ISID Institute for Studies in Industrial Development
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India's Trade in Pharmaceutical Products:
A Method for the Classification of Pharmaceutical Products and Recent Trends

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India's Trade in Pharmaceutical Products: A Method for the Classification of Pharmaceutical Products and Recent Trends

Reji K. Joseph and Dinesh Kumar[*]

***Abstract**: It has been challenging for researchers to identify the appropriate classification for the identification of pharmaceutical products for undertaking cross-country comparisons in trade as various agencies, international and national, follow different classifications for the identification of pharmaceutical products. This paper proposes a new method, based on International Standard Industrial Classification (ISIC), for the identification of pharmaceutical products and categorisation of pharmaceutical products based on global best practices. The pharmaceutical products identified based on this new method of classification cover HS six-digit products from HS chapters 29 and 30 and captures pharmaceutical products more comprehensively. This study also provides a brief analysis of the trends in India's trade in pharmaceutical products based on new method.*

JEL Classification: F13; F14; L65

Keywords: Pharmaceutical industry, trade, formulations, active pharmaceutical ingredients

1. Introduction

Cross-country comparisons in trade in pharmaceutical products have been a challenging task for researchers as various agencies follow different classifications for the identification of pharmaceutical products. At national levels, agencies tend to use the World Customs Organization's Harmonised Commodity Description and Coding System (HS) of trade classification beyond 6-digit levels, which makes comparisons between countries very difficult as there is no harmonization at the global level beyond the 6-digit level. And different publications of international organisations like the World Trade Organization (WTO) do not use the same classification for the identification of products of the pharmaceutical industry. All these issues make it challenging for researchers to identify the appropriate classification for collecting data for the analysis of cross-border trade in pharmaceutical products. At the same time, it is also important to categorise pharmaceutical products into appropriate categories to get more insights. In this context,

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this paper aims to propose a method, based on International Standard Industrial Classification (ISIC) for the identification of pharmaceutical products from international trade statistics and categorisation of pharmaceutical products based on global best practices. It also provides a brief analysis of the trends in India's trade in pharmaceutical products based on this methodology.

The structure of the paper is as follows. Section 2 provides an overview of the various methods used by different agencies, national and international, for the identification of pharmaceutical products. Section 3 discusses in detail the proposed method for the identification of pharmaceutical products at HS six-digit level and classification of pharmaceutical products into different categories. Section 4 analyses recent trends in India's trade in pharmaceutical products using proposed method. Section 5 concludes with a recap of major findings.

2. Identification of Pharmaceuticals Products from International Trade Statistics

There is no uniform classification of pharmaceutical products being followed by various agencies, national and international, for compiling statistics on cross-border trade. This makes it difficult for researchers to analyse trade in pharmaceuticals. The World Trade Statistical Review of WTO (WTO 2021), a successor of the International Trade Statistics, published annually uses Standard International Trade Classification (SITC) division 54 for capturing trade in pharmaceuticals. SITC has concordance with HS at HS 6-digit level. Although the WTO International Trade Statistics report used to provide trade statistics separately for pharmaceuticals, its successor, the World Trade Statistical Review, has subsumed pharmaceuticals within the category of chemicals. The methodology for compilation of data makes clear that pharmaceuticals (SITC division 54) is treated as part of Chemicals (SITC section 5) [1].

However, some other publications of WTO and the products covered by the WTO plurilateral Agreement on Trade in Pharmaceutical Products (WTO Pharma Agreement) do not strictly follow SITC division 54. The coverage of pharmaceutical products is narrower, as compared to SITC, in the book *Promoting Access to Medical Technologies and Innovation: Intersections between public health, intellectual property and trade* that WTO jointly published with World Intellectual Property Organization (WIPO) and World Health Organization (WHO) (WTO, WIPO and WHO 2013). Whereas the coverage of pharmaceutical products in the WTO Pharma Agreement is wider as compared to SITC division 54.

[1] Methodology for estimating trade statistics in the report is available at https://www.wto.org/english/res_e/statis_e/wts2021_e/wts2021chapter04_e.pdf (accessed on 20 April 2022)

In India, there are a few government agencies – the Department of Pharmaceuticals (DoP) and Pharmaceuticals Export Promotion Council of India (Pharmexcil), that provide trade statistics for pharmaceutical products. The data provided by these agencies show that there is not much variation among their estimates. This indicates that they all follow the same classification for estimating trade in pharmaceuticals. We had accessed the HS codes at 8-digit level from the DoP in 2010 that was used for compiling trade statistics (Joseph, 2016). It contains more than 450 products at HS 8-digit level covering 129 HS 6-digit headings. A limitation of this classification for international comparisons is that the products are selectively identified at HS 8-digit level and therefore, for some product lines, we found that all HS 8-digit lines within the corresponding HS 6-digit level are not covered entirely. This means that the DoP classification although covers 129 HS 6-digit headings, all the 8-digit product lines coming under each of these 6-digit headings are not covered. Therefore, the HS 6-digit headings covered in the DoP classification cannot be used for international comparisons.

Similar is the case with the annexures of the WTO Pharma Agreement. The annexures cover a list of APIs which are identified using International Non-proprietary Names (INN) from WHO. They are also identified selectively beyond HS 6-digit levels.

The real challenge for researchers in identifying pharmaceutical products using the methodologies, which these organisations have adopted, lies not only in the variation in the coverage in terms of the number of HS 6-digit headings but also in the divergence of coverage in terms of the number of HS chapters covered. Divergence in the coverage of pharmaceutical products in the classifications followed by these organizations is provided in Table 1.

Table 1: Coverage of Pharmaceutical Products in different classifications

Details	*Number of HS 6-digit headings covered*	*Coverage of HS chapters (2-digit level)*
World Trade Statistical Review (2021) / SITC division 54	77	29, 30
WTO, WHO and WIPO (2013)	73	29, 30
WTO Pharma Agreement	219	28, 29, 30, 32, 34, 35, 38, 39
DoP	129	15, 17, 28, 29, 30, 35, 38, 56, 96

Source: Compiled by authors from WTO, WIPO and WHO (2013); WTO (2021); WTO Pharma Agreement (including it's annexures); and the list of pharmaceutical products accessed from DoP.

It is evident from the above discussion that various agencies are using different methods for the classification of pharmaceutical products in international trade. In India, the DoP use HS 8-digit level classification for collecting the data. However, this classification cannot be used for cross-country studies as HS classifications beyond the 6-digit level are country-specific. For example, Japan has HS product classification at 9-digit, the US at 10-digit and

India at 8-digit level. Even in those cases where countries follow 8-digit level classification, there doesn't need to be uniformity in terms of codes and their product coverage beyond the 6-digit level.[2] Therefore, cross-country analysis must be done at HS 6-digit level, which is accepted by all the countries.

HS Chapter 30 is devoted to pharmaceutical products. However, it does not cover active pharmaceutical ingredients, which is an important category of pharmaceutical products. Therefore, some studies (Joseph 2012, 2016; Chaudhuri 2021) have used SITC division 54, to make cross-country comparisons in trade in pharmaceutical products. In these studies, SITC sub-divisions 541 and 542 were used for capturing active pharmaceutical ingredients (APIs) and formulations, respectively. Although this classification enables international comparisons, the difference in the estimates based on this classification and the DoP classification is quite substantial (Table 2).

Table 2: Estimates of India's export of pharmaceutical products (in US $ Billion)

Details of Organisation / Publication	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
WTO, WHO and WIPO (2003)	13.7	14.1	14.0	15.4	17.5	19.5
WTO (2021) / SITC Division 54	14.0	14.4	14.3	15.8	17.9	20.1
DoP*	16.6	16.4	16.9	18.8	20.6	24.4

Source: Data compiled from World Integrated Trade Solution (WITS) except for DoP; data for DoP was compiled from it's annual reports (various years)

Note: * Data is in financial year.

We are proposing a new method that captures pharmaceutical products more comprehensively at HS 6-digit level.

2.1. A new method for the identification of pharmaceutical products

We use International Standard Industrial Classification (ISIC, Rev.4) for the identification of pharmaceutical products. ISIC division 2100 (Manufacture of pharmaceuticals, medicinal chemicals and botanical products) covers pharmaceutical products. As there is no direct concordance between ISIC and HS, we use the Central Product Classification (CPC, Ver.2.1), which has concordance with ISIC and HS to trace the concordance of ISIC division 2100 with HS. The CPC division 352 (pharmaceutical products) has concordance with ISIC division 2100. CPC also provides the concordance between its sub-divisions and HS 2007 at 4-digit and 6-digit levels. The HS 2007 codes at the 6-digit level which are in concordance with ISIC division 2100 are given in Table 3 (for detail see Annexure 1). We have categorised the 102 HS 6-digit codes into formulations, APIs, Bulk Medicines and Other Pharmaceutical Products.

[2] This issue is explained in more detail in Joseph and Kumar (2021).

