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India's Integration into the World Economy—Intensifying, but Still Ample Potential for Improvement

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Abstract

- With respect to its GDP of markedly more than US$ 2,000 billion, India is the seventh largest economy in the world, with respect to population it is even the second largest. Therefore, India has a substantial market potential.
- The authors analyze in how far the fast growing Indian economy has unexploited options to integrate itself into the international division of labor, to what extent India is actually integrated into the world economy, and what are the country's regional and sectoral trade patterns. India's integration patters are analyzed between the poles of a global and a regional design during the last two decades.
- These issues are addressed by using a detailed dataset of India's foreign trade statistics, and from a more analytical perspective by virtue of a gravity model.
- It turns out that India's overall integration into the international division of labor is still far from being completed and leaves ample room for improvement. So far, India is trading intensely with some specific partners, like the USA, and particularly with the Arabian countries around the Arabian Gulf.
- These quite distinct links are more or less the result of the commodity pattern of India's export and import flows, primarily the exchange of crude oil with oil products, and intermediate inputs as well as finalized products of the jewelry industry. One can conclude that the increasing dominance of these product lines are one of the main drivers behind the apparent shift towards Asian trading partners in general, as the trading partners' analysis by continents reveals.
- In addition, India's mutual trade relations with China have greatly improved during the observation period. During these two decades, China and its special economic zone Hong Kong constantly gained importance as one of India's trading partner according to the results of the gravity model.
- With respect to the labor-intensity of commodity exports India is lagging behind. It has left space to its Asian competitors.
- Even exports to the USA which have retained their position as prime export destination—albeit with a shrinking export share—have been dominated by the two prominent product lines of jewelry and mineral oil products.
- Looking at European partners there is still ample space for India to integrate more intensely in the pertinent international division of labor with most of the European countries. Only on India's export side the former links to the United Kingdom as the old colonial power seem to be rather intact, and also Germany has over proportional links to India, at least with respect to India's exports.

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INDIA'S INTEGRATION INTO THE WORLD ECONOMY—INTENSIFYING, BUT STILL AMPLE POTENTIAL FOR IMPROVEMENT

Claus-Friedrich Laaser und Astrid Rosenschon

1 Motivation and Stylized Facts

India's Prime Minister Narendra Modi visited Germany at the end of Mai 2017 for the fourth (biannual) intergovernmental consultations and met German chancellor Angela Merkel. As a result of their consultations both sides agreed on a closer cooperation between both countries: This meant, among other objectives, more development aid and additional investment in India, but also an intensifying of mutual trade relations.[1] Their declaration was made in a period of increasing challenges to free trade: (i) the staggering trade relations with Russia after the EU sanctions against Russia and Russian counter-sanctions following the Ukraine crisis since 2014, (ii) the British vote for a "Brexit" in 2016, and (iii) the announcement of the newly elected president of the United States, Donald Trump, to pursue a distinct protectionist and mercantilist policy in favor of the USA.

Given these actual or at least looming threats to trade relations, one could expect that new opportunities for seeking and finding allies in favor of uninhibited trade flows will be opened up. In this context it is hardly surprising that not only China comes to the fore, but also India. Measured by population figures and its labor force, India is the second largest market in the world economy after China (Table 1).

Table 1:
Key data of India and the other countries with more than 100 million inhabitants, 2015

Country	Population in in million persons	Labor force in million persons[a]	GDP per capita in current US$	Market size[b]	Export quota[c]
China	1,371	806	8,027	11.0	22.09
India	1,311	497	1,598	2.1	19.94
United States	321	161	56,115	18.0	12.55
Indonesia	258	124	3,346	0.9	21.09
Brazil	208	110	8,539	1.8	13.04
Pakistan	189	65	1,435	0.3	10.59
Nigeria	182	56	2,640	0.5	10.66
Bangladesh	161	79	1,212	0.2	17.34
Russian Federation	144	77	9,093	1.3	29.50
Mexico	127	56	9,005	1.1	35.36
Japan	127	65	32,477	4.1	17.90
Philippines	101	44	2,904	0.3	28.19

[a]2014.—[b]GDP in trillion current US$.—[c]Exports of goods and services in percent of GDP.

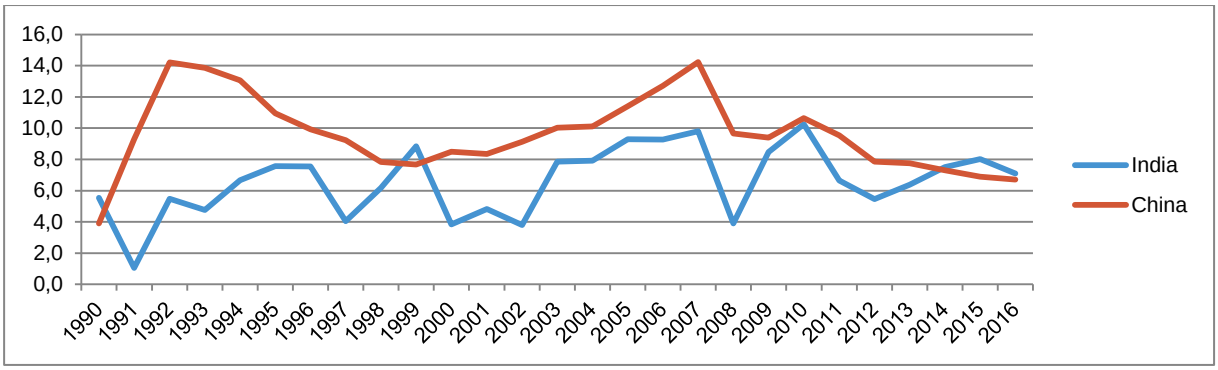
Source: World Bank (2015/2016); own compilation.

[1] Cf. Presse- und Informationsamt der Bundesregierung (2017: 3), *FAZ* (2017), and *ZEIT online* (2017).

Although the economic importance of India does not match this rank—India's total GDP of US$ 2.1 trillion as a measure of the country's economic market potential can be regarded only as the fourth largest among the countries with the highest population figures[2]—, the country appears to be an interesting market anyway. This is even truer as during Modi's visit to Germany a new study by Felbermayr et al. (2017) was published. It says that there exists an ample potential for intensifying mutual trade relations and that the integration between Germany and India is far from complete. A free trade agreement with India would be of benefit to both parties according to this study and might boost German GDP by EUR 4.6 billion per year.[3] Such a free trade agreement between the European Union (EU) and India has been at the negotiation table for a whole decade now. But negotiations were tough and even officially interrupted in 2013 due to controversial positions on the most pressing issues. Moreover, attempts to resume negotiations in 2015 were not successful, and mayor disagreements on the most crucial liberalizations are still persisting.[4]

The plea for a free trade agreement raises several questions: Is it really possible that India as an important—and in the last years fast growing[5]—country has left substantial options to integrate itself into the international division of labor unexploited, not only with Germany? To what extent is India actually integrated into the world economy? And with whom and with which commodities India is mainly trading? Is India's integration pattern of a global or more of a regional design? Has India's integration pattern markedly changed over the years?

Figure 1:
GDP growth in India and China, 1990–2016[a]



[a]Annual growth rates of GDP in percent.

Source: World Bank (2015/2016/2017); own compilation.

For a large country as India, one would expect that foreign trade relations are less intensive, at least if the domestic market is large enough. On the other hand: a relatively poor country might be dependent on capital goods imports although the product pattern of India also contains modern commodities like sophisticated vehicles. Preliminary evidence by aggregate data renders a multi-

[2] India's yearly per capita income (GDP per capita in current US$) with US$ 1,598 in 2015 was only one fifth of that of China. In the group of countries with more than 100 million inhabitants even Indonesia and Nigeria reached an income level twice resp. one and two thirds as high as India.
[3] Cf. also *FAZ* (2017) citing this study.
[4] Cf. *Spiegel Online* (2015); *FAZ* (2017); Statista (2017).
[5] To be sure, immediately after the reforms of 1991 India's growth record needed time to develop. At the same time, China grew faster during most of the period since then (Figure 1). But with the exception of 2000 to 2002 and the crisis year 2008, India's nominal growth reached rates of 6 to 10 percent since the millennium and even surpassed China in the most recent years.

faceted picture. Table 1 reveals that India's export quota—as measured by the World Bank (2016) for both goods and services—does not appear to lag behind that of China to a large degree: India reports a quota of 20 percent in 2015 which is only 2 percentage points less than that of China. And China has not for nothing been targeted by US president Trump as an export nation which is endangering US markets and jobs. Moreover, India's export quota is 7.5 resp. 2 percentage points larger than those of the large and, at the same time, rich advanced economies United States and Japan. Both can certainly rely to a substantial degree on the high purchasing power of their domestic customers and are less dependent on earning revenues from foreign markets (Table 1). On the other hand it is also true that larger European countries, such as France and Italy, exhibit an export quota around 30 percent.

As regards trading partners, one should expect closer trade ties from India towards Europe, given the long colonial history under the reign of the Commonwealth. Therefore, not only Germany's role in India's trade pattern deserves attention, but the role of Europe and the European Union as a whole.

Hence, we will try to analyze Indian foreign trade patterns in more detail: how it has developed in the last two decades, which trading partners have become the closest allies of Indian firms, which commodity patterns are governing Indian trade flows, and, lastly, how India's foreign trade can be characterized from a more analytical perspective—that of a gravity model. These issues will be addressed in the following paragraphs. And we will try to answer the questions raised above in this contribution, whereby we use a detailed dataset of India's foreign trade statistics from 1996–1997 to 2014–2015.

2 Increasing Trade Intensity since 2003

The comprehensive albeit slow reform process in India from a highly regulated and widely state-controlled economy towards a somewhat more open market system commenced in 1991 under the Rao Government when India had fallen into a balance of payments crisis. It was driven by the then Secretary of Finance Manmohan Singh (who became Prime Minister later on). At the beginning, this process brought (i) a devaluation of the Rupee, (ii) it abolished – among others – the severe import licensing system (the trade side of the "License Raj"), (iii) it put bureaucratic export subsidies to an end, and it brought (iv) a liberalization of earning foreign exchange for enterprises, which ended two years later in the Rupee convertibility on the trade account (Das 2012: 215–219). In sum, the reform speed was rather low. Opening up to foreign trade and loosening domestic regulations were among the first steps to be taken, but progressed slowly.[6] Nevertheless, Bhagwati and Panagariya (2014) point to an increasing trade-to-GDP ratio which resulted from these measures. However, trade growth appears to have remained at a moderate level in the first years after the reforms at least until the millennium[7], maybe because GDP growth rates increased only slowly in the first years after commencing the reforms, as Drèze and Sen (2014: 43–44) point out. Moreover, the study by

