2019
China	12.19%	11.51%	11.10%	11.64%	12.03%
Germany	9.16%	9.51%	9.20%	9.40%	9.01%
Thailand	7.46%	7.52%	8.75%	8.17%	8.35%
USA	8.18%	7.74%	7.22%	7.31%	7.17%
Japan	6.16%	6.02%	5.53%	5.56%	5.61%
Rep. of Korea	4.10%	4.23%	4.17%	4.15%	3.95%
Malaysia	3.74%	3.54%	3.89%	3.91%	3.86%
France	3.87%	3.69%	3.49%	3.52%	3.46%
Indonesia	3.54%	3.48%	4.16%	3.34%	3.27%
Poland	2.68%	2.80%	2.81%	3.05%	2.85%
Italy	2.73%	2.82%	2.74%	2.84%	2.75%
Belgium	2.57%	2.71%	2.52%	2.66%	2.57%
Netherlands	2.38%	2.51%	2.33%	2.37%	2.38%
Spain	2.21%	2.27%	2.14%	2.33%	2.27%
Czechia	2.12%	2.18%	2.10%	2.17%	2.11%
Viet Nam	1.52%	1.75%	2.05%	2.01%	2.31%
Canada	1.97%	1.94%	1.70%	1.72%	1.78%
Russian Federation	1.49%	1.73%	1.90%	1.65%	1.65%
Mexico	1.54%	1.54%	1.52%	1.65%	1.78%
India	1.41%	1.48%	1.53%	1.65%	1.75%
Others	18.99%	19.04%	19.14%	18.91%	19.10%
Total Export Value	***100.00%***	***100.00%***	***100.00%***	***100.00%***	***100.00%***

Source: Computed from UN Comtrade database

We compute similar tables for the top importers of the commodity in the world. Tables 7 and 8 below show the total import values of rubber by the top twenty countries and their percentage shares respectively. The top five importers in the list consist of USA, China, Germany, France and Mexico.

Table 7: Imports of Rubber (ITCHS 40) in million US dollars

Country	2015	2016	2017	2018	2019
USA	27913.49	26164.16	27903.32	29954.12	30083.55
China	14152.93	13713.87	18754.07	16908.81	15370.91
Germany	14524.82	14849.93	16033.38	16968.37	15279.55
France	6644.31	6383.01	7088.91	7629.95	7074.78
Mexico	6564.38	6108.82	6862.63	7021.01	6850.07
Canada	6171.06	5784.38	6242.50	6466.42	6302.33
United Kingdom	5245.78	4899.15	5444.31	5743.42	5281.49
Italy	4550.09	4542.66	5011.26	5293.06	4997.50
Belgium	4064.83	4273.29	4677.09	4960.70	4465.34
Japan	4246.02	3992.36	4668.24	4626.76	4656.29
Netherlands	4042.51	4060.26	4478.39	4794.98	4656.56

Spain	3829.55	3769.19	4200.73	4336.72	4045.42
Poland	3211.46	3306.17	3811.95	4281.96	3918.14
Russian Federation	2704.81	3210.19	4179.66	3874.28	3999.27
Malaysia	3096.39	2880.90	3882.10	3708.35	3601.97
India	2918.65	2888.21	3252.79	3772.86	3260.97
Australia	2798.83	2718.46	3097.57	3345.12	3291.08
Brazil	2975.24	2475.58	3060.47	3062.56	2970.39
Turkey	2525.20	2560.93	2951.17	2803.17	2601.50
Czechia	2389.96	2415.97	2791.40	2918.21	2642.55
Others	49691.94	47597.63	53754.62	55075.95	50533.74
Total Import Value	***174262.24***	***168595.10***	***192146.51***	***197546.76***	***185883.40***

Source: Computed from UN Comtrade database

Table 8: Shares of countries in world imports of Rubber (ITCHS 40)