Table 3: Classification of pharmaceuticals products at HS 6-digit level using ISIC-CPC-HS concordance

Formulations	292419	293627	293941	300331
300410	292423	293628	293942	300339
300420	292424	293629	293943	300390
300431	292429	293690	293949	300340
300432	293229	293711	293951	**Other Pharmaceuticals**
300439	293311	293712	293959	300610
300440	293319	293719	293961	300640
300450	293321	293721	293962	300650
300490	293352	293722	293963	300670
300220	293353	293723	293969	300120
300230	293354	293729	293991	300190
APIs	293355	293731	293999	300210
291821	293359	293739	294000	300290
291822	293369	293740	294110	300510
291823	293430	293750	294120	300590
292241	293500	293790	294130	300620
292242	293621	293810	294140	300630
292310	293622	293890	294150	300660
292320	293623	293911	294190	
292390	293624	293919	**Bulk Medicines**	
292411	293625	293920	300310	
292412	293626	293930	300320	

Our categorisation of pharmaceutical products into four categories is based on the definition of pharmaceutical products used by various international agencies. The WHO defines a pharmaceutical product as "any substance or combination of substances marketed or manufactured to be marketed for treating or preventing disease in human beings, or with a view to making a medical diagnosis in human beings, or to restoring, correcting or modifying physiological functions in human beings".[3] The Directive of the European Union on Community Code for Medicinal Products also uses a similar definition.[4] Regarding the identification of a product based on implications for 'restoring, correcting or modifying physiological functions in human beings', the European Court of Justice (ECJ), in a few judgements, has directed that medicinal properties in a product

[3] https://extranet.who.int/pqweb/content/glossary (accessed on 22 April 2022)

[4] See Article 1 of the Directive 2001/83/EC of the European Parliament and of the Council on Community Code for Medicinal Products for Human Use.

should be the criteria for identification of medicinal products in such situations (MHRA 2020). Therefore, the use of ISIC for the identification of products belonging to the pharmaceutical industry is appropriate.

The US Code of Federal Regulations Title 21, which is on food and drugs, defines a finished dosage form (formulation) as a "tablet, capsule, solution, etc. that contains an active drug ingredient generally, but not necessarily, in association with inactive ingredients" and API as "any component that is intended to furnish pharmacological activity or other direct effects in the diagnosis, cure, mitigation, treatment, or prevention of disease, or to affect the structure or any function of the body of man or other animals"[5]. In India, similar definitions of formulations and APIs are used in the guidelines of the Product Linked Incentive (PLI) Scheme for APIs, Drug Intermediates (DIs) and Key Starting Materials (KSMs). A formulation is defined as "a finished dosage form, for example, capsule, tablet, solution, injectable, ointment, semisolid, etc. that contains an active drug ingredient along with other ingredients" and API is defined as "any substance or mixture of substances intended to be used in the manufacture of a drug (medicinal) product and that, when used in the production of a drug, becomes an active ingredient of that drug. Such substances are intended to furnish pharmacological activity or other direct effects in diagnosis, cure, mitigation, treatment, or prevention of disease or to affect the structure or function of the body".

Some publications (WTO, WIPO and WHO, 2013 and Helble 2012) classify HS chapter 3003 as a separate category called Bulk Medicines. HS 3003 contains "medicaments constituting two or more constituents which have been mixed together for therapeutic or prophylactic uses, not put up in measured doses or in forms or packings for retail sale". This HS 4-digit heading contains APIs mixed with other ingredients. As products under this heading have not been put into dosage forms, they cannot be considered as formulations. The European Agency for the Evaluation of Medicinal Products' (EMEA) Note for Guidance on Start of Shell Life of the Finished Dosage Form (EMEA 2001) points out that the date of production of a batch (of formulations) is defined as the date in which the first step is performed for combining an API with other ingredients. Therefore, from that date onwards treatment of that product as an API will cease to exist. Therefore, we also categorise products under HS heading 3003 as Bulk Medicines.

There are some pharmaceutical products, apart from formulations, that are used in the treatment of diseases like band-aids. Some of the regulatory agencies define disease to include injury. The Human Medicines Regulations 2012 of the UK defines disease to include "any injury, ailment or adverse condition, whether of body or mind".[6] Those pharmaceutical products, which are not formulations, but have some therapeutic uses and therefore are used in the treatment of diseases, come under the category of other

[5] Code of Federal Regulations, Title 21, Volume 4, https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=210.3

[6] Regulation 8, https://www.legislation.gov.uk/uksi/2012/1916/regulation/8/made?view=plain

pharmaceutical products. In CPC, these products are classified as other pharmaceutical products and other articles for medical or surgical purposes. We classify such products as other pharmaceutical products.

This method for the classification of pharmaceutical products has reduced the variation with the DoP estimates considerably (Table 4).

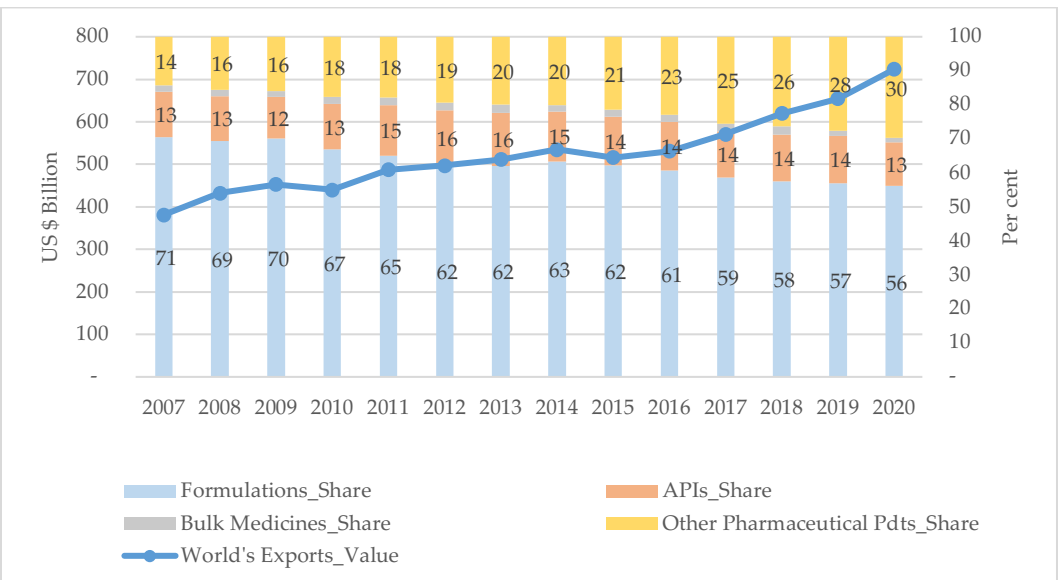
Table 4: Comparison of estimates of India's export in pharmaceutical products (in US $ Billion)

Details of Organisation / Publication	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
WTO, WIPO, and WHO (2003)	13.7	14.1	14.0	15.4	17.5	19.5
WTO (2021) / SITC Division 54	14.0	14.4	14.3	15.8	17.9	20.1
DoP*	16.6	16.4	16.9	18.8	20.6	24.4
Our classification based on ISIC	15.1	15.6	15.6	17.4	19.6	22.0

Source: Same as Table 2.
Note: * Data from DoP is in financial year.

Although our method of classification is covering only two HS chapters – 29 and 30, it captures pharmaceutical products more comprehensively. This classification covers 102 HS 6-digit headings as against much fewer headings covered by WTO, WIPO and WHO (2003); and WTO (2021)/SITC Division 54 (refer to Table 1). This classification covers only two HS chapters against nine chapters covered by the DoP classification, but our estimates are quite close to that of DoP. The total world's trade in pharmaceutical products (exports), based on our method of classification, is provided in Figure 1.

Figure 1: World's total export of pharmaceutical products



Source: Compiled from WITS

The global export of pharmaceutical products increased from USD 453 billion in 2009 to USD 724 billion in 2020. Formulations account for the highest share, followed by other pharmaceuticals and APIs. Bulk medicines constitute - a very small share in pharmaceutical exports.

3. Analysis of Recent Trends in Exports and Imports

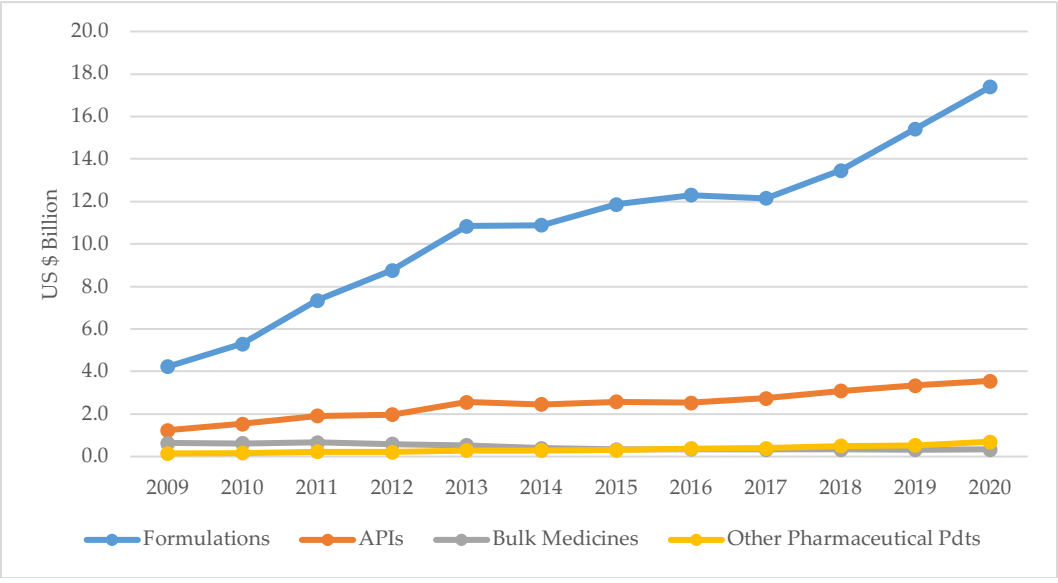
This section provides an analysis of trends in India's trade in pharmaceutical products based on our method of classification. As explained in the previous section, the concordance that we traced between ISIC and HS using CPC is based on HS 2007. In WITS, the trade data of India based on HS 2007 is available from 2009 onwards. Therefore, this analysis starts from 2009.

