# Chapter 03- An Analysis of India -China Trade Relations (1992-2018)

## 3.1 Introduction:

Over the years China has become one of the major trade partners of India. And this development has attracted the attention of scholars, researchers, and policy makers to explore various aspects of trade relationship between India and China. These two countries have many common features. They are both most populous countries in the world, and both are promising emerging economies. And most importantly they are neighbors who had experienced bittersweet relationship over the years which includes Indo- China war of 1962 and border disputes. Even though the pollical relationship between the two are volatile but trade relationship between them was relatively smooth particularly after 1991 when India adopted New Economic Policy with and objective of liberalize its economy which was further strengthened by China's accession to WTO in 2001.

In this chapter we discuss various facets of the trade relation between India and China from 1992 to 2018 with an objective to understand the nature of India's trade relationship with China.

Rest of the chapter is organized as follows. In section 3.2 we will discuss relevant literatures on the topic. It is followed by description of method and data in section 3.3, that has been employed in this chapter. In section 3.4 we examine and analyze the relationship between India and China using various indices and measure. Finally in section 3.5 we conclude

## 3.2 Review of Literature:

Many studies have been conducted with respect to the issues related to India- China bilateral trade. Following is some of the studies on different issues of Inda China trade relation in chronological order:

Shri Prakash (2003) study shows that China's joining of WTO, had led lowering of tariff and consequently rapid increase in the bilateral trade between India and China. He argues that there are many areas where there were scopes of cooperation between India and China. On the basis of the difference in the nature of production he concluded that the two countries had huge potential for bilateral trade.

Biswa N Bhattacharya et al (2005), in their study which focused on the trade and investment in southwest China and east and northeast India found that India was emerging as knowledge based and China was as manufactured based economy, so because of the diversity and complementarity the region benefits from economic cooperation between the two countries.

The Report on the India- China Joint Study Group (2005) points out that trade and investment between India and China had not only grown rapidly but there is also a huge potential in the future. Their analysis shows that as China has advantage in manufacturing sector and India in service sector, they can complement each other and benefit each other. Not only that but according to this report together they can play a very important role in the economic integration of Asia.

Amita Batra (2006), in her study estimated the difference between actual and potential trade between India and China. For this purpose, she applied augmented gravity model on data from 2002. Her study revealed that as compared to actual trade, India's potential trade was two and half times more with China. Similarly, for China, as compared to actual trade its potential trade was as high as six times more with India. Even though there was difference on potential trade, there was scope of expansion of trade for both the countries with each other.

Arvind Virmani (2006) argued that due to the size in economic terms and economic dynamism in India and China, there is very high trade potential between the two neighboring countries. According to him as both India and China are highly diversified economies with diversified manufacturing structure, there is for intra-industry trade between the two nations in intermediate manufacturing goods. He also pointed out that the export specialization of India and China were different because of difference in natural resource endowments, skills, and policy. And because of that their exports were noncompeting in many sectors. Using the example of textile sector, he pointed out that, as India's textile sector is based on natural cotton and that of China on manmade fibers, the exports of textiles sectors in these two countries were noncompeting.

Bhattacharya, S. K., & Bhattacharyya, B. N. (2006), in their study suggests that open regionalism and trade cooperation between India and China are beneficial to them as it can promote outward oriented development as well as intra-regional trade on them on the basis of comparative advantage and factor endowments. According to them in the short run, an FTA between India and China will be relatively more advantageous to China than India and the reason for this difference according to them was India has high tariff rates whereas China has low. They also found that FTA can affect the economic efficiency of the two nations because of the exclusion and discrimination of other countries of the world and as India has high tariff barriers, because of that discrimination brings disadvantage to India. According to authors, India – China FTA can construct 'bridges' and 'linkages' between East and South –

East Asia who can act as catalyst to strengthen multilateralism and for the creation of Asian Economic Community.

Jean-Joseph Boillot, & Mathieu Labbouz. (2006), on the basis of two probable scenario, authors tried to project the trend in trade between India and China in 2015, For this study they considered two scenario. First was continuation of the bilateral trade expansion between India and China which they called ‘’Chindia’ ’and second was ‘’end of catching up process and the emergence of a joint ‘ India and China’ upsurge at the world level. By considering the models of specialization and industrial transformation both in micro and macro level by both these countries, the authors concluded that second scenario had better probability than the first one. With regard to projected trade between India and China in 2015, they found that China was far ahead of India in trade and trade flow between India and China was insignificant.

Bhat. T P, Guha. Atulan, Paul. Mahua (2006), in their study suggests that India and China have scope of economic cooperation. They found that both India and China are developing closer economic ties not only with each other but also with rest of the Asia using bilateral as well as multilateral agreements. They also figure out that there is vast potential of economic cooperation between the two countries as indicated by growth in trade and investment between them. They also found there exists complementarities between the two nations in trade. On the one hand India imports were electrical and electronics, chemicals, and silk product from China and exports to China products based of primary resource based and low technology manufactured ones. Regarding China’s entry into the WTO, they observe that it has not only provided challenges but also opportunities for both India and China. They suggest that India and China can take common stands in WTO in issues like agricultural subsidies, trade related aspects of intellectual property rights, trade facilities and so on.

Wu, Y., & Zhou, Z. (2006), in their paper, on the basis of estimation of trade intensity indices found that India and China are not trading at their potential level so there is ample scope for these two countries to expand trade with each other in the future. According to them there are overlapping in comparative advantage in many commodities of these two countries as well as there are commodities where there is no overlapping, so trade can be expanded among products where there is no overlapping. They also found that as China was dominant in industrial sector and India in service sector so they can complement each other in some areas. According to them an FTA between these two nations can be mutually beneficial and recommends them to explore possibility of formation of an FTA.

Beretta, S., & Lenti, R. T. (2012), in their paper examines competition and complementary position of India and China in world economy as well as bilateral relationship between them. According to them, India and China show different path of specialization along with intensification of bilateral. Comparing comparative advantages of India and China they observed that India's comparative advantage was still in traditional sectors and in some manufacturing sectors whereas China's specialization was focussed on mass export of cheap goods. On the basis of growing inter-industry trade between India and China, authors concluded that there is complementary relation between the two. According to them bilateral trade between India and China has immense potential.

Devadason, E. S. (2012), evaluates the possibility of economic cooperation between India and China focusing in trade in manufactures. She points out that the trade structures of both India and China are diversified, specifically in exports. And even though both countries have high intra- industry trade with rest of the world but same is not true in case of trade with each other. This according to her is prerequisite to follow similar trade pattern with one another. She also found that the two countries have limited competition in manufacturing sector as there are differences in the quality of products traded by these two countries. On the basis of this analysis, she concludes that if the differences that these two countries have in terms of comparative advantage in the form of product composition or product concentration as well as in product quality are exploited then it will lead to complementary trade between the two countries. This complementarity will have beneficial effect on both the countries

Project Research Study, RBI (2013), in their study recognized the irreversible impact of liberalization adopted by both India and China with an object of better integration with the world. Their research found that regionalism can be used to augment trade of both these countries as most of their trade flow was concentrated either in Southeast Asia or East Asia. The study also finds that India's import from China was uncompetitive in many sectors including textiles and clothing, automotive, chemical etc. This means that India's import from China in these sectors were not threat to domestic sectors. They also found on the basis of revealed comparative advantage that a considerable amount of goods that India imports from China were uncompetitive, and these products can be supplied to India by any other competitor of India. In other words, India does not rely completely on China's imports of these products. Another major finding of this project relates to impact of fluctuation of Chinese Yuan on Indian exports to other countries. According to this study, fluctuation in Yuan have significant impact on India export to other countries. With regard to India's trade relation with

China, this study concludes that India can gain from its engagement with China, but India needs to pursue cautious approach that ensures protection of India's long-term interest from this bilateral relationship. And for this they recommend reform not only in India's domestic but also in external policies.

S Singh and R Mishra (2014), in this study found that the total volume of between India and China had increased significantly particularly in the period after China become a member of WTO in 2001. They observed that there exists a tremendous scope in bilateral trade between India and China and China's entry in WTO had positive impact in that relation. One measure to achieve full potential of bilateral trade between India and China, authors suggest that the remaining trade barriers as well as constraints between them should be lifted.

Zhang et al (2019), in their paper examined two issues between India and China trade for the period of 2008-2012. First one was inability of these two countries to follow their economic growth and internationalization pace. And second was to explore the determinants of trade between India and China during recession. In this study they had based their analysis in two cases. They are: 1) China's exports to India and 2) India's exports to China. Their study suggests that China's exports to India is explained by law of comparative advantage or price competition along with trade protection. On the other hand, India's exports to China are explained by comparative advantage or trade structure along with Chinese import demand trait. Regarding determinants of trade between India and China their study suggests that factors responsible for decline in China's exports to India were price competition, low trade, complementarity, trade protection against China, and appreciation of the Chinese Yuan against the Indian Rupee. In case of India's exports to China, quality competition was the main issue fi India's exports in Chinese markets.

Along with them these studies also concern themselves with various aspects of India China trade. Bhartendu Kumar Singh (2009) discussed about the impact of global meltdown on trade between India and China, Arvind Kumar (2010), in his paper analyzed the relationship between India and China and their future challenges. Rajesh K. Pillania (2010), discussed about the India- China bilateral trade relationship and asserts that this will have significant impact on world trade. Virender Pal (2011), in his paper gives and overview of India China bilateral trade and identifies various potential products for the expansion of trade between them in the future. R Raghuramapatruni (2013) discusses the role of trade between India and China and observes that potential of these two countries as long run partners is yet to be fully explored.

## 3.3 Data and Methodology:

For understanding trade relationship between India and China we are using the data from WITS-COMTRADE. The data was taken for the period from 1992 to 2018. All data are in current price in $ US terms. Data has been used to analyze the pattern of trade between the two nations. First, we will be discussing the trend of import, export, and overall trade and then we will be discussing the composition of exports and imports between the two nations. After that we will try to understand various aspects of trade for which we will be using following trade related indices which has been detailed in Appendix.

## 3.4 Discussion:

### 3.4.1 Comparison of Shares of export, import and trade in each other's trade:

### A. Exports Share:

The table below shows the share of exports of India and China to each other for the period of 1992-2018. The table shows that China's share in India's export was greater than that of India's share in China's export throughout the period. India's share was 0.19 percent in China's export in 1992 whereas China's share in India's export was 0.76 percent which was four times greater than that of India. India's maximum share in China's export was 3.08 percent in 2018 and minimum share was 0.19 percent in 1992. Similarly, China's maximum share in India's export was 7.91 percent in 2010 and minimum share was .76 percent in 1992. So, China's maximum share was more than two times the maximum share of India and its minimum share was four times more than the minimum share of India.

**Table 3.1a : Shares of India and China in Each Other's Total Exports (%)**

| Year | India's Share | China's Share | Year | India's Share | China's Share | Year | India's Share | China's Share |
|---|---|---|---|---|---|---|---|---|
| **1992** | 0.19 | 0.76 | **2001** | 0.71 | 2.10 | **2010** | 2.59 | 7.91 |
| **1993** | 0.28 | 1.25 | **2002** | 0.82 | 3.06 | **2011** | 2.66 | 5.55 |
| **1994** | 0.47 | 0.97 | **2003** | 0.76 | 4.32 | **2012** | 2.33 | 5.09 |
| **1995** | 0.51 | 1.05 | **2004** | 1.00 | 5.40 | **2013** | 2.19 | 4.88 |
| **1996** | 0.45 | 1.84 | **2005** | 1.17 | 7.16 | **2014** | 2.31 | 4.23 |
| **1997** | 0.51 | 2.06 | **2006** | 1.50 | 6.46 | **2015** | 2.56 | 3.62 |
| **1998** | 0.55 | 1.29 | **2007** | 1.97 | 6.51 | **2016** | 2.78 | 3.42 |
| **1999** | 0.60 | 1.47 | **2008** | 2.21 | 5.55 | **2017** | 3.01 | 4.24 |
| **2000** | 0.63 | 1.73 | **2009** | 2.47 | 5.87 | **2018** | 3.08 | 5.08 |

**Data Source: WITS-COMTRADE**

On the one hand China crossed one percent mark in the very next year of the beginning of the period in 1993 but on the other India crossed one percent share of

China's export only after 2004. Whereas China passed 2 percent mark in India's export in 1997, to achieve the same percent of share India took seventeen years. Only in 2008 India crossed two percent share in China's export. But India reached two percent mark much faster than it reached one percent mark. It took only four years to reach two percent mark after reaching one percent mark which took thirteen years from the beginning of the period. After reaching two percent, it took another five years for China to reach 3 percent share in India's export, but India took even longer period to reach 3 percent of share in China's export. It reached three percent in 2017. As mentioned earlier India's maximum share was 3.08 percent so there was no further expansion in India's share in China's export in given period. But China shares in India's export crossed four percent mark in just one year in 2003 after reaching 3 percent in 2002 and five percent mark in next ear in 2004 and crossed seven percent mark in 2005. So, this period from 2001 to 2005 China's share in India's export increased very rapidly. But after that China's share in India's export declined from 2006 to 2008 and again increased for next two years between 2009 and 20210 and even reached maximum in 2010 but after that it the share fall continuously from 2011 to 2016 from 5.55 percent in 2011 to 3.42 percent in 2016. After that, the share increased for next two years. It increased to 4.24 percent in 2017 and further to 5.08 percent in 2018.