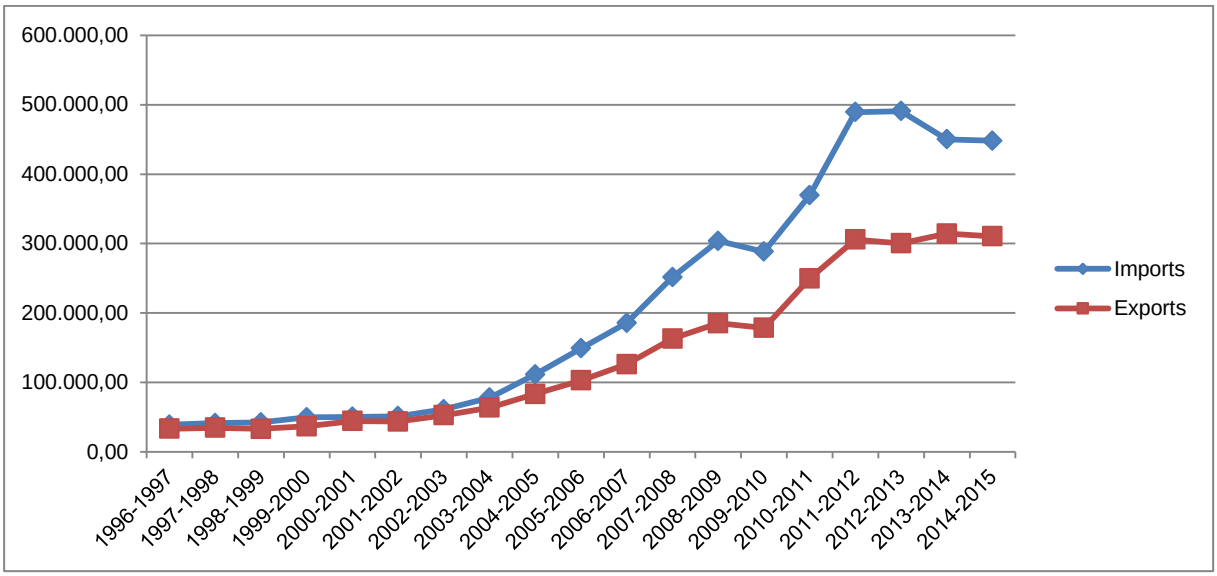
[6] Others, like privatization of public enterprises, labor market deregulation, or permitting foreign direct investment in strategic branches were late or even not all on the agenda and are partly discussed still now (Drèze and Sen 2014: 43–44).

[7] According to Bhagwati and Panagariya (2014: 31) the trade-to-GDP ratio, i.e., exports plus imports in relation to GDP was 17 percent in 1990–1991 and increased to more than 50 percent at the end of the 2000s. This is in line with the trade database we can dispose of and which commenced in 1996–1997: In the first year of our data the rate of exports plus imports to GDP had not increased to more than 22 percent.

Felbermayr et al. (2017) shows that the opening up to foreign trade has been incomplete and relatively high import tariffs have remained in place.

The slow trade growth was true even for absolute values of trade flows in nominal terms. Looking at data of exports and imports of goods only, i.e., commodity trade without services, shows that import flows did not exceed the threshold of US$ 50 billion until 1999–2000 while exports reached this level not before 2002–2003 (Figure 2).[8]

Figure 2:
India's exports and imports, 1996–1997 to 2014–2015 (million US$)[a]



[a]Exports and imports of goods; yearly data from April to March, e.g., 2012–2013 means Apr'2012 to Mar'2013.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

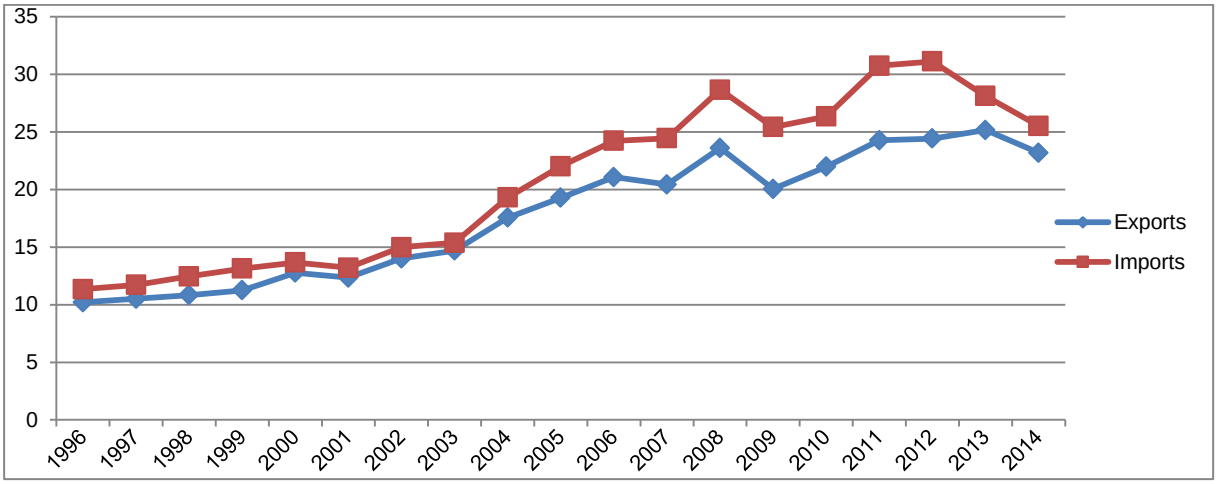
Afterwards from 2003 on, both export and import flows of India increased at a greater pace, a process which lasted until the outbreak of the global financial and economic crisis in 2008. In contrast to other countries such as Germany the downward movement of foreign trade figures in the course of the crisis was not that pronounced in India. The decline in 2009 was rather mild, and already in 2010 India's exports and imports again increased at an even faster pace, indicating a country which is not yet so much integrated into the world economy: It did not suffer so much from the crisis, and it had still potential to renew its path towards opening up its foreign trade relations. This renewed growth process came to a halt, however, in 2012, with imports declining to 450 billion and exports stagnating at around US$ 310 billion.

The remarkable increase of exports and imports since 2003 is by no means a mere inflationary process of nominal figures—it did not just accompany the growth of India's GDP at the same pace. This becomes clear if one is checking India's export and imports quotas as has been done in Figure 3. From

[8] Please note that the Indian statistical year as depicted in the Statistical Yearbook (Ministry of Statistics & Programme Implementation India 2015; 2016) lasts from April of the first shown year until March of the following year. Cf. also Bhagwati and Panagariya (2014: 243, endnote 9).

1996, when both quotas exceeded the 10 percent threshold only marginally, until 2001 only very mild increases can be observed.[9]

Figure 3:
India's export- and import quotas, 1996–2014[a]



[a]Exports of goods and services in percent of GDP.

Source: World Bank (2015/2016).

The increase from 2003 to 2004 and in the following years is also visible in the quota dimension with the export quota increasing from 15 to 23 percent of GDP and the import quota even from 15 to 28 percent of GDP. India clearly has opened its economy to foreign trade at least a bit in this period. Even just after the global financial and economic crisis the import and export quotas increased again, the former until 2012 and the latter even until 2013. Afterwards, however, both quotas fell. Even if India's export quota does not seem to lag behind that of China substantially at the current edge in 2015 (Table 1), it becomes clear that India's integration into the global division of labor still leaves room for improvement. Quite often, a pure macro-perspective on this topic may hide important features and structures on the micro-level. Therefore, a view both on the patterns of India's trading partners and of commodities traded can unveil additional insights into India's current role in the world economy.

3 The Geographical Pattern of India's Foreign Trade Relations

3.1 Overview

Our dataset, consisting of highly disaggregated trade flows, which has been compiled from the data-base provided by the Ministry of Commerce & Industry (2015) and the Statistical Yearbook provided by the Ministry of Statistics & Programme Implementation India (2015; 2016) displays trade flows of the statistical years from 1996–1997 to 2014–2015. Three years have been chosen for demonstrating

[9] In Figure 3 which has been compiled from World Bank (2015/2016) data, again aggregated exports and imports of goods and services are displayed. At the same time, the World Bank has recalculated data to the normal calendar year.

the changes in the geographical pattern of India's exports and imports: 1996–1997, 2004–2005 and 2014–2015.

If one decomposes India's export and import flows of goods with regard to trading partners, a tendency towards regional concentration on Asia can be discerned for the last nineteen years on the export side (Figures 4a to 4c). Within this period the share of exports to Asia has increased from 39 ⅓ percent in 1996–1997 over 47 percent in 2004–2005 to 49 ½ percent at the current edge 2014–2015. In the same vein but at a much lower level, the importance of Africa as destination of India's exports has gained more importance, from nearly 5 percent over 6 ⅔ percent to 10 ½ percent. The share of exports has also increased for the destination Latin America from more than 1 percent over 2 percent to at least 3 ¾ percent. These figures draw a picture which suggests that regional integration as well as integration into a division of labor with other developing countries or emerging economies has been more important for India than trade with richer countries far away.

Figure 4a:
Geographical pattern of India's exports, 1996–1997[a]

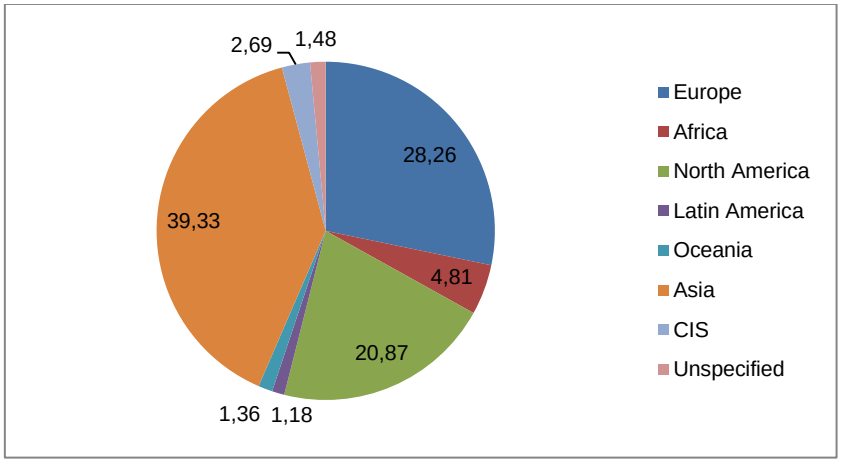


Figure 4b:
Geographical pattern of India's exports, 2004–2005[a]

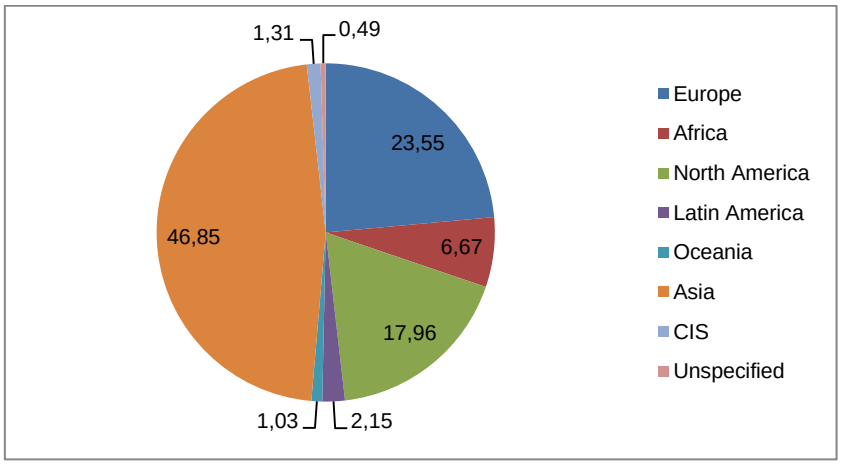
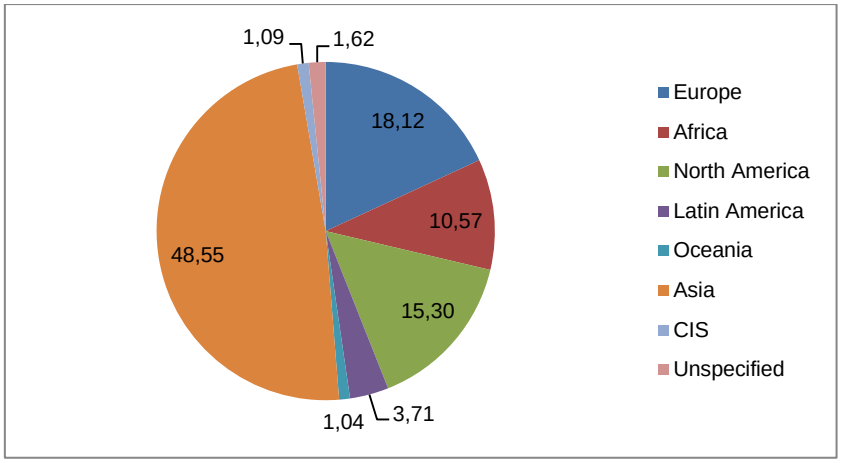