Country	**2015**	**2016**	**2017**	**2018**	**2019**
USA	16.02%	15.52%	14.52%	15.16%	16.18%
China	8.12%	8.13%	9.76%	8.56%	8.27%
Germany	8.34%	8.81%	8.34%	8.59%	8.22%
France	3.81%	3.79%	3.69%	3.86%	3.81%
Mexico	3.77%	3.62%	3.57%	3.55%	3.69%
Canada	3.54%	3.43%	3.25%	3.27%	3.39%
United Kingdom	3.01%	2.91%	2.83%	2.91%	2.84%
Italy	2.61%	2.69%	2.61%	2.68%	2.69%
Belgium	2.33%	2.53%	2.43%	2.51%	2.40%
Japan	2.44%	2.37%	2.43%	2.34%	2.50%
Netherlands	2.32%	2.41%	2.33%	2.43%	2.51%
Spain	2.20%	2.24%	2.19%	2.20%	2.18%
Poland	1.84%	1.96%	1.98%	2.17%	2.11%
Russian Federation	1.55%	1.90%	2.18%	1.96%	2.15%
Malaysia	1.78%	1.71%	2.02%	1.88%	1.94%
India	1.67%	1.71%	1.69%	1.91%	1.75%
Australia	1.61%	1.61%	1.61%	1.69%	1.77%
Brazil	1.71%	1.47%	1.59%	1.55%	1.60%
Turkey	1.45%	1.52%	1.54%	1.42%	1.40%
Czechia	1.37%	1.43%	1.45%	1.48%	1.42%
Others	28.52%	28.23%	27.98%	27.88%	27.19%
Total Import Value	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Computed from UN Comtrade database

Table 9 shows the majors sources of the highest importers of rubber for the year 2019.

Table 9: Top 5 sources of Rubber (ITCHS 40) for major importers in 2019

Destination Country	Source Country	Trade Value (million $)	Share of Total Imports
Canada	USA	2762.52	81.21%
	Mexico	256.03	7.53%
	China	137.89	4.05%
	Rep. of Korea	29.89	0.88%
	Belgium	20.57	0.60%
China	USA	2842.57	13.97%
	Mexico	1073.86	5.28%
	Japan	866.26	4.26%
	United Kingdom	820.35	4.03%
	Germany	794.43	3.91%
France	Germany	1164.52	17.77%
	USA	581.55	8.88%
	Belgium	459.03	7.01%
	Spain	455.30	6.95%
	Italy	417.57	6.37%
Italy	Germany	1158.48	20.24%
	France	537.18	9.39%
	USA	384.37	6.72%
	Spain	313.33	5.48%
	Poland	259.52	4.54%
Japan	USA	2356.15	19.24%
	China	1495.83	12.22%
	Australia	632.47	5.17%
	Thailand	580.75	4.74%
	Indonesia	531.85	4.34%
Mexico	USA	2784.30	76.21%
	Canada	262.70	7.19%
	China	90.75	2.48%
	Brazil	77.44	2.12%
	Costa Rica	35.97	0.98%
United Kingdom	Germany	356.96	12.16%
	Belgium	353.49	12.04%
	USA	280.52	9.56%
	France	190.72	6.50%
	Netherlands	179.04	6.10%
USA	Mexico	3173.87	23.43%
	Canada	2902.09	21.43%
	China	800.02	5.91%
	Germany	612.55	4.52%
	Australia	550.76	4.07%

Source: Computed from UN Comtrade database

Tables 10 and 11 below show the top twenty destinations for Indian exports of rubber, denoting the values and percentage shares respectively. USA, Germany, UAE, UK and Bangladesh are the countries which constituted the largest markets for India's rubber exports from 2015-2019 with export-value shares of 15%, 6%, 4%, 4% and 3% approx. respectively.

Table 10: India's exports of Rubber (ITCHS 40) to various countries (in million US dollars)

Partner Country	**2015**	**2016**	**2017**	**2018**	**2019**	**Total Export Value**
USA	308	338	397	483	548	2,074
Germany	141	145	175	199	196	856
United Arab Emirates	97	111	123	104	130	565
United Kingdom	91	95	109	114	103	512
Bangladesh	73	84	88	89	99	432
Netherlands	74	76	90	93	87	419
Italy	64	73	91	93	83	403
France	62	67	81	87	89	386
Philippines	76	74	75	73	68	366
Brazil	66	29	87	81	100	363
Nepal	35	52	67	84	92	331
Thailand	41	48	67	84	78	319
Indonesia	53	64	55	82	62	316
Australia	50	47	55	64	51	267
China	30	25	57	66	63	241
Turkey	50	52	49	41	38	230
Saudi Arabia	49	36	37	39	64	226
Spain	29	32	44	56	46	207
Iran	55	56	23	36	37	207
Sri Lanka	39	38	42	42	43	204
Others	879	866	1,034	1,150	1,148	5,077
Total	**2,362**	**2,408**	**2,845**	**3,160**	**3,227**	**14,002**

Source: Computed from UN Comtrade database

Table 11: Various countries' share in Indian exports of Rubber (ITCHS 40)