The trend of India's share in China's export shows that from 1992 to 2005 India's share grow continuously but at slower rate and after declining marginally in 1996 it again grows in the same manner from 1997 to 2002 from 0.51 percent in 1997 to 0.82 percent in 2002. Again, the share declines marginally in 2003 but again continued with its increasing trend from 2004 to 2011 from 1.00 percent in 2003 to 2.66 percent in 2011. After that, the share declined continuously in next two years from 2.33 percent in 2012 to 2.19 in 2013. From 2014 till 2018 there was continuous rise in the share of India's export in China's export from 2.31 percent to 3.08 percent in 2018 and as mentioned earlier it was the maximum share that India had in China's total export.

So, from this discussion the shares of both India and China have increased in each other's exports but China's share in India's export was greater than India's share in its exports. Again, the table also shows that China's share in India's export grew comparatively faster than India's share in China's export in most of the years in the given period. So, China was comparatively better than India in terms of their shares in each other's exports.

**B. Imports Share:**

The table below compares the shares of India and China in each other total imports. It reveals that the share of India's imports from China in its total imports is relatively higher than the share of China's imports from India in its total imports. China's imports from India never crossed 2 percent of its total imports during the study- period. On the other hand, India's imports from China were as high as 16 percent during the study- period. In India's total imports, the maximum share of China was 16.96 percent in 2016 and minimum share was 0.58 percent in 1992. On the other hand, in China's total imports, the maximum share of India was 1.79 percent in 2008 and minimum share was 0.22 percent in 1992. This means that China's maximum share in India's import was almost nine times higher than India's maximum share in China's import and similarly, China's minimum share in India's imports was almost three times higher than India's minimum share in China's imports.

**Table 3.1b: Shares of India and China in Each Other's Total Imports**

| Year | India's Share | China's Share | Year | India's Share | China's Share | Year | India's Share | China's Share |
|---|---|---|---|---|---|---|---|---|
| **1992** | 0.22 | 0.58 | **2001** | 0.70 | 3.61 | **2010** | 1.49 | 11.78 |
| **1993** | 0.40 | 1.28 | **2002** | 0.77 | 4.56 | **2011** | 1.34 | 12.00 |
| **1994** | 0.28 | 2.64 | **2003** | 1.03 | 4.99 | **2012** | 1.03 | 11.07 |
| **1995** | 0.30 | 2.21 | **2004** | 1.37 | 6.11 | **2013** | 0.87 | 11.08 |
| **1996** | 0.52 | 1.93 | **2005** | 1.48 | 7.22 | **2014** | 0.83 | 12.68 |
| **1997** | 0.63 | 2.68 | **2006** | 1.30 | 8.78 | **2015** | 0.80 | 15.77 |
| **1998** | 0.65 | 2.59 | **2007** | 1.53 | 11.24 | **2016** | 0.74 | 16.96 |
| **1999** | 0.50 | 2.59 | **2008** | 1.79 | 10.00 | **2017** | 0.89 | 16.20 |
| **2000** | 0.60 | 2.79 | **2009** | 1.36 | 11.49 | **2018** | 0.88 | 14.63 |

**Author's calculation**
**Data Source: WITS- COMTRADE**

It took only one year for China to cross 1 percent share and another one year to cross 2 percent share in India's total imports. In another nine years China crossed five percent share and in three years after that it crossed ten percent share. After that it took another six years to cross fifteen percent share. On the other hand, it took twelve years for India to cross one percent share in China's imports and another four years to cross 1.5 percent share. This means that China's share in India's total imports was much higher than India's share in China's total imports. And China's share in India's total imports grew relatively much faster than India's share in China's imports.

The trend in China's share in India's import shows that from 0.58 percent in 1992 it in increased continuously for next two years first to 1.28 percent in 1993 and then to 2.74 percent in 1994 but after that it declined continuously for next two years, first to

2.21 percent in 1995 and then to 1.93 percent in 1996. In 1997 it increased to 2.68 percent but again declined to 2.59 percent in 1998. The share remained at 2.59 percent in 1999. There was continuous rise in share after that from 2.79 percent in 2000 to 11.24 percent in 2007. After declining to 10 percent, it again increased continuously for next three years from 11.49 percent in 2009 to 12 percent in 2011. In 2012 it declined to 11.07 percent but again increased continuously for next four years from 11.08 percent in 2013 to 16.96 percent in 2016. After that, the share declined continuously for next two years first to 16.20 percent and then to 14.63 percent in final year of 2018.

Now, we will discuss trend in India's share in China's imports. In 1992, India's share was 0.22 percent which increased to 0.40 percent in 1993 but again declined to 0.28 percent in 1994. After that there was continuous improvement from 0.30 percent in 1995 to 0.65 percent in 1998. It again declined to 0.50 percent in 1999 but after that increased continuously from 0.60 percent in 2000 to 1.48 percent in 2005. Then in 2006 it declined to 1.30 percent but again increased continuously for next two years first to 1.53 percent in 2007 then to 1.79 percent in 2008 The share again declined in 2009 to 1.36 percent which was followed by increase in the share to 1.49 percent in 2010. After that there was continuous decline in the share from 1.34 percent in 2011 to 0.74 percent in 2016. In 20117 the share improved to 0.89 percent but in the last year of the period the share declined marginally to 0.88 percent.

This discussion clearly shows that over the period the share of both India and China increased in each other's total imports. But as compared to India's share, China's share had increased faster over the period. Our discussion also shows that China's share in India's total import was higher than India's share in China's import in every year during the study period. This means that China had a significant share in India's total imports but India on the other hand had insignificant share in China's total imports.

**3.4.2 Growth Rate of India's Export to China:**

The table below shows growth rate of India's export to China for the period of 1992-2018. The calculation is based on the formula for CAGR. In the very first year of the period the growth rate was 227.01 percent and the rate in the last year of 2018 was 30,98 percent. So, there was a huge gap in the growth rates between these two years. In fact, growth rate in 1992 was over seven times more than that in 2018. The maximum growth rate was 227.01 percent which was registered in 1992 as already discussed and the minimum growth rate was -40.54 percent in 1998. The negative growth rate that was first registered was in 1994

at -8.90 then in 1998. After than in all the years between 2011 to 2016. In every other year's growth rate was positive.

**Table 3.2: Growth Rate of Exports (%):**

| year | growth rate | year | growth rate | year | growth rate |
|---|---|---|---|---|---|
| **1992** | 227.01 | **2001** | 25.54 | **2010** | 68.18 |
| **1993** | 76.79 | **2002** | 66.02 | **2011** | -4.14 |
| **1994** | -8.9 | **2003** | 67.61 | **2012** | -11.89 |
| **1995** | 30.47 | **2004** | 59.65 | **2013** | 11.46 |
| **1996** | 85.35 | **2005** | 75.28 | **2014** | -18.17 |
| **1997** | 16.81 | **2006** | 8.98 | **2015** | -28.72 |
| **1998** | -40.54 | **2007** | 21.24 | **2016** | -6.9 |
| **1999** | 26.93 | **2008** | 6.34 | **2017** | 40.14 |
| **2000** | 35.59 | **2009** | 2.74 | **2018** | 30.98 |
| | | | | **1992-2018** | 19.54 |

**Author's calculation**
**Data Source: WITS- COMTRADE**

As far as the trend is concerned India's exports to China after growing at 227.01 percent in 1992 declined to 76.79 percent in 1993 which was still a very strong growth. But then in 1994 exports experienced a negative growth rate of -8.90 percent. This was corrected in next two years when export grew at 30.47 percent in 1995 and then at a very strong rate of 85.35 percent in 1996. The growth declined for next two years to 16.81 percent in 1997 and -40.54 percent in 1998 which was the minimum growth in the entire period as well as second negative growth. After the worst growth rate of 1998, exports grew for two consecutive years from 26.93 percent in 1999 to 35.59 percent in 2000.

In 2001 there was weakening in growth rate to 25.54 percent. The exports from 2002 to 2005 five experienced a growth rate of more than 50 percent in each year. In 2002 there was huge rise in growth rate from 25.54 percent in previous year to 66.02 percent. It again increased to 67.61 percent in 2003 but there was a slight decline in the growth rate in 2004 to 59.65 percent and it again rise to 75.28 percent in 2005. The fluctuation continued in next two year when there was a sharp decline in the growth rate from 75.28 percent to 8.98 percent in 2006 and then rise to 21.24 percent in 2007. The growth falls continuously for two years after 2007 to 6.34 percent in 2008 and further to .74 percent in 2009.

But in 2010, the growth rate experienced a sharp rise to 68.18 percent. The years between 2011 to 2016 experienced negative growth rates in exports except for 2013 when growth rate was 11.46 percent. After falling to -4.14 percent in 2011 it further declined to -11.89 percent in 2012. Even though in 2013 there was positive growth rate of 11.46 percent,

but negative growth rates were registered in the next three years from 2014 to 2016. The growth rate in 2014 was – 18.17 percent which further declined to -28.72 percent and finally to -6.90 percent which was an improvement as compared to 2015. After this, positive growth rates were registered in next two years from 2017 to 2018. The growth rate was 40.14 percent in 2017, and 30.98 percent in 2018 which was positive but less than previous year's growth rate. The overall growth rate for the entire period was 19.54 percent

### 3.4.3 Growth Rate of India's Import from China

We will now discuss the growth rates of imports of India from China for the given period of 1992 to 2018 as shown in the table. The growth rate was spectacularly high in 1992 at 571.78 percent and in 2018 it was 25.69 percent which was extremely low as compared to growth rate of 1992. Maximum growth rate was registered in 1992 at 571.78 percent and minimum was registered in 1996 at -6.62 percent. The growth rate of import during this period did not follow a definite trend or patten.

Remarkably high growth rate was registered during the first three years from 1992 to 1994 of the periods. In the very first year the highest growth rate of 571.78 percent was registered. In 1993 the rate declined to 112.65 percent but again the rate increased to 152.90 percent. The growth rate was abnormally high during these three years. After that there was a huge decline in the growth rate in 1995. From three-digit growth rates of previous three years the growth rate in 1995 was only 6.98 percent and it even registered negative growth rate of -6.62 percent in next year of 1996. After that, a comparatively high 46.80 percent growth rate was registered in 1997. Then there was another negative growth rate of -1.16 percent in 1998.

**Table 3.3: Growth Rate of Import (%)**

| Year | Growth rate | Year | Growth rate | Year | Growth rate |
|---|---|---|---|---|---|
| **1992** | 571.78 | **2001** | 23.69 | **2010** | 34.74 |
| **1993** | 112.65 | **2002** | 43.35 | **2011** | 34.51 |
| **1994** | 152.9 | **2003** | 37.99 | **2012** | -2.42 |
| **1995** | 6.98 | **2004** | 67.39 | **2013** | -4.63 |
| **1996** | -6.62 | **2005** | 68.02 | **2014** | 12.77 |
| **1997** | 46.8 | **2006** | 53.82 | **2015** | 5.79 |
| **1998** | -1.16 | **2007** | 57.14 | **2016** | -1.82 |
| **1999** | 17.96 | **2008** | 28.53 | **2017** | 18.91 |
| **2000** | 14.11 | **2009** | -3.08 | **2018** | 25.69 |
| | | | | **1992-2018** | 28.23 |

**Author's calculation**
**Data Source: WITS- COMTRADE**

In the next year import grew at 17.96 percent which reduced to 14.11 percent in 2000. The next two years exhibited continuous rise in growth rate from 23.69 percent in 2001 to 43.35 percent in 2002. and reduced to 37.99 percent in 2003. There was continuous rise in growth rates to 67.39 percent and to 68.02 percent respectively in 2004 and 2005. There was a fluctuation in growth rate in next three years. Whereas growth reduced to 53.82 percent in 2006, it increased to 57.14 percent in 2007 and again reduced to 28.53 percent in 2008. The growth in imports was -3.08 percent in next year of 2009.

As compared to 2009, a considerable growth rate of 34.74 percent was registered in 2010. The growth rate reduced in the next three years. Except for 2011 where only a marginal reduction in growth rate was registered, the other two years of 2012 and 2013 registered negative growth rates of -2.42 percent and -4.63 percent, respectively. The growth rate rises to 12.77 percent in 2014 but reduced to 5.79 percent in 2015 which further reduced to -1.82 percent in 2016. The last two years of the period experience increasing growth rates of 18.91 percent in 2017 and further to 25.69 percent in 2018. In this entire period, growth in import was extremely high. The first three years had three-digit growth rate. Again, the period from 1999 to 2008 was the period of long and uninterrupted growth rate even though there were fluctuations in the rate during this period. The overall growth rate for entire period was 28.23 percent.

**3.4.4 Export Value Index(EVI):**

This is another index which helps us to understand how much of India's export has increased over the period from 1992 -2018. Even though there was not much increase in the share of India's export to China as we have already discussed, that does not imply that India's export with China was stagnant. So, this index helps us to show that India's export to China has increased manyfold during this period. In the table we have taken the export value of 1992 = 100 and with reference to that we discuss India's export to China in different years of the period. During the period, there was no instance that value of India's export had fallen below the level of 1992.