Figure 4c:
Geographical pattern of India's exports, 2014–2015[a]



[a]Exports of goods to country group in percent of India's total exports of goods.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

In contrast to this, the share of India's exports to Europe has decreased continuously, from 28 ¼ percent in 1996–1997 over 23 ½ in 2004–2005 to 18 percent in 2014/2015. Old ties both to the former colonial power UK and to the EU apparently have lost in intensity. The share of exports to North America (including Canada) has shrunk as well, from 21 percent over 18 percent to 15 ⅓ percent, although, as will be shown in the next paragraphs, the USA have retained their position as prime destination of India's exports. Oceania lost its anyway small share from 1 ⅓ percent to 1 percent. Therefore, the importance of the so called "first world" of rich industrial countries lost ground as destination of India's exports. Interestingly, the share of the Community of Independent States (CIS), the successor of the former Soviet Union on which the Indian Union leaned upon as a model for a long time since its independence in 1947, was already not substantial in 1996–1997 and even decreased to 1 percent in 2014–2015.

On the import side comparable tendencies are governing the pattern of origins of India's imports. The Asian share increased from 34 ⅓ percent in 1996–1997 to 56 ½ percent in 2014–2015 (Figures 5a to 5c).[10] The African share increased slightly to 6 ½ percent, the Latin American substantially to 6 percent. Hence, both the processes of regional integration as well as integration with other emerging economies and developing countries can be found on the import side, too. Correspondingly, Europe, North America and Oceania have lost ground as sources for India's imports, while the CIS has retained its (small) share of 1 ¾ percent.

[10] For 2004–2005 the import statistics report an unusually high percentage of imports from unspecified sources of more than a quarter of India's total imports, a figure which has not been corrected by later updates. This feature is also true for the adjacent years. Therefore, the 2004–2005 figures are skipped from the discussion, and we don't display figures from the neighboring years as well.

Figure 5a:
Geographical pattern of India's imports, 1996–1997[a]

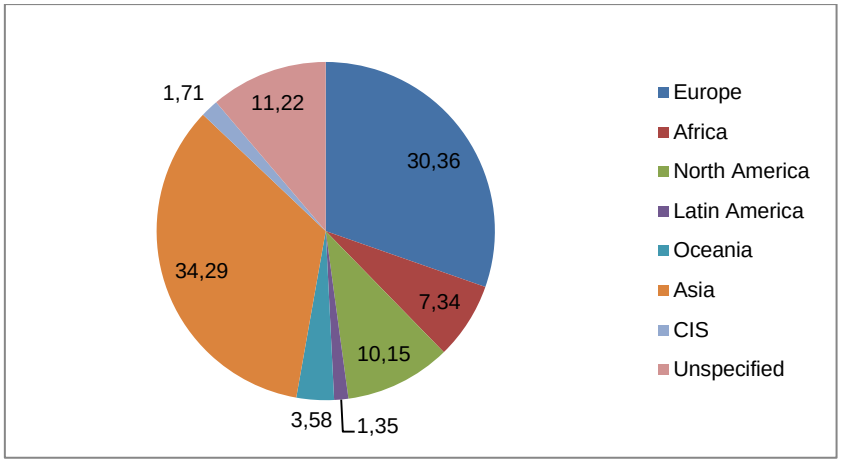


Figure 5b:
Geographical pattern of India's imports, 2004–2005[a]

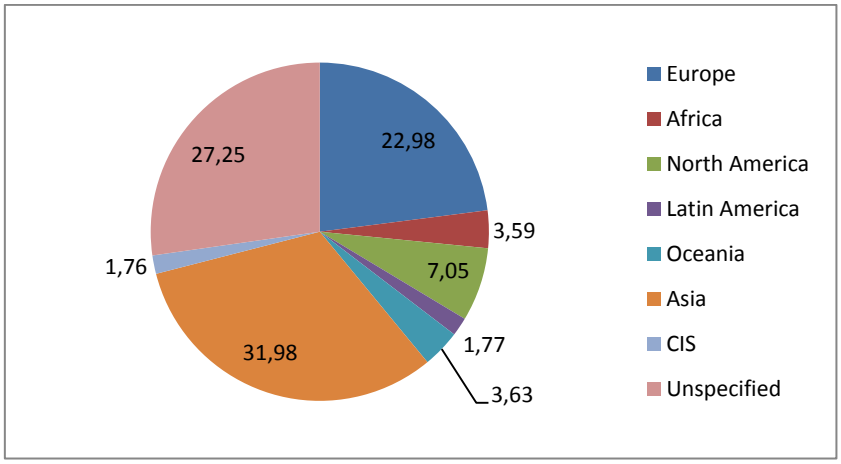
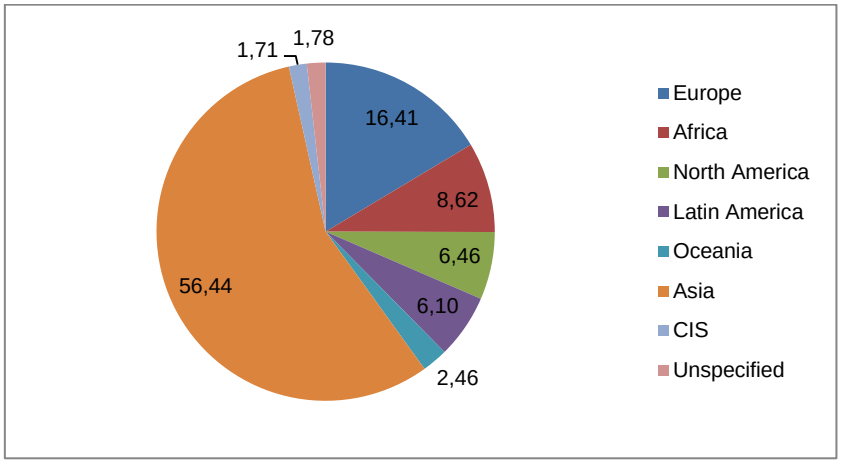


Figure 5c:
Geographical pattern of India's imports, 2014–2015[a]



[a]Imports of goods from country group in percent of India's total imports of goods.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

3.2 Top20 Export Destinations and Import Sources

Comparing the Top20 destinations of Indian exports and sources of imports for the three selected years in the observation period underlines the far-reaching changes in the pattern of India's trading partners which became already apparent in the depiction by continents in the section above. There are only few cases of maintained positions in the rankings of the most important partners. The most prominent example of this kind are the USA as the most important export destination (Table 2) in all three reporting years. But Indian exports to this partner did not grow in accordance with Indian total exports so that the share of exports to the USA declined by more than 6 percentage points to 13 ⅔ percent in the statistical year 2014–2015. The same is true for Bangladesh on rank 10 and the Netherlands on rank 11. These losses in shares of the three countries which maintained their ranks correspond with a more even geographical distribution of export partners in general: The Top10 as well as the Top20 as a group acquired in 2014–2015 around 10 percentage points less of shares than two decades before. Hence, India's exports are less focused on their Top20 destinations at the current edge than in 1996–1997, or to put it differently: the entropy of Indian exports has increased.[11]

In contrast to the Netherlands, all other European partners which appeared in the export ranking for 1996–1997 skidded down the scale during the two decades reported here, the UK (from rank 2 to rank 6 in 2004–2005 and further to rank 7 in 2014–2015), Japan (from rank 3 over rank 10 to rank 16), Germany (from rank 4 to rank 7 and then to rank 8), Belgium (from rank 7 to rank 8 and further down to rank 15), Italy (from rank 9 to rank 19), and France (from rank 13 to rank 20). Apparently, Western Europe lost most of its appeal for India's exports. But Russia's decline is even more pronounced as it is to be found on rank 37 in 2014–2015 and does no longer belong to the Top20 Indian export destinations.

The majority of Asian destinations managed to climb the ranking upwards, be it Hong Kong, Singapore, China, Malaysia, or Sri Lanka. With the exception of Hong Kong these countries could even increase their shares in Indian exports. The nevertheless high share of Hong Kong may be explained against the backdrop of the tense situation between China and India. Apparently, Hong Kong still serves as an important gateway to the Chinese markets for Indian exports. In 1996–1997 and in 2014–2015 the share of Hong Kong in India's exports was even higher than the Chinese share; only in the year 2004–2005 in between, China mainland could surpass its special administrative region.

[11] Trade entropy is a distribution indicator and can tell us, in how far a country is integrated with its partners. *Absolut trade entropy* is measured by $I_{xi} = \sum_j (b_{ij} \ln(1/b_{ij}))$ with b_{ij} as the trading partner country shares. The more evenly the b_{ij} are distributed, the higher will be the indicator value. Absolute equal distribution would bring about a maximum indicator value of *lnJ* (with *J* as the number of all trading partners). In this case the reporting country is "everybody's darling" and totally integrated into international trade relations. The other extreme value is represented by trade with only one partner. I_{xi} will be 0, and the respective country is not integrated into the international division of labor. If I_{xi} is divided by *lnJ* one arrives at the *relative trade entropy* rI_{xi} which shows the degree ($0< rI_{xi} <1$) of even distribution that is realized. India' *relative export entropy* rI_{xi} increased from 1996–1997: .64 over 2004–2005: .66 to 2014–2015 .69 (calculated from the data used for Tables 2 to 9). See Marwah (1995), Marwah and Klein (1995), Lundqvist and Persson (1998), and Schrader and Laaser (2005: 8 and 28) on the concept of trade entropy.