Partner Country	2015	2016	2017	2018	2019	Export Share(%)
USA	13.03%	14.02%	13.96%	15.28%	16.99%	14.81%
Germany	5.97%	6.04%	6.14%	6.31%	6.06%	6.11%
United Arab Emirates	4.09%	4.62%	4.33%	3.29%	4.03%	4.04%
United Kingdom	3.84%	3.93%	3.82%	3.62%	3.21%	3.66%
Bangladesh	3.08%	3.48%	3.08%	2.80%	3.08%	3.09%
Netherlands	3.12%	3.16%	3.17%	2.93%	2.69%	2.99%
Italy	2.70%	3.03%	3.18%	2.93%	2.58%	2.88%
France	2.62%	2.78%	2.83%	2.75%	2.76%	2.76%
Philippines	3.24%	3.09%	2.62%	2.30%	2.11%	2.61%
Brazil	2.80%	1.19%	3.07%	2.57%	3.11%	2.60%
Nepal	1.49%	2.17%	2.37%	2.65%	2.86%	2.36%
Thailand	1.73%	1.98%	2.37%	2.67%	2.42%	2.28%
Indonesia	2.26%	2.65%	1.94%	2.61%	1.91%	2.26%
Australia	2.13%	1.96%	1.92%	2.03%	1.58%	1.91%
China	1.25%	1.05%	2.01%	2.09%	1.96%	1.72%
Turkey	2.12%	2.15%	1.74%	1.29%	1.17%	1.64%
Saudi Arabia	2.09%	1.48%	1.31%	1.24%	1.99%	1.61%
Spain	1.24%	1.34%	1.53%	1.76%	1.44%	1.48%
Iran	2.32%	2.34%	0.81%	1.13%	1.14%	1.48%
Sri Lanka	1.65%	1.57%	1.47%	1.34%	1.33%	1.46%
Others	37.23%	35.98%	36.32%	36.40%	35.57%	36.26%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: Computed from UN Comtrade database

In similar vein, tables Tables 12 and 13 show the top twenty destinations for Indian imports of rubber, denoting the values and percentage shares respectively. Indonesia, Thailand, China, South Korea and Japan are the countries from which India imported rubber, in descending order of magnitude of import-values (US$), from 2015-2019 with import-value shares of 12%, 10%, 10%, 10% and 8% approx. respectively. Thus, Indian rubber imports of value around 50% were sourced from these five countries from 2015 to 2019.

Table 12: India's imports of Rubber (ITCHS 40) from various countries (in million US dollars)

Partner Country	2015	2016	2017	2018	2019	Total Import Value
Indonesia	344	336	489	446	290	1,906
China	352	394	330	304	284	1,663
Thailand	321	288	330	371	286	1,597
Rep. of Korea	322	266	344	363	286	1,580
Japan	233	236	268	291	269	1,297
USA	195	200	220	230	189	1,033
Viet Nam	156	160	123	198	245	882
Germany	154	142	164	180	131	770
Singapore	48	68	88	264	281	749
Malaysia	105	107	82	179	202	676
Russian Federation	108	106	144	137	91	586
United Kingdom	87	85	77	85	75	409
Italy	68	84	83	88	66	389
France	70	73	76	65	64	347
Belgium	40	48	47	82	73	291
Poland	31	32	54	46	34	198
Other Asia, nes	32	33	42	45	43	196
CÃ´te d'Ivoire	15	25	28	46	37	150
United Arab Emirates	11	9	9	48	57	134
Sri Lanka	21	21	28	32	30	132
Others	204	176	228	272	228	1,108
Total	**2,919**	**2,888**	**3,253**	**3,773**	**3,261**	**16,093**

Source: Computed from UN Comtrade database

Table 13: Various countries' share in Indian imports of Rubber (ITCHS 40)