3.1. Global position of India in the export of pharmaceutical products

India exported USD 22 billion worth of pharmaceutical products in 2020 (Figure 2). Formulations is the leading export category accounting for more than three-fourths share (79 per cent) in 2020. APIs had a share of 16 per cent in the same year. Bulk medicines and other pharmaceutical products constitute the remaining 5 per cent of exports.

In relation to value, India ranks 11 among the leading pharmaceuticals exporting countries, accounting for a 3 per cent share in 2020 (Table 5). Germany is the leading country in exports. With respect to volume, however, India's global position is 6.

Figure 2: India's export of pharmaceutical products



Source: Same as Figure 1

Table 5: India's Global Position in the Pharmaceutical Industry in 2020

Value				*Volume*			
Ranking	*Country*	*Exports in 2020 (in US $ Billion)*	*Share in World's Exports (%)*	*Ranking*	*Country*	*Exports in 2020 (in 1000 MT)*	*Share in World's Exports (%)*
1	Germany	103	14.3	1	China	3,796	30.7
2	Switzerland	102	14.1	2	Germany	1,186	9.6
3	Ireland	80	11.1	3	USA	634	5.1
4	USA	52	7.2	4	France	597	4.8
5	Belgium	52	7.2	5	Netherlands	455	3.7
6	France	40	5.5	6	India	441	3.6
7	Italy	36	5	7	Italy	383	3.1
8	China	31	4.3	8	Spain	358	2.9
9	Netherlands	29	4.1	9	UK	358	2.9
10	UK	28	3.9	10	Indonesia	311	2.5
11	India	22	3	11	Belgium	302	2.4
World's Exports (Value)		724		World's Exports (Volume)		12,383	

Source: Same as Figure 1

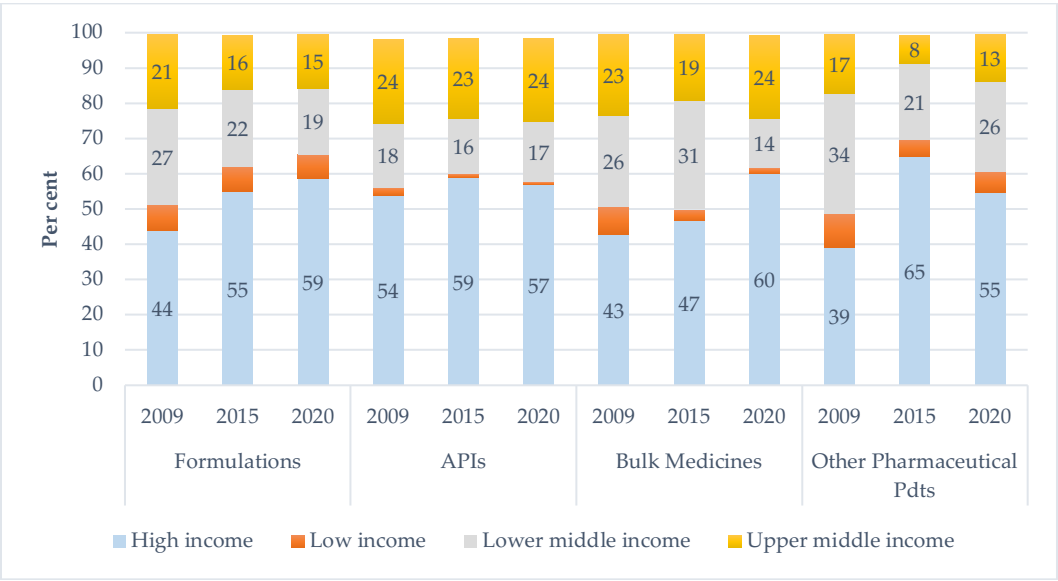
Although India has an overall share of 3 per cent in the world's pharmaceutical exports, in certain categories of pharmaceutical products, the share is even more. The following table (Table 6) gives the category-wise share in exports, both in terms of value and volume and India's ranking in 2020. Exports to high-income countries account for the largest share of India's exports of all categories of pharmaceutical products (Figure 3)

Table 6: India's share (category-wise) in the world's total export of pharmaceutical products both in terms of value and volume of exports (per cent)

Category	*Value*				*Volume*			
	2009	*2015*	*2020*	*Ranking (2020)*	*2009*	*2015*	*2020*	*Ranking (2020)*
Formulations	1.3	3.7	4.3	10	13.2	9.6	6.3	5
APIs	2.2	3.5	3.8	7	1.9	2.7	1.7	12
Bulk Medicines	8.8	3.1	3.5	10	22.3	7.5	8.2	2
Other Pharmaceuticals	0.2	0.3	0.3	21	2.6	1.4	1.4	16
Total	1.4	2.9	3	11	7.3	5.3	3.6	6

Source: Same as Figure 1

Figure 3: India's export of pharmaceutical products, country groups wise (per cent)



Source: Same as Figure 1

3.2. Export, Import and Balance of Trade

India is having a surplus in the trade in pharmaceuticals in general (Table 7). However, when it comes to different categories of pharmaceutical products, formulations and bulk medicines have shown trade surplus consistently. In the case of other pharmaceuticals, there is a trade deficit in all the three time-points covered in the analysis. In APIs, the trade balance shows a surplus after 2009. Following table provides details of trade in different categories of pharmaceutical products.

Table 7: Category-wise trends in India's global trade in pharmaceutical products (in US $ Billion)

Category	*2009*			*2015*			*2020*		
	Export	*Import*	*BOT*	*Export*	*Import*	*BOT*	*Export*	*Import*	*BOT*
Formulations	4.23	0.80	3.43	11.87	1.16	10.71	17.39	1.43	15.96
APIs	1.24	1.32	-0.08	2.57	2.36	0.21	3.56	3.38	0.18
Bulk Medicines	0.63	0.05	0.58	0.33	0.03	0.29	0.34	0.07	0.27
Other Pharmaceuticals	0.15	0.23	-0.08	0.30	0.42	-0.12	0.70	0.98	-0.28
Total (all the above categories)	6.25	2.40	3.85	15.07	3.98	11.09	21.99	5.85	16.13

Source: Same as Figure 1

3.2.1. Formulations

The US is the leading destination for formulation exports, accounting for more than one-third share in 2020 (Table 8). The top 10 export destinations account for 59 per cent of

India's export in formulations in 2020. India is having a trade surplus with all these countries.

The concentration is lower in sources of imports as compared to destinations of exports. The leading source country accounts for 20 per cent of India's import of formulations in 2020. Unlike in the case of exports, India is having a trade deficit with some of the source countries. Interestingly, the leading source countries include a few countries from the developing world (Table 9).

Nearly half of India's import of formulations is in the category of AYUSH medicines. Switzerland, US, Germany and Belgium are the leading suppliers of these formulations (Table 10). Vaccines and insulin are the other two leading formulation categories that are being imported. Much of the imports from other developing countries – Brazil, China and Indonesia are in these two categories. Details of formulations imported from these three countries are given in Tables 11, 12 and 13.

Table 8: Major destinations for export of formulations

Country	*2009*		*2015*		*2020*	
	Share (%)	*BOT (US $ Bn.)*	*Share (%)*	*BOT (US $ Bn.)*	*Share (%)*	*BOT (US $ Bn.)*
United States	24.2	0.9	38.5	4.4	38.6	6.5
South Africa	3.9	0.2	4.0	0.5	3.9	0.7
United Kingdom	4.8	0.2	3.7	0.4	3.1	0.5
Russian Federation	5.7	0.2	2.9	0.3	2.3	0.4
Nigeria	3.5	0.1	3.2	0.4	2.3	0.4
Canada	0.7	0.0	1.1	0.1	1.7	0.3
Brazil	2.2	0.1	1.8	0.1	1.7	0.2
Germany	1.9	0.0	1.1	0.0	1.6	0.2
Australia	1.3	0.1	1.5	0.2	1.6	0.3
France	1.4	0.0	1.2	0.1	1.5	0.2
Total	49.6	1.9	58.9	6.4	58.6	9.7

Source: Same as Figure 1

Table 9: Major sources for India's import of formulations

Country	*2009*		*2015*		*2020*	
	Share (%)	*BOT (US $ Bn.)*	*Share (%)*	*BOT (US $ Bn.)*	*Share (%)*	*BOT (US $ Bn.)*
Belgium	5.7	0.0	5.5	0.0	20.4	0.0
United States	11.4	0.9	17.2	4.4	13.1	6.5
Switzerland	36.7	-0.3	7.3	-0.1	13.0	-0.2
Germany	9.1	0.0	13.8	0.0	8.0	0.2
Netherlands	1.3	0.1	3.8	0.1	6.9	0.1

Country	*2009*		*2015*		*2020*	
	Share (%)	*BOT (US $ Bn.)*	*Share (%)*	*BOT (US $ Bn.)*	*Share (%)*	*BOT (US $ Bn.)*
France	4.5	0.0	6.6	0.1	6.8	0.2
Brazil	0.2	0.1	5.2	0.2	5.4	0.2
Denmark	5.7	0.0	3.8	0.0	4.9	0.0
Indonesia	3.3	0.0	11.0	-0.1	4.2	0.0
Italy	6.5	-0.1	5.6	-0.1	3.4	0.0
United Kingdom	2.6	0.2	3.7	0.4	3.3	0.5
China	2.7	0.0	6.1	-0.1	2.2	0.0
Total	89.5	0.9	89.7	4.8	91.4	7.4

