AN EXAMINATION OF COMPLEMENTARY AND COMPETITIVE ASPECTS OF TRADE RELATIONS BETWEEN INDIA AND CHINA

A Thesis submitted to the University of North Bengal for the Award of Doctor of Philosophy in Economics

By

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Under the Supervision of

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September 2022

CERTIFICATE

I, certify that, Karan Tamang has prepared the thesis titled "An Examination of Complementary and Competitive Aspects of Trade relations between India and China" under my guidance and supervision. No part of the thesis has formed the basis of award of any degree or fellowship previously. It is a genuine and original work of the scholar. He has carried out the research at the Department of Economics, University of North Bengal.

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Declaration

I, declare that the thesis titled "***An Examination of Complementary and Competitive Aspects of Trade Relations between India and China*** " has been prepared by me under the supervision of Prof. Anil Bhuimali, Professor, Department of Economics, University of North Bengal. No part of this thesis has formed the basis for the award of any degree or the fellowship in the past.

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Chapter 01 – Introduction 1.1 Introduction: India's trade relation with China is an important area of study for both scholars and policymakers of both these nations. A large volume of works has been produced on different aspects of India's trade relations with China. Our study covers some of the important aspects of these relations. Trade relations can have two different aspects. One of the aspects is the complementary bilateral relation between the nations, where two countries trade with each other. Other one is the competitive relation where two countries compete with each other in the world market. As far as the trade relationship between India and China are concerned, most of the studies are either focused on complementary aspects or they are focused on competitive aspects. A very few authors have considered both aspects in their studies. We have in our study considered both complementary and competitive aspects of trade between India and China so as to have a holistic understanding of the bilateral trade relationship between the two nations. Even though we have considered both complementary and competitive aspects in this study, we have given more importance to the complementary aspect of the trade relation. The rest of the chapter is organized as follows: In the next section we have review of literature on various aspects of India's trade and India's trade with China. In section 1.3 we discuss Rational of the study and in 1.4 Limitation of this study. We have formulated several objectives for this study which is accompanied by relevant principal research questions and research hypothesis. These are presented from section 1.5 to section .7. In section 1.8 we discuss the data and methodology that we have considered for this study. And finally in section 1.9 we have presented the structure of our thesis. 1.2 Review of Literature: As we have just introduced the issues that we have covered in our preceding chapters, where we have made extensive review of literature for each chapters, in this chapters we have considered two broad aspects related to our study. One is exclusively related to India's trade and other related to India – China trade. First one is covered under the theme of a) India's Trade Potential and the second one under b) Important issues related to India-China economic relations. a) India's Trade: Charan Wadhva (1998) studied the export performance of India from 1950-1997 focusing on two sub- groups viz. 1950-1990 and 1991 -1997. He concluded that during the study period India failed to "take off to a long-term self-sustaining high growth path". He attributed this failure to inability of India's policy to align to world standard at both macro and micro level. According to him it was the domestic supply related constraint and not the external factors which was responsible for relatively low export performance. He asserts that since India's trade policy was unable to evolve into 'strategic and comprehensive national export policy' over the years, there is a need for reformulation of India's export strategy as a part of national macroeconomic strategy. C. Veeramani made a comparison of export growth during the pre reform period of 1950-1990 and post reform period of 1993-2005 and found that growth rate during post reform period was not very high as compared to pre reform period. Comparing the potential and actual growth rates of exports during the post reform period he found that during this period actual growth rate was higher than potential growth rate. The reason he gave for this was overall improvement in competitiveness of India's export during this period. He also identified that appreciation of real effective exchange rate had adverse effect on India's exports during post reform period. Ranajoy Bhattacharyya and Tathagat Banerjee in their paper titled "Does the Gravity Model explain India's direction of trade? A panel data approach" examines India's direction of foreign trade. With regard to the factors responsible for affecting a countries foreign trade they pointed out that the comparative advantage to the other countries, economies of scale, the aggregate income of the home as well as the partner residents, trade policies of the government, membership to curry unions and /or customs unions and finally participation in bilateral, regional and multilateral agreements. Using the gravity model to analyse India's direction of trade they come up with some of the very interesting findings. They found that this model can explain 43 percent of fluctuations in India's direction of trade in the second half of the twentieth century. Again, when it comes to the responsiveness of India's trade, they found that it responded less than proportionally to the size and more than proportionally to the distance. The presence of colonial heritage in India's trade still seems to be an important determining factor for India's direction of trade. According to their study India trade more with the developed nations than with the developing but size of the partner appears to be more influential determining factor than the level of the development of the partner. S.N Bhattacharya and B.N Bhattacharya in their work titled "Gains and Losses of India China Trade Cooperation: A Gravity Model Impact Analysis calculated the trade intensity indices of India and China, and their result shows significant trade potential between the two countries.

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Abstract

India not only have complementary trade relationship with China but it also faces competition from China in the world export market. In this study we have examined both these aspects of India China trade relations for the post liberalization period between 1992-2018. Here we have examined both complementary and competitive aspects of bilateral relations, but our focus was more on complementary aspects than on competitive one. Our study is based on secondary data on international trade of India and China. For the purpose of analysis, we have used various trade related indices as well as econometric models. There are seven chapters in this work. Of the seven five chapters are analytical in nature. In first chapter we have introduction and in last chapter we have summary, recommendations, and conclusion. In second chapter we discussed the performance of India's trade during the post liberalization period between 1992-2018. For this purpose, we used various trade related indices. We found a significant improvement in the performances of both exports and imports of India during the study period. But the share of India's trade in the world market during the period remained stagnant. In third chapter we discussed the bilateral relationship between India and China. Here also we used various trade related indices to analyse the relationship between the two. Our study revealed that as a partner China was relatively more important for India as compared to India for China. We Also found that the actual trade between the two countries were below their potential. In chapter four we analysed the extent of intra- industry trade between India and China. For this purpose, we used Grubel- Lloyd index to measure the extent of aggregated intra-industry trade and disentanglement method to find out which type of IIT was dominant between India and China. Our study revealed that the intraindustry trade between the two had increased during the study period and the dominant type of intra-industry trade was found to be VIIT (Vertical Intra-industry trade) rather than HIIT (

Horizonal Intra-industry trade). In chapter five we analysed the long- run relationship between India's exports and imports with China. For this purpose, we had used the Engel- Granger two step Cointegration test. We used quarterly data from 1996 to 2018 for this analysis. Our study found that there exists a stable long run relationship between India's exports and imports with China during the study period, but the relationship was found to be weak in nature. Finally, in chapter six, we discussed the competition between India and China in exports to the world. In this study also we had used appropriate trade related indices and made a comparison of various aspects of export performances of the two nations between 1992-2018. The comparison revealed that China's share was much higher than that of India in the world export market and China was found to have outperformed India in export performance during the study period. So, China in terms of trade performance, both as a partner or as a competitor of India was found to have played a strong dominant role during the study period.

Keywords: post- reform, trade, India, China, exports, imports, complement, competition, intra-industry trade, HIIT, VIIT, long-run, equilibrium, trade-indices,

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Chapter 01 – Introduction

1.1 Introduction:

India's trade relation with China is an important area of study for both scholars and policymakers of both these nations. A large volume of works has been produced on different aspects of India's trade relations with China. Our study covers some of the important aspects of these relations. Trade relations can have two different aspects. One of the aspects is the complementary bilateral relation between the nations, where two countries trade with each other. Other one is the competitive relation where two countries compete in the world market. As far as the trade relationship between India and China are concerned, most of the studies are either focused on complementary aspects or they are focused on competitive aspects. A very few authors have considered both aspects in their studies. We have in our study considered both complementary and competitive aspects of trade between India and China to have a holistic understanding of the bilateral trade relationship between the two nations. Even though we have considered both complementary and competitive aspects in this study, we have given more importance to the complementary aspect of the trade relation.

The rest of the chapter is organized as follows: In the next section we have review of literature on various aspects of India's trade and India's trade with China. In section 1.3 we discuss Rational of the study and in 1.4 Limitation of this study. We have formulated several objectives for this study which is accompanied by relevant principal research questions and research hypothesis. These are presented from section 1.5 to section .7. In section 1.8 we discuss the data and methodology that we have considered for this study. And finally in section 1.9 we have presented the structure of our thesis.

1.2 Review of Literature:

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a) India's Trade:

Charan Wadhva (1998) studied the export performance of India from 1950-1997 focusing on two sub- groups viz. 1950-1990 and 1991 -1997. He concluded that during the study period India failed to "take off to a long-term self-sustaining high growth

path". He attributed this failure to inability of India's policy to align to world standard at both macro and micro level. According to him it was the domestic supply related constraint and not the external factors which was responsible for relatively low export performance. He asserts that since India's trade policy was unable to evolve into 'strategic and comprehensive national export policy' over the years, there is a need for reformulation of India's export strategy as a part of national macroeconomic strategy.

C. Veeramani made a comparison of export growth during the pre-reform period of 1950-1990 and post reform period of 1993-2005 and found that growth rate during post reform period was not very high as compared to pre reform period. Comparing the potential and actual growth rates of exports during the post reform period he found that during this period actual growth rate was higher than potential growth rate. The reason he gave for this was overall improvement in competitiveness of India's export during this period. He also identified that appreciation of real effective exchange rate had adverse effect on India's exports during post reform period.

Ranajoy Bhattacharyya and Tathagat Banerjee in their paper titled "Does the Gravity Model explain India's direction of trade? A panel data approach*"* examines India's direction of foreign trade. With regard to the factors responsible for affecting a countries foreign trade they pointed out that the comparative advantage to the other countries, economies of scale, the aggregate income of the home as well as the partner residents, trade policies of the government, membership to curry unions and /or customs unions and finally participation in bilateral, regional, and multilateral agreements. Using the gravity model to analyse India's direction of trade they produced some interesting findings. They found that this model can explain 43 percent of fluctuations in India's direction of trade in the second half of the twentieth century. Again, when it comes to the responsiveness of India's trade, they found that it responded less than proportionally to the size and more than proportionally to the distance. The presence of colonial heritage in India's trade still seems to be an important determining factor for India's direction of trade. According to their study India trade more with the developed nations than with the developing but size of the partner appears to be more influential determining factor than the level of the development of the partner.

S.N Bhattacharya and B.N Bhattacharya in their work titled "Gains and Losses of India China Trade Cooperation: A Gravity Model Impact Analysis calculated the trade intensity indices of India and China, and their result shows significant trade potential between the two countries. They also showed with gravity model the likely impact in terms of

gain or loss in imports of both India and China due to different preferential arrangements and free trade agreements.

Amita Batra in her study titled *"India's Global Trade Potential: A Gravity Model Approach*" argues that though India's economic liberalisation had positive impact on India's external sector but compared to other countries the volume of trade as a share of world market is far less. She used the gravity model of trade to examine the trade potential of India. Her study reveals that India's trade potential is maximum with Asia- Pacific Region followed by Western Europe and North America. With regard to individual nations potential of trade expansion is highest with China, UK, Italy, and France. Her study reveals that among ASEAN countries the trade potential is highest with Philippines and Cambodia.

Nilanjan Banik, identified the factors responsible for significant decline in India's exports during the post reform period. He found that India that decline in India's growth rate was mainly because of fall in growth rate of export volume. And the factors responsible for declined export growth rates were related to demand side factors rather than supply side ones. But he also suggested that, taking care of supply side factors is also important for the revival of exports growth. According to him, the actual demand for India's exports was due to sharp decline in India's competitiveness caused by depreciation of the currencies of many Southeast Asian countries during that time. Another reason for the decline according to him was imposition of high non- tariff barriers by many developed countries during that period.

Prabir De's study titled "*Global economic and financial crisis: India's trade potential and future prospects"* also confirms the findings of Amita Batra. Using the gravity model of trade to examine the India's trade potential during pre- crisis and post- crisis period with panel data, he concludes that India's trade potential is maximum in Asian and Pacific region followed by Africa and Latin America. The study also shows that the potential for expansion of trade is highest with countries like China during post –crisis period.

b) Important issues related to India-China economic relations:

Many studies have been conducted with respect to the issues related to India- China bilateral trade.

Arvind Virmani in his article "India- China Economic Cooperation" has pointed out several issues related to India China trade. Here he shows his optimism regarding the high prospect of India China trade resonating some empirical work done by Amit Batra. According to him India- China "bilateral trade potential is very high given the size and economic dynamism of the two economies."

Bhat et al 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.

Singh and Mishra 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.

Qureshi and Wan in their work titled" Trade Expansion of China and India: Threat or Opportunity?" identifies the export performance and specialization pattern of China and India with special focus on their trade competitiveness and trade complementarities with respect to each other and with the rest of the world. Their finding shows that present competition that India faces from China in export of traditional labour-intensive products may reduce in the long run.

Beretta and Lenti 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 huge potential.

According to the "Report on the India- China Joint Study Group on Comprehensive Trade and Economic Cooperation (2005) there is rapid growth in the bilateral trade and investment between India and China and has a "vast potential for growth in the future". According to the report India and China can complement each other because China has advantage over manufacturing sector and India is dominant in-service sector and they can use their respective strengths for mutual benefits. Along with this according to the report India and China can together play significant role in broader economic integration of Asia.

Boillot, and Labbouz. (2006), using two probable scenarios, 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.