Partner Country	2015	2016	2017	2018	2019	Import Share(%)
Indonesia	11.78%	11.63%	15.04%	11.83%	8.90%	11.84%
China	12.05%	13.65%	10.13%	8.05%	8.69%	10.33%
Thailand	11.01%	9.98%	10.16%	9.84%	8.77%	9.92%
Rep. of Korea	11.03%	9.20%	10.56%	9.61%	8.78%	9.82%
Japan	7.99%	8.16%	8.25%	7.71%	8.25%	8.06%
USA	6.70%	6.91%	6.75%	6.09%	5.79%	6.42%
Viet Nam	5.33%	5.56%	3.77%	5.26%	7.50%	5.48%
Germany	5.26%	4.90%	5.04%	4.77%	4.02%	4.78%
Singapore	1.64%	2.37%	2.69%	7.01%	8.61%	4.65%
Malaysia	3.61%	3.71%	2.53%	4.74%	6.19%	4.20%
Russian Federation	3.70%	3.66%	4.44%	3.62%	2.80%	3.64%
United Kingdom	2.98%	2.94%	2.37%	2.25%	2.31%	2.54%
Italy	2.35%	2.92%	2.54%	2.32%	2.03%	2.42%
France	2.39%	2.51%	2.34%	1.73%	1.95%	2.16%
Belgium	1.38%	1.65%	1.46%	2.18%	2.24%	1.81%
Poland	1.07%	1.10%	1.67%	1.21%	1.05%	1.23%
Other Asia, nes	1.10%	1.15%	1.30%	1.20%	1.31%	1.22%
CÃ´te d'Ivoire	0.51%	0.86%	0.85%	1.23%	1.12%	0.93%
United Arab Emirates	0.39%	0.30%	0.26%	1.28%	1.75%	0.83%
Sri Lanka	0.72%	0.74%	0.85%	0.84%	0.94%	0.82%
Others	7.00%	6.10%	7.00%	7.22%	6.99%	6.89%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Source: Computed from UN Comtrade database

While the supply-side of rubber 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 6: 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 14 below shows the indices of the countries with the highest imports of rubber from the world and from India.

Table 14: Export Intensity Indices for Rubber (ITCHS 40) of Countries w.r.t. India

Countries	2015	2016	2017	2018	2019
Brazil	1.7713	0.8851	1.7681	1.6249	2.0400
China	0.1768	0.1445	0.2951	0.2546	0.2568
South Africa	1.7807	2.0253	1.8371	1.5724	1.9865
USA	0.8672	0.9838	1.0008	1.0356	1.1661
UK	1.3081	1.2561	1.3235	1.3831	1.1625
Germany	0.7667	0.6770	0.7316	0.8358	0.7714
Thailand	1.6823	1.7590	1.8887	2.1610	1.9414
Japan	0.3343	0.2955	0.3321	0.3337	0.3271
Rep. of Korea	0.3432	0.3365	0.3246	0.3501	0.3051

Source: Computed from UN Comtrade database

Table 14 shows that among the main importers of rubber and some other important trading nations, the Export Intensity Indices of India with Brazil and South Africa (among the BRICS countries), USA, UK and Thailand are greater than 1, implying India gives much more importance to these countries as a destination for its exports of rubber than the rest of the world does. Although an exhaustive list of importers is not shown in this table, there is room for improvement with China, Germany, Japan and the Korean Republic as their respective indices are less than 1.

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 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 rubber.

Section 7: 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 rubber, 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 rubber 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 Rubber (ITCHS 40) is given in table 15 below. India has comparative advantage in supply-side for exports of rubber to the world (since RCA >1) as seen from table 15 below.

Table 15: RCA of various countries' exports of Rubber (ITCHS 40)

Countries	2015	2016	2017	2018	2019
India	0.9206	0.9136	0.9954	1.0465	1.0114
China	0.9224	0.8819	0.9398	0.9538	0.8663
Germany	1.2099	1.1645	1.2227	1.2296	1.0963
Thailand	5.9926	5.6193		6.6045	6.5734
USA	0.918	0.8419	0.8712	0.8771	0.773
Japan	1.6965	1.5012	1.519	1.5378	1.4153
Rep. of Korea	1.3384	1.3717	1.3946	1.4007	1.2981
Malaysia		3.0039	3.4207	3.2325	2.8973
France	1.3481	1.2137	1.2781	1.2654	1.1433
Indonesia	4.053	3.8714	4.7236	3.7814	3.606
Poland	2.3673	2.2925	2.433	2.377	2.13
Italy	1.001	0.9548	0.9668	0.9938	0.9131
Belgium		3.0039	3.4207	3.2325	2.8973
Netherlands	0.8661	0.8262	0.8122	0.824	0.8047
Spain	1.398	1.2952	1.2338	1.4462	1.2885

Source: Computed from UN Comtrade database

Similarity, if the RCII in the destination country is greater than 1 then the country imports rubber 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 Rubber (ITCHS 40).Table 16 below shows that USA, Germany, France, Mexico, Canada , Italy, Belgium, Spain, Poland, Russia, Malaysia, Australia and Brazil have RCII>1 indicating a higher than average appetite for imports of rubber that the rest of the world and these countries should thus serve as potent destination markets for India's rubber exports.