If we look at the trend, from 100 in 1992, it increased to 177 in 1993 but declined to 160 in 1994. After that it increased to 210 in 1995. So, by 1995 it increased by two times. As compared to 1995, in 1996, value continue to increase to 389 and further to 455 in 1997. After that there was a declined in value to 271 in 1998 but after then it continuously increased to 343 in 1999 and further to 466 in 2000.

**Table 3.4: Export Value Index (EVI) (1992 = 100)**

| Year | EVI | Year | EVI | Year | EVI |
|---|---|---|---|---|---|
| **1992** | 100 | **2001** | 584 | **2010** | 11049 |
| **1993** | 177 | **2002** | 970 | **2011** | 10591 |
| **1994** | 161 | **2003** | 1626 | **2012** | 9331 |
| **1995** | 210 | **2004** | 2597 | **2013** | 10400 |
| **1996** | 389 | **2005** | 4551 | **2014** | 8511 |
| **1997** | 455 | **2006** | 4960 | **2015** | 6067 |
| **1998** | 271 | **2007** | 6013 | **2016** | 5649 |
| **1999** | 343 | **2008** | 6395 | **2017** | 7916 |
| **2000** | 466 | **2009** | 6570 | **2018** | 10368 |

**Author's calculation**
**Data Source: WITS - COMTRADE**

So, in 2000, the value of export had increased by almost five times as compared to base value of 1992. From 466 in 2000, the value increased to 584 in 2001, and then further to 970 in 2002. The values continued to increase to 1626 in 2003 and further to 2597 in 2004 and then it reached 4551 in 2005. In 2005 the value of export had increased by almost forty-six times of the base value of 1992. So, between 2001 to 2005 the value of export had increased faster. In 2006 the value increased to 4960 and further to 6013 in 2007. It continues to rise in 2008 at 6395 and in next year at 6570. The value reached 11049 in 2010. Again, comparing the value in 1992 with that in 2010, we found that the value had increased by approximately 110 times.

After increasing in 2010, the value declined continuously for next two years to 10591 in 2011 and further to 9331 in 2012 but it again increased in 2013 to 10400. After that, the value declined continuously for next three years to 8511 in 2014 and to 6067 in 2015. So, in 2015 the value had increased by sixty times. But as compared to value of 2010, this value of 2015 was shows decline in value of exports. After that, the value further declined to 5649 in 2016 but after that it increased to 7916 in 2017 and further to 10368 in 2018. So, in 2018 the value had increased by almost 104 times than the value in base year of 1992. So, on the basis of this discussion we found that in 1995 the value of export had increased by two times, in 2000 it increased by almost five times, in 2005 by forty-six times, in 2010 by 110 times, in 2015 by sixty times and finally in 2018 by almost 104 times. Except from 2015, the value had increased in all the selected years.

### 3.4.5 Import Value Index(IVI):

Just like Export Value Index helps us to understand the growth in values of exports over the years, Import Value Index (IVI) helps us to understand the growth in value

of imports over the years. As compared to India's share in China's import, China's share in India's import was relatively higher in every year of the period. In this section we will know how India's import from China grew over the period. Just like EVI, here also we have considered the value of import of 1992 = 100. And as usual we have converted values of each year in terms of 1992's value.

**Table 3.5: Import Value Index (IVI): (1992 = 100)**

| Year | IVI | Year | IVI | Year | IVI |
|---|---|---|---|---|---|
| **1992** | 100 | **2001** | 1298 | **2010** | 29295 |
| **1993** | 213 | **2002** | 1861 | **2011** | 39404 |
| **1994** | 538 | **2003** | 2567 | **2012** | 38450 |
| **1995** | 575 | **2004** | 4298 | **2013** | 36671 |
| **1996** | 537 | **2005** | 7221 | **2014** | 41355 |
| **1997** | 789 | **2006** | 11107 | **2015** | 43751 |
| **1998** | 780 | **2007** | 17454 | **2016** | 42955 |
| **1999** | 920 | **2008** | 22432 | **2017** | 51079 |
| **2000** | 1049 | **2009** | 21741 | **2018** | 64201 |

**Author's calculation**
**Data Source: WITS- COMTRADE**

The table shows that the value of index increased from 100 in 1992 to 213 in 1993 and further to 5.38 in 1994 and reach even higher value of 575 in 1995. So, in 1995 the value of imports was around six times the value of 1992. In 1996 the value declined to 537 from 575 in 1995. But after that the value increased to 789 in 1997 but in the next year the value declined marginally to 780. The value increased sharply to 920 in 1999 as compared to 780 in 19988 and further to 1049 in 2000.

In 2000 import had increased around ten times the value of 1992. There was continuous rise in the value of index from 2001 to 2008. In 2001 value had increased to 1298 as compared to 1049 in 2000. The value increased sharply to 2861 in 2002, further to 2567, and even further to 4298 and reached 7221 in 2005. So, in 2005 the value of import had increased as high as more than seventy-two times the value of 1992. From 7221 in 2005 it increased sharply to 11107, further to 17454 and reached 22432 in 2008. After that, the value declined for single year of 2009 to 21741 but again increased to 29295 in 2010.

So, again in 2010, the value of imports had increased by almost 293 times as compared to 1992. In 2011, the value increased to 39404 as compared to 29295 in 2010. The next two years showed some decline in the value to 38450 in 2012 and further to 36671 in 2013. But the next two years showed continuous increase in the value to 414355 in 2014 and further to 43751 in 2015. So, again, in 2015 the value had increased by almost 438

times as compared to the base value of 1992. There was decline in the value of index in 2016 to 42955 but then in the last two years it continuously increased to 51079 in 2017 and further to 64201 in 2018. The value of 2018 was the maximum value of the index during the period. So, in 2018 the value of imports increased by 642 times as compared to the base value of 1992. So, it is clear from this discussion that there had been a significant increase in the value of India's imports from China. The discussion revealed that the value had increased to almost six times in 1995, 10 times in 2000, 72 times in 2005, 292 times in 2010, 438 times in 2015, and 642 times finally in 2018.

**3.4.6 Export Composition by Stage of Processing:**

Here we will discuss export composition of India with China for the four categories of goods for the given period of 1992-2018. The table shows that in 1992 share of Intermediate goods was highest compared to other goods and that of capital goods was lowest. Of the four goods, the top two goods with highest share were intermediate goods with 50.6 percent and Raw Materials with 44.33 percent. The share of these two goods was more than 95 percent of the four goods. The bottom two goods were Capital goods with 0.94 percent and consumer goods with 3.89. This composition is consistent with the RCAs of these goods that we discussed earlier. The share of goods with RCA greater than one had larger share and that with RCA less than one had smaller share.

Comparing the shares in 1992 with the shares in 2018 reveals that even though intermediate goods had the highest share in total exports with 50.40 percent, but the second highest contributor was not Raw Materials but rather it was Consumer goods with 23.11 percent which was much higher than its share in 1992. In this year, the share of Raw Materials was 16.73 percent, and it was the third highest share in the total exports. Even though the position of Capital good in terms of share remain the same but as compared to its share in 1992, there was a significant increase in its share in 2018. As compared to 1992, the shares of Intermediate goods and Raw Materials had declined whereas that of Consumer goods and Capital goods had improved significantly.

Now let us discuss the share of these goods individually. Let us begin with Capital goods. This was the least contributing goods in total exports. Its share was not even one percent. It was 0.94 percent whereas in 2018 it was 9.98 which was more than 10 percent rise compared to the share in 1992. The highest share of Capital goods was registered in 2016 at 12.59 percent and lowest share in 1993 at 0.71 percent

**Table 3.6 Export Composition by Stage of Processing (%)**

| Stage/Year | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| Capital goods | 0.94 | 0.71 | 1.97 | 1.54 | 1.30 | 2.07 | 3.37 | 3.62 | 4.67 |
| Consumer goods | 3.89 | 5.53 | 3.27 | 5.56 | 4.20 | 5.09 | 9.83 | 9.04 | 7.30 |
| Intermediate goods | 50.76 | 66.27 | 46.30 | 49.29 | 55.40 | 53.39 | 42.36 | 40.80 | 45.01 |
| Raw materials | 44.33 | 27.49 | 48.36 | 43.58 | 39.04 | 39.30 | 44.21 | 46.28 | 42.63 |
| unspecified | 0.08 | 0.01 | 0.10 | 0.02 | 0.05 | 0.15 | 0.22 | 0.26 | 0.39 |
| All Products | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Stage/Year** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** |
| Capital goods | 3.14 | 3.61 | 4.30 | 3.92 | 2.58 | 3.47 | 3.64 | 3.42 | 6.46 |
| Consumer goods | 9.85 | 6.27 | 7.02 | 3.50 | 2.63 | 2.84 | 3.07 | 3.51 | 6.03 |
| Intermediate goods | 42.27 | 50.98 | 57.03 | 41.44 | 32.22 | 34.22 | 26.76 | 20.19 | 32.07 |
| Raw materials | 44.11 | 38.69 | 31.15 | 50.79 | 62.25 | 58.99 | 66.30 | 69.77 | 54.62 |
| unspecified | 0.63 | 0.46 | 0.50 | 0.35 | 0.32 | 0.47 | 0.22 | 3.10 | 0.82 |
| All Products | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Stage/Year** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| Capital goods | 3.31 | 5.09 | 5.56 | 7.59 | 10.24 | 9.24 | 12.59 | 10.57 | 9.68 |
| Consumer goods | 3.89 | 10.80 | 5.69 | 7.16 | 15.19 | 10.63 | 13.25 | 12.57 | 23.11 |
| Intermediate goods | 41.78 | 36.12 | 44.88 | 49.33 | 51.41 | 62.72 | 49.17 | 55.99 | 50.40 |
| Raw materials | 50.89 | 47.64 | 43.68 | 35.71 | 23.10 | 17.31 | 24.83 | 20.73 | 16.73 |
| unspecified | 0.13 | 0.35 | 0.18 | 0.21 | 0.06 | 0.11 | 0.17 | 0.14 | 0.07 |
| All Products | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

**Author's calculation**
**Data Source: WITS- COMTRADE**.

The trend in the share of this good shows that for the first two years of 1992 and 1993, its share was less than one but after that for the remaining years it was greater than one. In 1992 it was .94 percent which further declined to .71 percent in 1993. After improving in 1994 to 1.97 percent the share again declined for next two years to 1.54 percent in 995 and again to 1.30 in 1997. The next three years after 1997 showed increasing trend in the share. As compared to 2.07 percent in 1997, it increased to 3.37 percent in 1998, then to 3.62 percent in 1999 and further to 4.67 percent in 2000. The share declined to 3.4 percent in 2011 but after that it improved to 3.61 percent in 2002 and again in 2003 to 4.30 percent. After that improvement for two years, the share declined in next two years continuously to 3.92 percent in 2004 and to 2.58 in 2005. After declining for two years the share again showed improvement in the next two years of 2006 and 2007 when the shares were 3.47 which was greater than the share of 2.58 in 2005 and 3.64 percent, respectively. After that there was fluctuations in the share for next three years of 2008 to 2010. The share declined in 2008 to 3.42 percent which improved significantly in 2009 to 6.46 but again there was a significant

decline in the share to 3.31 percent in 2010. After the decline of 2010, the share continuously improved for next four years from 2011 to 2014 from 5.09 percent in 2011 to 10.24 percent in 2014 which two time more than in 2011. The share declined to 9.24 percent in 2015 which again improved to 12.59 percent in 2016. After that, the share showed declining trend for last two years of 2017 and 2018. The share declined to 10.57 percent from 12.59 percent in 2017 and further to 9.68 percent in 2018.

Even though the position of Capital goods did not improve in terms of its position, and it remains least contributing good in total exports but over the period there was a significant improvement in its share in the total export of India to China. Next, we will discuss consumer goods.

The share of Consumer goods had improved significantly during this period. Its share was 3.89 percent in 1992 to 23.11 percent in 2018 which was six time more compared to its shar in 1992. Its share was highest at 23.11 percent in 2018 and was lowest at 2.63 in 2005. As far as the trend in its share is concerned, the share improved form 3.89 percent in 1992 to 5.53 percent in 1993 but it declined to 3.27 percent in 1994. The fluctuation continued for next two years of 1995 and 1996 when share improved to 5.56 percent in 1995 and then again declined to 4.2 percent in 1996. After those fluctuations, the next two years showed improvement in the share from 4.20 percent in 1996 to 5.09 percent in 1997 and further to 9.83 percent in 1998. The share again declined for next two years to 9.04 percent in 1999 and further to 7.3 percent in 2000. There were fluctuations in the share for next three years from 2001 to 2003. Whereas the share was 9.85 percent in 2001 which was an improvement compared to share of 2000, it declined to 6.27 percent in 2002 and again rose to 7.02 percent in 2003. The share declined continuously for the next two years to 3.5 percent in 2004 and further to 2.63 percent in 2005. The share continuously increased for next four years from 2006 to 2009. It increased from 2.84 percent in 2006 to 6.03 percent in 2009. As compared to share of 2006, share in 2009 was little more than double. The share fluctuated after 2010 and rise and fall in the share continued till 2018. The share declined to 3.89 percent in 2010 as compared to 6.03 percent share in 2009. In the next year in 2011, the share increased to 10.80 percent which was almost three times more than the share of 2010. In 2012 the share was declined to 5.69 percent which was almost half of the share of previous year. The next two years registered improvement in the share to 7.16 percent in 2013 and further to 15.19 percent in 2014. The share of 2014 was two times more than that of 2013. After that again there was a fall in the share to 10.63 percent in 2015 Fluctuation continued and the share again increased to 13.25 percent in 2016, which again declined to 12.57 percent in 2017. Finally, in 2018 there was a

significant increase in the share to 23.11 percent which was almost two times more than the share of 2017 and almost six time more than the share of first year of 1992. So, the share of Consumer goods had increased manyfold during the period of 1992-2018 even though as obvious this rise in the share was not continuous as we have seen that it fluctuated between many years during this period. The share of this good was third highest during the period from 1992 to 2017 and only in 2018 its share outperformed Raw materials and occupied second position in terms of share in total exports. Now we will discuss Intermediate goods.