Table 2:
Top20 destinations of India's exports 1996–1997, 2004–2005 and 2014–2015

Rank 1996–1997	*(Rank 2014–2015)*	Country	Exports 1996–1997[a]	1996–1997 in percent of total
1	*1*	U S A	6,555.45	19.59
2	*7*	U K	2,046.91	6.12
3	*16*	Japan	2,005.96	5.99
4	*8*	Germany	1,893.06	5.66
5	*3*	Hong Kong	1,862.59	5.56
6	*2*	U Arab Emts	1,476.01	4.41
7	*15*	Belgium	1,092.67	3.26
8	*6*	Singapore	977.47	2.92
9	*19*	Italy	933.70	2.79
10	*10*	Bangladesh PR	868.96	2.60
		Top10	**19,712.78**	**58.90**
11	*11*	Netherland	852.37	2.55
12	*37*	Russia	811.16	2.42
13	*20*	France	716.17	2.14
14	*4*	China P RP	614.80	1.84
15	*25*	Indonesia	591.86	1.77
16	*5*	Saudi Arabia	577.18	1.72
17	*14*	Malaysia	531.14	1.59
18	*21*	Korea RP	518.48	1.55
19	*9*	Sri Lanka DSR	477.41	1.43
20	*26*	Thailand	447.08	1.34
		Top11-20	**6,137.65**	**18.34**
		Top20	**25,850.43**	**77.23**

Rank 2004–2005	*(Rank 2014–2015)*	Country	Exports 2004–2005[a]	2004–2005 in percent of total
1	*1*	U S A	13,765.75	16.48
2	*2*	U Arab Emts	7,347.88	8.80
3	*4*	China P RP	5,615.88	6.72
4	*6*	Singapore	4,000.61	4.79
5	*3*	Hong Kong	3,691.82	4.42
6	*7*	U K	3,681.09	4.41
7	*8*	Germany	2,826.25	3.38
8	*15*	Belgium	2,509.71	3.00
9	*19*	Italy	2,285.99	2.74
10	*16*	Japan	2,127.91	2.55
		Top10	**47,852.89**	**57.28**
11	*20*	France	1,680.94	2.01
12	*10*	Bangladesh PR	1,631.12	1.95
13	*11*	Netherland	1,604.86	1.92
14	*9*	Sri Lanka DSR	1,413.18	1.69
15	*5*	Saudi Arabia	1,412.06	1.69
16	*28*	Spain	1,389.37	1.66
17	*25*	Indonesia	1,332.60	1.60
18	*23*	Iran	1,231.39	1.47
19	*14*	Malaysia	1,084.06	1.30
20	*21*	Korea RP	1,041.68	1.25
		Top11-20	**13,821.26**	**16.55**
		Top20	**61,674.15**	**73.83**

Rank 2014–2015	Country	Exports 2014–2015[a]	2014–2015 in percent of total
1	U S A	42,449.21	13.67
2	U Arab Emts	33,034.10	10.64
3	Hong Kong	13,602.62	4.38
4	China P RP	11,935.54	3.84
5	Saudi Arabia	11,167.18	3.60
6	Singapore	9,999.53	3.22
7	U K	9,322.46	3.00
8	Germany	7,536.91	2.43
9	Sri Lanka DSR	6,703.76	2.16
10	Bangladesh PR	6,464.49	2.08
	Top10	**152,215.80**	**49.01**
11	Netherland	6,324.44	2.04
12	Vietnam Soc Rep	6,257.75	2.01
13	Brazil	5,963.81	1.92
14	Malaysia	5,819.19	1.87
15	Belgium	5,519.34	1.78
16	Japan	5,385.53	1.73
17	Turkey	5,358.16	1.73
18	South Africa	5,299.60	1.71
19	Italy	5,092.27	1.64
20	France	4,956.66	1.60
	Top11-20	**55,976.75**	**18.02**
	Top20	**208,192.55**	**67.04**

[a]Million US$.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

The most striking ranking climbers, however, are countries which one would expect on leading positions of import partner rankings (because they are energy exporters) but less so in an export partner ranking: the United Arab Emirates (UAE) and Saudi Arabia. The former held the second position of the partner ranking already in 2004–2005 und could even increase their share in Indian exports to 10 ⅔ percent in 2014–2015. Saudi Arabia reached an export share of 3.6 percent on rank 5 not far behind China in the same year. Although economic geography suggests that India should be

trading with those countries which are located on the rim of the same ocean—in this case the Arabian Sea—, as oceans are less dividing but rather trade-enhancing, the UAE's and Saudi Arabia's prominent role in India's export ranking is astonishing.

On the import side of India's trade statistics, both countries play a major role as well, and here this finding is much less striking. Saudi Arabia climbed from rank 6 in 1996–1997 to the 2nd rank in 2014–2015, with a share that increased by one third in the nearly two decades to 6.3 percent (Table 3).[12] The UAE increased their share in India's imports in the same period by nearly 70 percent to little bit less than 6 percent, and they are now the No. 3 in the import ranking. Given these countries' export commodity pattern, it is conjecturable that these prime ranks and high Indian import shares are the result of crude oil imports.

The unchallenged No. 1 among India's import sources in 2014–2015, however, is now China which provides 13 ½ percent of India's imports or more than twice as much as the second partner, Saudi Arabia. That is insofar informative, as India and China are two large neighboring countries with a tense mutual relationship. Two decades before, China delivered less than 2 percent of India's imports and was to be found lagging far behind on rank 17 of the Top20-list of import partners. Moreover, Hong Kong did not appear in the 1996–1997 and 2014–2015 rankings at all.[13] Apparently, its role as gateway to China is confined to exports.

As it is the case on the export side, European partners have lost their leading positions which they held in 1996–1997. The former colonial power UK, in 1996–1997 ranking still 5th with 5 ½ percent, does not appear among the Top20 in 2014–2015, when it reached only rank 24. Germany's import share more than halved itself from 7 ¼ to less than 3 percent so that Germany switched downwards from the 2nd to the 12th rank. Nearly the same happened to Belgium, among the Asian partners, to Japan, and even to the USA which nevertheless keep the 5th rank of India's imports with a share of close to 5 percent. There is only one exception from the rule of descent of Western industrialized countries: Switzerland which climbed upwards from rank 10 to 4 and nearly doubled its Indian import share to now nearly 5 percent.

Moreover, it is noticeable that the majority of import partners are countries which can be labeled as crude oil or natural gas exporters, not only the already mentioned UAE and Saudi Arabia on rank 2 and 3 in 2014–2015. Hence, India's imports seem to be dominated by growth-induced energy imports, a notion that is supported by the following analysis of the commodity pattern of India's exports and imports.

[12] As has already been noted, the import statistics for the year 2004–2005 contain an unusual high share of imports from unknown sources. As has been done in the previous section, the year 2004–2005 will be skipped from the discussion, as the shares of the Top20 are unreliable. The section in Table 3 on 2004–2005 may only serve as information on the sources of the import flows allocated to countries of origin.

[13] Only in the rather unreliable intermediate statistics of 2004–2005 Hong Kong is to be found on rank 16. As can be seen from the only for information column "Rank 2014–15" in this part of the table, it was partner No. 22 in the most recent year reported here.

Table 3:
Top20 Origins of India's imports, 1996–1997, 2004–2005 and 2014–2015

Rank 1996–1997	*(Rank 2014–2015)*	Country	Imports 1996–1997[a]	1996–1997 in percent of total
1	*5*	U S A	3,617.12	9.24
2	*12*	Germany	2,830.31	7.23
3	*15*	Belgium	2,230.87	5.70
4	*17*	Japan	2,187.45	5.59
5	*24*	U K	2,133.96	5.45
6	*2*	Saudi Arabia	1,819.65	4.65
7	*9*	Nigeria	1,525.63	3.90
8	*3*	U Arab Emts	1,327.71	3.39
9	*16*	Australia	1,317.20	3.37
10	*4*	Switzerland	1,127.32	2.88
		Top10	**20,117.22**	**51.41**
11	*14*	Malaysia	1,103.29	2.82
12	*11*	Kuwait	949.06	2.43
13	*28*	Italy	915.08	2.34
14	*10*	Korea RP	883.59	2.26
15	*18*	Iran	860.42	2.20
16	*19*	Singapore	841.10	2.15
17	*1*	China P RP	756.91	1.93
18	*26*	France	698.80	1.79
19	*6*	Indonesia	597.05	1.53
20	*27*	Russia	527.85	1.35
		Top11-20	**8,133.15**	**20.78**
		Top20	**28,250.37**	**72.19**

Rank 2004–0205	*(Rank 2014–2015)*	Country	Imports 2004–2005[a]	2004–2005 in percent of total
1	*1*	China P RP	7,097.98	6.36
2	*5*	U S A	7,001.35	6.28
3	*4*	Switzerland	5,939.93	5.33
4	*3*	U Arab Emts	4,641.10	4.16
5	*15*	Belgium	4,588.91	4.11
6	*12*	Germany	4,015.35	3.60
7	*16*	Australia	3,824.53	3.43
8	*24*	U K	3,566.20	3.20
9	*10*	Korea RP	3,508.77	3.15
10	*17*	Japan	3,235.13	2.90
		Top10	**47,419.25**	**42.52**
11	*19*	Singapore	2,651.40	2.38
12	*6*	Indonesia	2,617.74	2.35
13	*14*	Malaysia	2,299.01	2.06
14	*20*	South Africa	2,197.67	1.97
15	*26*	France	1,894.10	1.70
16	*22*	Hong Kong	1,730.13	1.55
17	*28*	Italy	1,373.10	1.23
18	*27*	Russia	1,322.74	1.19
19	*2*	Saudi Arab	1,301.15	1.17
20	*29*	Taiwan	1,092.07	0.98
		Top11-20	**18,479.11**	**16.57**
		Top20	**65,898.36**	**59.09**

Rank 2014–2015	Country	Imports 2014–2015[a]	2014–2015 in percent of total
1	China P RP	60,409.76	13.48
2	Saudi Arabia	28,242.01	6.30
3	U Arab Emts	26,008.43	5.80
4	Switzerland	22,133.16	4.94
5	U S A	21,817.53	4.87
6	Indonesia	14,995.58	3.35
7	Qatar	14,604.71	3.26
8	Iraq	14,247.66	3.18
9	Nigeria	13,682.97	3.05
10	Korea RP	13,528.51	3.02
	Top10	**229,670.32**	**51.26**
11	Kuwait	13,381.97	2.99
12	Germany	12,788.96	2.85
13	Venezuela	11,978.47	2.67
14	Malaysia	11,133.95	2.49
15	Belgium	10,805.92	2.41
16	Australia	10,258.25	2.29
17	Japan	10,131.43	2.26
18	Iran	8,955.02	2.00
19	Singapore	7,124.20	1.59
20	South Africa	6,496.52	1.45
	Top11-20	**103,054.69**	**23.00**
	Top20	**332,725.01**	**74.26**

[a]Million US$.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

4 The Commodity Pattern of India's Exports and Imports

The view on India's Top20-export and -import commodities in the three selected years of observation unveils on the export side an—at first sight—unexpected prime commodity group: Precious stones, metals and jewelry (HS commodity group 71). These products were clearly leading in the export statistics of 1996–1997 with 14 ½ percent and in 2004–2005 with 17 ½ percent. Only in the most recent year of reporting, 2014–2015, they got only the second place with 13.4 percent. The prime

commodity in this year were mineral fuels and products thereof (HS 27) with 18 ⅔ percent. What looks surprising at first sight can be explained by the fact that India—although being a net importer of crude oil—has developed a major refinery industry which is more and more exporting to foreign countries.[14] Mineral fuels ranked as No. 2 already in 2004–2005 (Tables 4a to 4c).