SK Mohanty, in his study India-China Bilateral Trade Relationship (2013) has identified following issues with regard to India China trade relations: i) India's trade gap is increasing over time not only in the world but also in terms of its trade with China and how much is the contribution of China in overall trade gap of India. ii) Role of tariff policies on the trade performance of India and China as regard to country's expanding participation on various RTAs in Asia and in the world. iii) Role of India in the Global value chain which is an unexplored area in India through engagement with China and iv) Revaluation of Chinese currency yuan and its impact on India's trade not only with China but also with the world.

1.3 Rationale of the study:

India's economic relationship with China is not only limited to bilateral complementary relationship but China is also a major competitor of India in the world market. This study is an attempt to understand the nature and consequence of India's economic relationship with China. The study basically has two components or parts. Firstly, we are going to study different aspects of bilateral trade relationship between India and China. Secondly, we study the competition between the two countries by comparing their performances in the world market. The rationale for doing such a study is to understand both complementary and competitive relationship between the two nations in one study to have a holistic understanding

of the nature of trade relationship between India and China .As most of the literatures on India China trade relations have focused either on one or the other relation and we this prevents us to have an overall understanding of India – China trade relations. So, this study is an attempt to bridge that research gap.

1.4 Limitations:

One of the important limitation of this study is that in this study we have considered only merchandise trade and we have not considered trade in services and other aspects related to trade like FDI. As far as data is concerned, we have used data with two different frequencies. In Chapter 02, Chapter 03, and Chapter 06 we have used annual data and in Chapter 05 we have used quarterly data. In case of Chapter 04 we have used annual as well as quarterly data due to unavailability of data.

1.5 Objectives of the study:

This study has been conducted with the following specific objectives :

1. To examine the performance of India's trade during the study period.
2. To understand the nature of India- China bilateral economic relationship.
3. To examine factors that complements India- China bilateral relations.
4. To examine the extent and nature of intra-industry trade between India and China.
5. To examine the long -run relationship between India's exports to and imports from China.
6. To understand the nature competition between India and China in the world market.

1.6 Principal Research Questions:

We have formulated certain specific research questions or principal research questions for conducting this research with an intention to make sense of the issue objectively and scientifically.

1. Has India's trade in the world trade stagnated?
2. What is the nature of India's trade relationship with China?
3. What is the nature and extent of share of intra- industry trade in India China trade?
4. Is there any long-run relationship between India's exports to and import from China ?
5. Is India's export performance better than China in the world market?

In our study question no. 1 is addressed in chapter 02 and question no. 2 in chapter 03. The third question is addressed in chapter 04 and fourth question in chapter 05. The last question i.e., fifth one is addressed in chapter 06 of our study.

Similarly, for our studies we had formulated following research hypotheses

1.7 Research hypotheses:

In the study we are going to test the following important hypothesis that we have formulated so that we come up with better understanding of the issue we are addressing in this study.

1. India's trade remains stagnant during the study period.
2. India is an important trade partner of India.
3. China is an important trade partner of India.
4. India intra-industry trade with China reduced overtime.
5. There was no change in the type of intra-industry trade between India and China.
6. There is no long-run relationship between India's exports to and imports from China.
7. India's export performance is better than China in the world market.

1.8 Data and Methodology:

The data that we are going to use in this study is secondary in nature from different national govt. and international agencies. The basic sources of data for this study will be from publications of WTO, Ministry of Foreign Trade, Ministry of Commerce, CMIE etc. The data after 1991 will be used for the purpose.

For Chapters 02, 03 and 05 we have calculated various types of trade related indices and used them in our study. For chapter 04 we used index of intra-industry trade and another method to separate different types of IIT. In chapter 05 we have used cointegration approach to find out the long run relationship between variables concerned. The data for our analysis is collected from various sources which includes WITS- COMTRADE, RBI, Ministry of Commerce, Government of India , Federal Bank of St Louis, USA. For most of the analysis the frequency of our data was annual but the data that has been used in chapter 05 is quarterly data.

1.9 Structure of the work:

The structure of this work are as follows. In Chapter 02 we discuss performances of India's trade during the period from 1992-2018. In this chapter we examine various aspects of India's trade. In Chapter 03 we will be analyzing the complementary trade

relationship between India and China for the same period. This chapter will help us to understand the nature of India China trade. It is followed by Chapter 04 where we discuss the extent and nature of India's intra-industry trade with China. This chapter will show the share of intra-industry trade in the overall trade of India with China. Along with that in this chapter we will also know the nature or type of intra-industry trade between India and China. After this chapter, in Chapter 05 we will examine the long- run relationship between India's export and import with China. It also helps us to know the stability of the relationship between these two variables. In Chapter 06, we will make a comparison of trade performances of India and China in the world market. This chapter will help us to understand the competitive relationship between the two countries. In the final chapter i.e., Chapter 07 we will summarize the study, make relevant recommendations, and conclude the work.

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Chapter 02 - An Overview of India's Trade for The Period 1992-2018

2.1 Introduction:

During early nineties India faced a severe balance of trade crisis and in order to mitigate it a bunch of reforms in the form of New Economic Policy was adopted and India's external sector was formally liberalized. Further impetus in liberalization effort was provide when GATT was replaced by WTO in 1995. India was one of the founding members of WTO. These developments draw the attention of scholars, researchers, and policymakers, as a consequence large volume of works related to performances of India's trade during the post liberalization period was produced.

In this chapter we will not analyse the impact of New Economic Policy on India's trade rather we will analyze the performances of India's trade during the post liberalization period from 1992-2018. For this purpose, we have used several trade related indices along with other measures. To understand the performance of trade we should understand the performances of its constituents which are exports and imports. So, we focus our study on examining the performances of these two constituents of trade. We will examine the growth rates of exports and imports along with their shares of in the world trade. India's share in the beginning of liberalization period was insignificant and stagnant. We will find out whether there is an improvement in the share over the years. We will also analyse the growth rates of exports and imports using CAGR (Compound Annual Growth Rate), along with that we will analyse the actual growth is both exports and imports. Another important issue is the difference between exports and imports. When exports are greater than imports then it is called trade surplus and when it is less than imports then it is called trade deficit. We will examine the trend in difference in export and import by using an index called Export-Import Coverage. It helps us to understand whether India's exports during the study period were sufficient to cover its import bills. An important aspect related to exports is RCA (Revealed Comparative Advantage). If a country has RCA in more products, it will have more exports. What are the sectors in which India had RCA during the study period ? We will try to find the answer to this question by identifying sectors with RCAs. International trade not only brings beneficial effects to a country, but it has certain disadvantages too. On such disadvantage is vulnerability of domestic consumers and producers to external shocks due to increased dependence for their demand(of imports) and supply (of exports). We will use two indices to capture the vulnerability of India's domestic consumers and producers due to increased reliance on partner countries during the study period. These indices are i) Export Propensity Index and ii) Import

Penetration Index. We will also examine the composition and direction of exports and imports in detail. We have used some other indices and measures to make sense of performance of India's trade during the study period.

The rest of the chapter is arranged in following manner. In section 2.2 we have presented review of literature. Then in section 2.3 we have data and methodology. In the next section of 2.4 we have discussion and finally we conclude our chapter with conclusions in section 2.5.

2.2 Review of Literature:

In this section we have reviewed works of different scholars on different aspects of India's trade during post reform period. Their studies covered the issues such as, exports, imports, comparative advantages, composition, direction and so on. We have reviewed some relevant literatures on the issues related to India's trade in the post reform period.

O.P Sharma (1996), suggest that the positive export performance during Eight Five Year Plan, can be sustained in the Nineth Five Year Plan if policy reforms were continued. According to him India's export in the Nineth Five-year Plan depends on the growth performance of Indian economy during that period. Another factor according to him was increasing outward orientation which is reflected in the rise in export- GDP ratio. According to this ratio was rising during the Eight Five Year Plan period and he expected that given the experiences of Asian countries, India can increase this ratio during Ninth Five Year Plan. He suggested that increase in the exports during the Ninth Five Year Plan depends upon two factors: performance of the economy and outward orientation.

H.A C Prasad (1996), also studied the effect of economic reforms on India's major exports. His study shows that during the study period the share of major export items was more than 90 percent. There was rise in the number of export items during this period. India's export was also found to be more competitive during this period as compared to previous period. Another important inference of this study was that during this time there was he rise in India's share in world export as compared to previous period.

Charan Wadhva (1998) studied the export performance of India from 1950-1997 focusing on two sub- groups viz. 1950-1990 and 1991 -1997. He concluded that during the study period India failed to "take off to a long-term self-sustaining high growth path". He attributed this failure to inability of India's policy to align to world standard at both macro and micro level. According to him it was the domestic supply related constraint and not the external factors which was responsible for relatively low export performance. He asserts that since India's trade policy was unable to evolve into 'strategic and comprehensive national

export policy' over the years, there is a need for reformulation of India's export strategy as a part of national macroeconomic strategy.

M Talha (2001), found that India's economic policy for globalization during the period of 1991-2001 was that of export led growth policy. He suggested that in order the increase exports Indian products need to be more competitive in the world market. Another suggestion for increasing exports according to him was diversification of Indian products. On the issue of direction of trade, he found that 40 percent of India's exports is concentrated in few countries viz. United States, Japan, United Kingdom, and Germany during the study period and on the other hand more than 60 percent of India's imports were from ten countries which includes France, Hong Kong, Singapore and so on. He also reveals that Asia and Oceania were the largest market for India's exports and constituted more than 30 percent of total market.

Nilanjan Banik (2001), in his paper identified the factors responsible for significant decline in India's exports during the post reform period. He found that India that decline in India's growth rate was mainly because of fall in growth rate of export volume. And the factors responsible for declined export growth rates were related to demand side factors rather than supply side ones. But he also suggested that, taking care of supply side factors is also important for the revival of exports growth. According to him, the actual demand for India's exports was due to sharp decline in India's competitiveness caused by depreciation of the currencies of many Southeast Asian countries during that time. Another reason for the decline according to him was imposition of high non- tariff barriers by many developed countries during that period.

C. Veeramani (2007), compared the export growth between the pre reform period of 1950-1990 and post reform period of 1993-2005 and found that growth rate during post reform period was not very high as compared to pre reform period. Comparing the potential and actual growth rates of exports during the post reform period he found that during this period actual growth rate was higher than potential growth rate. The reason he gave for this was overall improvement in competitiveness of India's export during this period. He also identified that appreciation of real effective exchange rate had adverse effect on India's exports during post reform period.

Arvind Panagariya (2006), in his studies found that India's domestic policies have impacted the export of labor-intensive products and lack of attention on small scale industries (SSI) is mainly responsible for India's poor performance in external trade.

A.O Krueger, (2008), in her paper observes that Indian economy had substantially liberalized after the crisis of early 1990s. According to her, India's exports

increased rapidly after liberalization. She observed that improvement in India's trade sector had contributed majorly to growth performance of India which was rising rapidly. She also suggested measures to meet policy challenges in order to sustain existing growth rate. in post liberalization period.

P. C. Athukorala (2008) , studied export performance of India during the reform period. He found that there was improvement in the performance of both service and merchandise exports of India. In could not find the exact reason for the growth in merchandise exports. He found that during reform period India exports basket was dominated by resource-intensive manufacturing. His study also reveals that India's export share with developing nations remain stagnated at 2 percent during the period. According to his study there was mild gain for India in world. Another important result of this study was related to India's comparative advantage in export goods. According to the author, during this period there was a structural shift in comparative advantage from labour intensive to resource, capital, and skill intensive products. India's export in the labor-intensive product was heavily dependent on textile and clothing sector.

Hulten and Srinivasan (1999) in their study pointed out that Indian manufacturing performance is sound and in line with the general experience of the Asian Tigers.

Burange and Chaddha (2008), while studying India's revealed comparative advantage in merchandise goods for the period of 1996-2005 found that during that period India had revealed comparative advantages in the exports of labor-intensive goods like Textiles and in scale intensive goods like chemicals and iron and steel.

Ruma Bhattacharyya (2012), in her study compared India's revealed comparative advantage and competitiveness in vegetables, fruits and flower trade with other Southeast Asian nations in the Asian , European Union and North American markets. Her study revealed that in EU markets India had significantly high comparative advantage in vegetables and fruits but same is not true for flowers.

Asish and Kannan (2015) studied the comparative advantage of India's agro-processed products. For this purpose, they categorized 116 items into three categories viz. processed animal, processed vegetables, and processed food products. Their study concludes that India had comparative advantage in exports of 7 items out of 32 items in the category of processed animal products, 12 items out of 40 items in the category of processed vegetable products and 7 items out of 44 items in the category of processed food products. They also concluded that India's RCA in these three categories had declined over time.

C. Veeramani (2012), analyzed the growth and pattern of India's merchandise trade and found that during the first decade after reform there was relatively low export growth rate whereas in the second decade there was strong export growth rate. He also found that there was steady change in the composition of India's exports towards capital and skill intensive products. With respect to export destination, he found that there was a shift in India's export destination from markets of developed countries to that of emerging economies of Asia and Africa.

Sai Hara Gopal (1999) compared different variables viz, exports, imports, trade deficits, foreign exchange reserves, and the external debt related to India's external sector. For the study the author used the data from 1980-81 to 1996-97 which he divided into pre liberalization and post liberalization period. The study shows that the liberalization had positive effect on the export, import, and foreign exchange reserves, and negative effect on external debt. Another finding of the study shows that rate of growth of imports was higher than the rate of growth of exports during the post liberalization period as compared to pre-liberalization period. So, like many other works his work also confirmed that liberalization had positive impact on India's trade.