Source: Same as Figure 1

Table 10: Major imported formulations and their leading sources in 2020 (HS 6-digit wise, in US $ Million)

HS 6 digit	*World*	*Belgium*	*Brazil*	*China*	*Denmark*	*France*	*Germany*	*Indonesia*	*Italy*	*Netherlands*	*Switzerland*	*UK*	*US*
Ayurvedic, Unani, Homoeopathic, Siddha or Biochemic systems medicaments (300490)	732.4	75.5	0.6	11.9	34	22.7	94.5	7.8	23.3	47.5	145.6	41.7	141.5
Vaccines for human use (300220)	339.5	128.3	0	17.1	2.9	67.4	0.8	51.5	2.8	37.8	0.5	2.5	18.4
Insulin (300431)	207.4	60.4	74.3	0.2	33.4	4.1	11.5	-	19	3.4	-	0	0.1
Pituitary hormones; Prednisolone; Dexamethasone; Danazol; Other progestogen and oestrogen group hormones (300439)	52.9	7.7	0	0	0	0.4	3.6	-	0.5	3.6	25.5	0.2	6.3
Certain antibiotics such as cephalosporins, fluoroquinolones, etc. (300420)	38.6	13.1	0.6	0.9	0.2	0.1	3.1	-	0.8	1.8	9.4	0	3.2
Vaccines for veterinary use (300230)	30.1	5.6	1.3	-	-	1.5	-	0.4	0.9	4.3	-	-	8.6
Certain antibiotics, containing penicillin, etc. (300410)	14.7	0.2	0	1.3	0	0	0.1	-	0.5	0	0	0.9	7.4
Vitamins (300450)	5.8	-	-	0.1	-	0	0.1	-	-	0.2	4.4	0.1	0.1
Containing alkaloids, salbutamol, bromhexine, etc. (300440)	3.9	-	0	0.1	0	0.1	0	-	0.1	0.1	-	0.5	2.1
Corticosteroid hormones and their derivatives (300432)	3.8	0.2	-	-	-	0	0	-	-	0	0	0.9	0.1
Total	1,429	291	77	32	70	96	114	60	48	99	185	47	188

Source: Same as Figure 1

Table 11: Major formulations imported from Brazil (HS 8-digit level)

HS 8-digit Code	Description	2019-20 (US$ Mn.)	2020-21 (US$ Mn.)	Share in 2020-21 (%)
30043110	Insulin injection	72.7	78.5	95.6
30023000	Vaccines for veterinary medicine	2.5	1.6	1.9
30049099	Other medicines put up for retail sale	0.6	0.8	1.0
India's total import of formulations from Brazil		77.1	82.1	100.0

Source: Compiled from DGFT

Table 12: Major formulations imported from China (HS 8-digit level)

HS 8-digit Code	Description	2019-20 (US$ Mn.)	2020-21 (US$ Mn.)	Share in 2020-21 (%)
30049099	Other medicines put up for retail sale	16.5	10.6	36.0
30022017	Vaccine for Japanese encephalitis	18.8	8.5	28.9
30022012	Vaccines for hepatitis	4.0	2.7	9.2
30022019	Other single vaccines	2.1	2.1	7.0
30022016	Anti-rabies vaccine	1.4	1.3	4.5
30041030	Amoxicillin in capsules, injections etc.	0.7	0.9	3.0
India's total import of formulations from China		49.4	29.5	100.0

Source: Same as in Table 11

Table 13: Major formulations imported from Indonesia (HS 8-digit level)

HS 8-digit Code	Description	2019-20 (US$ Mn.)	2020-21 (US$ Mn.)	Share in 2020-21 (%)
30022014	Vaccines for polio	68.6	45.9	74.5
30049099	Other medicine put up for retail sale	4.5	7.1	11.4
30022019	Other single vaccines	12.9	3.9	6.4
30022018	Vaccines for whooping cough (pertussis)	2.3	2.3	3.7
30022013	Vaccines for tetanus	1.4	1.5	2.4
30023000	Vaccines for veterinary medicine	0.1	1.0	1.6
India's total import of formulations from Indonesia		89.6	61.6	100.0

Source: Same as in Table 11

3.2.2. APIs

The US is the leading destination for the export of APIs, accounting for 12 per cent share in 2020 (Table 14). China is the next leading export destination. Although India is heavily dependent on China for KSMs/DIs/APIs, China is a leading destination for the export of APIs. Even in the case of some APIs in which India is reported to be heavily dependent on China for its imports, a study by Joseph and Kumar (2021) finds that India is still exporting the same API to China. However, India has a huge trade deficit with China in APIs.

Table 14: Major destinations for the export of APIs

Country	*2009*		*2015*		*2020*	
	Share (%)	*BOT (US $ Mn.)*	*Share (%)*	*BOT (US $ Mn.)*	*Share (%)*	*BOT (US $ Mn.)*
United States	17.3	142	12.2	211	11.5	317
China	4.4	-791	3.8	-1,518	4.9	-2,170
Brazil	4.2	49	3.9	99	4.6	157
Germany	4.3	19	5.4	81	4.0	88
Switzerland	1.7	5	2.5	41	3.9	113
Turkey	3.4	42	4.6	118	3.5	121
Italy	2.1	-16	3.1	1	3.4	0
Belgium	2.0	20	1.6	33	3.2	53
Netherlands	2.4	18	3.6	51	3.2	80
Bangladesh	2.3	29	2.6	67	3.0	102
Total for the above countries	44.1	-484	43.4	-817	45.3	-1,139

Source: Same as Figure 1

China is the most important source for APIs imports. It's share in India's total import of APIs has increased from 64 per cent in 2009 to 69 per cent in 2020 (Table 15). And India has a huge trade deficit with China in APIs, which is keep rising. India is also having trade deficit with a few other countries; but as compared to the trade deficit with China, these deficits are very small. Interestingly, there is a rise in imports from Hong Kong in the recent period which is reflected by the rise in the share of that country in India's total imports of APIs, registering a trade deficit of $53 million in 2020. It needs to be verified whether China is re-routing their exports to India through Hong Kong.

Table 15: Major sources for India's import of APIs

Country	*2009*		*2015*		*2020*	
	Share (%)	*BOT (US $ Mn.)*	*Share (%)*	*BOT (US $ Mn.)*	*Share (%)*	*BOT (US $ Mn.)*
China	63.9	-791	68.3	-1,518	69.3	-2,170
Italy	3.1	-16	3.4	1	3.6	0
United States	5.4	142	4.4	211	2.8	317
Belgium	0.4	20	0.4	33	1.9	53
Spain	2.5	6	2.1	17	1.8	34
Hong Kong	0.4	7	0.2	7	1.8	-53
Germany	2.7	19	2.5	81	1.6	88
Japan	1.4	-1	0.8	46	1.4	36
Denmark	3.2	-38	1.9	-43	1.4	-43
Singapore	0.5	9	0.4	20	1.4	24
Total for the above countries	83.5	-643	84.4	-1145	87.0	-1714

Source: Same as Figure 1

3.2.3. Bulk medicines and other pharmaceuticals

Bulk medicines and other pharmaceutical products constitute a very low share in India's trade in pharmaceutical products. The leading export destinations and sources of imports of these two categories are given in the following tables (Tables 16 and 17).

Table 16: India's major export destinations and sources of imports for bulk medicines (in 2020)

Exports			*Imports*		
Country	*Share (%)*	*BOT (US $ Mn.)*	*Country*	*Share (%)*	*BOT (US $ Mn.)*
United States	21.2	72.0	China	25.0	-9.0
Germany	5.7	34.4	Germany	22.9	4.3
Belgium	4.1	21.0	Canada	17.5	-0.3
Mexico	3.9	13.1	Nepal	16.1	-8.6
Brazil	3.9	13.0	Belgium	10.7	6.9
Colombia	3.8	12.7	Korea, Rep.	3.8	2.6
Chile	3.5	11.7	Austria	0.8	-0.5
Canada	3.3	22.7	United States	0.6	71.1
Netherlands	3.3	11.1	France	0.5	5.1
Spain	2.5	8.5	New Zealand	0.5	0.2
China	2.2	23.8	Romania	0.4	0.6
Total for the above countries	57.4	244.0	Total for the above countries	98.8	72.4

Source: Same as Figure 1

Table 17: India's major export destinations and sources of imports for other pharmaceutical products (in 2020)

Exports			*Imports*		
Country	*Share (%)*	*BOT (US $ Mn.)*	*Country*	*Share (%)*	*BOT (US $ Mn.)*
United States	29.1	316.1	South Korea	27.4	-267.3
Netherlands	5.3	46.9	Switzerland	16.6	-159.4
Canada	5.0	36.3	China	13.9	-135.0
Morocco	4.5	31.2	United States	11.5	91.0
Sri Lanka	3.5	25.6	Germany	4.4	-31.9
United Kingdom	2.6	41.8	France	3.5	-28.3
Peru	2.5	17.1	Belgium	3.4	-32.7
Venezuela	2.3	16.2	Austria	2.8	-27.6
Spain	1.9	28.3	United Kingdom	2.4	-5.6