Among all the goods, the share of intermediated goods was the highest in most of the years during this period. Its share was 50.76 percent in 1992 and the same was 50.40 percent in 2018. There was not much change in the share if this good in these two years. Its maximum share was registered in in 1993 at 66.27 percent and minimum was registered in 2008 at 20.19 percent. The share of this good improved to 66.27 percent in 1993 from 50.6 percent in previous year but compared to this, there was a significant decline in its share to 46.3 percent in 1994. The share improved continuously for next two years to 49.29 percent in 1995 and further to 55.40 percent in 1996. After that share declined continuously for next three years from 1998 to 2000. when it reached 40.80 percent in 1999 from 55.40 percent in 1996. The share again improved in 2000 to 45.01 percent but next year in 2001 It declined to 42.27 percent. After falling in 2001, the share again improved for next two years to 50.98 percent and further to 57.03 percent only to decline in next two years to 42.44 percent in 2004 to 32.22 percent in 2005. These were significant decline. The share showed improvement in the next year to 34.22 percent but after that the share contracted to 26.76 percent in 2007 and further to 20.19 percent in 2008. In 2009, the share improved to significantly to 32.07 percent. The trend continued in the next year of 2010 when it registered 41.78 percent share in total exports. The share declined to 36.12 percent in 2011. After that there was continuous improvement in the share for four years from 44.88 percent in 2012 to 62.72 percent in 2015. In the last three years the share fluctuated. The share declined in 2016 to 49.17 percent which improved to 55.99 percent in 2017 but in the last year of 2018 the share declined to 50.4 percent.

**3.4.7 Import Composition by Stage of Processing:**

The table below shows the composition of India's import from China for the period from 1992 to 2018. Among the four goods, intermediate goods were the good with highest share in total imports from 1992 to 2005 and in 2008. But from 2006 onwards till 2018 it was Capital goods which had the highest share in India's import from China. Similarly, Raw Materials was the third highest contributing good in total import from 1992 to 2002 but

after that Consumer goods become third highest contributing good in total imports. So, there had been a significant change in the composition of India's import from China during this period.

**Table 3.7: Import Composition by Stage of Processing (%)**

| **Goods/year** | **1992** | **1993** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** |
|---|---|---|---|---|---|---|---|---|---|
| **Capital goods** | 10.89 | 16.26 | 8.43 | 12.22 | 14.77 | 16.58 | 21.62 | 20.78 | 22.1 |
| **Consumer goods** | 10.59 | 5.56 | 22.46 | 5.16 | 5.45 | 7.18 | 9.19 | 11.24 | 9.88 |
| **Intermediate goods** | 50.34 | 47.34 | 48.19 | 61.94 | 65.84 | 64.82 | 52.45 | 49.54 | 46.75 |
| **Raw materials** | 26.57 | 27.46 | 17.48 | 17.32 | 11.53 | 9.34 | 11.74 | 17.53 | 20.26 |
| **unspecified** | 1.61 | 3.38 | 3.45 | 3.35 | 2.41 | 2.09 | 4.99 | 0.91 | 1.02 |
| **All Products** | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Goods /year** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** |
| **Capital goods** | 22.29 | 32.96 | 36.78 | 38.94 | 41.85 | 42.93 | 42.55 | 37.52 | 51.09 |
| **Consumer goods** | 11.34 | 11.17 | 11.39 | 11.23 | 11.15 | 10.54 | 12.63 | 11.24 | 13.2 |
| **Intermediate goods** | 46.87 | 43.16 | 42.91 | 41.21 | 39.79 | 39.41 | 41.13 | 38.17 | 28.39 |
| **Raw materials** | 19.12 | 12.02 | 8.04 | 8.27 | 6.51 | 4.53 | 2.15 | 2.13 | 1.59 |
| **unspecified** | 0.37 | 0.7 | 0.88 | 0.34 | 0.69 | 2.6 | 1.54 | 10.94 | 5.74 |
| **All Products** | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Goods/year** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| **Capital goods** | 46.4 | 43.32 | 43.74 | 47.35 | 45.89 | 49.57 | 54.98 | 56.43 | 51.57 |
| **Consumer goods** | 11.35 | 12.07 | 12.66 | 13.39 | 12.96 | 13.85 | 13.98 | 14 | 14.45 |
| **Intermediate goods** | 32.92 | 33.69 | 32.95 | 33.43 | 37.27 | 34 | 28.7 | 27.44 | 32.33 |
| **Raw materials** | 1.61 | 2.82 | 2.38 | 1.07 | 1.02 | 0.9 | 0.94 | 1.09 | 0.82 |
| **unspecified** | 7.72 | 8.1 | 8.26 | 4.76 | 2.86 | 1.68 | 1.4 | 1.04 | 0.82 |
| **All Products** | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

**Author's calculation**

**Data Source: WITS- COMTRADE**

Now we will begin with discuss contribution of these goods individually. We will start with Intermediate goods.

**i) Intermediate Goods:**

The share of Intermediate goods was 50.34 percent in 1992 and in 2018 it was 32.33 percent. There was a significant decline in the share of this good between 1992 to 2018. The highest share registered for this good was 65.84 percent in 1996 and lowest was 27.44 percent in 2017. Considering the trend, we see that the share declined form 50.34 percent in 1992 to 47.34 percent in 1993. There was a continuous improvement in the share after that for next three years from 48.19 percent in 1994 to 65.84 percent in 1996. Then it followed declining trend in next four years. The share declined to 64.82 percent in 1997 and reached 46.75 percent in 2000.

In next year there was a marginal rise in the share to 46.87 percent. But after that again the share contracted continuously for next five years from 43.16 percent in 2002

to 39.41 percent in 2006. Compared to the continuous decline between 1997 to 2000, the decline in this period of 2002-2006 was comparatively small. In 2007 there was some improvement in the share to 41.13 percent but then it declined continuously for next two years registering a share of 38.1 percent in 2008 and 28.39 percent in 2009.

The share improved in next two years reaching 32.92 percent in 2010 and further to 33.69 percent in 2011. After a marginal decline in 2012 to 32.95 percent it again improved continuously for next two years. Whereas it reached 33.43 percent in 2013, the improvement was comparatively better in 2014 when it reached 37.27 percent as compared to 33.43 percent previous years. From 2015 to 2017 i.e., for the next three years the share showed declining trend when it contracted to 34 percent in 2015 which further reduced to 28.7 percent in 2016 and further to 27.44 percent. As compared to the share of 2017, there was an improvement in the share of this good to 32.33 percent. But as discussed earlier even though this good had highest share in India's total share from China in earlier year but during latter years it lost that position and become second highest contributor in India's import from China. The good that we discuss next is Capital goods.

**ii) Capital Goods:**

In 1993 the share of capital goods was only 10.89 percent, but its share was 51.57 percent in 2018. In 1992 the share of Capital goods was third highest in India's total imports from China but in 2018 it occupied first position in terms of share in total imports. The highest share for this good was registered in 2017 when its share was 56.43 percent and lowest share in 1994 at 8.43 percent. The trend shows that the share improved from 10.89 percent in 1992 to 16.26 percent in 1993 but declined to 8.43 percent in 1994. The share picked up from next year and increased continuously for five years till 11998. The share increased from 8.43 percent in 1994 to a significant 21.62 percent in 1998. In 1999 it reduced slightly to 20.78 percent.

Then from 2000 the rising trend continued till 2006. The share increased from 22.1 percent in 2000 to 41.93 percent in 2006 which was an increase of almost two times. Decline in the share followed the next two years where the decline was marginal to 42.55 percent in 2007 but ye was comparatively more decline in share in 2008 at 37.52 percent than in 2007. The share crossed fifty percent mark for the first time in 2009 when it registered 51.09 percent share in total imports. In the next year there was a slight fall in the share to 46.40 percent which further reduced to 43.32 percent in 2011. There was a continuous rise in the share for next two years. Whereas the increment was marginal in 2012 at 43.74 percent but compare to that the rise was quite significant in 2013 at 47.35. The share declined in 2014 to

45.89 percent but after that it continuously increased for next three years from 2015-2017 from 49.57 percent to 56.43 percent and as already discussed the share of 2017 was also the highest for this good. In the final year of 2018 during this period the share was 51.57 percent which was less than the share in previous year.

Throughout this period the importance of Capital goods in the composition of India's import basket from China had significantly increased. The good which was in third position in terms of contribution to imports during early years of the period gradually improved and become the topmost contribution good in the import composition of India during the later years of the period. not only it occupied the top position but also for a considerable number of years contributed fifty percent or more share in the total imports of India from China. Now we will discuss the share of Raw Materials in composition of India's import from China.

**iii) Raw Materials:**

The share of Raw Materials in 1992 was 26.57 percent and in 2018 it was 0.82 percent. So, the share had declined significantly in 2018 as compared to 1992. It was second highest contributor in terms of share in India's imports in 1992 but in 2018 was the least contributing good. Its highest share was registered in 1993 at 27.46 percent and lowest share in 2018 at 0.82 percent. The trend of the share shows that from 26.27 percent in 992 it increased to 27.46 percent, but the share declined continuously for next four years from 1994 to 1997. The highest fall was registered in 1994 when it contracted to 17.48 percent from 27.46 percent in 1993. This decline continued and reached 9.34 percent in 1997. Then the share improved in the next two years to 17.53 percent in 1999 to 20.26 percent in 2000.

There was continuous declining trend in the share for three years from 2001 to 2003 when share contracted from 19.12 percent in 2001 to as low as 8.04 percent in 2004. Then, after a marginal rise in share from 8.04 percent in 2003 to 8.27 percent in 2004 it declined continuously from 6.51 percent in 2005 to 1.59 percent in 2009. There was an insignificant improvement in the share in 2010 at 1.61 percent and further improved to 2.82 percent in 2011.

Next four years from 2012 to 2015 exhibited declining trend in the share from 2.38 percent in 202 to as low as 0,90 percent in 2015. In the last three years of the period the share rises marginally in 2016 to .94 percent and then to 1.09 percent in 2017 and finally in 2018 the share declined to the lowest share in the entire period of 0.82 percent.

The table shows that this good enjoyed double-digit share from 1992 to 2002 but after that from 2003 to 2018 its share was reduced to single digit and continued to

decline. At some years, its share was even less than one percent including the final year of the period. So, from this discussion it is clear that even though the Raw Materials had second highest share in India's import from China but gradually that importance fainted over time and during the later years of the period it become least important in terms of its contribution in the composition of India's import from China. Now finally we will discuss the share of Consumer goods during this period.

**iv) Consumer Goods:**

As far as the share of Consumer goods in India's import basket from China is concerned, it was least contributing good among the four good since 1992 but elevated to third position in 2018. Its share in 1992 was 10.59 percent whereas it was 14.45 in 2018 which was an improvement in the share as compared to 1992. 22.46 percent in 1994 was the maximum share of this good and 5.16 percent in 1995 was the minimum share of Consumer goods. Looking at the trend shows that the share declined from 10.59 percent in 1992 to 5.56 in 1993 but reached its highest in the next year in 1994 to 22.46 percent. In 1995 there was a significant decline in the share to 5.16 percent. After the huge decline in share in 1995, the share improved continuously from 5.45 percent in 1996 to 11.24 percent in 1999 which was two times more than the share of 1996. From 2000 to 2003 for four years the share fluctuated.

In 2000 the share was 9.88 percent in 2000 which increased to 11.34 percent in 2001 then declined marginally to 11.17 percent in 2002 but again rise to 11.39 percent in 2003. After these fluctuations, the share declined continuously between 2004 and 2006 from 11.23 percent to 10.54 percent. The share again fluctuated between 2007 to 2010. In 2007 the share increased to 12.63 percent then it declined to 11.24 percent.

After that, the share again increased to 13.20 percent in 2009 only to again decline to 11.35 percent in 2010. After this fluctuation in the share, it exhibited increasing trend for next three years from 2011 to 2013 from 12.07 percent in 2011 to 13.39 percent in 2013. After declining marginally to 12.96 percent, the share followed increasing trend for the last four years from 2015 to 2018. During this last four years the share increased from 13.85 percent in 2015 to 14.45 percent in 2018. So, from the discussion it is clear that there has been an improvement not only in the share of this good but also its importance in the import basket of India from China. Whereas it had least contribution during early years but during the later years it become third most important contributor after Capital goods and Intermediate goods.

**3.4.8 Export Propensity:**

This index shows the overall degree of reliance of domestic producers on foreign markets. It is similar to the trade dependence index but may provide a better

indicator of vulnerability to certain types of external shocks (e.g., falls in export prices or changes in exchange rates). It may be a policy target.