S.M. Ahsan Habib and Pinki Shah (2003) , in their study found that volume of India's trade registered a considerable growth during the post liberalization (post-openness) period. They also found that, as compared to other developing countries India's barriers to trade were relatively higher. They also conclude that as compared to other developing countries considered for comparison, India's share in world trade was insignificant. Their study also found that during the given period very strong association was found between India's trade and its economic growth.

Anjali Tandon (2005) compared the export and import performance of India's agricultural sector during the pre and post reform period. She found that on the one hand there was acceleration in the imports of agricultural products and on the other, there was deceleration in exports. Another inference she made was that the significance of agricultural product in total merchandise trade, though they had higher values in both import and export, had reduced during the period.

Pushpalata Singh (2014) studied performance of India's foreign trade during the post liberalization period. She found that during this period both imports and exports increased but as compared to exports, the growth rate of imports was higher. As far as export and import compositions are concerned, she found that manufactured items constituted the major position of India's exports and petroleum, and crude products constituted the major

portion of India's imports.

2.3 Data and Methodology:

In this chapter we will use various measures and trade related indices to analyse the performances of India's trade. These formula of the related indices and measures had been detailed in the Appendix of this chapter. The data that we have used in this analysis has been taken from WITS – COMTRADE website. The period that we have considered are between 1992-2018. All data are at current price in $US terms. For the analysis of RCA and composition of goods we have considered goods at sector level. And for the direction of trade, we have considered regions and not individual countries. The data that has been used are not whole trade data, but it is limited to trade in goods or merchandise trade. So, our analysis is basically focused on India's merchandise trade and trade in services are not considered.

2.4 Discussion:

Now in this section we will discuss various aspects of India's trade on using various trade related indicators.

2.4.1 Growth Rate of Exports:

The table below shows the growth of India's exports during the period of 1992-2018. In 1992 export registered 15.71 percent growth rate and in 2018 it registered 9.49 percent. So, the growth rate in the first year of period was better than the last year. During this period, the maximum growth rate registered was 36.78 percent in 2011 and lowest was registered in 2015 at –16.74 percent. So, India experienced both negative growth and positive growth during this period.

Table 2.1: Export Growth Rate (%)

Year	Export growth rate	Year	Export growth rate	Year	Export growth rate
1992	15.71	2001	3.59	2010	24.69
1993	7.37	2002	14.17	2011	36.78
1994	18.41	2003	18.49	2012	-3.95
1995	20.39	2004	27.87	2013	16.25
1996	5.58	2005	32.21	2014	-5.66
1997	3.96	2006	20.77	2015	-16.74
1998	-4.56	2007	20.38	2016	-1.53
1999	11.18	2008	24.65	2017	13.07
2000	14.73	2009	-2.8	2018	9.49
				1991-2018	11.3

Author's calculation

Data Source: WITS- COMTRADE

Now let us discuss year to year trend in India's exports growth during the period. As we have seen India's growth rate in 1992 was 15.71 percent in declined to 7.37

percent in 1993 but after that it again rise to 18.41 percent in 1994 and further to 20.39 percent in 1995. After that the growth rate continuously declined for next three years. From 20.39 percent in 1995 it sharply declined to 5.58 percent in 1996 and further to 3.96 percent in 1997 and it became negative for the first time in 1998 at -4.56 percent. In the next two years India's again registered positive growth rate. It registered 11.18 percent in 1999 and further 14.73 percent in 2000. After declining sharply to 3.59 percent in 2001 the growth rate increased continuously for next four years from 2002 to 2005. From 3.59 in 2001 it increased sharply to 14.17 percent in 2002 and reached 18.49 percent in 2003. It further increased to 27.87 percent in 2004 and then in 2005 it reached 32.21 percent. After that the growth rate declined to 20.77 in 2006 and further marginally to 20.38 percent in 2007. After declining for two years the growth rate again increased to 24.65 percent in 2008. There was a sharp decline in the growth rate in 2009 and a negative growth rate of -2.80 was registered in this year.

After the negative growth rate of 2009 there was sharp increase in the export growth rate in 2010 to 24.69 percent and further in 2011 to 36.78 percent, which was also the highest growth rate registered throughout the period. After achieving the highest growth rate in 2011, India's export growth rate dipped into another negative growth rate of -3.95 percent in 2012. This was compensated by 16.25 percent growth rate in the next year of 2013. The three years after that was worst from the point of view of India's export growth. India registered negative growth rates continuously for three years from 2014 to 2016. India experienced the growth rate of -5.66 percent in 2014 and worst ever growth rate of -16.74 in 2015 followed by another negative growth rate of 1.53 percent in 2016. There was sharp recovery and improvement in the growth rate in 2017 at 13.07 percent. In the final year as mentioned earlier India's growth rate was 9.49 percent which was less than the previous year's rate. The period between 1999 to 2011 was the best period for India's export growth except for 2009 when the rate was negative.

2.4.2 Growth Rate of Imports:

After discussing growth rate of exports now, we will discuss growth rate of imports. For the same period.

The table shows growth rate of India's imports from China for the period of 1992-2018. As before calculation is based on the formula for CAGR. In 1992 the growth rate was 25.34 percent compared to 39.16 percent in 2018. The highest growth rate was registered in 2008 at 44.39 percent and lowest growth in -15.62 percent in 2009. So, there was a huge gap between the highest and lowest growth rate during this period. Now let us consider the trend in growth rate of imports during this period. The growth rate drastically fell to -4.70

percent in 1993 from 25.34 percent in 1992. But after that there was a sharp increase to 22.96 percent in 1994 and further to 27.70 percent in 1995. The growth rate then continuously declined from next three years to 6.89 percent in 1996 to 2.40 percent in 1998.

Table 2.2: Import Growth Rate (%)

Year	Import growth rate	Year	Import growth rate	Year	Import growth rate
1992	25.34	**2001**	-4.29	**2010**	31.39
1993	-4.70	**2002**	13.39	**2011**	32.10
1994	22.96	**2003**	26.07	**2012**	5.75
1995	27.70	**2004**	36.66	**2013**	-4.69
1996	6.89	**2005**	42.31	**2014**	-1.43
1997	5.92	**2006**	26.52	**2015**	-14.94
1998	2.40	**2007**	22.69	**2016**	-8.71
1999	17.88	**2008**	44.39	**2017**	24.49
2000	5.86	**2009**	-15.62	**2018**	39.16
				1992-2018	13.65

Author's calculation
Data Source: WITS- COMTRADE

After that in 1999, it increased sharply to 17.88 percent but again declined to 5.86 percent in 2000 and become – 4.29 percent in 2001. Thereafter from 2002 to 2005, the growth rate continuously increased from 13.39 percent to 42.31 percent. The next two years saw decline in the growth rate to 26.52 percent in 2006 and further to 22.69 percent in 2007. Then again in 2008 in increased sharply to 44.39 percent. In 2009, there was again negative growth of -15.62 percent which was higher than previous negative growth rate of -4.29 percent in 2001. But the growth recovered in next year to 31.39 percent and it increased further to 32.10 percent in 2011. 2012 saw another sharp decline in the growth rate and registered 5.75 percent but next four-year experienced continuous negative growth rate. In 2023 it was – 4.69 precent which improved to -1.43 percent but again deteriorated sharply to -14.94 percent in 2015 but again relative improvement in 2016 when a growth rate of -8.71 percent was registered. After that import growth improved continuously to 24.49 percent in 2017 and then to 39.16 percent n in 2018. During the entire period of 1992-2018, the annual average growth rate of import was decent 13.65 percent.

2.4.3 India's Share in World Trade:

India's share in the world trade was not very significant during the period of 1992-2018. Throughout the period it was around two percent. From 1992 to 2004 the share was less than one percent. It was only after 2004 that India's share exceeded one percent

mark and reached two percent in 2011. The minimum share was 0.71 percent and maximum were 2.37 percent during this period. It does not mean that India's trade is not growing. Let us discuss the trend in India's trade share during the period.

Table 2.3: India's Share in World Trade (%):

year	Trade share	Year	Tade share	Year	Trade share
1992	0.92	**2001**	0.71	**2010**	1.78
1993	0.80	**2002**	0.78	**2011**	2.00
1994	0.73	**2003**	0.82	**2012**	2.04
1995	0.72	**2004**	0.90	**2013**	2.03
1996	0.72	**2005**	1.10	**2014**	1.97
1997	0.71	**2006**	1.17	**2015**	1.91
1998	0.71	**2007**	1.25	**2016**	1.84
1999	0.78	**2008**	1.47	**2017**	1.99
2000	0.71	**2009**	1.69	**2018**	2.37

Author's calculation
Data Source: WITS- COMTRADE

In 1992, the share of India in the world trade was only 0.92 percent which declined to 0.80 percent in 1993 and further to 0.73 percent in 1994. There was further marginal decline in the share in 1995 to 0.72 percent and this share continued in the next year of 1996. But it again declined marginally to 0.71 percent in 1997 and remain at that level in 1998. After that the share increased in 1999 to 0.78 percent only to decline in the next year to 0.71 percent. This share continued in 2001 as well. After that India's share in the world trade increased continuously from 0.78 percent in 2002 to 2.04 percent in 2012. India crossed one percent share in 2005 and reached two percent share in 2011. After that the share continuously declined in next four years from 2.03 in 2013 to 1.84 percent in 2016. The share increased in the next two year to 1.99 percent in 2017 and 2.37 percent in 2018.

Even though India's share showed increasing tendency during the period, but it increased very slowly. Next, we will discuss India's share in World exports and Imports.

2.4.4 India's Share in World Exports and Imports:

We have discussed India's share in world trade. Now we will discuss share of India's imports and exports in the world. This will give us a better picture of India's position in world trade. The table shows that share of India's imports was higher than that of exports during the said period. The maximum share of imports during this period was 3.27 percent in 2018 and minimum was in 0.75 percent in the year 1994. Similarly for the exports,

maximum share was 1.60 percent and minimum were 0.60 percent in 2000. The share of imports was higher than that of exports in the case of both maximum and minimum.

Table 2.4: India's Share in World Exports and Imports (%)

Year	Import	Export	Year	Import	Export	Year	Import	Export
1992	0.99	0.84	**2001**	0.81	0.64	**2010**	2.31	1.31
1993	0.81	0.79	**2002**	0.88	0.69	**2011**	2.56	1.49
1994	0.75	0.70	**2003**	0.95	0.70	**2012**	2.71	1.44
1995	0.77	0.68	**2004**	1.06	0.74	**2013**	2.52	1.60
1996	0.77	0.67	**2005**	1.34	0.87	**2014**	2.48	1.52
1997	0.77	0.66	**2006**	1.47	0.91	**2015**	2.42	1.45
1998	0.79	0.63	**2007**	1.57	0.95	**2016**	2.26	1.47
1999	0.89	0.67	**2008**	1.96	1.03	**2017**	2.52	1.51
2000	0.82	0.60	**2009**	2.15	1.28	**2018**	3.27	1.51

Author's calculation

Data Source: WITS- COMTRADE

Comparison of shares of imports and exports during this period shows that the share of imports was always greater than that of exports for every year. There was not a single year during this period where the share of export was higher than that of imports. The maximum difference in the share of imports and exports was in 2018 and minimum was in 1993.

During the period of 1992-2001 the average import share was 0.82 and average export share was 0.69. The table shows that there was a decline in the share of imports for the first three years from 1992 to 1994 and after that it increased or remain same for next five years till 1999. The share declined during 2000 and 2001. So, this decade exhibited both contraction and expansion in the share of India's imports. On the other hand, the share of exports showed declining trend from 1992 till 1998 and after rising in 1999 again it declined for the next two years of 2000 and 2001. So, in case of exports share during this decade the tendency was that of contraction rather than that of expansion. So, the pattern of imports shares and that of export share was dissimilar during this period. And the share of import was relatively greater than export share.

During the next period of 2002-2011, the average import share was 1.63 percent and average export share was one percent The trend was quite different during this period for both import and export share than preceding period. the share of both exports and imports in exhibited a secular expansion. The import share during this period expanded from 0.88 percent in 2002 to 2.56 percent in 2011. Similarly, export share increased from 0.69 percent in 2002 to 1.49 percent in 2011. Comparison of export share and import share shows

that just like pervious period the expansion in imports was higher than that of exports. This period was interesting in the sense that unlike in the previous period there was expansion in both exports and imports share during this period.

During the seven years period of 2012-2018, there was a mixed trend of expansion and contraction for both imports and exports share. The average share of import and export during this period was 2.60 and 1.50 percent respectively. In case of import share, it declined continuously for four years from 2013 to 2016 and then increased during next two years of 2017 and 2018. The highest share was in 2018 with 3.27 percent. Similarly, in case of export share, it was 1.44 percent in 2012 which increased to 1.60 percent in 2013. After that, there was a decline in its share in next two years of 2014 and 2015. In 2016 and 2017 there was an expansion in the share. The share in 2018 was same as that in 2017. During this period also the share of imports was higher than that of exports for every year just like in case of previous two periods.