Table 4a:
Top20 commodities in India's export commodity pattern, 1996–1997

HS-Code	Commodity group	Rank 1996–1997	*(Rank 2014–2015)*	Exports 1996–1997[a]	1996–1997 in percent of total
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	1	*2*	4,771.71	14.26
52	Cotton.	2	*11*	2,826.20	8.44
62	Articles of apparel and clothing accessories, not knitted or crocheted.	3	*8*	2,719.47	8.13
3	Fish and crustaceans, molluscs and other aquatic invertabrates.	4	*16*	1,115.86	3.33
10	Cereals.	5	*7*	1,104.07	3.30
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	6	*4*	1,047.64	3.13
61	Articles of apparel and clothing accessories, knitted or corcheted.	7	*12*	1,033.98	3.09
23	Residues and waste from the food industries; prepared animal foder.	8	*35*	997.13	2.98
29	Organic chemicals.	9	*5*	993.06	2.97
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof.	10	*3*	901.93	2.69
	Top10 Commodities			**17,511.05**	**52.32**
72	Iron and steel.	11	*10*	865.71	2.59
9	Coffee, tea, mate and spices.	12	*23*	860.56	2.57
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts.	13	*9*	858.17	2.56
42	Articles of leather,saddlery and harness;travel goods, handbags and similar cont.articles of animal gut(othr thn silk-wrm)gut.	14	*27*	787.72	2.35
63	Other made up textile articles; sets; worn clothing and worn textile articles; rags.	15	*19*	745.32	2.23
30	Pharmaceutical products.	16	*6*	672.00	2.01
57	Carpets and other textile floor coverings.	17	*34*	651.63	1.95
26	Ores, slag and ash.	18	*45*	579.06	1.73
64	Footwear, gaiters and the like; parts of such articles.	19	*22*	572.64	1.71
73	Articles of iron or steel.	20	*13*	535.77	1.60
	Top11-20 Commodities			**7,128.58**	**21.30**
	Top20 Commodities			**24,639.63**	**73.62**

[a]Million US$.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

[14] India's refinery industry is said to be the second largest refiner in Asia after China (Make in India 2017).

Table 4b:
Top20 commodities in India's export commodity pattern, 2004–2005

HS-Code	Commodity group	Rank 2004–2005	*(Rank 2014–2015)*	Exports 2004–2005[a]	2004–2005 in percent of total
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	1	*2*	14,436.21	17.28
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	2	*1*	7,140.39	8.55
72	Iron and steel.	3	*10*	4,218.32	5.05
62	Articles of apparel and clothing accessories, not knitted or crocheted.	4	*8*	3,932.66	4.71
26	Ores, slag and ash.	5	*45*	3,738.85	4.48
29	Organic chemicals.	6	*5*	3,620.46	4.33
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	7	*4*	3,306.94	3.96
61	Articles of apparel and clothing accessories, knitted or corcheted.	8	*12*	2,641.28	3.16
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof.	9	*3*	2,464.65	2.95
73	Articles of iron or steel.	10	*13*	2,310.12	2.77
	Top10 Commodities			**47,809.88**	**57.23**
52	Cotton.	11	*11*	2,262.86	2.71
39	Plastic and articles thereof.	12	*17*	2,105.19	2.52
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,and parts.	13	*9*	2,071.65	2.48
30	Pharmaceutical products.	14	*6*	2,061.66	2.47
10	Cereals.	15	*7*	2,008.07	2.40
63	Other made up textile articles; sets; worn clothing and worn textile articles; rags.	16	*19*	1,974.03	2.36
3	Fish and crustaceans, molluscs and other aquatic invertabrates.	17	*16*	1,314.01	1.57
42	Articles of leather,saddlery and harness;travel goods, handbags and similar cont.articles of animal gut(othr thn silk-wrm)gut.	18	*27*	1,075.24	1.29
54	Man-made filaments.	19	*28*	994.10	1.19
74	Copper and articles thereof.	20	*20*	944.39	1.13
	Top11-20 Commodities			**16,811.20**	**20.12**
	Top20 Commodities			**64,621.08**	**77.36**

[a]Million US$.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

The leading role of jewelry exports, however, is striking only at first sight. As branch reports reveal, India's jewelry industry is known for years as the major earner of foreign exchange and one of the fastest growing industries at all. It contributes 6 to 7 percent of GDP and consists of a great number of mostly small producers (500,000 in total). India's market for jewelry is regarded as being among the Top5 of jewelry markets world-wide (Rough Polished 2011; IBEF 2017).

Remarkable is also the changes on the following ranks. Exports of cotton (HS 52) and apparel (HS 62) were following on ranks 3 and 4 in the 1996–1997 ranking. Both accounted for export shares of more than 8 percent. In addition, apparel accessories (HS 61) were to be found on rank 7 with a share of more than 3 percent. These products were important parts of India's export pattern two decades ago,

but already in 2004–2005 they lost their leading positions and half or even more of their former shares. In 2014–2015, both groups ranked only on No. 8 and No. 11 of the export shares list, with apparel accessories (HS 61) following on rank 12.

Table 4c:
Top20 commodities in India's export commodity pattern, 2014–2015

HS-Code	Commodity group	Rank 2014–2015	Exports 2014–2015[a]	2014–2015 in percent of total
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	1	57,865.36	18.63
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	2	41,549.79	13.38
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof.	3	14,473.70	4.66
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	4	13,802.92	4.44
29	Organic chemicals.	5	11,948.91	3.85
30	Pharmaceutical products.	6	11,584.85	3.73
10	Cereals.	7	9,550.59	3.08
62	Articles of apparel and clothing accessories, not knitted or crocheted.	8	9,191.96	2.96
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,and parts.	9	8,696.63	2.80
72	Iron and steel.	10	8,684.45	2.80
	Top10 Commodities		**187,349.16**	**60.32**
52	Cotton.	11	7,717.99	2.49
61	Articles of apparel and clothing accessories, knitted or corcheted.	12	7,654.10	2.46
73	Articles of iron or steel.	13	7,601.14	2.45
88	Aircraft, spacecraft, and parts thereof.	14	6,159.63	1.98
89	Ships, boats and floating structures.	15	5,352.61	1.72
3	Fish and crustaceans, molluscs and other aquatic invertabrates.	16	5,249.17	1.69
39	Plastic and articles thereof.	17	5,080.72	1.64
2	Meat and edible meat offal.	18	4,929.27	1.59
63	Other made up textile articles; sets; worn clothing and worn textile articles; rags.	19	4,645.61	1.50
74	Copper and articles thereof.	20	3,359.77	1.08
	Top11-20 Commodities		**57,750.01**	**18.59**
	Top20 Commodities		**245,099.17**	**78.92**

[a]Million US$.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

The 2014–2015 ranks after the leading commodities mineral oil and jewelry and ahead of these traditional labor intensive products are taken by road vehicles (HS 87), machinery products (HS 84), organic chemicals (HS 29) and pharmaceutical products (HS 30). One would well expect these commodities in the product pattern of more advanced industrialized countries, but less so in India. The current export statistic thus corroborates a reproach which is put forward by scholars like Bhagwati and Panagariya (2014: 103–107). They deplore a tendency in India towards a production pattern which concentrates on capital and skill intensive advanced products that does not match the factor endowment of the country with its abundant pool of cheap and unskilled labor. Accordingly, exports of capital-intensive (or at least semi-skilled-labor-intensive) products have greatly increased

while exports of low-skilled-labor-intensive products could not keep their former shares in the course of time. Both authors blame even after the 1991 reforms the still existing over-excessive labor and land use regulations for this tendency which leaves too many workers unemployed (Bhagwati and Panagariya 2014: 109–124, and 125–128).

Another feature of the changes in the commodity patterns of exports is the growing tendency to concentrate on the export of fewer commodity groups with higher shares: While in 1996–1997 the Top10 and the Top20 commodities accounted for 52 ⅓ resp. 73 ⅔ percent, these subgroups increased their shares to 60 ⅓ resp. 79 percent. While the geographical pattern of India's export shows a declining concentration on partners, the opposite is true for the commodity pattern.

On the import side, the picture is more stable in the course of time and more in harmony with India's development stage (Tables 5a to 5c).

Mineral oil products, crude and refined (HS 27), were the prime import commodities during the whole observation period, in 1996–1997 with a share of nearly 30 percent. In 2004–2005 the share had passed the 30 percent threshold,[15] and in 2014–2015 the share had increased to nearly 35 percent. India's energy demand is regarded as being triggered off by the high GDP growth in recent years so that its prime role in the import statistics is less surprising than the comparable position in the export list presented above.

Advanced industrial products which are to be found in HS-groups 84 (machinery) and 85 (electrical machinery) held leading positions throughout the observation period as well, although machinery lost some percentage points and ranks: from nearly 11 percent on rank 2 in 1996–1997 over 8 ⅔ percent on rank 3 in 2004–2005 and 7 percent in 2014–2015. Electrical machinery became more important: rom 4 percent on rank 5 in 1996–1997 to 8 percent on rank 4 in 2004–2005, and 7.4 percent on rank 3 in 2014–2015.

A common feature with the export ranking list, however, is the prominent ranking of imports of precious stones, metals as well of jewelry (HS 71), which ranked 3rd in 1996–1997 with nearly 11 percent, then climbed to the 2nd rank in 2004–2005 with even 18 ⅔ percent, and kept this position in 2014–2015 with nearly 14 percent of India's imports. While one could suspect also industrial inputs behind these high figures, a closer look at the more detailed statistics reveals a different picture: Of India's imports in the HS commodity group 71 in 2014–2015, which amount to US$ 62,380 million, well over US$ 34,400 million, i.e., 55 percent, are those of gold (HS 7108). These imports of gold are nearly exclusively of an unwrought nature and labeled as "non-monetary" (HS 71081200) according to the trade databank.[16] The second most important product in the category HS 71 are diamonds (US$ 20,500 million) of which roughly 82 percent are labeled as being of "non-industrial" use (HS 71023100). Silver ranks 3rd with US$ 4,500 million and is unwrought, too, up to 95 percent (HS 71069100), followed by precious stones, pearls and jewelry. The reason behind this high rank can again be attributed to the important role of India's jewelry industry (Rough polished 2011; IBEF 2017). The imports of unwrought gold, silver and diamonds are used in gold- and silversmiths' and jewelry productions, partly because of the leading role of this industry, but partly also because jewelry is a widely used store of value in India itself.

[15] In contrast to the geographical pattern of imports in 2004–2005 which showed a high percentage of unidentified sources of the import flows, the commodity pattern of the same year seems to be complete.
[16] US$ 34,000 million belong to this group "Other non-monetary unwrought forms of Gold." All figures presented in this paragraph rest on an inquiry at 8-digit HS-code level at Ministry of Commerce & Industry of India (2015).