The table shows the export propensity index of India with China and with the World. It gives us a good understanding about how much contribution does China has in India's export propensity. As compared to world India's export propensity with China was extremely low. The highest value of this Index with China was 0.88 in 2013 and lowest was 0.05 in 1992. The trend shows that from 0.05 in 1992 it increased to 0.10 in 1993 but declined to 0.08 in 1994,

. After that it improved continuously for next three years from 0.09 in 1995 to 0.17 in 1997. In 1998 it declined again to 0.10. Then it improved continuously for next seven years from 0.12 in 1999 to 0.88 in 2005. It then declined continuously for next two years first to 0.83 in 2006 and then to 0.78 in 2007. It again increased to 0.84 in 2008 before declining to 0.77 in 2009. In 2010 it increased to 1.04 but after that it declined continuously for next two years first to 0.92 in 2011 and then to 0.81 in 2012. In 2013 it again increased to 0.88. After that there was continuous declined in India's export propensity for next three years from 0.66 in 2014 to 0.39 in 2016. In the final two years it improved continuously first to 0.47 in 2017 and then to 0.61 in 2018.

**Table 3.8: Export Propensity Index**

| Year | China | World | Year | China | World | Year | China | World |
|---|---|---|---|---|---|---|---|---|
| **1992** | 0.05 | 7.19 | **2001** | 0.19 | 9.04 | **2010** | 1.04 | 13.15 |
| **1993** | 0.10 | 7.96 | **2002** | 0.30 | 9.73 | **2011** | 0.92 | 16.54 |
| **1994** | 0.08 | 8.05 | **2003** | 0.42 | 9.77 | **2012** | 0.81 | 15.84 |
| **1995** | 0.09 | 8.80 | **2004** | 0.58 | 10.70 | **2013** | 0.88 | 18.13 |
| **1996** | 0.16 | 8.52 | **2005** | 0.88 | 12.23 | **2014** | 0.66 | 15.57 |
| **1997** | 0.17 | 8.37 | **2006** | 0.83 | 12.89 | **2015** | 0.46 | 12.57 |
| **1998** | 0.1 | 7.88 | **2007** | 0.78 | 11.99 | **2016** | 0.39 | 11.34 |
| **1999** | 0.12 | 8.05 | **2008** | 0.84 | 15.17 | **2017** | 0.47 | 11.10 |
| **2000** | 0.16 | 9.04 | **2009** | 0.77 | 13.17 | **2018** | 0.61 | 11.93 |

**Author's calculations**
**Data Source: WITS- COMTRADE**

Except for 2010, the index never crossed 1 during the entire period. Even though India's export propensity in the world was extremely low but it was even worse with China. So going by the definition we can conclude that India's domestic producers had insignificant reliance on China for their products. In other words, we can say that Indian domestic producers were not much vulnerable to any shock in China's domestic market.

### 3.4.9 Import Penetration Index:

This index shows to what extent domestic demand is satisfied by imports. this index can provide an indication of the degree of vulnerability to certain types of external shocks. It is measured in percentage terms.

The table shows that highest value of Import Penetration index of India with China was 3.66 and lowest was 0.05. This means that at most China satisfied 3.66 percent of India's domestic demand and at least it satisfied only 0.05 percent. Here also India was not much vulnerable to any shocks happen in Chinese economy. The trend in this index shows that from 0.05 in 1992 it increased continuously for next two years first to 0.12 and then to 0.25.

In 1995 its value remained same at 0.25 but declined to 0.21 in 1996. It again increased to 0.29 in 1997 but declined to 0.28 in next year of 1998. From 1999 it improved continuously for ten years from 0.31 in 1999 to 3.01 in 2008. In 2009 it again declined to 2.56 but then improved continuously for next two years first to 2.76 and then to 3.52. After that it declined continuously for five years from 2012 to 2016. In the final two years it improved continuously first to 2.96 percent in 2017 and then to 3.66 percent in 2018.

**Table 3.9: Import Penetration Index.**

| Year | China | World | Year | China | World | Year | China | World |
|---|---|---|---|---|---|---|---|---|
| **1992** | 0.05 | 9.14 | **2001** | 0.41 | 11.43 | **2010** | 2.76 | 23.39 |
| **1993** | 0.12 | 9.06 | **2002** | 0.56 | 12.29 | **2011** | 3.52 | 29.32 |
| **1994** | 0.25 | 9.5 | **2003** | 0.65 | 13.12 | **2012** | 3.4 | 30.71 |
| **1995** | 0.25 | 11.11 | **2004** | 0.95 | 15.48 | **2013** | 3.29 | 29.65 |
| **1996** | 0.21 | 10.86 | **2005** | 1.39 | 19.29 | **2014** | 3.27 | 25.81 |
| **1997** | 0.29 | 10.84 | **2006** | 1.87 | 21.35 | **2015** | 3.24 | 20.56 |
| **1998** | 0.28 | 10.9 | **2007** | 2.24 | 19.96 | **2016** | 2.89 | 17.03 |
| **1999** | 0.31 | 11.82 | **2008** | 3.01 | 30.11 | **2017** | 2.96 | 18.28 |
| **2000** | 0.35 | 12.38 | **2009** | 2.56 | 22.28 | **2018** | 3.66 | 25.03 |

**Author's calculations**
**Data Source: WITS- COMTRADE**

It took fourteen years for China to cross one percent mark, two years to cross two percent mark but only one year to cross 3 percent mark but after that there was not much improvement and it never go beyond four percent mark. Even though there was increase in the value of this index over the years, but its value was below five percent throughout the year. In relative sense we may say that a shock in Chinese economy no doubt will have impact in India but not as much as compared to impact on India of global shock. But in absolute sense since majority of India's domestic demand was satisfied domestically, so even though external

shocks may have impact on Indian economy, but India is not vulnerable to those shocks like many other countries.

### 3.4.10 Export Import Coverage (EIC):

Here we discuss the Export Import coverage of India with respect to China. If the value is greater than one, then country's export is more than enough to cover its imports and if it is less than one then it means country's export is not enough to cover its imports. Given this definition we find that India's EIC with China was less than one for every year of the period except the year of 1992. This means that India's export was not enough to cover its imports from 1993 to 2018.

Now we discuss the trend in EIC of India with China. In 1992 the value of EIC was 1.12 which was the maximum value. But it declined continuously for next two years to 0.93 in 1993 and to 0.34 in 1994. After that, the value increased for next two years to 0.41 in 1995 and further to 0.81 in 1996. The value again declined for next two years to 0.65 and further to 0.39 before increasing to .50 in 2000.

**Table 3.10: Export Import Coverage (EIC)**

| Year | EIC | Year | EIC | Year | EIC |
|---|---|---|---|---|---|
| **1992** | 1.12 | **2001** | 0.50 | **2011** | 0.30 |
| **1993** | 0.93 | **2002** | 0.58 | **2010** | 0.42 |
| **1994** | 0.34 | **2003** | 0.71 | **2012** | 0.27 |
| **1995** | 0.41 | **2004** | 0.68 | **2013** | 0.32 |
| **1996** | 0.81 | **2005** | 0.71 | **2014** | 0.23 |
| **1997** | 0.65 | **2006** | 0.50 | **2015** | 0.16 |
| **1998** | 0.39 | **2007** | 0.39 | **2016** | 0.15 |
| **1999** | 0.42 | **2008** | 0.32 | **2017** | 0.17 |
| **2000** | 0.50 | **2009** | 0.34 | **2018** | 0.18 |

**Author's calculations**
**Data Source: WITS- COMTRADE**

The value remains same at -50 in 2001 and then increase to 0.58 in 2002 and further to 0.71 in 2003. There was a slight decline in the value to 0.68 in 2004 but again the value improved to 0.71 in 2005. The value showed declining trend for next three years when the value declined to 0.50 in 2006 and to 0.39 in 2007 and further to 0.34 in 2009. There was a slight improvement in the value in 2010 to 0.42 but again declined to 0.30 in 2011. The value further declined to 0.27 in 2012. After increasing slightly to 0.30 in 2013, it again declined continuously for three years from 2014 to 2016. The valued declined to 0.23 in 2014

and to 0.16 in 2015 and further to 0.15 in 2016. After that, the value increased to 0.17 in 2017 and further to 0.18 in 2018.

The table shows that the value of EIC from 2007 onwards was less than .50 which means that during this period India's export to China failed to cover even 50 percent of its import from China. And the situation was even worse during the last four years of the period from 2015 to 2018 when India's export to China could not cover even 20 percent of India's import from China.

### 3.4.11 Trade Dependence Index:

Value of India's overall trade dependence index was 15.67 in 1992 which was 34.65 in 2018. It was highest in the year 2013 at 43.23 and lowest in 1992 at 15.67. The value of TDI increased for the first three years after 1992 from 15.67 to 18.95 then it declined for next three years between 1996 to 1998. It declined from 18.95 in 1995 to 1847 in 1996 which further declined to 18.33 in the next year of 1997 and reached 17.97 in 1998. After that there was a slight rise in the value for next two years. It increased to 18.95 in 1999 and further to 20.35 in 2000.

**Table 3.11: Trade Dependence Index (TDI)**

| Year | TDI overall | TDI China | Year | TDI overall | TDI China | Year | TDI overall | TDI China |
|---|---|---|---|---|---|---|---|---|
| **1992** | 15.67 | 0.10 | **2001** | 19.48 | 0.57 | **2010** | 34.04 | 3.50 |
| **1993** | 16.31 | 0.21 | **2002** | 20.89 | 0.81 | **2011** | 41.90 | 3.96 |
| **1994** | 16.80 | 0.31 | **2003** | 21.69 | 1.02 | **2012** | 42.60 | 3.77 |
| **1995** | 18.95 | 0.32 | **2004** | 24.66 | 1.43 | **2013** | 43.23 | 3.67 |
| **1996** | 18.47 | 0.35 | **2005** | 29.40 | 2.11 | **2014** | 38.10 | 3.51 |
| **1997** | 18.33 | 0.44 | **2006** | 31.84 | 2.50 | **2015** | 31.14 | 3.38 |
| **1998** | 17.95 | 0.36 | **2007** | 29.96 | 2.80 | **2016** | 26.89 | 3.02 |
| **1999** | 18.95 | 0.40 | **2008** | 41.50 | 3.48 | **2017** | 27.84 | 3.18 |
| **2000** | 20.35 | 0.47 | **2009** | 33.03 | 3.05 | **2018** | 34.65 | 3.94 |

**Author's Calculation**
**Data Source: WITS-COMTRADE**

In 2001, the value of TDI declined to 19.48 but after that there was an increase in the value for next five years and reached 31.84 in 2006. There was a fluctuation in the value for next three years from 2007-2009. It was 29.96 in 2007 which increased to 41.50 in 2008 and again fall to 33.03 in 2009. From 2010 to 2013, the value again followed the increasing trend. It increased from 34.04 in 2010 to 43.23 in 2013. The value declined from 2014 to 2016 from 38.10 to 26.89. After that it increased from next two years of 2017 and 2018 from 27.84 to 34.65.

As compared to Inda's TDI in the world, the value is very low with China. The value of TDI with China was 0.03 in 1991 which increased to 3.94 in 2018. It was not until 2003, the value reached one. The highest value was registered in 2018 at 3.94 and lowest in 1991 at 0.03. From 1991-1997 there was a rising trend in the value of TDI. It increased from 0.03 in 1991 to .44 in 1997. After declining to 0.36 in 1998, the TDI again increased from 0.40 in 1999 to 3.48 in 2008. The value of TDI declined to 3.05 in 2009 but increased during the next two years from 3.50 in 2010 to 3.96 in 2011. The value declined for next five years from 3.77 in 2012 to 3.02 in 2016. During the next two years the value increased from 3.18 in 2017 to 3.94 in 2018.

### 3.4.12 Trade Intensity Index:

This index helps us to find out whether the bilateral trade flow between two countries were as expected or not. If the value of this index does not cross one, then the bilateral trade is said to be less than expected and if it is equal to one then we call such trade as expected trade and if the value exceeds one then it means that the bilateral trade is more than expected. On the basis of the above interpretation of the value the table shows that the value of TII was less than one for most of the years and it exceeded the value of one for some years. In 2010 the value was exactly one. So, this means that India's bilateral trade flow with China was less than expected for most of the years.

**Table 3.12: Trade Intensity Index (TII)**

| Year | TII | Year | TII | Year | Year |
|---|---|---|---|---|---|
| **1992** | 0.51 | **2001** | 0.59 | **2010** | 1.00 |
| **1993** | 0.37 | **2002** | 0.75 | **2011** | 0.69 |
| **1994** | 0.32 | **2003** | 0.89 | **2012** | 0.63 |
| **1995** | 0.35 | **2004** | 1.04 | **2013** | 0.59 |
| **1996** | 0.61 | **2005** | 1.33 | **2014** | 0.51 |
| **1997** | 0.68 | **2006** | 1.15 | **2015** | 0.43 |
| **1998** | 0.45 | **2007** | 1.10 | **2016** | 0.40 |
| **1999** | 0.51 | **2008** | 0.96 | **2017** | 0.46 |
| **2000** | 0.54 | **2009** | 0.82 | **2018** | 0.54 |

**Author's calculation**
**Data source: WITS- COMTRADE**

The value was maximum in 2005 at 1.33 and minimum in 1994 at 0.32. Considering the trend in value, the table shows that from 1992 -2003, then from 2008 - 2009

and finally from 2011- 2018 the bilateral trade flow between India and China was less than expected as the values of TII were less than one during these periods. Only during the period between 2004 to 2007 the bilateral trade flow was more than expected and only in one year of 2010 the flow of trade was on expected line.