Table 16: RCII of various countries' imports of Rubber (ITCHS 40)

Countries	**2015**	**2016**	**2017**	**2018**	**2019**
India	0.7184	0.7522	0.6732	0.7608	0.662
USA	1.1604	1.0832	1.0667	1.1741	1.1601
China	0.7578	0.8024	0.8803	0.7671	0.7338
Germany	1.3209	1.3055	1.2632	1.3433	1.2383
France	1.14	1.0579	1.0638	1.1858	1.1072
Mexico	1.5973	1.4662	1.5001	1.5478	1.4456
Canada	1.4188	1.3355	1.3267	1.4378	1.3831
United Kingdom	0.8004	0.7133	0.7764	0.7552	0.7568
Italy	1.056	1.0008	1.0121	1.0717	1.0538
Belgium	1.0537	1.0605	1.0548		1.0445
Japan	0.6528	0.6111	0.6389	0.633	0.6509
Netherlands	0.9193	0.9519	0.9218	0.941	0.9184
Spain	1.2223	1.157	1.0981	1.1771	1.0798
Poland	1.6282	1.6293	1.6071	1.6373	1.5964
Russian Federation	1.4287	1.4237	1.4446	1.6509	1.6606
Malaysia		1.5894	1.8282	1.7462	1.7318
Australia	1.3419	1.3303	1.2539	1.4501	1.4541
Brazil	1.669	1.672	1.8644	1.6624	1.5786

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 rubber (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 rubber 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 rubber, 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 8: 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 rubber 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 17 shows the indices of Indian exports as well as other top exporters of rubber(China, Germany, Thailand, USA and Japan) for the top importing countries (USA, China, Germany, France and Mexico). For Indian exports, the index is high only for USA (>1). It has poor values, especially in China and Mexico, implying India must step up its game in these importing countries (with index < 1) to compete with other exporters of rubber.

Table 17: Competitiveness Indices (Product) of various exporter countries w.r.t Rubber (ITCHS 40)

Competitiveness Index (Product) of Exporter(Reporter) to Importer(Partner)						
		Partner				
		USA	**China**	**Germany**	**France**	**Mexico**
Reporter	**India**	1.24302	0.28175	0.93169	0.82835	0.55049669
	China	0.79803	N/A	0.43809	0.48185	1.32400501
	Germany	0.44671	0.59729	N/A	2.0683	0.40397713
	Thailand	1.74107	3.27363	0.29284	0.3801	0.33266559
	USA	N/A	0.65893	0.51126	0.41601	5.86591765
	Japan	1.41719	1.76091	0.47557	0.40366	0.79381887

Source: Computed from UN Comtrade database

Table 18: Competitiveness Indices (Market) of various exporter countries w.r.t Rubber (ITCHS 40)

Competitiveness Index (Market) of Exporter(Reporter) to Importer(Partner)						
		Partner				
		USA	**China**	**Germany**	**France**	**Mexico**
Reporter	**India**	0.93563	0.60315	1.88056	1.29081	0.83410248
	China	0.50123	N/A	0.50225	0.59778	0.85938607
	Germany	0.7658	1.03275	N/A	1.22545	0.9249361
	Thailand	10.3968	13.0276	4.23802	5.75702	2.04914815
	USA	N/A	0.87225	0.60057	0.47104	1.02332959
	Japan	1.33147	1.14462	1.13152	1.18703	1.11222982

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 19) shows varying degrees of IIT between India and some major rubber importers. The values are high (>0.8) between India and Germany and India and France, showing greater interdependence (exports and imports by the same sector) 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 19: Intra-Industry Trade between India and Some Major Rubber Importing Countries

IIT between India and Partner Countries (Rubber Importers)	
Countries	**Grubel-Lloyd**
USA	0.51217
China	0.36462
Germany	0.80257
France	0.83255
Mexico	0.13260
Thailand	0.42891

Japan	0.17918
Rep. of Korea	0.09307
Indonesia	0.35024

Source: Computed from UN Comtrade database

Section 9: India's exports to Trading Blocs and associations

This section discusses India's export of Rubber and Articles thereof (ITCHS 40) to the trading blocs, namely the EU and the ASEAN, and the members of BRICS. Table 20 shows India's export, in terms of trade value, to the aforementioned trading blocs and associations.