Table 5a:
Top20 commodities in India's import commodity pattern, 1996–1997

HS-Code	Warengruppe, englische Bezeichnung	Rank 1996–1997	*(Rank 2014–2015)*	Imports 1996–1997[a]	1996–1997 in percent of total
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	1	*1*	11,464.60	29.30
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	2	*4*	4,261.93	10.89
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	3	*2*	3,968.92	10.14
98	Project goods; some special uses.	4	*20*	2,118.35	5.41
29	Organic chemicals.	5	*5*	1,973.89	5.04
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,and parts.	6	*3*	1,594.42	4.07
72	Iron and steel.	7	*6*	1,502.28	3.84
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, or radi. elem. or of isotopes.	8	*13*	916.01	2.34
15	Animal or vegetable fats and oils and their cleavage products; pre. edible fats; animal or vegetable waxex.	9	*8*	864.56	2.21
39	Plastic and articles thereof.	10	*7*	834.67	2.13
	Top10 Commodities			**29,499.63**	**75.38**
74	Copper and articles thereof.	11	*22*	744.56	1.90
31	Fertilisers.	12	*12*	685.74	1.75
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof.	13	*15*	579.42	1.48
90	Optical, photographic cinematographic measuring, checking precision, medical or surgical inst. and apparatus parts and accessories thereof.	14	*11*	567.64	1.45
88	Aircraft, spacecraft, and parts thereof.	15	*16*	502.51	1.28
48	Paper and paperboard; articles of paper pulp, of paper or of paperboard.	16	*27*	498.00	1.27
73	Articles of iron or steel.	17	*18*	428.16	1.09
25	Salt; sulphur; earths and stone; plastering materials, lime and cement.	18	*24*	345.42	0.88
38	Miscellaneous chemical products.	19	*17*	342.63	0.88
76	Aluminium and articles thereof.	20	*19*	329.42	0.84
	Top11-20 Commodities			**5,023.50**	**12.84**
	Top20 Commodities			**34,523.13**	**88.22**

[a]Million US$.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

Table 5b:
Top20 commodities in India's import commodity pattern, 2004–2005

HS-Code	Warengruppe, englische Bezeichnung	Rank 2004–2005	*(Rank 2014–2015)*	Imports 2004–2005[a]	2004–2005 in percent of total
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	1	*1*	34,818.66	31.22
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	2	*2*	20,784.38	18.64
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	3	*4*	9,651.75	8.65
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,and parts.	4	*3*	8,945.43	8.02
29	Organic chemicals.	5	*5*	4,180.75	3.75
72	Iron and steel.	6	*6*	3,355.62	3.01
15	Animal or vegetable fats and oils and their cleavage products; pre. edible fats; animal or vegetable waxex.	7	*8*	2,531.13	2.27
90	Optical, photographic cinematographic measuring, checking precision, medical or surgical inst. and apparatus parts and accessories thereof.	8	*11*	2,014.95	1.81
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, or radi. elem. or of isotopes.	9	*13*	1,809.43	1.62
89	Ships, boats and floating structures.	10	*14*	1,770.41	1.59
	Top10 Commodities			**89,862.51**	**80.58**
39	Plastic and articles thereof.	11	*7*	1,667.34	1.50
88	Aircraft, spacecraft, and parts thereof.	12	*16*	1,592.18	1.43
26	Ores, slag and ash.	13	*10*	1,015.37	0.91
31	Fertilisers.	14	*12*	961.61	0.86
44	Wood and articles of wood; wood charcoal.	15	*26*	907.40	0.81
38	Miscellaneous chemical products.	16	*17*	900.33	0.81
73	Articles of iron or steel.	17	*18*	886.62	0.80
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof.	18	*15*	844.48	0.76
48	Paper and paperboard; articles of paper pulp, of paper or of paperboard.	19	*27*	709.55	0.64
40	Rubber and articles thereof.	20	*21*	677.70	0.61
	Top11-20 Commodities			**10,162.58**	**9.11**
	Top20 Commodities			**100,025.09**	**89.69**

[a]Million US$.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

Table 5c:
Top20 commodities in India's import commodity pattern, 2014–2015

HS-Code	Warengruppe, englische Bezeichnung	Rank 2014–2015	Imports 2014–2015[a]	2014–2015 in percent of total
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	1	156,400.98	34.91
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	2	62,379.89	13.92
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,and parts.	3	33,172.81	7.40
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	4	31,731.02	7.08
29	Organic chemicals.	5	17,751.43	3.96
72	Iron and steel.	6	12,342.04	2.75
39	Plastic and articles thereof.	7	11,690.41	2.61
15	Animal or vegetable fats and oils and their cleavage products; pre. edible fats; animal or vegetable waxex.	8	10,670.00	2.38
99	Miscellaneous goods.	9	7,471.79	1.67
26	Ores, slag and ash.	10	7,361.05	1.64
	Top10 Commodities		**350,971.42**	**78.33**
90	Optical, photographic cinematographic measuring, checking precision, medical or surgical inst. and apparatus parts and accessories thereof.	11	7,049.62	1.57
31	Fertilisers.	12	6,381.33	1.42
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, or radi. elem. or of isotopes.	13	5,135.94	1.15
89	Ships, boats and floating structures.	14	4,958.90	1.11
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof.	15	4,861.68	1.09
88	Aircraft, spacecraft, and parts thereof.	16	4,708.26	1.05
38	Miscellaneous chemical products.	17	4,177.51	0.93
73	Articles of iron or steel.	18	3,978.62	0.89
76	Aluminium and articles thereof.	19	3,739.75	0.83
98	Project goods; some special uses.	20	3,640.61	0.81
	Top11-20 Commodities		**48,632.22**	**10.85**
	Top20 Commodities		**399,603.64**	**89.19**

[a]Million US$.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

5 India' Trade Pattern 2014–2015 with Selected Partners

Given some rather surprising results both in the geographical and in the commodity pattern of India's trade statistic it may be instructive to have a closer look at a blending of both criteria: What are the most important commodities in trade with the most important trading partners? This view is taken in Tables 6 for exports and 7 for imports in the most recent year 2014–2015 of our sample. Rank 1 on the list of export partners in that year were the USA. The most important commodity group of exports to the USA is precious metals, pearls and jewelry (HS 71) which covered nearly 20 percent of India's exports to the USA (Table 6). The background of this result is to be found in the fact that the USA are

for years among the prime customers of India's jewelry industry (Rough polished 2011). The second most important commodity group is mineral oils and products thereof (HS 27), a less expected result.

Table 6:
Top5 commodities of India's exports to Top5 destinations, 2014–2015

HS-Code	Commodity group	Rank 2014–2015	Exports 2014–2015[a]	2014–2015 in percent of total[b]
	Destination of exports: USA	**1**	**42,449.21**	**100.00**
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	1	8,419.58	19.83
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	2	3,886.70	9.16
30	Pharmaceutical products.	3	3,769.09	8.88
63	Other made up textile articles; sets; worn clothing and worn textile articles; rags.	4	2,213.75	5.22
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	5	2,157.13	5.08
	United Arab Emirates	**2**	**33,034.10**	**100.00**
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	1	12,280.37	37.17
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	2	6,525.72	19.75
62	Articles of apparel and clothing accessories, not knitted or crocheted.	3	1,507.56	4.56
89	Ships, boats and floating structures.	4	1,181.39	3.58
61	Articles of apparel and clothing accessories, knitted or corcheted.	5	1,142.70	3.46
	Hong Kong	**3**	**13,602.62**	**100.00**
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	1	12,206.19	89.73
41	Raw hides and skins (other than furskins) and leather.	2	398.51	2.93
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,and parts.	3	219.14	1.61
3	Fish and crustaceans, molluscs and other aquatic invertabrates.	4	97.85	0.72
52	Cotton.	5	92.05	0.68
	China People's Republic	**4**	**11,935.54**	**100.00**
52	Cotton.	1	2,277.94	19.09
74	Copper and articles thereof.	2	1,890.76	15.84
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	3	1,292.01	10.82
29	Organic chemicals.	4	1,045.40	8.76
25	Salt; sulphur; earths and stone; plastering materials, lime and cement.	5	621.41	5.21
	Saudi Arabia	**5**	**11,167.18**	**100.00**
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	1	5,576.16	49.93
10	Cereals.	2	1,299.89	11.64
73	Articles of iron or steel.	3	608.32	5.45
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	4	379.31	3.40
2	Meat and edible meat offal.	5	300.97	2.70

[a]Million US$.—[b]Percent of total exports to this country.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

Of the commodities on ranks 3 to 5, the No. 4 of exports to the USA, "other" textile articles (HS 63) may be attributed to India's role as a still developing country with an abundant labor force producing labor-intensive products. But No. 3 and No. 5 in the ranking, pharmaceutical products (HS 30) and machinery (HS 84), one would expect more on India's import side but less so as important products being exported to the USA.

The second important export partner were the UAE. The prime commodities exported to this country (with more than one third of exports) were again precious metals, pearls and jewelry (HS 71) which can be seen against the backdrop that the UAE are a rich country with a lot of luxury consumer demand. What is striking in this case, however, are mineral oil products (HS 27) on rank No. 2 with nearly 20 percent of exports. Apparently, India's refinery industry is strong enough to (re-)export refined mineral products to one of the main sources of its crude oil imports. Apparel (HS 62) and related accessories (HS 61) on ranks 3 and 5 are less surprising, as well as ships and boats on rank 4.

Hong Kong and the Peoples Republic of China were following as the No. 3 and 4-customers of India's exports in 2014–2015. While exports to China were mainly raw material-intensive commodities, e.g., cotton (HS 52)—and rank No. 3 of mineral oil products again underlines the strength of India's refinery industry—the structure of exports to Hong Kong is again noteworthy: Nearly 90 percent of India's exports to Hong Kong were once more precious metals, pearls and jewelry (HS 71). They were totally dominating the commodity pattern of deliveries to this special administrative region. Moreover, a further look into the statistics reveals that in the year before (2013–2014) another commodity group was dominating in a comparable manner: ceramic products (HS 69) with 88 percent of India's exports while HS 71-exports in that year were negligible. This underlines that Hong Kong seems to be a special gateway of deliveries to China, where special and large contracts are performed.

Rank No. 5 of export partners in 2014–2015 is occupied by Saudi Arabia, and here the observer can see—as in the case of the UAE—the division of labor between an Arabian country which is rich of crude oil and India as an important point to refine the crude oil to mineral oil products and send it back to the source in Arabia.

In contrast, the import side of the joint Top5-countries-commodities list does not present so many surprising results. China as India's prime import source delivers particularly (electrical) machinery (HS 85 and 84), chemicals (HS 29), fertilizers (HS 31) and iron and steel (HS 72, Table 7).

Saudi Arabia and the UAE on rank 2 and 3 are main providers of India's crude oil imports (HS 27), and particularly the UAE are also busy in trading products or raw materials of India's prime commodity group precious metals, pearls and jewelry (HS 71) which follow on commodity rank 2 of the UAE. This group also occupies the leading rank even in imports from the USA which are import partner No. 5. HS 71 thus beats even product groups which can well be expected in trade relations between a highly developed industrial country and a catching-up country: machinery (HS 84), aircraft (HS 88) and electrical machinery (HS 85).

The important role of India's jewelry industry is once more underlined by one result of the joint Top5-countries-commodities list: Switzerland was import partner No. 4 of India in 2014–2015, and imports from this country were nearly exclusively—besides negligible amounts of imports of advanced industrialized products—precious metals, pearls and jewelry (HS 71).