Exports			*Imports*		
Country	*Share (%)*	*BOT (US $ Mn.)*	*Country*	*Share (%)*	*BOT (US $ Mn.)*
Germany	1.6	54.4	Italy	1.6	-12.2
Philippines	1.6	10.9	Spain	1.5	-1.9
Nepal	1.5	10.2	Hong Kong	1.2	-9.3
Total for the above countries	61.2	634.9	Total for the above countries	90.4	-620.2

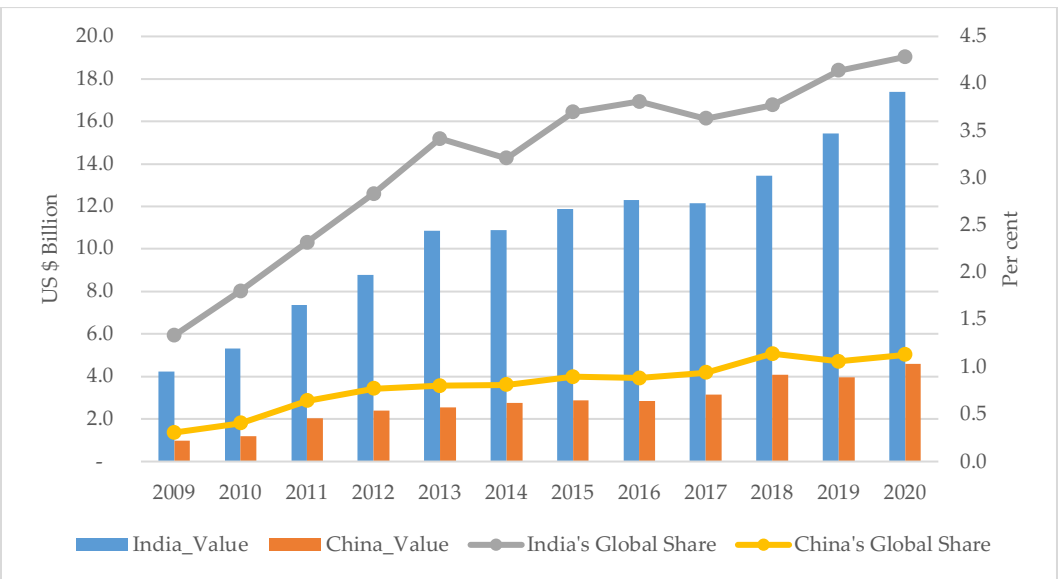
Source: Same as Figure 1

4. Comparison of India and China in Export Performance in Formulations and APIs

4.1. Formulations

India's exports of formulations, in terms of value of exports, have been growing at a higher pace as compared to that of China (Figure 4). As a result, the share of India in global exports of formulations increased from 1.3 per cent in 2009 to 4.3 per cent in 2020 while the share of China increased from 0.3 per cent to 1.1 per cent during the same period.

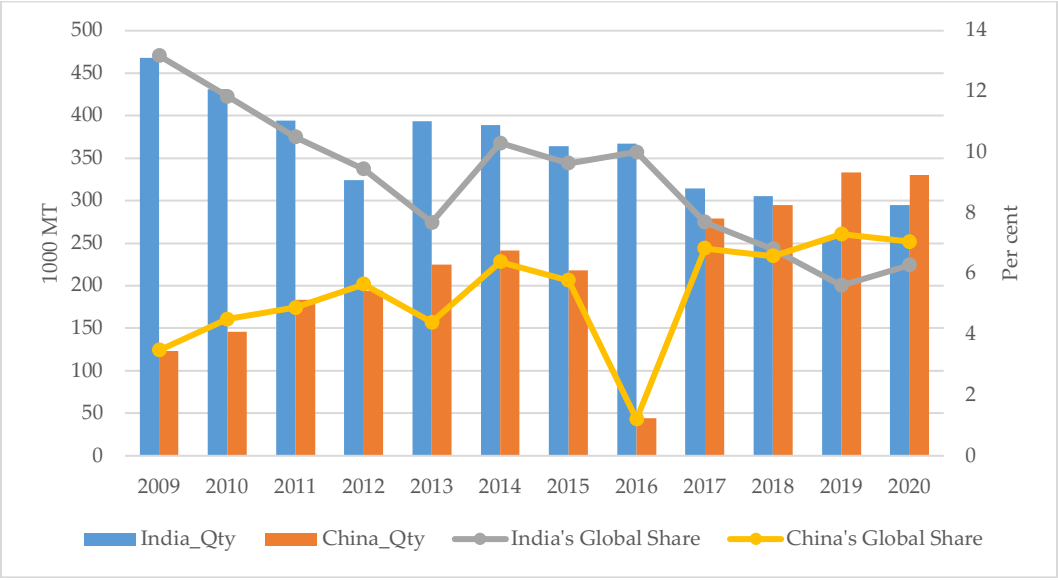
Figure 4: Global exports of formulations by India and China in terms of value of exports



Source: Same as Figure 1

In terms of volume of exports, India's export of formulations has been declining over the years while China's exports have been increasing (Figure 5). In fact, China has overtaken India by 2019. A growing value of exports while the declining volume of exports indicates that India is increasingly exporting more value-added formulations.

Figure 5: Global exports of formulations by India and China in terms of volume of exports



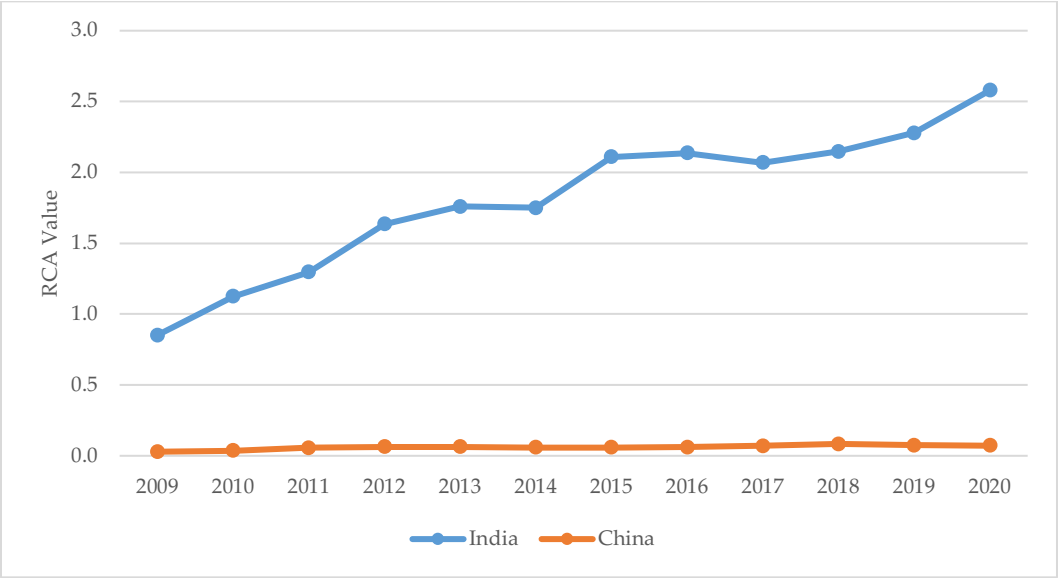
Source: Same as Figure 1

An analysis of the revealed comparative advantage (RCA) of exports of formulations by India and China is undertaken to get a better understanding of the advantage that these two countries enjoy globally. RCA is an index of the export performance of a country with respect to a particular commodity that captures the comparative advantage of that commodity. The RCA of a particular commodity is measured by the share of that commodity in the country's total exports relative to the country's share in the total world exports. RCA index may take values from zero to infinity with values greater than one indicate the existence of comparative advantage or in other words, the product is competitive in global markets. While interpreting the RCA index, one should also keep in mind that changes in a country's total export can have corresponding changes in the RCA index of a commodity.

The results of the RCA analysis presented in Figure 6 show that China's RCA index is much below 1 and it has been stagnant at 0.1 for the past many years. Whereas this index of India has been rising constantly and it has reached 2.5 in 2020.

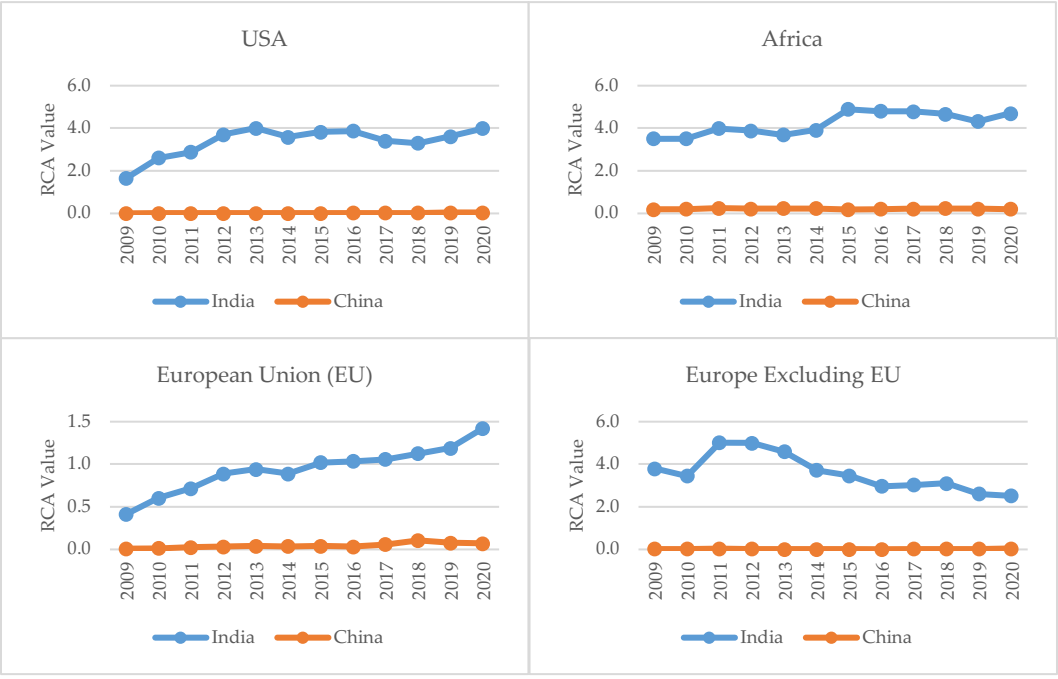
A region-wise RCA analysis is also undertaken to compare the advantage that these two countries are having in different regions (Figure 7). It shows that India's RCA value is above 1 in all the regions with Africa having the highest value followed by the US. The RCA value of China is below 1 in all the regions.