2.4.5 Export Value Index (EVI):

This indicator helps us to understand the growth in India's exports . Here we have used 1992 as base year and its value as 100 and we have transformed the value of other years based on the value of 1992. This will help us to understand the extent of growth in India's exports during the given period. As we have already discussed the share of India's export in world exports. We found that there was not much change in India's share in world exports and it remained stagnant. That was true when we discussed India's exports relative to the world. But that does not mean India's export was not growing or remained stagnant.

The table shows that from 100 in 1992 the value of EVI increased to 153 in 1995 and further to 204 in 2000. The value reached 484.53 in 2005. After that in 2010 it increased significantly to 1064.19. There was further increase in the value to 1276.51 in 2015 and in the final year the value was 1556.12 . So, there was continuous increase in the value of EVI during this period. The highest value was registered in 2013 at 1625.26. The trend shows that there was continuous rise in the value from 107.37 in 1993 to 167.99 in 1997, Then it declined to 160.33 in 1998 and after that it increased continuously for another ten years from 178.26 in 1999 to 878.08 in 2008. This means that India's exports increased by more than eight times in 2008 as compared to its value in 1992. The value declined to 853.47 in 2009. After that it increased continuously for next two years to 1064.19 in 2010 and further to 1455.65 in 2011.

In 2011 the value was more than fourteen times the value of 1992. In 2012 again there was a slight decline in the value to 1398.10 but it increased and reached

highest in 2013 at 1625.26. So, the maximum value was more than sixteen times the value of 1992. For the next four years the value of EVI declined continuously from 1533.20 in 2014 to 1421.28 in 2017. Then in the final year it increased to 1556.12. So, in the final year the value of exports was fifteen times more than the value of 1992.

Table 2.5: Export Value Index (EVI) (1992 =100)

Year	EVI	Year	EVI	Year	EVI
1992	100	**2001**	211.86	**2010**	1064.19
1993	107.37	**2002**	241.89	**2011**	1455.65
1994	127.13	**2003**	286.61	**2012**	1398.1
1995	153.05	**2004**	366.49	**2013**	1625.26
1996	161.6	**2005**	484.53	**2014**	1533.2
1997	167.99	**2006**	585.19	**2015**	1276.51
1998	160.33	**2007**	704.44	**2016**	1256.93
1999	178.26	**2008**	878.08	**2017**	1421.28
2000	204.52	**2009**	853.47	**2018**	1556.12

Author's calculation
Data Source: WITS- COMTRADE

So, we can conclude that India's export had increased continuously during the said period. The growth was rapid during the period from 2003 to 2011. During this period, as compared to the value in 1992 , the export value grew as high a sixteen times. So even though India's export share in the world was apparently stagnant but in absolute sense India's export had increased many fold during the given period of 1992-2018.

2.4.6 Import Value Index (IVI):

After discussing export value index, we will now discuss import value index of India for the same period. This discussion will help us to understand the extent of India's imports during this period on the basis of its imports in 1992. Even though just like exports India's import in the world was either stagnant or increased very slowly. But this discuss will show that even though the performance was insignificant relative to world imports but in had increased manyfold in absolute sense during the given period.

On the basis of import value of 1992 = 100, in 1995 the value rises to 147.20 and then to 218.53 in 2000. In 2005 it further increased to 605.97 and reached as high as 1485.49 in 2010. The rise in the valued continued even in 2015 to 1666.32 and finally it reached the maximum value of the period of 2165.95 in the final year of 2018. Let us look at the trend now. In 1993 the value declined to 96.66 which was the only value in the entire period which was less than that of 1992. Afte that it improved continuously from 113.85 in 1994 to

218.53 in 2000. It declined in 2001 to 213.75 but after that it again improved continuously from 239.71 in 2002 to 1361.65 in 2008. The value declined in the next year of 2009 to 1090.91 but again increased continuously for next three years from 1485.49 in 2010 to 2077.01 in 2012. The value followed declining trend continuously for next four years from 1973.95 in 2013 to 1532.04 in 2016. Afte that the value increased continuously to 1901.97 in 2017 and further to 2165.95 in 2018.

Table 2.6: Import Value Index (IVI) (1992=100)

Year	IVI	Year	IVI	Year	IVI
1992	100.00	**2001**	213.75	**2010**	1485.49
1993	96.66	**2002**	239.71	**2011**	1970.00
1994	113.85	**2003**	307.76	**2012**	2077.01
1995	147.20	**2004**	423.19	**2013**	1973.95
1996	160.93	**2005**	605.97	**2014**	1963.40
1997	175.72	**2006**	756.71	**2015**	1666.32
1998	182.30	**2007**	972.86	**2016**	1532.04
1999	199.26	**2008**	1361.65	**2017**	1901.97
2000	218.53	**2009**	1090.91	**2018**	2165.95

Author's calculations
Data Source: WITS- COMTRADE

This means that the value was almost 1.5 time higher in 1995 and was two time higher in 2000 and in 2005 it was six times higher than the value of 1992. In 2010 the value further increased and become more than fourteen times higher rand in 2015 more than sixteen times higher. And finally in 2018 the value was more than twenty-one times higher than 1992. The discussion shows that most of the increase in India's imports happened in the latter part of the period particularly after 2005.

So, on the basis of this discussion, we may infer that even though India's imports did not rise satisfactorily relative to world imports but in absolute terms or in comparison to its own earlier value in this case the value of 1992) it had increased tremendously as high as twenty-one times more as shown in the table.

2.4.7 Export Import Coverage:

Another index we have considered here is the Export Import coverage. This index shows that during the said period of 1992-2018, India's exports were enough or not to cover its import bills. Since this index is measured as ratio of import value and export value, if the value of index exceeds one then it means that exports of the country is more than enough to cover its imports and if the value of index is less than one then it means that exports of the

country is not enough to cover its imports and if its value is exactly one then it means that the country's exports is just enough to cover its imports.

Table 2.7: Export Import Coverage

Year	EIC	Year	EIC	Year	EIC
1992	0.85	**2001**	0.87	**2010**	0.63
1993	0.95	**2002**	0.87	**2011**	0.65
1994	0.92	**2003**	0.82	**2012**	0.59
1995	0.87	**2004**	0.77	**2013**	0.72
1996	0.86	**2005**	0.71	**2014**	0.69
1997	0.84	**2006**	0.68	**2015**	0.68
1998	0.78	**2007**	0.67	**2016**	0.73
1999	0.74	**2008**	0.58	**2017**	0.66
2000	0.80	**2009**	0.66	**2018**	0.52

Author's calculation
Data Source: WITS- COMTRADE

The table shows that in 1992 the value of EIC was 0.85 and in 1995 it increased to 0.87. The value then declined to 0.80 in 2000 and reached 0.71 in 2005. The value become even less in 2010 at 0.63 percent. In 2015 there was some improvement in value at 0.68 but then again in 2018 it declined and reached as low as 0.52. The maximum value of the index during this period was 0.92 in 1992 and minimum value was 0.52 in 2018.

The trend shows that the value increased from 0.85 in 1992 to 0.95 in 1993 after that it continuously declined from 0.92 in 1994 to 0,74 in 1999. After that, the value increased for next two years as it increased to 0.80 in 2000 and further to 0.87 in 2001 In 2002 the value remained at 0,87 but after that it continuously declined for next six years from 0.82 in 2003 to 0.58 in 2008. In 2009 value increased to 0.66 but again declined to 0.63 in 2010 which again increased to 0.65 in 2011. But again in 2012 it declined to 0.59. It was again followed by a rise in the value to 0.72 in 2013. In next two years the value declined continuously, first to 0.69 in 2014 and then to 0.68 in 2015. Then again in increased to 0.73 in 2016. After that in the last two years the value continuously declined first to 0.66 in 201 and then to 0.52 in the final year of 2018.

This discussion shows that India's exports were never enough to cover its imports during the period. The value of EIC was neither equal to nor exceeded one in any of the years. Its value was always less than one and declined over the period.

2.4.8 Export Market Penetration:

India's performance in this index had improve throughout the period from 1992-2018. Its value was maximum in 2017 at 29.53 percent and minimum in 1992 at 7.44 percent. From 7.44 percent in 1992 it rose to 10.33 percent in 1995 and further to 16.64 percent in 2000. After that in 2005 it improved further to 22.97 percent and reached 27.08 percent in 2010. It slowed down from that and reached 28.12 percent in 2015 and finally in 2018 it was declined to 27.15. percent.

Table 2.8: India's Export Market Penetration (EMP) (%)

Year	EMP	Year	EMP	Year	EMP
1992	7.44	**2001**	17.59	**2010**	27.08
1993	8.34	**2002**	18.61	**2011**	26.91
1994	9.82	**2003**	19.86	**2012**	27.46
1995	10.33	**2004**	20.5	**2013**	28.53
1996	11.29	**2005**	22.97	**2014**	28.25
1997	12.31	**2006**	23.8	**2015**	28.12
1998	13.18	**2007**	25.01	**2016**	28.62
1999	14.06	**2008**	25.79	**2017**	29.53
2000	16.64	**2009**	25.78	**2018**	27.15

Source: WITS- COMTRADE

The trend shows that from 7.44 percent in 1992 it increased continuously for next 16 years from 8.34 percent in 1993 to 25.79 percent in 2008 but declined marginally to 25.78 percent in 2009. It again improved to 27.08 percent in 2010 but again declined to 26.91 percent in 2011. After that it improved continuously for next two years first to 27.46 percent and then to 28.53 percent in 2013. Then it again declined continuously for next two years first to 28.12 percent in 2015 and then to 28.62 percent in 2016. It again improved and reached its highest in 201 at 29.53 percent. In the final year of 2018, it again declined to 2.15. percent.

Even though the value of India's EMP fluctuated from 2006 onwards but the value increased continuously over the period. India's export market penetration had increased almost four-fold during this period.

2.4.9 Revealed Comparative Advantage (RCA) Selected Years:

Now we will discuss the sector wise RCA of India for the given period from 1992-2018. But here we have taken seven sleeted years of 1992,1995, 2000, 2005, 2010, 2015, and 2018 and 16 sectors.

In 1992, India had RCA in eight sectors and RCDA (Revealed comparative disadvantage) in eight sectors. So, 50 percent sectors hade RCA and other 50 percent had RCDA in this year. The sectors in which India had RCA were Stones and Glass,

Minerals, Hides and Skins, Textiles and Clothing, Vegetables, Animal, Footwear, and Food Products. Among these eight sectors with RCA Stone and Glass had the most comparative advantage 5.82 and Food products had the least comparative advantage with 1.21. Similarly, the sectors eight sectors with RCDA during this year were: Metals, Chemicals. Fuels, Plastic or Rubber, Miscellaneous, Machinery and Electricals, Transportation, and Wood. Among these sectors Metals with a value of 0.92 had the least comparative disadvantage and Wood with 0.12 had the most comparative disadvantage.

Table 2.9: Revealed Comparative Advantage (RCA) Selected Years:

Year	1992	1995	2000	2005	2010	2015	2018
Stone and Glass	5.82	6.16	6.37	7.27	5.22	3.56	4.00
Hides and Skins	5.04	5.24	4.06	3.11	2.43	2.50	2.33
Textiles and Clothing	4.02	4.14	4.22	3.62	3.33	3.34	3.16
Vegetable	2.31	2.39	3.20	1.94	1.57	1.96	1.63
Footwear	1.65	1.97	1.79	1.62	1.56	1.62	1.49
Minerals	5.64	4.14	4.40	6.35	3.53	0.95	0.90
Animal	1.66	1.69	2.04	1.17	0.97	1.42	1.35
Food Products	1.21	0.74	0.95	0.65	0.74	0.70	0.59
Metals	0.92	0.83	1.12	1.25	1.00	1.23	1.33
Chemicals	0.76	0.80	1.25	1.14	1.20	1.55	1.64
Fuels	0.37	0.24	0.18	0.46	0.91	0.83	0.77
Plastic or Rubber	0.33	0.40	0.54	0.74	0.55	0.63	0.76
Mach and Elec	0.16	0.19	0.22	0.27	0.37	0.34	0.39
Miscellaneous	0.17	0.23	0.27	0.25	0.24	0.33	0.38
Transportation	0.12	0.22	0.19	0.28	0.46	0.55	0.57
Wood	0.12	0.15	0.21	0.22	0.27	0.27	0.31

Source: WITS - COMTRADE

In 1995, seven sectors had RCA and nine sectors had RCDA. The sector that lost RCA in this year was Food Products which had the least RCA in 1992. The sector with RCA includes Stones and Glass, Minerals, Hides and Skins, Textiles and Clothing, Vegetables, Footwear, and Animal. In this year also Stone and Glass had the most comparative advantage with 6.16 and Animal sector had the least RCA with a value of 1.69. The nine sectors with RDCA were Metals, Chemicals. Fuels, Plastic or Rubber, Miscellaneous, Machinery and Electricals, Transportation, Wood. and food products. The sector with the least comparative disadvantage during this year was Metals sector and the sector with most comparative

disadvantage was again Wood sector. In percentage terms, in this year 43.75 percent of the sectors had RCA and 56.25 percent of sectors had RCDA.