Then it increased slightly to 0.35 in 1995 after that there was further significant increase in the value to 0.61 in 1996. The value further increased to 0.68 in 1997 after that it significantly declined to 0.45 in 1998. After that, the value increased continuously from 0.51 in 1999 to 1.33 in 2005 which was the highest value throughout the period. After that, the value declined continuously from 1.15 in 2006 to 0.82 in 2009. The value increased to 1.00 in 2010. But after that it continuously declined from 0.69 in 2011 to 0.40 in 2016. In the last two years the value increased continuously to 0.46 in 2017 and further to 0.54 in 2018. So, it is clear from this discussion that the bilateral trade flow between India and China was less than expected for majority of the years even though for some years trade flow was shown to be more than expected.

### 3.4.13 Trade Complementarity Index

In this section we discuss Trade complementarity index between India and China. First, we will discuss it from India's perspective and then from China's perspective. This index helps us to understand how compatible China is as a trade partner.

The table shows that India's TCI with China in 1992 was 49.76 percent which increased to 52.46 percent in 1995 but in 2000 it declined to 48.24 percent. The share increased to 55.53 percent in 2005 and further to 58.16 percent in 2010. In 2015 it reached 60.03 percent and finally in 2018 it reached 61.79 percent.

The trend shows that the value of TCI declined from 49.76 percent in 1992 to 43.12 percent in 1993 but again increased to 47.11 percent in 1994 and further to 52.46 percent in 1995. Then it continuously declined for next four years from 51.95 percent in 1006 to 45.34 percent in 1999. The TCI increased to 48.24 percent in 2000 and further to 51.21 percent in 2001 but it declined to 49.62 percent in 2002. After that it increased continuously from 51.98 percent in 2003 to 60.68 percent in 2009. Then after declining to 58.16 percent in 2010, it again increased to 61.31 percent. The value again declined for next two years to 58.77 percent in 2012 and further to 57.18 percent in 2013. In 2014 value increased to 57.82 percent and further to 60.03 percent in 2015. But the value again declined to 58.85 percent in 2016 and further to 58.72 percent in 201. In the final year of 2018, the value increased to 61.79 percent.

So, India's TCI with respect to China throughout the period was more than 40 percent and it even reached 60 percent on some occasions.

**Table 3.13: Comparison of TCI of India and China with Each Other**

| year | India | China | year | India | China | year | India | China |
|---|---|---|---|---|---|---|---|---|
| **1992** | 49.76 | 34.76 | **2001** | 51.21 | 18.65 | **2010** | 58.16 | 22.80 |
| **1993** | 43.12 | 30.90 | **2002** | 49.62 | 18.17 | **2011** | 61.31 | 22.72 |
| **1994** | 47.11 | 29.85 | **2003** | 51.98 | 14.10 | **2012** | 58.77 | 21.86 |
| **1995** | 52.46 | 33.22 | **2004** | 54.92 | 16.93 | **2013** | 57.18 | 19.17 |
| **1996** | 51.95 | 31.54 | **2005** | 55.53 | 26.39 | **2014** | 57.82 | 17.07 |
| **1997** | 51.27 | 31.70 | **2006** | 55.89 | 29.99 | **2015** | 60.03 | 18.34 |
| **1998** | 47.84 | 32.79 | **2007** | 56.28 | 27.14 | **2016** | 58.85 | 17.27 |
| **1999** | 45.34 | 32.83 | **2008** | 58.78 | 30.65 | **2017** | 58.72 | 17.92 |
| **2000** | 48.24 | 24.73 | **2009** | 60.68 | 23.98 | **2018** | 61.79 | 22.56 |

**Authors calculation**

**Data source: WITS - COMTRADE**

In case of China, its value was 34.6 percent in 1992 which declined to 33.22 percent in 1995 and further to 24.73 percent in 2000. There was a slight improvement in the value to 26.39 percent in 2005 but it again declined to 22.80 percent in 2010. In 2015 it further declined to 18.34 percent and finally in 2018 the value improved to 22.56 percent.

The trend shows that the value of TCI declined from 34.6 in 1992 to 30.90 percent in 1993 and further to 29.85 percent in 1994. After that, the value increased to 33.22 percent in 1995 and again declined to 31.54 percent in 1996. For the next three years the value continuously increased and reached 32.83 percent tin 1999. Then in 2000 it declined to 24.73 and continue declining and reached 14.10 percent in 2003. The value increased for next three years from 16.93 in 2004 to 29,99 in 2006. In 2007 it declined again to 27.14 percent but then again increased to 30.65 percent. From 2009 onwards the value continuously declined from 23.98 to 17.07 in 2014. In 2015 it again increased marginally to 18.34 but again declined to 17.27 in 2016. After than in the last two years the value increased to 17.92 percent in 2017 and further to 22.56 percent in 2018.

On the basis of the above discussion, we found that Value of TCI for India was much higher than the value of TCI for China during the given period. Whereas for India the highest value of TCI was as high as 61.79 percent in 2018, for China highest value was only 34.776 percent in 1992. For India, the value of TCI was more than 50 percent for most of the period but for China it was less than 30 percent in most of the period. This means that India's TCI with China was relatively higher than China's TCI with India.

We may conclude from above that China was relatively more important trade partner for India as compared to India for China. In other words, China is an important trade partner from India's perspective but from China's perspective India is not an important trade partner.

### 3.4.14 Herfindahl-Hirschman Product Concentration Index(HHPCI) for India's Export to China:

This index is used to determine whether a country's export is concentrated in fewer commodities, or it is more diversified. The value of this index lies between 0 and 1. If the value is closer to zero, we can consider that the export basket of that country is highly diversified and if its value is closer to one then it means that the country's export is concentrated in fewer commodities. With that let us consider the above table for HHI for India's export to China. The table shows that throughout the period of 1992-2018, the value of HHI was not very high in any year. The maximum value registered was 0.40 in 1993 and minimum value was 0.06 in 2016. It means that India's exports were least diversified in 1993 and it was most diversified in 2016 as compared to other years of the period.

Let us consider the trend of the value of HHI for the period of 1992-2018. In 1992 the value of HHI was .37 which increased to .40 in 1993. There was a sharp decline in the value of HHI in 1994 to 0.14. The value increased marginally in 1995 to .15. Then in 1996 it again declined to .11 and remain same in 1997. After increasing marginally to .12 in 1998, it declined continuously in the next two first. First to .11 in 1999 and then to 0.09 in 2000.

**Table 3.14:HHPCI for India's Export to China**

| Year | HHPCI | Year | HHPCI | Year | HHPCI |
|---|---|---|---|---|---|
| **1992** | 0.37 | **2001** | 0.12 | **2010** | 0.19 |
| **1993** | 0.40 | **2002** | 0.12 | **2011** | 0.11 |
| **1994** | 0.14 | **2003** | 0.14 | **2012** | 0.11 |
| **1995** | 0.15 | **2004** | 0.23 | **2013** | 0.11 |
| **1996** | 0.11 | **2005** | 0.32 | **2014** | 0.08 |
| **1997** | 0.11 | **2006** | 0.23 | **2015** | 0.08 |
| **1998** | 0.12 | **2007** | 0.28 | **2016** | 0.06 |
| **1999** | 0.11 | **2008** | 0.35 | **2017** | 0.07 |
| **2000** | 0.09 | **2009** | 0.22 | **2018** | 0.07 |

**Author's calculation**
**Data source: WITS-COMTRADE**

The value increased to .12 in 2001 and remain same in 2002 but after that the value increased continuously for next three years from 0.14 in 2003 to .32 in 2005. Again in 2006 it declined to .23 but increased continuously for next two years to .28 in 2007 and further to .35 in .35 in 2008. After the consecutive rise the value declined for three consecutive years to .22 in 2009 to .19 in 2010 and further to .11 in 2011.

The value of 2011 continued for the next two years of 2012 and 2013. The value further declined to 0.08 in 2014 and continued in 2015. In again declined to .06 which was the minimum value for the entire period in 2016 but then in 2017 it marginally increased to 0.07 and same value continued in the final year of 2018. So, from this discussion, we can infer that India's export to China was comparatively least diversified in the first two years of 1992 and 1993. After that from 1994 to 2003, and from 2011 to 2013 the values of HHI were very low so these twos period were comparatively more diversified than the first two years. Again, from 2004 to 2010, the value of HHI was relatively higher than the two periods of 1994-2003 and 2011-2013, so this period was relatively least diversified. And finally, the period from 2014 – 2018 had relatively lowest values than any other periods mentioned above. So, we can consider this period to be period when India export to China was most diversified.

Even though India's export to China was diversified throughout the period because its values never approached one in any of the years during the period of 1992-2018 but as pointed out above the relative degree of diversification varied from periods to periods. In other words, there is no doubt that India's export to China was diversified throughout but it was relatively highly diversified in some years and was relatively less diversified at others.

**3.4.15 Revealed Comparative Advantage: Stage of Processing:**

The table above shows India's RCA in goods at different stages of processing. As we know that a country is said to have advantage in a commodity if the value of RCA is greater than one disadvantage when it is less than one.

The table shows that, India had comparative disadvantage with respect to China in the Capital goods and the Consumers goods for the entire period of 1992-2018. The values of RCA of Intermediate goods and Raw materials show interesting trends. On the one hand Intermediate goods started with comparative disadvantage and ends with comparative advantage. On the other hand, the values of RCA of Raw materials followed a trend which was opposite of Intermediate goods. Raw materials had comparative advantage in early years and comparative disadvantages in the later years of the period, more precisely from 2014 onwards.

These two goods are the goods in which India had comparative advantage in most of the years with respect to China.

**Table 3.15: Revealed Comparative Advantage: Stage of Processing**

| Stage of processing/Year | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| Capital goods | 0.03 | 0.03 | 0.03 | 0.09 | 0.04 | 0.04 | 0.03 | 0.07 | 0.09 |
| Consumer goods | 0.30 | 0.35 | 0.30 | 0.41 | 0.26 | 0.23 | 0.35 | 0.33 | 0.43 |
| Intermediate goods | 0.62 | 1.49 | 1.12 | 1.13 | 1.38 | 1.33 | 1.55 | 1.41 | 1.48 |
| Raw materials | 6.82 | 4.64 | 6.94 | 4.65 | 3.71 | 3.59 | 3.61 | 4.26 | 2.83 |
| **Stage of processing/Year** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** |
| Capital goods | 0.08 | 0.10 | 0.08 | 0.07 | 0.08 | 0.09 | 0.08 | 0.06 | 0.12 |
| Consumer goods | 0.44 | 0.23 | 0.13 | 0.14 | 0.23 | 0.15 | 0.12 | 0.18 | 0.18 |
| Intermediate goods | 1.51 | 1.84 | 1.99 | 1.30 | 1.32 | 1.39 | 1.14 | 0.83 | 1.25 |
| Raw materials | 3.27 | 3.07 | 3.02 | 3.92 | 3.48 | 3.37 | 3.36 | 2.98 | 2.73 |
| **Stage of processing/Year** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| Capital goods | 0.10 | 0.12 | 0.14 | 0.17 | 0.20 | 0.19 | 0.23 | 0.21 | 0.20 |
| Consumer goods | 0.27 | 0.19 | 0.43 | 0.36 | 0.42 | 0.58 | 0.52 | 0.51 | 0.81 |
| Intermediate goods | 1.20 | 1.70 | 2.48 | 3.17 | 3.25 | 2.93 | 2.82 | 2.99 | 3.18 |
| Raw materials | 2.62 | 2.08 | 1.51 | 1.15 | 0.91 | 0.73 | 0.94 | 0.85 | 0.65 |

**Data Source: WITS-COMTRADE**

Now we will discuss the trends of the values of RCA of these four goods one by one. We start with Capital goods.

**i) Capital Goods:**

Capital goods had clear disadvantage during the entire period. In 1992 value of its RCA was a meagre 0.03 whereas its value was .20 in 2018, which was an improvement in the value, but it was still a disadvantage. The highest value of RCA for this good was registered in 2016 at .23 and lowest value was registered during the first three year of 1992,1993, and 1994 at 0.03. The values of RCA for this good remain same for first three years of 1992.1993. and 1994 at 0.03 as already discussed as the minimum value. Then in 1995 the value improved to 0.09. In the next two years of 1996 and 1997 the value falls to 0.04 and in 1998 it further declined to 0,03. The next two years showed some improvement in value to 0.07 in 1999 and 0.09 in 2000. The value declined to 0.08 in 2001 which again improved in the next year of 2002. After that, the value declined to 0.08 in 2003 and further to 0,07 in 2004. In the next two years there was an ordinary improvement in the value to 0.08 in 2005 and 0.09 in 2006. But after that improvement there was immediate ordinary deterioration in the value to 0.08 in 2007 to 0.06 in 2008. In 2009 the value improved to .12 from previous years 0.06. The value decline in 2010 to .10 but after that there was continuous improvement in the value for next four years. This was the longest improvement in the value in the entire period. From 0.10 in 2010 it rises to 0.12 in 2011 which increased to 0.14 in 2012 and further to 0.17 in 2013 and

finally in 2014 it was .20. After a slight decline in 2015 to 0.19, the value reached its maximum in 2016 at .23. After that, the value of RCA for this good declined continuously for next two years from .23 in 2016 to 0.21 in 2016 and 0.20 in final year 2018 of the period.