Figure 6: RCA index of India and China in the export of formulations



Source: Same as Figure 1

Figure 7: Region-wise RCA in the export of formulations by India and China



Source: Same as Figure 1

4.2. APIs

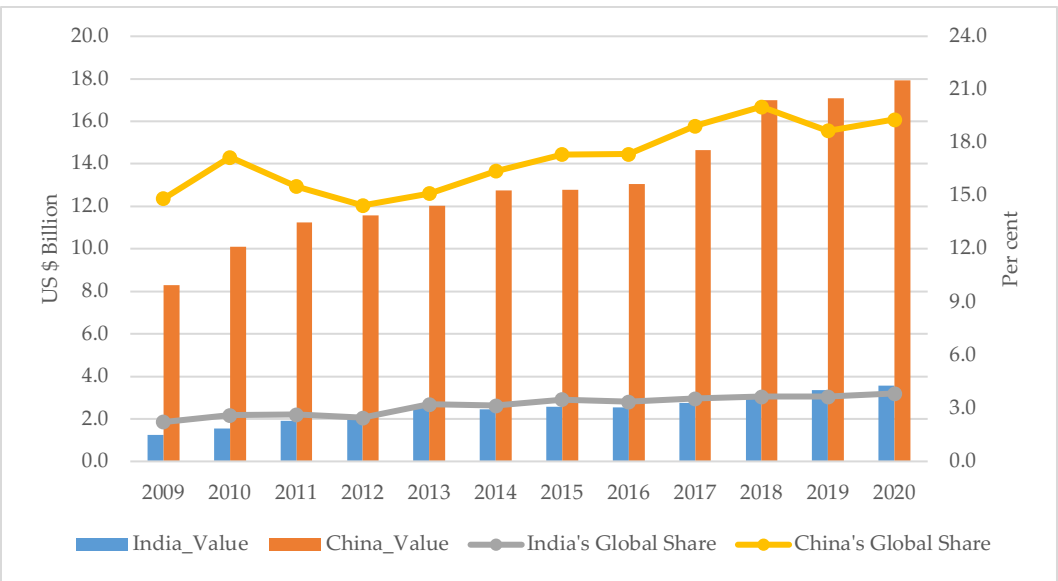
In terms of the value of exports of APIs, exports from China exhibit a faster growth as compared to exports from India (Figure 8). As a result, the share of China in global exports of APIs increased from 15 per cent in 2009 to 19 per cent in 2020 whereas the share of India increased from 2 per cent to 4 per cent during the same period.

Export of APIs in terms of volume has increased over the years for China whereas the same for India was stagnant, except for a few years (Figure 9). The increase in the value of exports of China is matched by the increase in the volume of exports. Whereas in the case of India, even when the export volume remained stagnant, the value of exports increased. This shows that India's export of APIs is characterised by higher value addition, same as in the case of formulations.

The RCA analysis shows that the exports of APIs from both countries have RCA value above 1 (Figure 10). The RCA value of APIs from India has steadily increased from 1.4 in 2009 to 2.3 in 2020 whereas the same for China slightly declined from 1.4 to 1.2 over the same period.

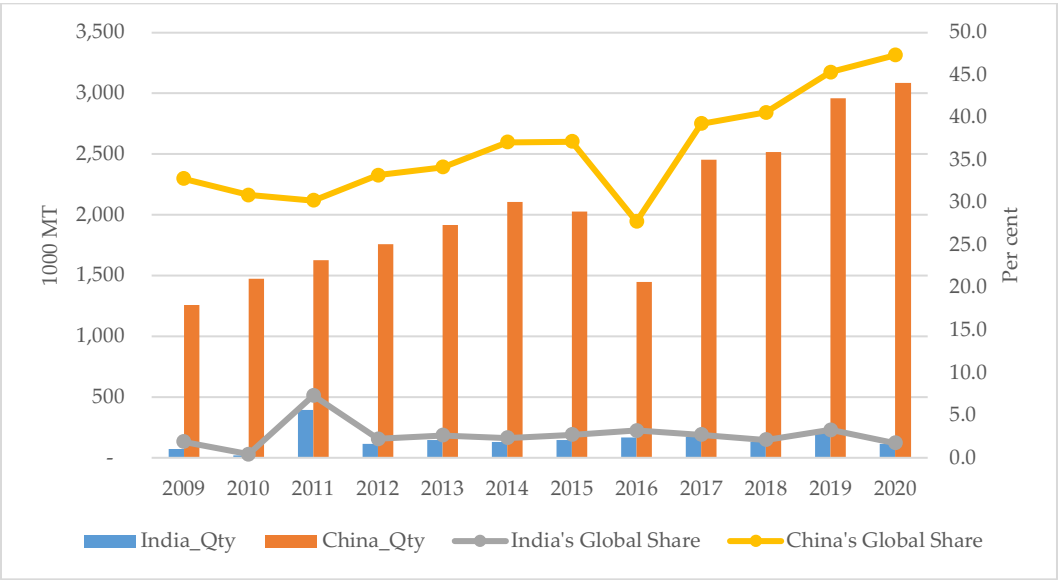
The region-wise RCA shows that the RCA value for APIs from India is higher in all the regions (Figure 11). The RCA value is less than one for China in the US.

Figure 8: Global exports of APIs by India and China in terms of the value of exports



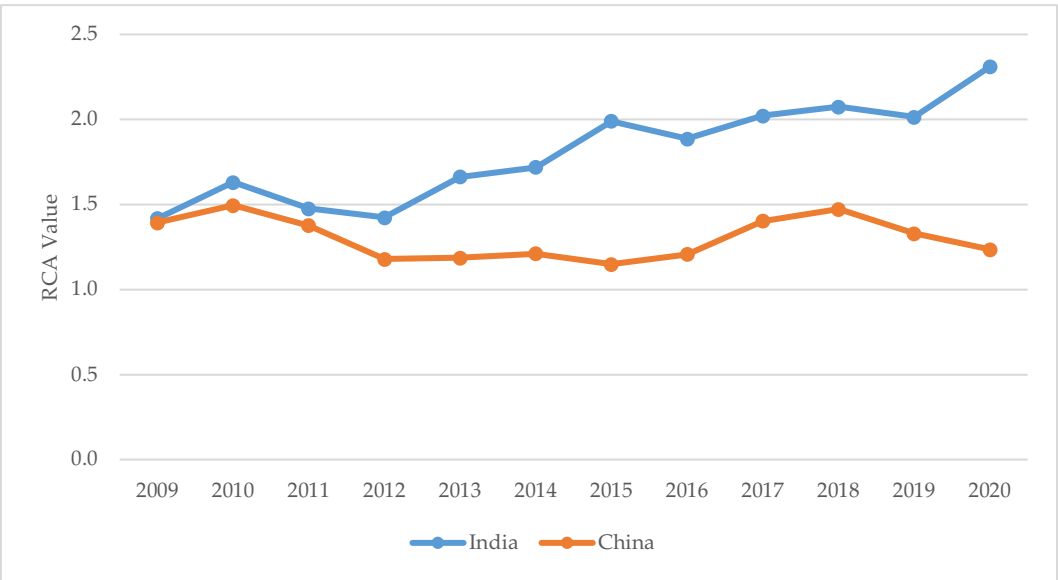
Source: Same as in Figure 1

Figure 9: Global exports of APIs by India and China in terms of volume of exports