The number of sectors with RCA in 2000 increased to nine and the sectors with RCDA declined to seven. The Chemicals sector and Metals sectors were the two sectors included in the sectors with RCA in this year and excluded from the sectors with RCDA. The sectors that had RCA in this year were Stones and Glass, Minerals, Hides and Skins, Textiles and Clothing, Vegetables, Footwear, Animal, Chemicals, and Metals. Among these sectors Stone and Glass sector continued to have the most RCA with 6.37 and the sector with least RCA was newly added Metals sector with a value of 1.12. Similarly, the sectors with RCDA includes. Fuels, Plastic or Rubber, Miscellaneous, Machinery and Electricals, Transportation, Wood, and Food products. In this year the sector with most RCDA was Fuels with 0.18 and sector with least RCDA was Food Products with 0.95. In this year 56.25 percent of sectors had RCA and 43.75 percent of sectors had RCDA.

There was no change in the number of sectors with RCA and with RDCA in 2005. In this year also same nine sectors of Stones and Glass, Minerals, Hides and Skins, Textiles and Clothing, Vegetables, Footwear, Animal, Chemicals, and Metals had RCA and same seven sectors of Fuels, Plastic or Rubber, Miscellaneous, Machinery and Electricals, Transportation, Food Products and Wood had RCDA. With a value of 7.27, Stone and Glass sector continue to have the most RCA and with a value of 1.14 Chemicals had the least RCA in this year. Similarly, with a value of 0.74 Plastic and Rubber had the least RCDA and Wood continue to have the most RCDA in this year. In this year also 56.25 percent of the sectors had RCA and 43.75 percent sectors had RCDA.

In 2010, there were again eight sectors which had RCA and eight sectors which had RCDA. In this year Animal sector was excluded for the first time from the sectors with RCA. The following sectors had RCA in this year: Stones and Glass, Minerals, Hides and Skins, Textiles and Clothing, Vegetables, Footwear, Chemicals, and Metals. In this year also, Stone and Glass sector with a value of 5.22 had the most RCA and Metals with a value of 1 had the least RCA. As compared to 2005, with the addition of Animal sector, the number of sectors with RCDA in this year increased to eight. It includes Fuels, Plastic or Rubber, Miscellaneous, Machinery and Electricals, Transportation, Food Products, Animal and Wood. In this year, the sector with least RCDA was changed from Plastic and Rubber sector in 2005 to Animal sector and the sector with most RCDA was also changed from Wood sector in 2005 to Miscellaneous. in this year. in this year 50 percent of the sector had RCA and other 50 percent had RCDA.

The situation was no different in 2015. In this year also eight sectors had RCA and another eight had RCDA. Even though numbers of sectors were same as in 2010 but sectors changed in this year. Animal sector which had RDCA in 2010 was excluded from sectors with RCDA and included in sectors with RCA in this year and Mineral's sector which had RCA in 2010 was excluded from sectors with RCA and included in the sectors with RCDA. So, the sectors with RCA in this year were Stones and Glass, Animal, Hides and Skins, Textiles and Clothing, Vegetables, Footwear, Chemicals, and Metals. In continuation to 2010, in this year also Stone and Glass were the sector with a value of 3.56 had the most RCA and Metals sector with 1.23 was the sector with least RCA, Similarly, sectors with RCDA in this yar were Fuels, Plastic or Rubber, Miscellaneous, Machinery and Electricals, Transportation, Food Products, Minerals and Wood. In this year Minerals sector was the new sector with least RCDA replacing Animal sector and sector of Wood was again the sector with most RCDA replacing Miscellaneous sector. There were 50 percent sectors in this year which had RCA and 50 percent sector which had RCDA.

Finally in 2018, there was neither any change in the number of sectors nor change in sectors which had either RCA or RCDA. In other words, same sectors had RCA and RCDA in this year as in 2015. So, the sectors that had RCA in 2018 were Stones and Glass, Animal, Hides and Skins, Textiles and Clothing, Vegetables, Footwear, Chemicals, and Metals. In this final year also Stone and Glass sector with a value of 4 had the most RCA and Metals sector with a value of 1.33 had the least RCA. In this year, Fuels, Plastic or Rubber, Miscellaneous, Machinery and Electricals, Transportation, Food Products, Minerals and Wood were the sectors with RCDA. Just like in 2015, in this year also Minerals was the sector with least RCDA, and Wood sector was the sector with most RCDA, Fifty percent of the sectors had RCA in this year and fifty percent had RCDA.

2.4.10 Hirschman Herfindahl Index (HH Index):

This index shows that whether a country's trade is concentrated within a few partners of it is diversified. If the value of this index is near zero, then the country in question is said to have diversified its trade across many countries and if value approaches one then this means that country's trade is concentrated in fewer countries.

The above table shows the HH index of India for the period of 1992-2018. The value of index in 1992 was 0.12 which declined to 0.07 in 1995. The value remained at 0.07 in 2000 and in 2001 it declined to 0.06. Then in 2010 it further declined to 0.04. In 2015 there was a rise in the value to 0.05 and in the final year of 2018 it remained at 0.05. The trend shows that the value of HH index declined continuously from 0.12 in 1992 to 0.06 in 1996. In

1997 it remained at 0.06 but increased in next two years to 0.07 in 1998 and to 0.08 in 1999. After that, the value declined to 0.07 in 2000 and further to 0.06 in 2001. In 2002 it again increased to 0.07 and then in 2003 it declined to 0.06. The value remained at 0.06 for next two years and declined to 0.05 in 2006. Same value of 0.05 continued in 2007 and then in 2008 it declined to 0.04. This value of 0.04 continued for next six years till 2014. After that, the value increased to 0.05 which continued 2018.

Table 2.10: Hirschman Herfindahl index

Year	HHI	Year	HHI	Year	HHI
1992	0.12	**2001**	0.06	**2010**	0.04
1993	0.09	**2002**	0.07	**2011**	0.04
1994	0.08	**2003**	0.06	**2012**	0.04
1995	0.07	**2004**	0.06	**2013**	0.04
1996	0.06	**2005**	0.06	**2014**	0.04
1997	0.06	**2006**	0.05	**2015**	0.05
1998	0.07	**2007**	0.05	**2016**	0.05
1999	0.08	**2008**	0.04	**2017**	0.05
2000	0.07	**2009**	0.04	**2018**	0.05

Source: WITS- COMTRADE

Even though India's value of HH index was low in 1992 and its trade was therefore diversified but over the years its value further declined to as low as 0.04. This indicates that India's trade over the given period of 1992-2018 become increasingly diversified.

2.4.11 Export Propensity:

The table below shows the value of export propensity index of India. There was an improvement in the value of this index over the years. The highest value was registered in 2013 at 18.13 percent and lowest value in 1992 at 7.19 percent. From 1992 the value increased to 8.80 in 1995 and then in 2000 it further improved to 9.04. It increased continuously and reached 12.23 in 2005 and in 2010 further to 13.15. After that there was decline in value to 12.57 in 2015 and it further declined to 11.88 in 2018.

The table shows that from 7.19 percent it improved continuously for next three years from 7.96 in 1992 to 8.80 in 1994. Then it declined continuously for next three years from 8.52 in 1996 to 7.88 in 1998. It again improved to 8.05 in 1999 and reached 9.04 in 2000. The value remained at 9.04 in 2001 and after that it improved continuously for next five years from 9.73 in 2002 to 12.89 in 2006. It declined to 11.99 in 2007 but again increased to 15.1 in 2008. After that it again declined continuously for next two years first to 13.17 in 2009 and then to 13.15 in 2010. It was followed by increase in value to 16.54 in 2011 but again in

2012 it declined to 15.84. In 2013 it again improved to 18.13. But after that it declined continuously for next four years from 15.57 in 2014 to 11.10 in 2017. In the final year it improved to 11.88.

Table 2.11: India's Export Propensity (1992-2018)

Year	EPI	Year	EPI	Year	EPI
1992	7.19	**2001**	9.04	**2010**	13.15
1993	7.96	**2002**	9.73	**2011**	16.54
1994	8.05	**2003**	9.77	**2012**	15.84
1995	8.80	**2004**	10.70	**2013**	18.13
1996	8.52	**2005**	12.23	**2014**	15.57
1997	8.37	**2006**	12.89	**2015**	12.57
1998	7.88	**2007**	11.99	**2016**	11.34
1999	8.05	**2008**	15.17	**2017**	11.10
2000	9.04	**2009**	13.17	**2018**	11.88

Author's calculation
Data Source: WITS- COMTRADE

So, even though India's performance on export propensity fluctuated but over the period it had improved considerably as compared to its value in the initial years.

2.4.12 Import Penetration Index:

According to the table below. the maximum value of the index during this period was 24.12 in 2012 and minimum was 8.31 in 1993. It increased from 8.38 in 1992 to 10.02 in 1995 and further to 11.05 in 2000. In 2005 it further improved to 16.36 and improvement continued, and it reached 19.29 in 2010. There was a decline in value in 2015 to 17.52 but again it improved to 20.54 in 2018.

The trend shows that the value declined from 8.38 in 1992 to 8.31 in 1993 but improved continuously for next two years first to 8.69 and then further to 10.02. After that it gain declined to 9.81 in 1996. In 1997 the value remained the same at 9.81 but after that it improved continuously for next three years from 9.85 in 1998 to 11.05 in 2000. In 2001 it again declined to 10.29 but after that it improved continuously for next five years from 11.00 in 2002 to 17.87 in 2006. In 2007 it declined to 16.96 but again it improved to 23.69 in 2008. The fluctuation continued and in 2009 it again declined to 18.61 followed by continuous increase from 19.39 in 2010 to 24.12 in 2012. After that it continuously declined for next four years from 23.46 in 2013 to 14.92 in 2016. In the final two years the value improved first to 15.85 and then to 20.54.

Table 2.12: India's Import Penetration Index

Year	IPI	Year	IPI	Year	IPI
1992	8.38	**2001**	10.29	**2010**	19.39
1993	8.31	**2002**	11.00	**2011**	23.31
1994	8.69	**2003**	11.67	**2012**	24.12
1995	10.02	**2004**	13.52	**2013**	23.46
1996	9.81	**2005**	16.36	**2014**	21.06
1997	9.81	**2006**	17.87	**2015**	17.52
1998	9.85	**2007**	16.96	**2016**	14.92
1999	10.60	**2008**	23.69	**2017**	15.85
2000	11.05	**2009**	18.61	**2018**	20.54

Author's calculation
Data Source: WITS-COMTRADE

So, we can infer that India's reliance on imports had increased and it may not be good for India as it makes Indian economy dependent and vulnerable to external shocks.

2.4.13 Trade Entropy Index:

The table shows that the value of TEI was more than one for India throughout the period. This means that the exports of India were diversified across the geographical locations, and we had already discussed that in direction of exports section.

In 1992, the value of TEI for India was 1.98 which increased to 1.76 in 1995. In 2000 it remained at 1.76. But in 2005 its value declined marginally to 1.75. There was an improvement in the TEI value for India in 2010 to 1.82 which further improved to 1.87 in 2015. The value declined marginally to 1.86 in 2018. During this period, the highest value of TEI was 1.89 in 2011 and lowest value was 1.67.

Table 2.13: Trade Entropy Index

Year	TEI	Year	TEI	Year	TEI
1992	1.98	**2001**	1.85	**2010**	1.85
1993	1.99	**2002**	1.81	**2011**	1.93
1994	1.99	**2003**	1.84	**2012**	1.87
1995	1.96	**2004**	1.86	**2013**	1.81
1996	1.96	**2005**	1.91	**2014**	1.79
1997	1.90	**2006**	1.88	**2015**	1.77
1998	1.93	**2007**	1.86	**2016**	1.78
1999	1.91	**2008**	1.86	**2017**	1.81
2000	1.88	**2009**	1.89	**2018**	1.79

Author's calculation
Data Source: WITS-COMTRADE

Trend shows that the value continuously increased from 1.73 in 1992 to 1.80 in 1998 then declined to 1.67 in 1999. After that it increased to 1.76 in 2000 and further to 1.82 in 2001. The value declined for the next two years to 1.78 in 2002 and further to 1.76 in 2003 In 2004 in increased to 1.77 but again declined to 1.5 in next year. The value again increased continuously from 1.78 in 2006 to 1.89 in 2011. After declining in 2012 to 1.84 it again increased to 1.87 and continued with that for next two years. In 2016 there was a decline in value to 1.86 and further to 1.84 in 2017 Then finally in 2018 it again increased to 1.86.

It clearly shows that India's export was diversified not only during the early years of the period, but also in the latter half of the period. But it was less diversified in the latter half of the period than the earlier half. In other words, India had become less diversified over the period.

2.4.14 Composition of Exports and Imports

A. Export Composition:

We will first discuss export composition of India and after that we will discuss import composition. For this we have considered five-year average share of each of the sixteen goods.

During 1992-1996 the top five sectors with highest contribution in total export were: Textiles and Clothing, Stone and Glass, Vegetables, Chemicals, and Metals. The share of these five sectors during this period was 67.12 percent on the other hand, the bottom five sectors with least contribution in exports were: Miscellaneous, Plastic or Rubber, Footwear, Fuels and Wood. The share of these bottom five sectors in total exports was 9.47 percent. So, whereas the share of top five sectors was more than 60 percent but that of bottom five sectors was less than 10 percent during 1992-1996. Among the top five sectors, the share of Textiles and Clothing was highest at 26.71 percent and that of Metals was lowest at 5.84 percent. On the other had highest contributor among the bottom five sectors was Miscellaneous with a share of 2.56 percent and least contributor was Wood with a share of as low as 0.50 percent.