Table 20: India's export of Rubber and Articles thereof (ITCHS 40) to ASEAN, BRICS and EU (in million US $)

	2014	2015	2016	2017	2018	2019
ASEAN	268.78	226.16	253.32	279.01	308	280.13
BRICS	267.72	146.59	109.40	224.52	228.19	253.87
EU Countries	610.75	556.15	629.38	790.04	824.57	772.02

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

Section 10: Indian Exports of Rubber

This section analyses the data on Indian exports of Rubber at the ITCHS 2-digit level showing YoY growth rate in value in Million US$.

Table 21: Indian exports of Rubber at the ITCHS 2-digit level showing YoY growth rate in value in Million US$

Countries	Values in US$ Million		%Growth
	2018-2019	2019-2020	
AFGHANISTAN TIS	8.32	12.46	49.78
AUSTRALIA	62.55	48.73	-22.09
AUSTRIA	20.06	17.58	-12.39
BANGLADESH PR	90.43	98.92	9.39
BELGIUM	38.35	32.87	-14.3
BELIZE	0.14	0.22	57.47
BRAZIL	83.86	100.05	19.3
CANADA	52.77	43.63	-17.32
CHILE	15.08	11.86	-21.35
CHINA P RP	66.62	63.55	-4.6
DENMARK	13.62	12.68	-6.88

FRANCE	91.65	87.91	-4.08
GERMANY	199.91	193.76	-3.08
GUATEMALA	7.02	8.78	25.11
GUINEA	4.86	3.97	-18.27
HONG KONG	5.2	4.5	-13.5
HUNGARY	6.49	7.65	17.84
INDONESIA	81.1	59.98	-26.04
IRAN	35.96	37.18	3.37
IRAQ	11.23	20.28	80.54
IRELAND	31.94	25.59	-19.87
ISRAEL	6.85	9.3	35.72
ITALY	91.71	79.94	-12.83
JAPAN	24.87	25.24	1.5
KENYA	27.65	27.04	-2.21
KOREA RP	16.97	12.69	-25.25
KUWAIT	11.68	10.7	-8.36
LAO PD RP	0.25	0.1	-58.93
LATVIA	17.65	15.75	-10.76
LEBANON	1.69	1.07	-36.75
LESOTHO	0.2	0.04	-78.16
LIBERIA	0.55	0.81	47.57
LIBYA	0.9	1.37	52.07
LITHUANIA	2.34	2.25	-3.97
LUXEMBOURG	0.29	0.33	12.58
MACEDONIA	0.35	0.28	-19.05
MADAGASCAR	1.59	2.33	46.55
MALAWI	1.68	3.3	96.01
MALAYSIA	18.93	20.25	6.99
MALDIVES	0.81	0.88	8.53
MALI	4.18	6.34	51.84
MALTA	0.47	0.44	-6.79
MARTINIQUE	0.09	0.16	83.89
MAURITANIA	0.05	0.07	30.26
MAURITIUS	2.3	2.19	-4.66
MAYOTTE	0.01	0	-60.23
MEXICO	43.99	39.69	-9.78
MOLDOVA	0.08	0.19	147.89
MONGOLIA	0.08	0.31	272.53
MONTENEGRO	0.22	0.2	-13.07
MOROCCO	4.34	3.95	-9.04

MOZAMBIQUE	5.36	7.29	35.86
MYANMAR	7.93	7.64	-3.65
NAMIBIA	0.06	0.14	148.2
NEPAL	86.81	91.78	5.72
NETHERLAND	88.3	84.06	-4.81
NETHERLANDANTIL	0.01	0.04	568.97
NEW CALEDONIA	0.46	0.11	-77.26
NEW ZEALAND	7.92	6.44	-18.69
NICARAGUA	2.28	2.24	-1.96
NIGER	0.18	0.25	43.78
NIGERIA	22.49	28.2	25.38
NORWAY	7.45	7.31	-1.84
OMAN	10.65	11.32	6.29
PAKISTAN IR	36.59	8.01	-78.12
PANAMA REPUBLIC	5.45	3.61	-33.79
PAPUA N GNA	0.67	0.9	34.45
PARAGUAY	1.24	0.94	-23.58
PERU	22.64	25.27	11.6
PHILIPPINES	69.79	68.79	-1.43
POLAND	43.58	44.77	2.73
PORTUGAL	26.95	24.25	-10.01
PUERTO RICO	1.22	1.5	22.93
QATAR	18.93	15.51	-18.09
REUNION	0.42	0.22	-48.75
ROMANIA	22.07	20.27	-8.16
RUSSIA	39.4	45	14.23
SAUDI ARAB	46.6	62.99	35.16
SINGAPORE	13.91	13.16	-5.36
SPAIN	50.61	47.92	-5.32
SRI LANKA DSR	42.15	42.98	1.97
SUDAN	15.53	18.55	19.47
SWEDEN	24.05	23.65	-1.68
TANZANIA REP	16.77	18.79	12.05
THAILAND	85.11	78.17	-8.15
TURKEY	37.98	38.44	1.22
U ARAB EMTS	109.95	127.82	16.25
U K	116.17	101.32	-12.78
U S A	503.72	530.85	5.39
VIETNAM SOC REP	25.24	28.53	13.05