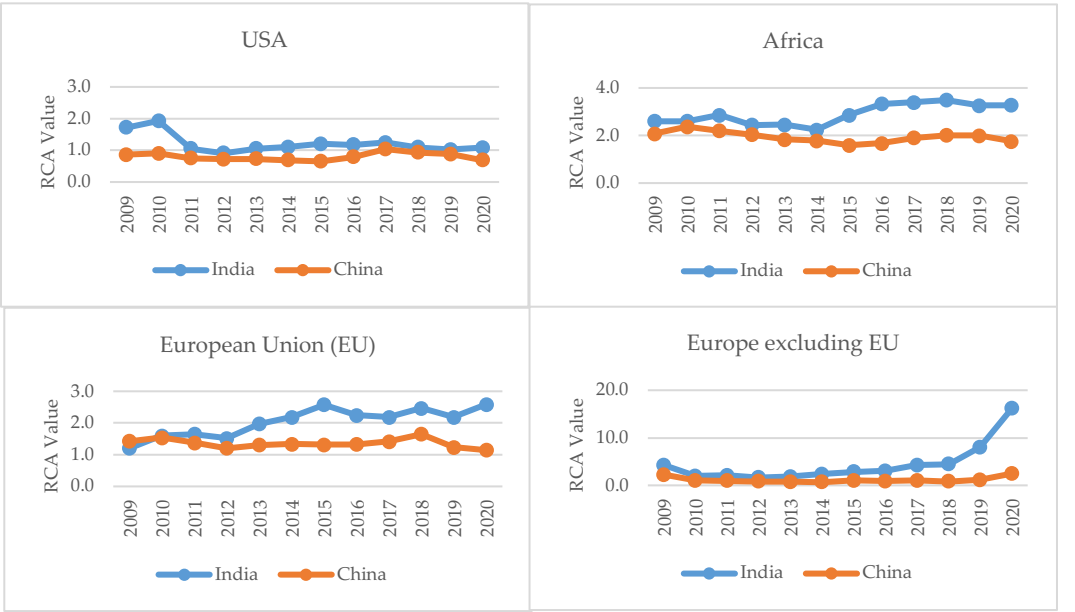
Source: Same as Figure 1

Figure 10: RCA of India and China in export of APIs



Source: Same as Figure 1

Figure 11: Region-wise RCA in the export of APIs by India and China



Source: Same as in Figure 1

The lower RCA value of China in APIs may be explained by the lower share that APIs have in the total exports of China. This doesn't necessarily indicate that exports of APIs from China are declining. The higher RCA value for APIs from India means that in the given export basket of India vis-a-vis China, APIs is a product category that is better equipped to compete with Chinese competition in the global market.

The RCA value of APIs from India has been growing steadily and it has reached almost the level of formulations (refer to Figure 6). For India, this implies that APIs have become as competitive as formulations in the international market.

India's higher RCA value in the export of APIs, as compared to China, which is the largest supplier of KSMs/DIs/APIs globally is not surprising. The study of Joseph and Kumar (2021) which analysed the export performance of those APIs covered in the phase-1 PLI scheme in the pharmaceuticals sector found that exports from India registered higher RCA values in different categories of APIs. The Phase-1 PLI covered those APIs (and DIs and KSMs) in which India is heavily dependent on China for imports and this scheme aimed at reducing the import dependence. Joseph and Kumar (2021) point out that in most cases it is likely that the import from China is in KSMs and DIs, which unfortunately is not captured due to data constraints. These products are then processed into APIs in India. The study of Dutta and Gajbhiye (2021), which investigated the drivers of India's exports in pharmaceutical products finds that it is the cheaper imports of raw materials and not the capabilities acquired through research and development (R&D) that are driving its exports. Cheaper imports from China have on the one hand made Indian pharmaceutical products, especially APIs, more competitive in the global

market, but on the other, it made the Indian pharma industry complacent in acquiring innovation capabilities that would have made the industry even more competitive.[7]

5. Concluding Remarks

The method that we used for the classification of pharmaceutical products is more comprehensive, as compared to the methods followed by various national and international organizations, in capturing pharmaceutical products from international trade statistics. As this classification is based on HS 6-digit lines, cross-country comparisons can be easily made.

The comparison that we made in this paper on the export performance of formulations and APIs by India and China brings out interesting results. In formulations, the RCA value for India is rising steadily and has reached 2.5 in 2020. This is quite expected as the Indian pharmaceutical industry is known as the pharmacy of the world. The RCA value of formulations for China is close to zero. It is also found that India is increasingly exporting more value-added formulations.

In APIs also a similar trend is found except that the RCA value for China is above 1. The higher RCA value of Indian APIs, which is also growing steadily, indicates the prospects that this category holds for India. But the advantage that India has globally in APIs is determined by the import of cheaper raw materials (KSMs and DIs) from China. This makes India very concerned about any disruption in the supplies from China, both in terms of price and quantity.

The Government of India's efforts to promote domestic production of KSMs/DIs/APIs has not generated the kind of enthusiasm that was expected from the industry. The strategy to achieve self-reliance or reduce import dependence should also ensure that the competitiveness that the Indian pharmaceutical industry is having globally is not affected adversely. There are various factors such as the large scale of operations, availability of raw materials, better technologies, etc. that make KSMs/DIs/APIs from China cheaper. We need to identify those factors which can make production in India competitive.

Leaving this task entirely to the private sector industry may not yield the intended results. Instead, the Government need to work together with the industry in identifying them and using them to our advantage. It has been pointed out that the production of some APIs from wasted fruits and vegetables could be a good option for India. The approach of the US Government in reducing import dependence on pharmaceutical ingredients is useful in this regard. In order to secure pharmaceutical supply chains, US Government worked with the industry to identify technology areas where investment needs to be made and accordingly the US Department of Health and Human Services committed an initial allocation of $60 million for the development of novel platform technologies to increase the domestic manufacturing of ingredients.

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[7] In the case of formulations, India is having the highest number of USFDA approved manufacturing facilities outsie the US. This gives Indian formulations an edge over generic formulations from other countries in the highly regulated markets.

References

Chaudhuri, Sudip (2021), *India's Import Dependence on China in Pharmaceuticals: Status, Issues and Policy Options*, Discussion Paper No. 268, Research and Information System for Developing Countries, New Delhi.

Dutta, Shibanjan and Gajbhiye, Dhirendra (2021), 'Drivers of Indian Pharmaceutical Exports', *RBI Bulletin*, July, pp.49-57, https://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/03AR_15072021B75D322EF39B4B3A83C9B918B459A759.PDF

EMEA (European Agency for the Evaluation of Medicinal Products), (2001), *Note for Guidance on Start of Shell Life of the Finished Dosage Form*, London, https://www.ema.europa.eu/en/documents/scientific-guideline/note-guidance-start-shelf-life-finished-dosage-form-annex-note-guidance-manufacture-finished-dosage_en.pdf

Helble, Matthias (2012), *More Trade for Better Health? International trade and tariffs on health products*, Staff Working Paper ERSD 2012-17, WTO, Geneva.

Joseph, Reji K. (2012), "Policy Reforms in the Indian Pharmaceutical Sector since 1994: Impact on exports and imports", *Economic and Political Weekly*, Vol. XLVII, No. 18, pp. 62-72.

Joseph, Reji K. (2016), *Pharmaceutical Industry and Public Policy in Post-Reform India*, Routledge, Oxon, New York and New Delhi.

Joseph, Reji K. and Kumar, Ramaa Arun (2021), *Reducing Import Dependence on APIs in the Indian Pharmaceuticals Sector: An Analysis of Early Experience of the PLI Phase-I Scheme*, Working Paper No. 239, Institute for Studies in Industrial Development, New Delhi.

MHRA (Medicines and Healthcare products Regulatory Agency) (2020*), A Guide to What is a Medicinal Product*, MHRA Guidance Note 8, Department of Health and Social Care, United Kingdom.

WTO (2021), *World Trade Statistical Review 2021*, Geneva, https://www.wto.org/english/res_e/statis_e/wts2021_e/wts2021_e.pdf

WTO, WIPO, WHO (2003), *Promoting Access to Medical Technologies and Innovation: Intersections between public health, intellectual property and trade*, Geneva.

Annexure

Appendix 1: List of identified Pharmaceutical Products at HS-6 digit

Category	*HS 6-digit*	*Description*
Formulations	300410	Medicaments containing penicillins/derivatives thereof with a penicillanic acid structure/streptomycins/their derivatives, put up in measured doses/forms/packings for RS
Formulations	300420	Medicaments containing other antibiotics (excl. of 3004.10), put up in measured doses/forms/packings for RS
Formulations	300431	Medicaments containing insulin, put up in measured doses/forms/packings for RS
Formulations	300432	Medicaments containing corticosteroid hormones, their derivatives & structural analogues, put up in measured doses/forms/packings for RS
Formulations	300439	Medicaments containing hormones/other products of 29.37 but not containing antibiotics, put up in measured doses/forms/packings for RS
Formulations	300440	Medicaments containing alkaloids/derivatives thereof but not containing hormones/other products of 29.37/antibiotics, put up in measured doses/forms/packings for RS
Formulations	300450	Medicaments containing vitamins/other products of 29.36 (excl. of 3004.10-3004.40), put up in measured doses/forms/packings for RS
Formulations	300490	Medicaments (excluding goods of heading 30.02/30.05/30.06/3004.10-3004.50) consisting of mixed/unmixed products for therapeutic/prophylactic uses, put up in measured doses (including those in the form of transdermal administration systems)/in forms/packi
Formulations	300220	Vaccines for human medicine
Formulations	300230	Vaccines for veterinary medicine
APIs	291821	Salicylic acid & its salts
APIs	291822	O-Acetylsalicylic acid, its salts & esters
APIs	291823	Esters of salicylic acid & their salts, other than salicylic acid & its salts/O-acetylsalicylic acid & its salts & esters
APIs	292241	Lysine & its esters; salts thereof
APIs	292242	Glutamic acid & its salts
APIs	292310	Choline & its salts
APIs	292320	Lecithins & other phosphoaminolipids
APIs	292390	Quaternary ammonium salts & hydroxides; lecithins & other phosphoaminolipids, whether/not chemically defined (excl. of 2923.10 & 2923.20)
APIs	292411	Meprobamate (INN)
APIs	292412	Fluoroacetamide (ISO), monocrotophos (ISO)&phosphamidon (ISO)
APIs	292419	Acyclic amides (including acyclic carbamates, excl. of 2924.11& 2924.12)&their derivatives; salts thereof
APIs	292423	2-Acetamidobenzoic acid (N-acetylanthranilic acid) & its salts
APIs	292424	Ethinamate (INN)
APIs	292429	Cyclic amides (incl. cyclic carbamates) & their derivatives (excl. of 2924.21-2924.24); salts thereof