During 1997-2001 also the top five sectors were same as during the period of 1992-1996. These were: Textiles and Clothing, Stone and Glass, Vegetables, Chemicals, and Metals. As compared to previous period the combined share of these five sectors had increased from 67.12 percent during previous period to 69.93 percent i.e., almost 70 percent in this year. On the other hand, the bottom five sectors during this period were Plastic and Rubber, Minerals, Fuels, Footwear, and Wood. So, in this period Miscellaneous sector was replaced by Mineral's sector. The combined contribution of these bottom five

sectors was 8.47 percent which was less than 9.47 percent in the previous period. The highest share among the top five sectors was from Textiles and Clothing sector with a share of 26.32 percent which was less than its share in previous period. And the lowest contribution was again made by Metal sector with 6.24 percent. On the other hand, the highest contributor among the bottom five sectors was made by Plastic and Rubber sector with a share of 2.16 percent and lowest contribution was made again by Wood sector with 0.53 percent.

Table 2.14a: Five Year Average Export Composition (%)

Sector/Period	1992- 96	1997-2001	2002-2006	2007-2011	2012-2016	2017-2018
Animal	4.25	3.95	2.6	1.83	3.22	3.58
Chemicals	7.6	9.39	10.09	9.8	11.37	13.22
Food Products	4.37	2.92	2.3	2.62	2.29	2.12
Footwear	2.09	1.67	1.23	0.93	1.02	1
Fuels	2.04	2.02	8.83	16.77	16.32	13.63
Hides and Skins	4.06	3.2	2.12	1.19	1.21	1.07
Mach and Elec	4.8	5.7	6.63	7.98	7.65	9.32
Metals	5.84	6.24	9.34	9.09	7.74	8.9
Minerals	3.08	2.09	4.03	3.76	1.24	1.28
Miscellaneous	2.56	3.47	3.21	4.09	2.41	1.96
Plastic or Rubber	2.28	2.16	3.14	2.45	2.75	3.2
Stone and Glass	17.44	18.58	17.35	15.6	15.26	14.24
Textiles and Clothing	26.71	26.32	19.02	12.52	12.61	12.06
Transportation	2.85	2.36	3.3	5.8	7.49	7.75
Vegetable	9.53	9.4	6.17	5.03	6.8	5.89
Wood	0.5	0.53	0.65	0.53	0.62	0.76

Author's calculation
Data Source: WITS- COMTRADE

In the next period of 2002-2006, we observed some changes in the contribution of the top five sectors. During this period Vegetables sector was replaced by Fuels sector in the top five sectors. It was one of the bottom five sectors in previous period. So, the top five sectors were: Textiles and Clothing, Stone and Glass, Chemicals, Metals, and Fuels. A decline in the combined share of top five sectors, from 69.93 percent to 64.63 was observed. The decline was mostly attributed to the decline in the share of Textiles and Clothing. Except for Footwear and Wood sectors, all other sectors were replaced in the bottom five sectors. Plastic and Rubber, Minerals and Fuels were replaced by Animal, Food Products and Hides and Skins. Their combined share during this period was 8.9 percent which was a marginal rise as compared previous period. During this period Textiles and Clothing still had the highest share among the top five sectors but its share declined from 26.32 in the previous period to

19.02 percent and as said earlier this decline is responsible for the decline in overall share of top five sectors. Fuels had the lowest share among the top five sectors at 8.83 percent. Among the bottom five sectors, most contribution was made by Animal sector with a share of 2.60 percent and least contribution was made again by Wood sector with a share of 0.65 percent.

During the period of 2007-2011, the top five sectors remained the same as before, but their position changed. These sectors include Textiles and Clothing, Stone and Glass, Chemicals, Metals, and Fuel. There was further decline in the combined share of top five sectors to 63.78 percent as compared to 64.63 percent in the previous period. There was a change in the bottom five sector during this year. Food Products sector was replaced by Plastic and Rubber sector. Othe sectors were Animal, Hides and Skins, Footwear, and Wood. The combined contribution of these five sectors was 6.93 percent which was less than 8.9 percent share in the previous period. Textiles and Clothing was replaced for the first time during this period as the sector with most contribution and its place was taken by Fuels sector with a share of 16.77 percent. Metals continued to have the least share of 9.09 percent among the top five sectors. Among the bottom five sectors, Plastic and Rubber sector had the highest share of 3.14 percent and Wood continued to have the lowest share of 0.53 percent during this period. The share of Wood sector had declined during this period.

During 2012-2016 also, there was no change in the top five sectors but among the bottom five sectors Plastic or Rubber sector and Animal sector were replaced by Food Products and Minerals. The top five sectors during this period were Fuels, Stone and Glass, Textiles and Clothing, Chemicals and Metal. The combined share of these five sectors in India's total export was 63.30 percent which was again less than 63.78 percent in the previous period. The bottom five sectors during this period were Food Products, Minerals, Hides and Skins, Footwear, and Wood. Their combined contribution during this period was 6.38 percent which was less than 6.93 percent in previous period. Among the top five sectors Fuels sector again had the highest contribution during this year with a share of 16.32 percent and the lowest contribution was from Metal sector with a share of 7.74 percent. The share of both Fuels and Metals had declined during this period. On the other hand, among the bottom five sectors, most contribution was made by Food Products with a share of 2.29 percent and least contribution was made again by Wood sector with a share of 0.62 percent.

Finally, during the last period of 2017-2018, there was change in the top five sectors, as well as in the bottom five sectors. In the top five sector Metals was replaced by Machinery and Electricals sector and in the bottom five sectors Food Product was replaced by Miscellaneous. The top five sectors were Fuels, Stone and Glass, Textiles and Clothing, Metals,

and Machinery and Electricals. Their combined contribution during this period was 62.47 percent which was again less than previous periods share of 63.30. The bottom five sectors were Miscellaneous, Minerals, Hides and Skins, Footwear, and Wood. The combined contribution of these five sectors was 6.07 percent which was less than 6.38 percent of previous period. During this period Fuels sector was replaced by Stone and Glass sector as the highest contributor among the top five sectors with a share of 14.24 percent and Metals sector which was the lowest contributing sector among the top five sectors was also replaced by Machinery and Electricals sector with a share of 9.32 percent. Among the bottom five sectors, highest share was contributed by Miscellaneous with a share of 1.96 percent and lowest was again by Wood sector with a share of 0.76 percent, which was an improvement as compared to previous periods share of 0.62 percent.

So, on the basis of this discussion, we can conclude that the top five sectors combined share was more than 60 percent of the total exports and bottom five sectors had the share of less than 10 percent throughout the period. The sectors that remained in the top five sectors were Textiles and Clothing, Stone and Glass and Chemicals and those which remained in the bottom five sectors throughout the period were Footwear and Wood. As far as the combined share of top five sectors are concerned, it increases in the second period but after that it continuously declined for the rest of the period. But it was above sixty percent throughout the period. Similarly, the combined share of bottom five sectors also declined throughout the period. Its share never exceeded ten percent mark in the entire period.

B. Import Composition:

Now we will discuss the import composition of India in the same manner in which we discussed India's export composition by considering the five-year average share of each of these sixteen sectors. The table below shows the five – year average share of all the sixteen sectors.

We will start our discussion from 19992-1996. During this period, the top five sectors with highest shares in India's imports were Fuels, Machinery and Electricals, Chemicals, Stone and Glass, and Metals. The combined share of these five sectors in India's total export was 72.81 percent. On the other hand, the bottom five sectors with lowest shares were Minerals, Food Products, Hides and Skins, Footwear, and Animal. The total share of these five sectors was only 3.3 percent. Among the top five sectors highest share was contributed by Fuels with 26.68 percent and lowest was contributed by Metals with 8.66 percent. Similarly, among the bottom sectors, highest share was contributed by Minerals with 1.72 percent and

lowest was by Animal with 0.07 percent share. The rest 23.89 percent share was contributed by the six sectors between these two groups.

Table 2.14b: Five Year Average Import Composition (%)

Period	1992- 1996	1997-2001	2002-2006	2007-2011	2012-2016	2017-2018
Animal	0.07	0.08	0.05	0.05	0.04	0.04
Chemicals	12.42	10.14	8.29	8.47	8.50	9.02
Food Products	0.99	0.61	0.37	0.35	0.47	0.61
Footwear	0.10	0.07	0.06	0.07	0.12	0.16
Fuels	26.68	27.95	32.02	33.39	33.57	30.46
Hides and Skins	0.42	0.37	0.28	0.19	0.21	0.22
Mach and Elec	14.38	13.87	17.06	16.12	15.45	18.65
Metals	8.66	5.60	5.61	6.30	5.95	6.21
Minerals	1.72	1.43	1.75	2.25	2.10	1.78
Miscellaneous	8.65	5.54	3.39	4.38	4.88	3.34
Plastic or Rubber	2.93	2.17	2.17	2.45	3.31	3.70
Stone and Glass	10.67	19.49	16.73	16.33	15.09	15.37
Textiles and Clothing	2.50	2.30	2.19	1.18	1.34	1.46
Transportation	3.65	2.12	3.74	3.97	3.13	3.02
Vegetable	3.44	5.37	4.04	2.95	4.19	4.30
Wood	2.72	2.90	2.24	1.56	1.66	1.66

Author's calculation
Source: WITS – COMTRADE

During the period of 1997-2001 also the top five sectors in order of their share were Fuels, Stone and Glass, Machinery and Electricals, Chemicals and Metals. The joint contribution of these five sectors during this period was 77.05 percent which was higher than their combined share in the previous period. The bottom five sectors also did not show any change. These sectors in descending order of their share are Minerals, Food Products, Hides and Skins, Animal, and Footwear. The combined share of these five sectors was 2.56 percent which was less than their previous combined share. During this year among the top five sectors Fuels sectors continued to have the highest contribution with a share of 27.95 percent which was slightly higher than its previous share and Metals also continued to have the lowest contribution of 5.6 percent which was lower than its previous contribution. On the other hand, among the bottom five sectors' Minerals continue to have the highest share with 1.43 percent which had 1.72 percent share in previous period. Footwear replaced Animal sector with a share of .0.07 percent to be the least contributing sector. Remaining 20.39 percent of the imports was shared by rest of the six sectors.

The top five sectors did not change during the next period of 2002-2006 even though due to change in their share their order change. These five sectors in ascending order in accordance with their share were Fuels, Machinery and Electricals, Stone and Glass, Chemicals, and Metals. So, during this period, Machinery and Stone and glass interchanged their respective places. As far as the combined share of these five sectors are concerned, their share was even higher than before at 79.71 percent. So, these five sectors had almost 80 percent share in India's total imports. On the other hand, the bottom five sectors also did not change during this period but just like in the case of top five sectors, there was change in the position of few sectors in terms of their share. Particularly, during this period the position of Footwear and Animal sectors were interchanged. So, the bottom five sectors in order of their share were Minerals, Food Products, Hides and Skins, Footwear, and Animal. The contribution of these five sectors in total imports contracted again marginally to 2.51 percent as compared to 2.56 percent in the previous period. Among the top five sectors, highest share was contributed by Fuels again with a share of 32.02 percent and the sector that contributed lowest share continued to be Metal sector with a share of 6.61 percent. In comparison to previous periods share, the share of both Fuels and Metals had increased. Similarly, among the bottom five sectors, Mineral's sector continued to have the highest share, but lowest share was contributed by Animal sector again replacing Footwear. The shares of both Minerals and Animal had improved during this period. The remaining six sectors had the share of 17.78 percent which was lower than their previous share.

During 2007-2011 the top five sectors in descending order of their contributions were Fuels, Stone and Glass, Machinery and Electricals, Chemicals, and Metals. Except for the positions of Stone and Glass and Machinery and Electricals, there was no change in the top five sectors. With a share of 80,61 percent, their combined share crossed 80 percent mark during this period. On the other and among the bottom five sectors, Minerals was replaced by Textiles and Clothing sector, all other sectors along with their position remained the same. These bottom five sectors were Textiles and Clothing, Food Products, Hides and Skins, Footwear, and Animal. Their combined contribution during this period was only 1.84 percent i.e., not even two percent. With an increased share of 33.39 percent as compared to previous share of 32.02 percent, Fuels continued to be the sector with highest share and with an increased share of 6.3 percent as compared to 5.61 percent in the previous period Metals sector also continued to be the sector with least contribution among top five sectors. On the other hand, among the bottom five sectors, Textiles and Clothing sector which replaced Mineral sectors from bottom five sector had the highest share of 1.18 percent and Animal sector with a share

of 0.05 percent continued to be the sector with least contribution among bottom five sectors. The remaining share of 17.55 percent was contributed by remaining six sectors. As compared to 17.78 percent in the previous period, their share had marginally declined during this period.

The situation was similar to previous period during 2012-2016. Neither there was any change in the top five sectors nor in the bottom five sectors. Same sectors remained in these two groups. In case of top five sectors there was change in the position of same Stone and Glass and Machinery and Electrical sectors due to change in their shares. These five sectors in descending order of their contribution were So, compared to previous period only Machinery and Electricals and Stone and Glass had interchanged their positions. Their combined share in India's total imports during this period was 78.56 percent which was a slight lower as compared to share in the previous period. The bottom five sectors not only remain the same as the previous period, but their position also did not change. They had the same order in this year as they had in the previous period. i.e., Textiles and Clothing, Food Products, Hides and Skins, Footwear, and Animal, their combined contribution was 2.18 percent which was an improvement as compared to previous share. During this period also Fuels had the highest contribution among top five sectors with a share of 33.57 percent, marginally more than previous period. And Metals also continued to have the lowest share with 5.95 percent, which was lower than its previous share. Among the bottom five sectors, Textiles and Clothing with a share of 1.34 continued to have the highest share and Animal sector with a share of 0.04 percent continued to have the least contribution. 19.26 percent is the combined share of remaining six sectors during this period. which was comparatively higher than their share in the previous period.