**ii) Consumer Goods:**

The values of RCA for Consumer goods were greater than that of Capital goods, but they never exceeded one in any of the years during the entire period of 1992-2018. This is another good where India had comparative disadvantage with China for entire period. In 1992 its value was .30 and in 2018 it was .0.81. Compared to 1992, there was an improvement the value of RCA in 2018. The maximum value was registered in 2018 at 0.81 and minimum was registered in 2007 at 0.12. .

Now we will discuss the trend of RCA of this good. In 1992 it was 0.30 which increased to 0.35 in 1993 but again declined to 0.30 in 1994. In 1995 it improved to 0.41 but after that it declined continuously for next two years, first to 0.26 in 1996 and then to 0.23 in 1997. It again improved to 0.35 in 1998 which was followed by a decline to 0.33 in 1999. The valued improved to 0.43 in 2000 and further to 0.44 in 2001. It again declined continuously for next two years first to 0.23 in 2002 and then to 0.13 in 2003. This decline was followed by improvement in 2004 to 0.14 which further improved to 0.23 in 2005. The fluctuation continued and the value again declined continuously for next two years, first to 0.15 in 2006 and then to 0.12 in 2007. In 2008 it improved to 0.18 and remained at 0.18 in 2009. After that, the value further increased to 0.27 but again declined to 0.19 in 2011. The fluctuation continued and the value again improved to 0.43 in 2012 which was followed by decline to 0.36 in 2013. Then it improved continuously for next two years first to 0.42 in 2014 and then to 0.58 in 2015. After improvement there was continuous decline for next two years, first to 0.52 in 2016 and then to 0.51 in 2017. Finally in 2018, it improved to 0.81. This discussion shows that India had no comparative advantage on consumer goods in any of the years of the period with China.

**iii) Intermediate Goods:**

The value of RCA for Intermediate goods was more than one for every year during this period except for the first year of 1992 and 2008 when the values were 0.62 and 0.83, respectively. This means that this good had comparative advantage in most of the years during this period. The value of RCA was 0.62 in 1992 as already mentioned and in 2018 it was 3.18. So, the value was around five times more in 2018 than in 1992. The value was highest in 2014 at 3.25 and it was lowest in 1992 at 0.62. Considering the pattern, the table shows that the value increased to 1.49 in 1993 from 0.62 in 1992. In 1994 there was a decline

in the value to 1.12 but after that it improved slightly to 1.13 in 1995 and further to 1.38 in 1996. After that it fluctuated between 1997 to 2000. Its value declined to 1.33 in 1997 then improved to 1.55 in 1998 which again declined to 1.41 in 1999 but in next year of 2000 it again rose to 1.48. The improvement in the value continued for next three years from 2001 to 2003. From 1.51 in 2001 it increased to 1.84 in 2002 and further to 1.99 in 2003. In the next year, the value declined to 1.30 but then there was an improvement in the value for the next two years of 2005 and 2006. In these two years the values were 1.32 and 1.39, respectively. After that, the value declined in 2007 to 1.14 and further in next year of 2008 to 0.83. This fluctuation continued in next two years of 2009 and 2010 as well. While value increased to 1.25 in 2009 compared to 2008, it again declined to 1.20 in 2010. Next four years from 2011 to 2014 showed huge improvement in the values of RCA for this good from 1.70 in 2011 to 3.25 in 2014. After this significant improvement, the value declined for next two years to 2.93 in 2015 and 2.82 in 2016. The value again improved in the next two years to 2.99 in 2017 and 3.18 in the final year of 2018 of the period 1992-2018. This means that India had comparative advantage in Intermediate goods throughout the period except for the year of 1992 with China. And over the years it become stronger and stronger.

**iv) Raw Materials:**

Raw Materials is another one where India had significant comparative advantage. But it was not consistent during the period. This good had highest value of RCA among the goods in the group during the early years of the period but gradually its value declined over the years and during the latter years the value of RCA become less than one i.e., India lost comparative advantage in this good during the latter years of the period. In the first year of the period the value of RCA for this good was a strong 6.82 whereas in the last year of 2018 same was only .65. From comfortable comparative advantage in first year was reduced to comparative disadvantage in the last year. As far as the highest and the lowest value of RCA for this good is concerned, 6.94 was highest value which was registered in 1994 and 0.65 was the lowest value which was registered in 2018. India had comparative advantage in this sector from 1992 to 2013. But it lost its advantage for the rest of the period of 2014 to 2018. As far as the trend in the value of RCA for this good is concerned, the value declined from 6.82 in 1992 to 4.64 in 1993 then again improved and in fact reached the highest value of 6.94 in 1994. The value showed declining trend for the next four years from 1995 to 1998. Between this period the value declined from 4.65 to 3.61. The value fluctuated for the next three years of 1999 to 2001, when the value increased to 4.26 in 1999 from 3.61 in 1998 and then declined to 2.83 in 2000 and again increased to 3.2 in 2001.

The value showed declining trend for next two years of 2011 and 2012 when its value declined to 3.07 in 2011 and further to 3.02. Then it improved to 3.92 in 2004. After increasing for one year in 2004 the value exhibited a declining trend for next eleven years, from 2006 to 2015, which was the longest trend during the entire period. During this period, the value declined from 3.48 in 2005 to 0.73 in 2015, which was almost five times decline in the value. It was during this period when India lost its comparative advantage in this good to China more precisely from 2014 onwards when the value become less than one for the first time. After this for the next five years from 2015 to 2018, the value of RCA for this good never reached or exceeded one. Even though there was an improvement in the value in 2016 to .94 as compared to the value in 2015 of .73 after than the value further declined in the next two years of 2017 and 2018 to 0.85 and 0.65, respectively. So even though this good had a very strong comparative advantage during the early years but over the years it continuously deteriorated and finally from 2014 onwards what was comparative advantage become comparative disadvantage for India.

It is clear from this discussion that out of the four goods in this category India had strong comparative disadvantage in Capital goods and Consumer goods where the value of RCA was less than one for the entire period. Similarly, India had clear comparative advantage only in Intermediate goods, whose value of RCA exceeded for most of the years except for two years when it was less than one. As for the Raw Materials is concerned, there was strong RCA for this good during the early years, but the strength of its RCA deteriorated over the years and become good with comparative disadvantage from 2014 onwards.

**3.4.16 MFN Weighted Average:**

In the table we have taken MFN for selected years to make a comparison between India and China in terms of imposition if tariff. A comparison of tariff rates imposed by these two countries shows that India's tariff was much higher than that of China in the early years but gradually over the years the gap was narrowed. Tariff rates of both countries had been reduced over the years. India's tariff rate reduced from 41.42 percent in 1992 to 6.47 percent in 2018.

Similarly, China's tariff rate reduced from 10.80 percent in 1992 to 2018. As far as imposition of maximum tariff is concerned, for India it was 41.42 percent in 1992 and for China it was 11.18 in 1996. There was as huge difference in maximum tariff rate between the two countries Again, minimum tariff imposed by India was 5.85 in 2015 and that imposed by China was 2.35 in 2010. Here also China's tariff was lower than India's.

As far as reduction in tariff is concerned, for India it happened between 2000 and 2005 where tariff reduced from 28 percent to 11.8 percent. This change in tariff policy of India for China may be due to China's accession to WTO in 2001. In case of China, highest reduction in tariff happened between the same period of 2000 to 2005 from 9.03 percent to 3.15 percent probably for the same reason for which India reduced its tariff rate.

**Table 3.16a: Comparison of MFN Weighted Average for Selected Years**

| Aggregated (%) | | |
|---|---|---|
| **Year** | **India** | **China** |
| **1992** | 41.42 | 10.8 |
| **1996** | 34.13 | 11.18 |
| **2000** | 28.00 | 9.03 |
| **2005** | 11.8 | 3.15 |
| **2010** | 6.08 | 2.35 |
| **2015** | 5.85 | 5.13 |
| **2018** | 6.47 | 5.03 |

**Data source: WITS-COMTRADE**

In case of India tariff was reduced in every year from 1992 to 2015 but there was a slight increase in 2018. In 2018 the rate was 6.47 percent whereas in 2015 was only 5.85 percent. In case of China tariff was increased in 1996 to 11.18 percent but after that it continuously reduced till 2010. The rate was 2.35 percent in 2010 but it increased to 5.13 percent in 2015 and again reduced after that to 5.03 in 2018.

So, the comparison of tariff imposed by India and China to each other shows that India's rate was higher than China for all the years in table. But the gap has been reduced over the years especially after China's accession to WTO in 2001. Now we will compare tariff rates imposed by India and China on different goods at different stages of processing. We start with Raw Materials.

**i) Raw Materials:**

We will compare now the MFN imposed by India and China on Raw Materials.

The table shows that India was highly protective in this good as compared to China. Whereas India imposed double digit rate throughout but for China it was single digit throughout. The highest rate imposed by India was in 1992 at 31.67 whereas highest rate imposed by China was only 4.88 percent. Similarly, the lowest rate imposed by India was in 2018 at 10.15 percent and same for China was only 0.83 percent in 2010. In case of India

according to table, tariff was 31.67 percent in 1992 to 10.15 percent in 2018 continuously without any fluctuations in between but same is not true for China.

**Table 3.16b: Comparison of MFN in Raw Materials**

| MFN weighted average (%) | | |
|---|---|---|
| **Year** | **India** | **China** |
| **1992** | 31.67 | 3.66 |
| **1996** | 28.82 | 4.88 |
| **2000** | 23.55 | 4.22 |
| **2005** | 18.35 | 1.05 |
| **2010** | 17.1 | 0.83 |
| **2015** | 10.94 | 3.19 |
| **2018** | 10.15 | 2.34 |

**Data source: WITS-COMTRADE**

In case of China there was fluctuations in the rate. China's rate was 3.66 percent in 1993 but then it increased to 4.88 percent in 1996. After that, the rate declined for next two years and registered 1.05 percent in 2005 and 0.83 percent in 2010. After that in 2015 there was an increase in the tariff rate to 3.19 and finally in 2018 a reduction was registered at 2.34 percent. So, in case of Raw materials India was more protective than China even though there was a huge reduction in the rate over the years, but it still remains high as compared to that of China.

**ii) Intermediate Goods:**

The table shows that India's rate was higher than China's in each and every given year. But here China's rates were also higher than that in case of Raw Materials even though they were lower than that of India.

**Table 3.16c: Comparison of MFN in Intermediate Goods**

| MFN weighted average (%) | | |
|---|---|---|
| **Year** | **India** | **China** |
| **1992** | 49.28 | 24.57 |
| **1996** | 36.1 | 13.51 |
| **2000** | 31.69 | 12.12 |
| **2005** | 15.57 | 6.63 |
| **2010** | 7.39 | 5.35 |
| **2015** | 7.86 | 5.00 |
| **2018** | 8.24 | 5.42 |

**Data source: WITS-COMTRADE**

The highest rate imposed by India was almost 50 percent at 49.28 percent in 1992 and China's rate was also highest in the same year though it was almost half of that of India. Similarly, lowest rate imposed by India was in 2010 at 7.39 percent and by China at 5 percent in 2015. India's tariff rate declined continuously from 1992 to 2010 from 49.28 percent to 7.39 percent. Then in 2015 there was a marginal increase from 7.39 percent in 2010 to 7.86 percent in 2015 which further increased to 8.24 percent in 2018.

Similarly, China's tariff rate reduced continuously from 24.57 percent in 1992 to 5 percent in 2015. Then in 2018 there was a marginal increase in the rate to 5.42 percent. Even though India and China showed similar continuous declining trend for long period and increase in at the end but rate at which India's tariff declined in these years were much higher than that of China. Comparing tariff rates, we can say that China was more protective for Intermediate goods than Raw materials. And since India's tariff rates for Intermediate goods were lower than that of Raw materials in the later years, we may say that for India protection of Raw material was more important than intermediate goods.

**iii) Capital Goods:**

The Table for the tariff rates for Capital goods for India and China shows that in the initial years both countries were protective of their respective capital goods but over the years both countries reduced their rates. India's rates were higher than that of China in the first two years of 1992 and 1996 and then in 2005 and in every other year in the later period it was less than that of China. The maximum rate imposed by India was 53.64 percent in 1992 and minimum was 3.38 percent in 2015. Similarly, maximum rate imposed by China was 21.55 percent in 1992 and minimum was 4.38 percent which was imposed in 2000 and again in 2010. The highest reduction in rate in case of India happened between 1996 to 2000 from 30.62 percent to 3.84 percent. The highest reduction in case of China also happened between 1996 and 2000 from 15.31 percent to 4.38 percent.