Source: Export Import Data Bank, Department of Commerce

Section 11: 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 natural and synthetic rubber (ITCHS 4001 and ITCHS 4002), 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 22. Among the top exporters of rubber, we find that for natural rubber, for Indian exports, the unit values started falling after 2017 which should increase demand for Indian natural rubber exports post 2017 .However, for China and Germany , natural rubber unit values are comparable or lower than Indian values, implying higher demand and competitive edge in exports of natural rubber.

Table 22: Unit values of Natural rubber, balata, gutta-percha, guayule, chicle and similar gums; in primary forms or in plates, sheets or strip (ITCHS 4001) exports from top exporting countries (in US$/kg)

Countries	2015	2016	2017	2018	2019
China	1.96	1.46	1.90	1.50	1.50
Germany	1.64	1.46	2.04	1.77	1.65
India	6.22	4.59	1.67	1.71	1.71
Japan	2.89	4.25	3.43	2.74	3.20
Thailand	1.38	1.27	1.64	1.31	1.33
USA	3.29	N/A	2.93	N/A	N/A

Source: Computed from UN Comtrade database

Table 23 shows the prices relative to Indian exports of natural rubber which help in understanding the substitution effect, if any. In 2015 and 2016, the prices of exports from other countries were less than that of India's. In 2017, each of the relative prices, except that of Thailand, have increased and it creates an advantage for Indian exporters to capture market shares of others. In 2018, China and Thailand export prices were cheaper than Indian export prices and in 2019, China, Germany and Thailand had cheaper export prices, rendering it difficult for India to enter and capitalize markets for exports of natural rubber.

Table 23: Unit values of Natural rubber, balata, gutta-percha, guayule, chicle and similar gums; in primary forms or in plates, sheets or strip (ITCHS 4001) exports from top exporting countries (in US$/kg) relative to India

Countries	2015	2016	2017	2018	2019
China	0.31	0.32	1.14	0.88	0.88
Germany	0.26	0.32	1.22	1.04	0.97
India	1.00	1.00	1.00	1.00	1.00
Japan	0.47	0.93	2.06	1.61	1.87
Thailand	0.22	0.28	0.98	0.76	0.78
USA	0.53	N/A	1.75	N/A	N/A

Source: Computed from UN Comtrade database

Tables 24 and 25 shows the prices relative to Indian exports of synthetic rubber and the analysis is similar as for natural rubber in the preceding paragraphs. In 2019, Germany, Japan and Thailand had dearer export prices for synthetic rubber, providing an excellent opportunity for India to enter markets and capture market sizes competitively vis-à-vis other exporters of synthetic rubber. In general, the edge in recent years seems to have emerged for India more for synthetic rubber than for natural rubber w.r.t major exporters in terms of price competitiveness.

Table 24: Unit values of Synthetic rubber and factice derived from oils, in primary forms or in plates, sheets or strip; mixtures of heading no. 4001 and 4002, in primary forms or in plates, sheets or strip (ITCHS 4002) exports from top exporting countries (in US$/kg)

Countries	2015	2016	2017	2018	2019
China	2.22	2.03	2.30	N/A	N/A
Germany	1.62	1.54	1.92	2.02	1.80
India	1.63	1.68	1.77	1.64	1.44
Japan	2.70	2.57	2.86	3.06	2.90
Thailand	1.40	1.38	1.81	1.51	2.10
USA	2.38	N/A	N/A	N/A	N/A

Table 25: Unit values of Synthetic rubber and factice derived from oils, in primary forms or in plates, sheets or strip; mixtures of heading no. 4001 and 4002, in primary forms or in plates, sheets or strip (ITCHS 4002) exports from top exporting countries (in US$/kg) relative to India

Countries	2015	2016	2017	2018	2019
China	1.36	1.21	1.30	N/A	N/A
Germany	0.99	0.92	1.08	1.23	1.25
India	1.00	1.00	1.00	1.00	1.00
Japan	1.65	1.53	1.62	1.86	2.01
Thailand	0.86	0.82	1.02	0.92	1.46
USA	1.46	N/A	N/A	N/A	N/A

Section 12: Summary

India is currently the sixth largest producer of NR in the world with one of the highest productivity (694,000 tonnes in 2017-18). Out of the total production capacity in India, around 75% is tapped.