During the final two-year period of 2017-2018 both the top five sectors and bottom five sectors did not change. Even their positions remained same as the previous period. The top five periods in ascending order of their shares were Fuels, Machinery and Electricals, Stone and Glass, Chemicals, and Metals. These five sectors made a combined contribution of 79.71 percent during this period, an improvement as compared to previous period. Similarly, the bottom five sectors were Textiles and Clothing, Food Products, Hides and Skins, Footwear, and Animal. Their combined contribution during this period was 2.49 percent, a slight improvement as compared to previous period. Just like every other period, in this period also fuels had the highest contribution among the top five sectors of 30.46 percent, a slight decline as compared to share in previous period and Metals had the lowest contribution of 6.21 percent, an improvement in the share as compared to previous period. Similarly, in this period also, Textiles and Clothing continued to have the highest share among the bottom five

sectors and Animal sector continued to have the least contribution among them. On the one hand there was an improvement in the share of Textiles and Clothing, but the share of Animal sector remained same as before. As far as the share of remaining six sectors were concerned, their combined share during this year was 17.80 percent. As compared to previous period the combined share of these six sectors had declined in this period.

2.4.15 Direction of Trade:

Now we will discuss India's direction of trade for both exports and imports in seven regions for the given period of 1992-2018. Here also we have considered the five-year average share of each region. First, we will consider the direction of exports and after that we will discuss direction of imports.

A. Direction of exports:

The table below shows the five-year average exports of India in different region of the world. We will now discuss them for each five-year period, starting from the period of 1992-1996.

Table 2.15a: Direction of Exports (five -year average) (%)

Period	1992-96	1997-2001	2002-2006	2007-2011	2012-2016	2017-2018
East Asia & Pacific	24.33	21.33	23.99	25.84	23.58	25.28
North America	19.62	22.42	19.69	12.29	14.75	16.65
Europe & Central Asia	29.77	28.64	25.99	22.58	19.96	20.72
Middle East & North Africa	10.37	12.24	15.05	20.78	21.22	17.61
South Asia	4.72	4.50	5.51	4.89	5.81	7.25
Sub-Saharan Africa	3.46	4.55	5.02	6.45	7.86	6.49
Latin America & Caribbean	1.16	2.02	2.39	3.66	4.46	4.07
Unspecified	6.57	4.30	2.36	3.52	2.36	1.92

Author's calculation
Data Source: WITS- COMTRADE

During the period of 1992-96, the top three regions for India's exports in order of their respective share were Europe and Central Asia, East Asia and Pacific and North America. The combined share of these three regions was 73.72 percent of the total exports of India during this period. On the other hand, the bottom three regions with lowest share were South Asia, Sub Saharan Africa, and Latin America. Their combined share in the total exports of India was only 9.34 percent. Among the top three regions Europe and Central Asia had the highest share of 29.77 percent and North America had the lowest share of 19.62 percent. East Asia and Pacific had a share of 24.33 percent. Similarly, among the bottom three regions, South Asia had the highest share of 4.72 percent and Latin America, and Caribbean

had the lowest share of 1.16 percent. Sub- Saharan Africa had a share of 3.46 percent during this period.

As far as their combined share is concerned it improved during this period to 11.07 percent from 9.34 percent during the previous period. Among the top three regions highest contribution was made again by Europe and Central Asia with a share of 28.64 percent and lowest by East Asia and Pacific with a share of 21.33 percent. The share of North America during this period was 22.42 percent. As compared to previous period the shares of Europe and Central Asia and East Asia and Pacific had declined and that of North America had improved during this period. Among the bottom three regions, highest share was contributed by Sub- Saharan Africa with 4.55 percent and lowest again by Latin America and Caribbean with 2.02. The share of South Asia during this period was 4.50 percent. As compared to previous year the share of Sub-Saharan Africa and that of Latin America and Caribbean had improved but that of South Asia declined. The share of Middle East and North Africa also improved during this period from 10.37 to 12.24 percent.

B. Direction of Imports:

After discussing direction of exports now we will discuss direction of India's imports among the seven regions. The table below shows the five-year average import share of different regions for the period of 1992-2018 as before.

During 1992-1996, the top three import regions for India's imports in order of their share were Europe and Central Asia, East Asia and Pacific and Middle East and North Africa. On the other hand, three bottom three regions in order of their shares were Sub-Saharan Africa, Latin America, and Caribbean. The combined shares of top three regions during this period were 64.87 percent and that of bottom three regions was 6.61 percent. Among the top three regions highest share was contributed by Europe and Central Asia with 27.5 percent and lowest share was by Middle East and North Africa with a share of 16.42 percent. Europe and East Asia had a contribution of 20.88 percent share. On the other hand, among the bottom three regions highest share was contributed by Sub-Saharan Africa with a share of 4.33 percent and lowest share was contributed by South Asia with a share of 0.65 percent. Latin America and Caribbean from the same group contributed a share of 1.63 percent during this period. In between these groups was North America and its share during this period was 11.39 percent.

During the next period of 199-2001 also the top three regions remain the same in the same order i.e., Europe and Central Asia, East Asia and Pacific and then Middle

East and North Africa. The combined share of these three regions was 66.91 percent which was higher than their share in the previous period. On the other hand, the bottom three regions also remain the same in the descending order of Sub- Saharan Africa, Latin America and Caribbean, and South Asia. Their combined share was 9,08 percent which was higher than their share of 6.61 percent in the previous period. Europe and Central Asia continued to have the highest share among top three regions with a share of 28.4 percent which was higher than its share in the previous period. And Middle East had the lowest share of 15.04. During this period the share of Middle East and North Africa had declined as compared to 16.42 percent share in previous period. From the same group, East Asia and Pacific had also increased share of 23.40 percent as compared to 20.88 percent in the previous period. On the other hand, among the bottom three regions Sub- Saharan Africa continued to have the highest share of 6.48 percent even though it declined as compared to previous periods share of 4.33 percent. And South Asia also continued to have the lowest share of 0.94 percent which was 0.65 percent in previous period. Latin America and Caribbean, from this group had an increased share of 1.66 percent. Its share in the previous period was 1.63 percent. During this period North America which was again was neither in any of the two groups had a declined share of 8.19 percent as compared to its share on 11.29 percent in the previous period.

Table 2.15b: Direction of Imports (five- year average) (%)

Region/ Period	1992-96	1997-2001	2002-2006	2007-2011	2012-2016	2017-2018
East Asia & Pacific	20.88	23.40	25.98	31.05	32.98	37.91
Middle East & North Africa	16.42	15.04	10.28	28.55	26.46	22.80
Europe & Central Asia	27.57	28.47	24.85	21.24	18.30	17.13
Sub-Saharan Africa	4.33	6.48	4.04	6.79	7.37	7.21
North America	11.29	8.19	7.17	6.85	5.83	6.76
Latin America & Caribbean	1.63	1.66	1.94	3.33	6.15	5.25
South Asia	0.65	0.94	0.90	0.63	0.59	0.68
Rest of the world	17.21	15.82	24.84	1.56	2.31	2.26

Author's calculation
Data Source: WITS- COMTRADE

During the period of 2002-2006, again there was no change in the top three regions, but the order of these regions had changed with East Asian and Pacific at top, followed by Europe and Central Asia, and then Middle East and North Africa. There was also a decline in the combined share of these three regions from 66.91 percent in previous period to 61.11 percent. But the bottom three regions continued to remain same and in same order of Sub- Saharan Africa, Latin America and Caribbean, and South Asia. The combined share of this group of nations also declined from 9.08 in the previous period to 6.88 percent. During this

period Europe and Central Asia was replaced by East Asia and Pacific to be the region with highest share among top three regions. Its share was 25.98 percent which was higher than its value of 23.40 percent in the previous period. And the region with lowest share in this group was still Middle East and North Africa with a decreased share of 10.38 percent as compared to 15.04 percent in the previous period. The share of Europe and Central Asia from the same group declined to 24.85 percent as compared to 28.47 percent in the previous period. Similarly, the highest share among the bottom three regions was contributed again by Sub Saharan Africa with a decreased share of 4.04 percent as compared to 6.48 in the previous period and the lowest share was also again contributed by South Asia with a decreased share of 0.90 percent as compared to 0.94 percent. The other region in the group was again Latin America and its share was 1.94 percent which was an improvement as compared to previous share of 1.66 percent. The share of North America, which was again not in any of the above two groups above further declined to 7.17 percent as compared to 8.19 percent.

Again in 2007-2011, even though there was no change in the top three regions as before, but order of the regions again changes in descending order of their share as East Asia and Pacific, Middel East and North Africa, and Europe and Central Asia. Their combined share this time had increased sharply to 80.84 percent as compared to 61.11 percent in previous period. But during this year also there was no change in the regions and their order among the bottom three regions. Their order continued to be Sub- Saharan Africa, Latin America and Caribbean, and South Asia. Just like the combined share of top three, the combined share of these bottom three regions had also increased from 6.88 in previous period to 10.75 percent during this period. During this period also East Asia and Pacific had the highest share of 31.05 percent which was higher than its share of 25.98 percent in the previous period but there was a change in the region with lowest share in this group from Middle East and North Africa to Europe and Central Asia. Its share was 21.24 percent during this year which was less than its share of 24.85 percent in the previous period. The other regions in this group were Middle East and North Africa and its share had increased sharply to 28.55 percent during this period as compared to just 10.28 percent in the previous period. Among the bottom three region Sub Saharan Africa still contributed the highest share of 6.79 percent which was higher than its previous share of 4.04 percent and South Asia still contributed the lowest share with 0.63 percent, and this was less than its share of 0.90 percent in previous period. The other region in this group was Latin America and its share was 3.33 percent during this period which was an improvement in its share as compared to 1.94 percent in the previous period. The region

of North America which was in between these two groups had a share of 6.85 percent during this period which was less than its share of 7.17 percent in the previous period.

During 2012-2016 also the top three regions were East Asia and Pacific, Middle East and North Africa and Europe and Central Asia in the same order as in the previous period. Their combined share was 77.74 percent which was a reduction as compared to previous share. On the other hand, the bottom three regions in descending order of their share were Latin America, North America, and South Asia. The combined share of this group of regions was 12.57 percent which was relatively higher than the share in the previous period. The highest share among the top three was contributed by East Asia and Pacific with a share of 32.98 percent, which was a relative improvement in its share compared to 31.05 percent in 2007-2011. The lowest share was contributed by Europe and Central Asia, whose share declined during this period from 21.24 percent to 18.30 percent. Another region in the group was Middle East and North Africa and its share was 26.46 percent, which was less than its share of 28.55 percent in the previous period. Among the bottom three, highest share was contributed by Latin America and Caribbean with a share of 6.15 percent. Its share was improved from 3.33 percent in the previous period. The lowest contribution was made again by South Asia with a share of 0.59 percent, a decline as compared to 0.63 percent in the previous period. During this period among the bottom three regions, Sub Saharan Africa was replaced by North America whose share declined from 6.85 percent in the previous period to 5.83 percent during this period. The region of Sub-Saharan Africa which was replaced from the bottom three group had shown improvement in tis share to 7.37 percent as compared to 6.79 percent in the previous period.

In continuation to previous three period, in this period also the top three regions in descending order of their shares were East Asia and Pacific, Middle East and North Africa and Europe and Central Asia. Their combined share during this year marginally increased to 77.84 percent from 77.74 percent in the previous period. The bottom three regions also were the same as the previous period but order of Latin American and Caribbean and North America was interchanged. Their position in descending order of their share were North America, Latin America and Caribbean, and South Asia. The combined share of this group of regions was 12.69 percent. This also had marginally increased as compared to previous period. As far as the individual share was concerned, East Asia and Pacific had the highest share of 37.91 percent among the top three regions and Europe and Central Asia with a share of 17.13 percent had the lowest share in the group. Middle East and North Africa was the other region in the group and its share was 22.80 percent. As compared to the share of previous period,

shares of Middle East and North Africa and that of Europe and Central Africa declined but the share of East Asia and Pacific had increased during this period. On the other hand, the highest share among the bottom three regions was contributed by North America with a share of 6.76 percent and lowest by South Asia with a share of 0.68 percent. Interestingly, South Asia remained the region with least contribution throughout the period. Latin America and Caribbean with a share of 5.25 percent was the other region with the bottom three group. As compared to their share in the previous period, the shares of North America and South Asia showed improvement whereas that of Latin America and Caribbean showed decline. During this period also, Sub Saharan Africa continued to be the region in between the top three and bottom three regions with a share of 7.21 percent which was relatively less than its share in the previous period.