Category	*HS 6-digit*	*Description*
APIs	293229	Lactones (excl. coumarin, methylcoumarins & ethylcoumarins)
APIs	293311	Phenazone (antipyrin) & its derivatives
APIs	293319	Heterocyclic comps. containing an unfused pyrazole ring (whether/not hydrogenated) in the structure (excl. phenazone & its derivatives)
APIs	293321	Hydantoin & its derivatives
APIs	293352	Malonylurea (barbituric acid) & its salts
APIs	293353	Allobarbital (INN), amobarbital (INN), barbital (INN), butalbital (INN), butobarbital, cyclobarbital (INN), methylphenobarbital (INN), pentobarbital (INN), phenobarbital (INN), secbutabarbital (INN), secobarbital (INN) & vinylbital (INN); salts thereof
APIs	293354	Derivatives of malonylurea (barbituric acid) (excl. of 2933.53); salts thereof
APIs	293355	Loprazolam (INN), mecloqualone (INN), methaqualone (INN) & zipeprol (INN); salts thereof
APIs	293359	Heterocyclic comps. containing a pyrimidine ring (whether/not hydrogenated)/piperazine ring in the structure (excl. of 2933.52-2933.55)
APIs	293369	Heterocyclic comps. containing an unfused triazine ring (whether/not hydrogenated) in the structure, other than melamine
APIs	293430	Compounds containing in the structure a phenothiazine ring-system (whether/not hydrogenated), not further fused
APIs	293500	Sulphonamides
APIs	293621	Vitamins A & their derivatives
APIs	293622	Vitamin B1 & its derivatives
APIs	293623	Vitamin B2 & its derivatives
APIs	293624	D- /DL-Pantothenic acid (Vitamin B3/Vitamin B5) & its derivatives
APIs	293625	Vitamin B6 & its derivatives
APIs	293626	Vitamin B12 & its derivatives
APIs	293627	Vitamin C & its derivatives
APIs	293628	Vitamin E & its derivatives
APIs	293629	Vitamins & their derivatives, unmixed (excl. of 2936.10-2936.28)
APIs	293690	Provitamins&vitamins, natural/reproduced by synthesis (including natural concentrates), derivatives thereof used primarily as vitamins,&intermixtures of the foregoing, whether/not in any solvent,n.e.s.in Ch 29.36
APIs	293711	Somatotropin, its derivatives & structural analogues
APIs	293712	Insulin & its salts
APIs	293719	Polypeptide hormones, protein hormones & glycoprotein hormones, their derivatives & structural analogues (excl. of 2937.11 & 2937.12)
APIs	293721	Cortisone, hydrocortisone, prednisone (dehydrocortisone) & prednisolone (dehydrohydrocortisone)
APIs	293722	Halogenated derivatives of corticosteroidal hormones
APIs	293723	Oestrogens & progestogens
APIs	293729	Steroidal hormones, their derivatives & structural analogues (excl. of 2937.21-2937.23)
APIs	293731	Epinephrine

Category	*HS 6-digit*	*Description*
APIs	293739	Catecholamine hormones other than epinephrine, their derivatives & structural analogues
APIs	293740	Amino-acid derivatives
APIs	293750	Prostaglandins, thromboxanes & leukotrienes, their derivatives & structural analogues
APIs	293790	Hormones, prostaglandins, thromboxanes & leukotrienes, natural/reproduced by synthesis(excl. of 2937.11-2937.50); derivatives & structural analogues thereof, including chain modified polypeptides, used primarily as hormones
APIs	293810	Rutoside (rutin) & its derivatives, natural/reproduced by synthesis
APIs	293890	Glycosides, other than rutoside (rutin) & its derivatives, natural/reproduced by synthesis, & their salts, ethers, esters & other derivatives
APIs	293911	Concentrates of poppy straw; buprenorphine (INN), codeine, dihydrocodeine (INN), ethylmorphine, etorphine (INN), heroin, hydrocodone (INN), hydromorphone (INN), morphine, nicomorphine (INN), oxycodone (INN), oxymorphone (INN), pholcodine (INN), thebacon
APIs	293919	Alkaloids of opium (excl. of 2939.11) & their derivatives; salts thereof
APIs	293920	Alkaloids of cinchona&their derivatives; salts thereof
APIs	293930	Caffeine & its salts
APIs	293941	Ephedrine & its salts
APIs	293942	Pseudoephedrine (INN) & its salts
APIs	293943	Cathine (INN) & its salts
APIs	293949	Ephedrines & their salts, other than ephedrine, pseudoephedrine (INN) & cathine (INN)
APIs	293951	Fenetylline (INN) & its salts
APIs	293959	Theophylline & aminophylline (theophylline-ethylenedia-mine) & their derivatives (excl. of 2939.51); salts thereof , n.e.s.
APIs	293961	Ergometrine (INN) & its salts
APIs	293962	Ergotamine (INN) & its salts
APIs	293963	Lysergic acid & its salts
APIs	293969	Alkaloids of rye ergot & their derivatives (excl. of 2939.61-2939.63); salts thereof
APIs	293991	Cocaine, ecgonine, levometamfetamine, metamfetamine (INN), metamfetamine racemate; salts, esters & other derivatives thereof
APIs	293999	Vegetable alkaloids, natural/reproduced by synthesis, & their salts, ethers, esters & other derivatives (excl. of 2939.11-2939.91)
APIs	294000	Sugars, chemically pure, other than sucrose, lactose, maltose, glucose&fructose; sugar ethers, sugar acetals&sugar esters,& their salts (excl. of 29.37/29.38/29.39)
APIs	294110	Penicillins & their derivatives with a penicillanic acid structure; salts thereof
APIs	294120	Streptomycins & their derivatives; salts thereof
APIs	294130	Tetracyclines & their derivatives; salts thereof
APIs	294140	Chloramphenicol & its derivatives; salts thereof
APIs	294150	Erythromycin & its derivatives; salts thereof

Category	*HS 6-digit*	*Description*
APIs	294190	Antibiotics & their derivatives (excl. of 2941.10-2941.50); salts thereof
Bulk Medicines	300310	Medicaments containing penicillins/derivatives thereof with a penicillanic acid structure/streptomycins/their derivatives, not put up in measured doses/forms/packagings for RS
Bulk Medicines	300320	Medicaments consisting of 2/more constituents, containing other antibiotics (excl. of 3003.10), not put up in measured doses/forms/packagings for RS
Bulk Medicines	300331	Medicaments containing insulin, not put up in measured doses/forms/packagings for RS
Bulk Medicines	300339	Medicaments containing hormones/other products of 29.37 but not containing antibiotics (excl. meds. containing insulin), not put up in measured doses/forms/packagings for RS
Bulk Medicines	300390	Medicaments (excluding goods of heading 30.02, 30.05/30.06/of 3003.10-3003.40) consisting of two/more constituents which have been mixed together for therapeutic/prophylactic uses, not put up in measured doses/in forms/packings for retail sale
Bulk Medicines	300340	Medicaments containing alkaloids/derivatives thereof but not containing hormones/other products of 29.37/antibiotics, not put up in measured doses/forms/packagings for RS
Other Pharmaceuticals Products	300610	Sterile surgical catgut, similar sterile suture materials (including sterile absorbable surgical/dental yarns)&sterile tissue adhesives for surgical wound closure; sterile laminaria&sterile laminaria tents; sterile absorbable surgical/dental/veterinary p
Other Pharmaceuticals Products	300640	Dental cements & other dental fillings; bone reconstruction cements
Other Pharmaceuticals Products	300650	First-aid boxes & kits
Other Pharmaceuticals Products	300670	Gel preparations designed to be used in human/veterinary medicine as a lubricant for parts of the body for surgical operations/physical examinations/as a coupling agent between the body & medical instruments
Other Pharmaceuticals Products	300120	Extracts of glands/of other organs/of their secretions
Other Pharmaceuticals Products	300190	Glands&other organs for organo-therapeutic uses, dried, whether/not powdered; heparin&its salts; other human/animal substances prepared for therapeutic/prophylactic uses, n.e.s./incld.
Other Pharmaceuticals Products	300210	Antisera & other blood fractions & modified immunological products, whether/not obt. by means of biotechnological processes
Other Pharmaceuticals Products	300290	Human blood; animal blood prepared for therapeutic/prophylactic/diagnostic uses; toxins, cultures of micro-organisms (excl. yeasts) & similar products

Category	*HS 6-digit*	*Description*
Other Pharmaceuticals Products	300510	Adhesive dressings & other articles having an adhesive layer
Other Pharmaceuticals Products	300590	Wadding, gauze, bandages & similar articles (eg. dressings, adhesive plasters, poultices), impregnated/coated with pharmaceutical substances/put up in forms/packings for retail sale for medical, surgical, dental/veterinary purposes(excl. of 3005.10)
Other Pharmaceuticals Products	300620	Blood-grouping reagents
Other Pharmaceuticals Products	300630	Opacifying preparations for X-ray examinations; diagnostic reagents designed to be administered to the patient
Other Pharmaceuticals Products	300660	Chemical contraceptive preparations based on hormones/other products of 29.37/spermicides

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