Table 7:
Top5 commodities of India's imports from Top5 origins, 2014–2015

HS-Code	Commodity group	Rank 2014–2015	Imports 2014–2015[a]	2014–2015 in percent of total[b]
	Origin of imports: China People's Republic	**1**	**60,409.76**	**100.00**
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,and parts.	1	16,741.99	27.71
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	2	10,144.18	16.79
29	Organic chemicals.	3	6,327.49	10.47
31	Fertilisers.	4	3,149.40	5.21
72	Iron and steel.	5	2,713.34	4.49
	Saudi Arabia	**2**	**28,242.01**	**100.00**
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	1	23,341.91	82.65
29	Organic chemicals.	2	1,270.46	4.50
39	Plastic and articles thereof.	3	1,135.75	4.02
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	4	758.62	2.69
31	Fertilisers.	5	612.68	2.17
	United Arab Emirates	**3**	**26,008.43**	**100.00**
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	1	13,379.83	51.44
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	2	8,795.43	33.82
74	Copper and articles thereof.	3	638.7	2.46
72	Iron and steel.	4	572.48	2.20
76	Aluminium and articles thereof.	5	502.26	1.93
	Switzerland	**4**	**22,133.16**	**100.00**
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	1	20,384.67	92.10
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	2	401.10	1.81
90	Optical, photographic cinematographic measuring, checking precision, medical or surgical inst. and apparatus parts and accessories thereof.	3	193.37	0.87
29	Organic chemicals.	4	184.52	0.83
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,and parts.	5	172.06	0.78
	USA	**5**	**21,817.53**	**100.00**
71	Natural or cultured pearls,precious or semiprecious stones,pre.metals,clad with pre.metal and artcls thereof;imit.jewlry;coin.	1	3,521.71	16.14
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof.	2	3,010.07	13.80
88	Aircraft, spacecraft, and parts thereof.	3	2,333.57	10.70
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers,and parts.	4	1,715.86	7.86
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes.	5	1,458.07	6.68

[a]Million US$.—[b]Percent of total imports from this country.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); own compilation and calculations.

As a result it seems that India's integration into world markets is governed by few commodity groups, whereby the energy hunger of the country is one facet of trade links, and the jewelry industry is another one which dominates both exports and imports. In contrast, labor-intensive products which could be expected as prime export commodities play a somewhat less distinctive role.

In order to add a more analytical perspective to the descriptive analysis so far a gravity analysis is performed in the following paragraph in order to get more insights into the shaping forces of India's trade relations and to reveal in how far the special relationships mentioned above are normal, more or less than proportional compared to the usual determinants of trade relations.

6 India's Foreign Trade from the Perspective of a Gravity Model

6.1 Some Methodological Remarks

Gravity models are often used in trade and integration analyses to assess the shaping forces of international trade flows. They assume that gravitational forces to undertake economic interaction stem from high incomes (or population figures) of trading partners, because these features promise high revenues from business deals with numerous well-funded clients. But transaction costs which may vary with distance can be expected to impede the impact of the gravitational forces on the intensity of trade relations. Various forms of distance may be relevant, not only real geographical distances as a proxy of transportation costs, but also „virtual distances" as exerted by tariff- or non-tariff-trade barriers, different languages, diversities in business cultures, traditions, colonial relationships or economic systems. Gravity models date back to Linder (1961), Tinbergen (1962) and Linnemann (1966), but have been further developed over time and remained a common tool not only for trade but also for transport analyses.

In this paper we divert from the common practice to estimate a gravity equation for a (large) group of countries and conclude on the shaping forces of trade flows for individual countries from the residuals, i.e., differences between actual trade flows and hypothetical trade flows as calculated from the model parameters for the whole sample. Instead, we calculate a single-country equation only for India. Special trade relationships which deviate from the effects of usual shaping forces of trade flows will be shown in this specification by the coefficients of pertinent country (group) dummies.

In calculating the model we deploy two methods: (1) the usual double-log-linear specification by OLS regression, and (2) a Poisson count model. In doing the latter, we follow Santos Silva and Tenreyro (2006) who suggested to use the Poisson count model for gravity analysis and introduced the PPML-estimator to the Stata program package. Dependent variables are trade flows T_{tj}, either exports X_{tj} or imports M_{tj}, of India, in OLS equation 1 in logs, in Poisson equation 2 in absolute terms:

$$\ln T_{tj} = Const + \beta_1 \ln GDP_{tj} + \beta_2 \ln PCI_{tj} + \beta_3 \ln GDP_{tHome} + \beta_4 \ln DIST_{Home-j} + \sum^{k} \delta_k DUM_k + \varepsilon \quad [6.1]$$

$$E[T_{tj}] = \exp\ (\alpha + \beta_1 \ln GDP_{tj} + \beta_2 \ln PCI_{tj} + \beta_3 \ln GDP_{tHome} + \beta_4 \ln DIST_{Home-j} + \sum_{k} \delta_k DUM_k + \varepsilon) \quad [6.2]$$

Subscript *t* indicates the year of observation (2000–2001 to 2014–2015), *Home* the reporting country *India*, *j* the respective bilateral trading partner, *k* the enumerative index of country dummies, and ε the error term.

Independent variables cover logs of India's trading partners' gross domestic products and per-capita-incomes (GDP_{tj}, resp. PCI_{tj},) as gravitational forces, India's own GDP_{tHome} as time trend and indicator of export growth in terms of domestic economic development, and the geographical distance $DIST_{Home\text{-}j}$ between India's capital and trading partners' capitals (or economic centers) as a factor for transportation costs and other general distance-related impedance factors.

In addition to these usual numerical variables, up to ten dummies (k = 1…10) are included to control for different kinds of virtual distances, proximities and neighborhood effects. One common dummy in this context is the contiguity dummy which equals 1 in case of a common land border. If two countries share a common border this may facilitate trade because only one borderline has to be crossed instead of several borders in the case of non-adjacently located countries. As India's border to China is a special case—given the problematic relationship in the past and the natural barrier of the Himalaya with few checkpoints which in addition having been closed for long years—China is controlled for separately with variable *CN*. The contiguity dummy thus reads *Contig–CN*. Against the backdrop of the special role which Hong Kong is playing in Indian-Chinese trade relations, *CN* is substituted by *CN+HKG* in a second specification. Another common dummy to gravities is colonial history. Accordingly, by *Colony* trade with the United Kingdom is controlled for. The other EU countries are comprised in four variables, *DE* for Germany which is singled out here because of its trade significance, the other 13 core-members of the EU-15 by *EU15–UK–DE*, the new members of 2004 and of 2007/13 by *EUNew2004* and *EUNew200713.* The other partners which played a major role in the descriptive analysis in the sections 3 and 5 of this paper (Russia, Saudi Arabia, UAE, and the USA) are controlled for by RUS, Gulf, and USA.

The trade data are the same as have been used in the sections before (Ministry of Commerce & Industry of India 2015; Ministry of Statistics & Programme Implementation India 2015). GDP and PCI data were taken from World Bank (2015). Due to the limitations of an own database derived from this source, the gravity analysis has been confined to the period 2000-01 to 2014-15. The vector of geographical distances has been compiled using the data provided by Mayer and Zignago (2011). The Contiguity dummy has also been taken from this source.

6.2 India's Export Side

Table 8 reports the results of our gravity estimates for India's exports. We have estimated two different equations: In data columns A1 and A2 it is assumed that in the case of China only direct exports to and imports from the People's Republic of China (*CN*) are relevant. In A1 the OLS regression method is used, in A2 the count data Poisson model.

As an alternative we have assumed that Hong Kong is an important gateway for trade links with China so that exports to and imports from both partners have be regarded jointly. Accordingly, data columns B1 und B2 report the results for trade with China plus Hong Kong (*CN+HKG*), again with OLS in B1 and Poisson in B2.

Table 8:
Gravity estimates for India's exports, 2000–2001 to 2014–2015

Estimate	OLS Exports, with China alone (A1)	Poisson Exports, with China alone (A2)	OLS Exports, China and Hong Kong (B1)	Poisson Exports, China and Hong Kong (B2)
Dependant variable	lnX_d	X_d	lnX_d	X_d
$lnGDP_j$	1.000***	0.496***	0.981***	0.462***
	(0.0153)	(0.0201)	(0.015)	(0.018)
$lnPCI_j$	-0.432***	0.177***	-0.431***	0.180***
	(0.0253)	(0.045)	(0.025)	(0.038)
$lnGDP_{Home}$	0.979***	0.877***	0.993***	0.894***
	(0.049)	(0.060)	(0.0490)	(0.059)
$lnDIST_{Home–j}$	-0.505***	-0.445***	-0.479***	-0.404***
	(0.0503)	(0.075)	(0.050)	(0.071)
Contig–CN	0.755***	0.753***	0.835***	0.890***
	(0.192)	(0.207)	(0.188)	(0.198)
CN	-0.961**	0.562***		
	(0.133)	(0.149)		
CN+HKG			1.049**	1.081***
			(0.352)	(0.141)
Colony (UK)	0.704***	0.402***	0.818***	0.563***
	(0.080)	(0.0764)	(0.078)	(0.075)
DE	0.195*	0.0358	0.316***	0.209**
	(0.081)	(0.080)	(0.079)	(0.079)
EU15–UK–DE	0.158°	-0.257***	0.241**	-0.138
	(0.091)	(0.107)	(0.090)	(0.102)
EUNew2004	-0.165°	-1.449***	-0.116	-1.389***
	(0.099)	(0.101)	(0.098)	(0.097)
EUNew200713	-0.901***	-1.600***	-0.846***	-1.541***
	(0.082)	(0.096)	(0.082)	(0.096)
RUS	-0.931**	-0.818***	-0.820*	-0.655***
	(0.163)	(0.106)	(0.161)	(0.105)
Gulf	1.420***	1.087***	1.511***	1.210***
	(0.155)	(0.182)	(0.154)	(0.175)
USA	0.588***	1.044***	0.721*	1.243***
	(0.097)	(0.082)	(0.095)	(0.087)
_cons	-38.69***	-28.20***	-38.91***	-28.26***
	(1.426)	(1.686)	(1.422)	(1.670)
N	2725	2764	2725	2764
R^2	0.776		0.777	
pseudo R^2		0.764		0.779
RMSE	1.281		1.278	
Log Likelihood		-978610.7		-917191.0

Standard errors in parentheses. °p<0.10, *p<0.05, **p<0.01, ***p<0.001.

Source: Ministry of Commerce & Industry of India, Department Of Commerce (2015); Ministry of Statistics & Programme Implementation India (2015); World Bank (2015); Mayer and Zignago (2011); own compilation and calculations.

Firstly, as regards the numerical variables in the four export estimates, the trading partners' GDP_j and India's GDP_{Home} show highly significant values in all cases. For GDP_{Home} as the time trend variable values are to be found around "1" for both model specifications, thus indicating an export growth more or less in accordance with domestic GDP growth. For GDP_j as the partners' market size and attractiveness variable this is the case for OLS specifications A1 and B1 as well, while Poisson specifications A2 and B2 show only coefficients with half that size. As Poisson includes all observations including the zero-trade ones and is said to produce less biased estimates, one may conclude that India's exports go also to smaller countries, if countries are included which do not receive any exports from India at all. OLS and Poisson disagree on the partners' wealth PCI_j, too. For OLS it is clearly negative while for Poisson it is weakly positive—highly significant in all cases. Hence, the partners' wealth plays only an ambiguous role for India's exports.