India remains the 20th largest exporter of rubber in the world, from 2015-19. In terms of imports of rubber, it ranks 16th. USA, Germany, UAE, UK and Bangladesh are the countries which constituted the largest markets for India's rubber exports from 2015-2019 with export-value shares of 15%, 6%, 4%, 4% and 3% respectively. Indonesia, Thailand, China, South Korea and Japan are the countries from which India

imported rubber, in descending order of magnitude of import-values (US$), from 2015-2019 with import-value shares of 12%, 10%, 10%, 10% and 8% approx. respectively. Thus, Indian rubber imports of value around 50% were sourced from these five countries from 2015 to 2019.The market indicators for India in terms of rubber trade can be improved with respect to other major importers. The low values of Export Trade Intensity with respect to China, Japan and South Korea is a testimony to this. Lower values of the Competitiveness index between India and the major importing countries, particularly China and Mexico are also a testament to the untapped possibility of Indian exports of rubber and its articles. Unit values analysis of natural and synthetic rubber also point out that in recent years, though price competitiveness has improved for Indian synthetic rubber exports, the same cannot be ascertained for natural rubber, wearing out the possibility of capturing markets for Indian exports for the latter 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 rubber items (at the 6-digit ITC- HS level)is based on the UN Comtrade data for year 2019.

ARGENTINA	MALAYSIA
AUSTRALIA	MEXICO
AUSTRIA	NETHERLAND
BAHARAIN IS	OMAN
BELGIUM	POLAND
BRAZIL	PORTUGAL
BULGARIA	ROMANIA
CANADA	RUSSIA
CHINA P RP	SERBIA
CZECH REPUBLIC	SINGAPORE
DENMARK	SLOVAK REP
FRANCE	SLOVENIA
GERMANY	SOUTH AFRICA
HUNGARY	SPAIN
INDONESIA	SWEDEN
ISRAEL	THAILAND
ITALY	TURKEY
KOREA RP	U K
LITHUANIA	U S A
UKRAINE	VIETNAM SOC REP

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,

RCAij = (xij/Xit)/(xwj/Xwt)
where xij = country i's exports of commodity j
Xit = country i's total exports
xwj= world exports of commodity j
Xwt= total world exports.
When RCAij > 1, i.e. when j's weight in i's exports (xij/Xit) is more than j's weight in world exports (xwj/Xwt), country i is said to have a revealed comparative advantage in commodity j. There is a revealed comparative disadvantage if RCAij < 1. When RCAij = 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. (xij/Xit) may have risen less or fallen more than proportionately than (xwj/Xwt).

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 = (xij/Xit)/(mkj/Mkt), where
mkj = import of commodity j to market k
Mkt= world imports of commodity k.
(mkj/Mkt) gives the weight of j in market k. So, if RCAij 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 = (mij/Mit)/(mwj/Mwt)
where mij = country i's imports of commodity j
Mit = country i's total imports
mwj= world imports of commodity j
Mwt= 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 = $1 - \sum (\left| mik - xij \right| /2)$, where
mik= share of commodity i in the imports of market k
xij = 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 mik and xij 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).
TII = (xij/Xit)/(xwj/Xwt)
where xij = country i's exports to country j
Xit = country i's exports to the world
xwj = world exports to country j
Xwt = 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 is low, and if TCI is high, bilateral trade can very well be increased through trade agreements.

6. Arelated indicator is the Export Similarity Index (XSI), which helps us identify a country's competitors.
XSI = $\sum$ [min (Xij, Xik)*100]
where Xij= share of commodity i in exports of country j
Xik= share of commodity i in exports of country k
XSI can vary between 0 and 100. It will be seen that when Xij= Xik for all i's, XSI = 100, which means complete export similarity between countries j and k. As Xij and Xik 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.

$HI = \sqrt{[\sum Sq(xi/Xt)]}$

where xi is the country's exports of commodity i

Xt 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).

$IITjk = 1 - [\sum | Xijk - Mijk | / (Xijk + Mijk)]$

where Xijk = exports of products of industry i from country j to country k

Mijk = 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).