As far as trend is concerned, in India's case the rate declined from 53.64 percent in 1992 to 30.62 percent in 1996 and further to 3.84 percent in 2000. It increased to 6.52 percent in 2005 then reduced to 3.84 percent in 2010 and further to 3.38 percent in 2015. In the last year of 2018, the rate increased to 4.01 percent. China's rate declined from 21.55 percent in 1992 to 15.31 percent in 1996 and further to 4.38 percent in 2000. Between 2005 to 2018 the rate fluctuated. In 2005, the rate increased to 5.03, but it declined to 4.38 percent in 2010, which again increased to 5.46 percent in 2015 and finally in 2018 It again declined to 5.34 percent.

**Table 3.16c: Comparison of MFN in Capital Goods**

| MFN weighted average (%) | | |
|---|---|---|
| **Year** | **India** | **China** |
| **1992** | 53.64 | 21.55 |
| **1996** | 30.62 | 15.31 |
| **2000** | 3.84 | 4.38 |
| **2005** | 6.52 | 5.03 |
| **2010** | 3.84 | 4.38 |
| **2015** | 3.38 | 5.46 |
| **2018** | 4.01 | 5.34 |

**Data source: WITS-COMTRADE**

So, for this good also both countries were protective in the initial years but later both countries reduced their tariff rate significantly. Comparison of the tariff rates in the initial period shows that India was relatively more protective than China in this good but in later years China was relatively more protective in this good than India.

**iv) Consumer goods:**

Consumer goods was also very important for both these countries and as a result both these countries tend to protect this sector in their respective country. The table shows that China's rate was comparatively higher than India in first two years of 1992 and 1996 and then in 2015. India's rates were higher in 2000, 2005. 2010 and in 2018. The maximum rate imposed by India was 36.70 percent in 2000 and minimum rate was 8.90 percent in 2015.

**Table 3.16d: Comparison of MFN in Consumer Goods**

| MFN weighted average (%) | | |
|---|---|---|
| **Year** | **India** | **China** |
| **1992** | 15.93 | 32.25 |
| **1996** | 31.18 | 33.76 |
| **2000** | 36.7 | 14.34 |
| **2005** | 14.32 | 5.64 |
| **2010** | 9.51 | 8.24 |
| **2015** | 8.9 | 10.21 |
| **2018** | 10.51 | 9.47 |

**Data source: WITS-COMTRADE**

Similarly. China imposed maximum rate in 1996 at 33.76 percent and minimum at 5.64 in 2005. Both maximum and minimum of India was higher than that of China. As far as trend is concerned, India increased its tariff rate from 15.93 percent in 1992 to 31.18 percent in 1996 and further to 36.70 percent in 2000. But after than the rate was reduced

continuously to 14.32 percent in 2005 which further reduced to 9.51 percent in 2010 and again to 8.9 percent in 2015. The rate was increased to 1051 percent in 2018. In case of China, the rate was increased from 32.25 percent in 1992 to 33.76 percent in 1996 after than it was reduced to 14.34 percent in 2000 and further to 5.64 percent in 2005. After that in 2010 the rate was increased to 8.24 percent which reached further to 10.21 percent in 2015. In the final year of 2018, the rate declined to 9.47 percent.

On the basis of this discussion, we can say that for China Consumer goods are more important than other goods in the list, so it was relatively more protected than others. Similarly, for India Consumer goods is more important than intermediate goods and Capital goods but not more than Raw Materials. In case of India, Raw Materials is relatively more protected than other three goods.

## Conclusion:

In this chapter we examined India's complementary trade relationship with China. We found that in both exports and imports the share of China in India was higher than India's share in China's exports and imports. Throughout the period the growth rate of India's exports to China was found to be lower than its growth rate of imports from China. The study shows that India's imports rise much faster than India's exports during the period.

As far as the composition of exports and imports are concerned our study observe that both were dominated by intermediate goods and Raw materials throughout the period. Our study finds that both Indian producers and Indian consumers become more vulnerable to shocks in China's domestic market during the study period. As far as India's trade deficit with China is concerned, it was found to be widening during the study period. India's exports to China were not able to cover even 20 percent of India's imports from China in the last four years of the study period. Our study also observes that India's dependence on China increased over time.

We also measure the dependence of India on China as well as potential of bilateral trade between India and China. India's dependence on China was found to be increased over the years and the flow of trade was found to be less than expected. Our study also revealed that for India China is an important partner, but India is not an important partner of China. During the study period, India's exports to China was found to be diversified. With respect to India, India was found to have comparative advantages on Intermediate goods and Raw Materials. Our comparison of tariff revealed that India's tariff relative to China was much higher in the early years of the period, but it tends to converge over the years.

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## Appendix:

**i) Export share:**

It tells us how important a particular export partner is in terms of overall export profile of an economy. Export share is the percentage of exports from the source country to the destination country in the total export of the source country. It is written as

$$\frac{\sum_{sd} X_{sd}}{\sum_{sw} X_{sw}} \times 100$$

Here *s* is the source country or set of countries in the source; d is the destination country or set of countries in the destination; w is the set of countries in the world; X is the bilateral total export flow. The numerator is the export from the source to the destination, the denominator is the total exports from the source. It takes the value between 0 and 100 percent. Greater percentage means greater importance of trading partner.

**ii) Import share:**

It tells us how important a particular import partner is in terms of overall import profile of an economy. Import share is the percentage of imports from the source country to the destination country in the total import of the source country. It is written as

$$\frac{\sum_{sd} M_{sd}}{\sum_{wd} M_{wd}} \times 100$$

Here, s is the source country or set of countries in the source; d is the destination country or set of countries in the destination; w is the set of countries in the world; M is the bilateral total import flow. The numerator is the import from the source to the destination, the denominator is the total imports from the source. It takes the value between 0 and 100 percent. Greater percentage means greater importance of trading partner.

**iii) Growth rate of exports and imports**

Growth rate of export is defined as the annual compound percentage change in the value of exports between two periods. This comparison is important for producers, exporters, investors, policy makers and trade negotiators. This is written as

$$\left[\left(\frac{\sum_{s\omega} X_{sw}^{1}}{\sum_{sw} X_{sw}^{0}}\right)^{\frac{1}{n}} - 1\right] \times 100$$

Here, s is the set of countries in the source; w is the set of countries in the world; $X^0$ is the bilateral total export flow in the start of the period; $X^1$ is the bilateral total export flow in the end of the period; and n is the number of periods. We do not include starting year in calculation. The value it takes ranges from -100 percent to +∞. -100 means the trade has ceased. When the value becomes 0, it indicates that value of trade has remained same.

In the same way growth rate of imports is written as

$$\left[\left(\frac{\sum_{sw} M_{sw}^{1}}{\sum_{sw} M_{sw}^{0}}\right)^{\frac{1}{n}} - 1\right] \times 100$$

where, $M^0$ is the bilateral total import flow in the start of the period; $M^1$ is the bilateral total import flow in the end of the period.

**iv) Export value Index :**

This index is the ratio of current value of export and the value of export in base year (1992=100). It tells us how much exports have increased or decreased over a period of time. It is written as

$\frac{x_t}{x_b}$ x 100

Here, $x_t$ is the value of export in current year; $x_b$ is the value of export in base year.

**v) Import value index:**

Import value index can be calculated in similar manner by replacing exports by imports.

$\frac{m_t}{m_b}$ x 100

Here, $m_t$ is the value of export in current year; $m_b$ is the value of export in base year.

**vi) Export Propensity:**

This index tells us about the degree of reliance of domestic producers on foreign markets. Even though this index is similar to trade dependence index, the advantage of this index is that it provides better indicator of vulnerability of certain types of external shocks such as fall in export prices, change in exchange rates etc. This index is defined as the ratio of exports to GDP in percentage terms. It can be written as

$$\frac{\sum X_{ds}}{GDP_d} \times 100$$

Here, d is the country under study; s represents set of all countries; X represents total bilateral exports; GDP is the gross domestic product of country d. The value of this indicator ranges from 0 to 100. When

the value is 0, it means that there was no export and 100 means that all domestic production was exported.

**vii) Import Penetration Index:**

This index is helpful in knowing that to what degree domestic demand is satisfied by imports. It is also known as self-sufficiency ration. This index can provide an indication of vulnerability of importing country to external shocks. This index is defined as the ratio of total imports of a country to its domestic demand in percentage terms. It is given as

$$\frac{\sum_s M_{sd}}{GDP_d - \sum_s X_{ds} + \sum_s M_{s\,d}} \times 100$$

The value of this indicator ranges from 0, where there is no import to 100 where all domestic demand is satisfied by imports only. This means there will be no domestic production and no exports.

**vii) Import Export Coverage:**

This indicator helps us to know whether a country's import bill in fully paid by its exports each year or not. It is defined as the ratio of total exports to total imports. It is given as

$$\frac{Total\ Export\ in\ year\ t}{Total\ Import\ in\ year\ t}$$

The value of this index ranges from 0 to ∞. When its value is 0, this means that country does not export and when it is ∞, this means that country does not import. If the value of this indicator is 1 in a particular year, this means that country export is fully capable of covering its import bill during that year.

**ix) Trade Dependence Index:**

This index shows the openness of and economy. It can be defined as the total trade of a country as a percentage of its GDP. It can be written as

$\frac{Total\ Trade}{GDP}$ x 100. In our case, since we are considering only the merchandise trade, so our index is modified as

$$\frac{Total\ Mercandise\ Trade}{GDP} \text{ x } 100$$

The value of this index lies between 0 and $+\infty$

**x) Trade Intensity Index:**

This indicator helps us to determine whether the value of trade between two countries is greater or less than expected based on their importance in world trade. This index is the share of on country's exports to a partner country divided by the share of world exports to that partner country. This is given by

$$T_{ij} = \frac{(x_{ij} \,/\, X_{it})}{(x_{wj} \,/\, X_{wt})}$$

Here, $x_{ij}$ is the export of country i to country j; $x_{wj}$ is the export of the world to country j; $X_{it}$ is country i's total export and $X_{wt}$ is total export of the world. The value of this indicator lies between 0 and $+\infty$. If the value of this indicator is less than 1, then this means that the bilateral flow between the

two countries is less than expected and if it is greater than one then it indicates that the bilateral flow between the two countries is more than expected.

**xi) Trade Complementarity Index:**

This index measures the degree to which the export pattern of one country matches with the import pattern of another. This index is defined as the sum of absolute value of the difference between the import category shares and the export shares of the countries under study, divided by two. This index is presented in percentage form. It is given by

$$TC_{ij} = 100\left(1 - sum\left(\left|m_{ik} - x_{ij}\right| / 2\right)\right)$$

Here, $x_{ij}\ is$ the share of good i in global exports of country j and $m_{ik}$ is the share of good I in all import of country k. The value of this index lies between 0 and 100. The value of index will be zero if no goods are exported by one country or imported by other country. And it will be 100 when the export share and import share exactly match.

**xii) HH Product Concentration Index:**

The HH export (import) product concentration index is calculated as the sum of squared product shares in a country's exports (import) and then normalised to lie between zero and one. HH export and import product concentration indices with scores close to zero indicate a diversified, i.e., equally distributed, product portfolio and scores close to one indicate high concentration on a few products.

This is given by

$$HHI = \frac{\sqrt{\Sigma_{i=1}^{N}\left(\frac{X_{ij}}{X_{j\cdot}}\right)^2} - \sqrt{\frac{1}{N}}}{1 - \sqrt{\frac{1}{N}}}$$

Here HHI is the product concentration index of export for count j; $X_{ij}$ is the value of exports of product i by county j; $X_j$ is the total value of exports of country j; N is the number of products exported sectorwise. The value of this index ranges from 0 to 1. Higher the value of index or if the value approaches 1 then the export is more concentrated in few products on the other hand if the value is low or if value approaches 0, then it means that the export is diversified among many products.

**xiii) Revealed Comparative Advantage:**

The RCA index is the ratio of a country's total exports of a commodity in its total exports and shares of world exports of the same commodity in total world exports. This index uses trade pattern to identify the sectors in which an economy has a comparative advantage. This is done by comparing the trade profile of the country of interest with the world average. It is written as

$$\frac{\sum_d x_{isd} \ / \ \Sigma_d X_{sd}}{\Sigma_{\omega d} x_{\omega d} \ / \ \sum_{\omega d} X_{\omega d}}$$

Here, s in the country of interest; d and w are the set of all countries in the world; I is the sector of interest; x is the quantity of commodity i and X is quantity of total exports. In the above expression,

share of good i in the exports of country s is given by numerator and the share of good i in the exports of the world is given by denominator. This index takes the value from 0 to $+\infty$ . The country s is said to have revealed comparative advantage in good i if its value is greater than one and if its value is less than one then the country will have revealed disadvantage in the good i.

**xiv) MFN Weighted Average Tariff:**

It tells us how much protection is applied by an economy or a region on average. Higher value indicated more protected economy and lower value indicates less protected economy. Weighted average tariff takes into account the volume of imports in each product category. It is the sum of the tariff in a country or a region's tariff schedule (or part of schedule) multiplied by a weighted factor representing the product's importance in the country or region's trade. It is given by

$$\sum_{is} \frac{m_{isd}}{\Sigma_k M_{kd}} t_{isd}$$

Here d is nothing but importing country, s(k) is the set of source countries, i is the set of products of interest, t is the tariff of interest (e.g., bound or applied) defined as percentage; m is the product level import; M is total import by category; In other words, we take each bilateral tariff and multiply it by the share of the corresponding bilateral import flow in total imports. Weighted tariffs are then summed across all sources / product categories. The range of this tariff is from 0 to $+\infty$.