The distance variable $DIST_{Home\text{-}j}$ which represents the trade impeding effect of distance between exporter India and the recipients of its exported commodities shows the usual negative sign and is always highly significant. In this case, OLS and Poisson do not disagree much on the result. What is striking, however, is the relative small negative value of the distance variable. Often it shows a value around "1" in other gravities. In India's case it reaches only .41 to .51. Apparently, India's exports go on average to countries located far away around the world. Another explication may be that India as a large "subcontinent" is confronted with longer trading distances at all. As section 2 has shown India's trade intensity does not differ much from other large countries. Hence, its consignments to foreign countries have to—and really do—bridge larger distances, and the impeding effect of distance may be lower for India.

The coefficients of these numerical variables represent the average attracting and impeding forces which govern India's exports in the observation period. The following dummy variables show the deviations from these normal patterns, if trade links with special partners are considered.

One usual variable in this context is the contiguity dummy which is = 1 for a common border between reporter and partner country. In the case of Indian exports we find indeed closer relationships with adjacent trading partners minus China, as represented by coefficients of +.75 to +.89. They represent exports being 110 to 140 percent higher than in the average if flows to direct neighbouring countries (with the exception of China) are considered.[17] In contrast to the findings of Santos Silva and Tenreyro (2006: 651) OLS and Poisson produce rather similar results in this context.

The specific relationship between India and China is represented in this estimates by the fact that the PRC dummy *CN* shows a high (and highly significant) negative value near "–1" which means exports are 60 percent *smaller* compared to the average partner—for OLS in A1, but +.56 (and equally significant) for Poisson in A2 which means exports are 75 percent *higher*. This ambiguity, however, disappears if we take China + Hong Kong (*CN+HKG*) instead. Now OLS B1 and Poisson B2 agree on high exports from India to China during the observation period.[18]

Looking at the "Colony"-variable which describes the relationship between India and its former colonial power UK reveals that a closer link is still intact, at least for the average of the observation

[17] The marginal effect of dummies is to be calculated by the formula $(e^{\beta_k} - 1) * 100$. See Santos Silva and Tenreyro (2006: 651, fn. 27).

[18] Of course, not all trade flows to Hong Kong have been transferred to the PRC but may have also gone elsewhere from the Chinese special administrative region. But given the great influence of China on Hong Kong one is inclined to conclude that the joint view on both may be appropriate.

period. According to OLS estimates A1 and B1 it is somewhat stronger (100 to 125 percent higher compared to the average partner) while Poisson estimates A2 and B2 give a more moderate picture (50 to 75 percent).

For Germany the estimates in the first specifications A1 and A2 show only weak or even non-significant special links while the specifications B1 and B2 reveal a significant but moderate over proportional relationship. This means that India's exports to Germany may be only a little bit more intensive (23 to 37 percent in B1 and B2) than can be expected from Germany's market size and the mutual distance between both countries. For the rest of the core-EU-15 without the UK and Germany India's deliveries are still mildly positive and weakly significant in the OLS estimates, but they are definitely negative in the Poisson estimates. Apparently, these countries are not prime export partners for India. For the rest of the EU any closer relationship cannot be identified at all. The relationship is weaker the later the new members joined the EU.

With Russia India maintained closer relationships in the years after gaining independence. For the exports in the observation period this is definitely not the case. Depending on the specification the coefficients are highly negative and significant. OLS and Poisson share this result, with Poisson coefficients being somewhat smaller.

Just the contrary is true for the countries on the western and southern shore of the Arabian Gulf. They show the highest positive coefficients at all and all are highly significant, indicating that this special relationship is not a random result. What has been discovered in the descriptive sections 3 and 4 on the geographical and commodity structure of India's exports is reflected here again.

The other main export partner for India—the USA—shows also rather high coefficients in the estimates. It is remarkable that in this case the Poisson estimate produces coefficients of nearly double the size as the OLS coefficients. While OLS regards India's exports being 80 to 100 percent higher than could be expected by market size and distance, Poisson rates them being 180 to 250 percent higher.

6.3 India's Import Side

On India's import side the estimates show a rather similar picture. India's imports have grown with its GDP even faster than exports; GDP_{Home} coefficients in Table 9 describing the forces that govern imports are somewhat higher than those in Table 8. The same is true for GDP_j representing the market size of the origin of India's imports, and again the Poisson coefficients have only half the size of the OLS ones. For the wealth variable PCI_j we find for imports the same diverging results as for exports, OLS shows a negative coefficient whereas Poisson shows a positive one.

The coefficients of the distance variable $DIST_{Home\text{-}j}$ are slightly higher for imports than those for exports for OLS (but anyhow still low compared to other gravities) while the Poisson import coefficients show even less distinct impeding effects of distance. Apparently, India is acquiring its imports from countries far way.

Table 9:
Gravity estimates for India's imports, 2000–2001 to 2014–2015

Estimate	OLS Imports, with China alone (A1)	Poisson Imports, with China alone (A2)	OLS Imports, China and Hong Kong (B1)	Poisson Imports, China and Hong Kong (B2)
Dependant variable	lnM_d	M_d	lnM_d	M_d
$lnGDP_j$	1.215***	0.603***	1.201***	0.622***
	(0.024)	(0.022)	(0.024)	(0.018)
$lnPCI_j$	-0.215***	0.242***	-0.216***	0.212***
	(0.038)	(0.043)	(0.038)	(0.039)
$lnGDP_{Home}$	1.108***	1.052***	1.119	1.061***
	(0.078)	(0.064)	(0.078)	(0.064)
$lnDIST_{Home–j}$	-0.531***	-0.236**	-0.510***	-0.205**
	(0.071)	(0.073)	(0.072)	(0.075)
Contig–CN	0.749*	-0.741**	0.808*	-0.716**
	(0.290)	(0.223)	(0.326)	(0.224)
CN	-0.303*	0.964***		
	(0.151)	(0.141)		
CN+HKG			0.958**	0.878***
			(0.240)	(0.112)
Colony (UK)	-0.137	-0.679***	-0.0507	-0.663***
	(0.171)	(0.123)	(0.172)	(0.126)
DE	-0.0789	-0.268**	0.0127	-0.255*
	(0.123)	(0.101)	(0.125)	(0.104)
EU15–UK–DE	-0.233°	-0.986***	-0.169	-0.947***
	(0.126)	(0.115)	(0.128)	(0.118)
EUNew2004	-0.401**	-2.019***	-0.364**	-1.968***
	(0.118)	(0.089)	(0.119)	(0.091)
EUNew200713	-0.846***	-2.079***	-0.806***	-2.039***
	(0.157)	(0.137)	(0.158)	(0.137)
RUS	-0.434**	-0.683***	-0.352*	-0.684***
	(0.165)	(0.124)	(0.165)	(0.123)
Gulf	2.158***	1.351***	2.229***	1.423***
	(0.162)	(0.112)	(0.164)	(0.117)
USA	-1.042***	-0.550***	-0.943***	-0.580***
	(0.149)	(0.122)	(0.150)	(0.122)
_cons	-49.74***	-37.82***	-49.91***	-38.60***
	(2.178)	(1.857)	(2.178)	(1.819)
N	2596	2713	2596	2713
R^2	0.684		0.685	
pseudo R^2		0.811		0.812
RMSE	1.948		1.945	
Log Likelihood		-1253550.3		-1265576.8

Standard errors in parentheses. °p<0.10, *p<0.05, **p<0.01, ***p<0.001.

Source: Ministry of Commerce & Industry of India (2015); Ministry of Statistics & Programme Implementation India (2015); World Bank (2015); Mayer and Zignago (2011); own compilation and calculations.

If we turn to the country (-group) dummies the results reveal a great dissent between OLS and Poisson for the common border variable *Contig–CN* of neighboring countries (with the exception of China). While OLS regards trade flows from adjacent countries as being more than 100 percent higher than from more distant countries, Poisson which includes zero-trade flows indicates imports from neighbors being 50 percent lower. This feature, however, is not uncommon since the proponents of the Poisson gravity Santos Silva and Tenreyro (2006: 651) arrive at the same result.

For China we find a result comparable to the export side. China alone with OLS (A1) shows even a negative coefficient, while Poisson (A2) turns it to the positive side. Moreover, if we treat China and

Hong Kong as a group, specifications B1 and B2 show for both methods high and highly significant coefficients. This corroborates the results from the descriptive section 3 that China became one of India's main import partners. As this gravity analysis covers the whole observation period from 2000–2001 to 2014–2015, the increasing role of China is not a short-term phenomenon.

For European trading partners we find less intensive trade links than on the export side. For the former colonial power, for Germany and for the rest of the core EU-15 the coefficients are either insignificantly negative (for OLS) or even significantly higher negative (for Poisson). This shows that European exporters occupy only a minor role as providers for India. This is even more the case for the new EU-members which joined the EU in 2004, 2007 and 2013. One might paraphrase this result by saying that there is ample potential for improving European trade relations with India.

The import results for Russia mirror those for exports to this country. The coefficients are significant and negative for all specifications, albeit somewhat smaller in size. The former relationship with Russia was no longer a close one during our observation period.

In contrast to these less than proportional consignments the results for imports from the gulf region show very high and highly significant coefficients. They reflect the energy hunger of the growing Indian economy. Poisson coefficients are smaller as OLS coefficients but nevertheless the highest positive results.

Surprising are the results of the import gravity for the USA. Although the USA were the 5th import partner for the most recent year in our sample 2014–2015, the coefficients both for OLS and Poisson are negative and highly significant (Poisson again with half the size). Apparently, India imported less from the USA during the whole observation period than could be expected from the economic strength of this partner and its distance from India. Occasional Indian purchases of aircraft and even jewelry imports were not sufficient to raise imports from the USA even to the average level of India's imports.

7 Conclusions

The gravity analysis which covers one and a half decades of India's foreign trade history corroborates the notion that India's overall integration into the international division of labor is still far from completed and leaves ample room for improvement. So far, India is trading intensely with some specific partners, the USA, and particularly the Arabian countries around the Arabian Gulf. These quite distinct links are more or less the result of the commodity pattern of India's export and import flows, namely primarily crude oil with oil products in exchange, and intermediate inputs as well as finalized products of the jewelry industry. One can conjecture that the increasing dominance of these product lines are one of the main drivers behind the apparent shift towards Asian trading partners in general which could be observed in the trading partners' analysis with regard to continents. In addition, India's mutual trade relations with China have greatly improved during the observation period. Not the least, China shows very high coefficients in the gravities, with the exception of exports to China alone in the OLS case. As the gravities assess the trade relations over the whole observation period, China and its special economic zone Hong Kong are playing increasingly but constantly an important role as India's trading partner.

But even exports to the USA which have retained their position as prime export destination—albeit with a lower export share—appear to have been dominated by the two product lines of jewelry and mineral oil products, and these groups play a distinct role on India's import side, too. On the other hand, India's export of labor-intensive commodities seems to be lagging behind. In this respect, India has left space to its Asian competitors, China and others, so far.

In sum, there is in fact ample space for India to integrate more intensely in the international division of labor. That is particularly true for the European partners. Only on India's export side the former links to the old colonial power UK seem to be rather intact, and also Germany has over proportional links to India only on the latter's export side, while India's imports from there and exports to and imports from the other EU members are definitely less than could be expected from these countries' economic strength and their distance to India.

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