2.5 Conclusion:

In this chapter we discussed the overall scenario of India's trade for the period 1992-2018. For the purpose of analysis, we used various trade related indices. During the study period the share of India's exports, imports and overall trade in the world was insignificant and more or less stagnant throughout the period. This does not mean that India performed poorly in external sector during this period. Even though India's share was insignificant and stagnant with respect to world trade, there was significant growth in both exports and imports of India during the study period. With reference to base year of 1992, there was many folds growth in both exports and imports. In fact, the growth in imports was found to be higher than the growth in exports throughout the study period. As a result of this India experienced persistent balance of trade deficit during that period. This persistent balance of trade deficit is one of the areas of concern in India's external sector. As far as the sector wise performance is concerned, our study found that India had comparative advantages in few sectors and comparative disadvantages in few other sectors. Another positive finding of our study relates to diversification of India's trade (exports). India's trade was diversified across many countries instead of concentrated in fewer countries. This makes India less vulnerable to economic shocks in a partner country. Even though India as a whole was less vulnerable but same in not true for domestic producers. Our study finds that the reliance of domestic producers on foreign market had increased during the study period. This means that on the one hand there was an increase in production of exportable, but it also means that the domestic producers of exportable are more vulnerable to external shocks. Any disruption in partner country will have negative impact on domestic producers of exportable. In the same manner the reliance on imports had increased during the study period for satisfying domestic demand. This also makes

Indian consumers in particular and Indian economy in general vulnerable to external shocks. Growth in exports and imports have both cost side and benefit side and as long as benefits outweighs costs, growth in exports and imports are both advantageous to a country. We also discussed composition of exports and imports along with direction of exports and imports. As far as the composition of India's exports and imports are concerned some changes were experienced during the study period. Our study on the direction of trade revealed that there was not much change in the direction of trade (both exports and imports) as well during the study period. On the basis of these analyses, we recommend that, the government should identify and focus on the problems related to India's external sector and adopt adequate policy responses to mitigate these problems.

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Appendix:

1) Growth rate of exports and imports

We define growth rate of export 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 zero, 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.

2) 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.

3) 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.

4) Export Import 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 zero, 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 one in a particular year, this means that country export is fully capable of covering its import bill during that year.

5) Export Market Penetration:

This index as calculated as the ratio of number of countries to whom a country exports a particular good and number of countries that import that particular good in a year. If the value of this index is zero, then the country is not exporting to any country and if it is 100 then it is exporting to maximum number of countries

$\frac{Number\ of\ countries\ where\ a\ country\ A\ exports\ x}{Number\ of\ countries\ that\ imports\ x}$ x 100

6) Revealed Comparative Advantage (RCA):

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.

7) The Herfindahl- Hirschman Index:

This index is the measure of geographical concentration of exports. This tells us the degree to which a region or country's exports are dispersed across different destinations. This index is defined as the square root of the sum across destinations of the squared export share for the region under study to all destinations. This index is given by

$$\sqrt{\sum_d \left[\frac{\sum_s X_{s\,d}}{\sum_{sw} X_{sw}}\right]^2}$$

Here, s is the set of source countries under study; d is the set of destinations; w is the set of countries in the world; and X is the bilateral flow of exports form the source to the destination. The value of this index lies between o and 1. Higher value of this index indicates that exports are concentrated on fewer markets and lower value indicates exports are diversified.

8) Export Propensity Index:

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.

9) Trade Entropy Index:

This index is a measure of the ''geographical concentration'' or dispersion of exports. This measure tells us the degree of integration of a country in study with the world economy and it can be used to understand the vulnerability of the country in question to external shocks when it relies on limited number of partners. This index is calculated by summing the export shares multiplied by natural log of the reciprocal of the export share (this is a weight which decreases with the size of the share) of the country under stud across all destinations. This can be expressed as

$$\sum_d \left(\frac{\sum_s X_{sd}}{\sum_{sw} X_{sw}}\right) \ln \left(\frac{1}{\sum_s X_{sd} / \sum_{sw} X_{sw}}\right)$$

Here, s is the set of source countries under study; d symbolizes set of destination countries; w is the set of countries in the world; X is the bilateral export flow from source country to destination country. The sets d and w contain the same elements as we want to sum over all destinations. Entropy index can be calculated using imports or exports shares as well. This index takes the values ranging from 0 to $+\infty$. Higher value of this indicator means greater uniformity in geographical dispersion of exports. Maximum value of this index indicates that the export share in every market is same.

10) 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.

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 $+\infty$.

Chapter 04: An Analysis of Extent of India's Intra Industry Trade with China

4.1 Introduction:

Intra industry trade is simply the trade within the same industry unlike in case of inter industry trade where trade takes place between industries. Traditionally the trade theories were directed towards the study of inter-industry trade, but many scholars find a mismatch between the traditional trade theories and empirical evidence and since 1960s intra-industry trade become an important area of studies in international trade.

. Even though in earlier times intra-industry trade was expected predominantly to be related to developed industrialized nations and most of the studies were conducted with focus on developed nations, but over the years this phenomenon was also examined in developing countries as it was realized that intra industry is a phenomenon not only present in developed industrialized nations but also found in the developing nations.

India was virtually a closed and a developing economy during 1960s. So, we cannot find any significant studies concerning the intra -industry trade of India. Most of the work regarding intra industry trade in India was conducted during 1990s as India was opening and started to integrate its economy with the world economy by adopting new economic policy.

In this chapter we will examine the issues related to intra –industry trade between India and China. We will try to find out the share of intra industry trade in India's total trade with China. We also identify the sectors which are important from this standpoint. Importantly we will try to find out the role of different factors responsible for the intra-industry trade between the two countries.

Rest of the chapter is organized as follows. In section 4.2 we made a thorough review of relevant literatures. It is followed by description of data and methods used in this chapter in section 4.3. In section 4.4 we have discussion where we have discussed and analysed intra-industry trade between India and China. Then in the last section of 4.5 we have conclusions of the chapter.

4.2 Review of Literature:

4.2.1 Theoretical development of IIT

Here we will discuss the theoretical evolution of IIT since 1960s.

Pieter Verdoorn (1960) was among the first to observe the phenomenon on intra-industry trade. In his study of trade pattern of Benelux countries after the formation of their Customs union he found that there was increase in intraindustry trade between them rather

than interindustry trade.

Bela Balassa (1966), in his study of trade pattern of ECC countries found the similar pattern as concluded by Verdoorn. That is, he also found the increasing trend of intraindustry trade among these countries as compared to interindustry trade. Balassa is also attributed to have used the term "intra-industry trade" for the first time. He is also responsible for developing the first ever measure of intra-industry trade. His work was basically focused on trade of manufactured goods.

H. G Grubel (1967) made an empirical study on intra-industry trade. In this study he studied the trade pattern of ECC countries with an objective to establish relationship between intra-industry trade and trade liberalization.

H. G Grubel and p. J Lloyd (1975) continued their empirical study and were able to identify the factors which were responsible for the emergence of intra-industry trade. In their study they found that the most import factor for the emergence of intra-industry trade was product differentiation. They also developed an index which later known as Grubel-Lloyd index, to measure the degree of intra-industry trade. This index is one of the most popular and important indices for measuring intra-industry trade.

These works were followed by many important theoretical works as many researchers and economists were drawn to work in this direction. As a result, many important theories and models were developed for explaining intra-industry trade and related issues.

M. Spence (1976), in his study concluded that as compared to other types of markets it is monopolistic competition where maximum product differentiation happens implying that most intra-industry trade happens in monopolistic competition.

A. Dixit and J Stiglitz (1977), like work of Spence (1976) used Chamberlin’s monopolistic competition model in their study. To explain intra-industry trade, they had used product diversity argument. The approach used by them is known as love for variety approach. They found that several reasons were responsible for demand and supply of variety of products.

4.2.2 Studies related to HIIT and VIIT:

Intra -industry trade has been divided into two types. They are Horizontal intra-industry trade (HIIT) and Vertical Intra-industry Trade (VIIT). Most of the studies after 1977 were focused on the development of theories and models of these two types of intra-industry trade.

M. An Andersen (2003) has provided the definitions of HIIT and VIIT.

According to him, HIIT is "characterized by products with similar quality levels with different attribute' and VIIT "is characterized by products with significantly different quality levels (high and low quality)". These definitions shows that as far as quality of product is concerned it is important in the context of VIIT only and not for HIIT. As said earlier, studies on specific type of IIT begin after 1977 with the works of Dixit and Stiglitz (1977). We will now review some of the important studies first on HIIT and after that on VIIT.

A. HIIT:

As far as theoretical works on HIIT is concerned the most important contributions were made by Dixit and Stiglitz (1977), Krugman (1979, 1980, 1981) Lancaster (1979), Helpman (1981) and Helpman and Krugman (1985).

Dixit and Stiglitz (1977) were responsible for modelling product differentiation in formal analysis of IIT. They introduced the ‘love of variety' approach to HIIT.

Lancaster (1979) made another important contribution in the study of HIIT. In this work he introduced another approach known as 'favourite variety' approach to HIIT.

These two works were followed by many other works which were either based on the approach followed by Dixit and Stiglitz (1977) or that followed by Lancaster (1979). The theoretical works that followed the approach followed by Dixit and Stiglitz (1977) were Krugman (1979, 1980), Dixit and Norman (1980), Helpman and Krugman (1985) Similarly, the studies that followed the approach of Lancaster (1979) were Lancaster (1980) and Helpman (1981).

B. VIIT

In case of theoretical works on VIIT, the most important contributions were made by Falvey (1981), Caves (1981), Shaked and Sutton (1983), Falvey and Kierzkowski (1987)

Rodney E Falvey (1981), was among the first to develop a theoretical model of VIIT. He used partial equilibrium approach in his model. On the basis of his 2x2x2 model, he argues that it is possible to explain simultaneously the existence of VIIT and inter industry trade. According to him a capital abundant country produces high quality manufacture products and labour abundant country produces low quality manufacture products. concludes that there is a positive relationship between the share of VIIT and difference in factor endowment or per capita income between trade partners.

R. E Falvey and H. Kierzkowski (1987), developed a model for explaining VIIT. They argue that VIIT is caused by difference in quality of products which is

caused by difference in factor endowments in different countries. They also infer that dissimilarity in income distribution between two countries causes the share of VIIT to rise between them. According to the model market size and share of VIIT has positive correlation.

H. Flam and E Helpman (1987), while working on VIIT developed a model of North- South trade. In this model North produces and exports high quality manufactured products whereas South produces and exports low quality manufactured products. This study concludes that IIT (which is VIIT) between North and South arises due to overlapping of income distribution.

4.2.3 India and Intra-industry trade:

Now we will discuss studies related to India's intra-industry trade and related issues.

There are very few works related to IIT of India prior to 1990s. There may be several reasons for this. One of the reasons may be the field of study of IIT was very new during that time. Another reason may be the fact that IIT was considered to be an advanced industrialized country phenomenon and India being a poor developing nation there was no scope for studying IIT in the context of India's trade. Yet another reason may be the policy that India adopted prior to 1991 about its industries and external sector. India before the 1991's New Economic Policy was virtually a closed economy with heavy restrictions on trade. Whatever may be the reasons the result was that prior to 1990s there was not much interest among researchers to study the role of IIT in India's trade. After 1990s, with liberalization and opening of India's economy, relatively more researchers were attracted to the study of IIT in Indian context. In these studies, varied areas and issues related to India and its IIT were covered.

During the pre-reform period the main focus of the researchers was to determine the share of IIT in India's trade.

Pant and Barua (1986) in their empirical study on India's IIT, for the period 1960-1980, found that even though on the one hand India experienced an increasing trend in her foreign trade during the study period but on the other hand it concluded that the share of IIT in India's trade was very low.

Bhattacharyya (1994), In his empirical study of pre reform period, used various methods to measure India's IIT. Along with that the sensitivity of results were tested at various level of aggregation.

Kantawala (1997) made an analysis of India's share of IIT with SAARC countries for the period between 1981-1992. His conclusion was similar to that of Pant and Barua (1986).

Veeramani (1999), conducted his study on India's IIT for a capital goods industry for a period of three year. In this study he found that nature of India's IIT was predominantly vertical (VIIT) in nature.

Veeramani (2002), in his study observes the significant role played by liberalization process on expansion of share of IIT in India's trade. According to him expansion in IIT was due to faster growth of exports. As far as the direction of IIT is concerned he concludes that India's IIT was more with high income countries than with developing ones.

Veeramani (2003), analysed factors which were specific to industry that affected India's IIT.

Banerjee and Bhattacharyya (2004) in their study of India's IIT between 1971- 2000. They observed that IIT grew continuously during the study period. On the basis of cointegration analysis they conclude that economic development played a significant role in the expansion of India's IIT during the study period.

Chakraborty and Chakraborty (2005), in their study found that economic reforms had a vital role in expansion of India's IIT.

Burange and Chaddha (2008), while studying India's IIT with respect to various regions of the world for the period between 1987-88 to 2005-06, found that even though there is an expansion in IIT but there was an uneven distribution of share of India's IIT in these regions. According to them India's share of IIT increased with the countries of Asia and Europe more than any other regions. They also demonstrated that in the context of growth of IIT, India's IIT is growing faster with the countries of America, Middle East and Africa compared to other regions.

Eshleman and Kotcherlakota (2010), while working with the data for period 2002- 2008 concludes that there was high IIT between India and countries of European Union.

Das and Dubey (2014), conclude that India's active presence in Free Trade Area (FTA) is a key factor affecting IIT.

Singh (2014), in his study argued that institutional parameters play a significant role in affecting India's IIT in both short run and long run.

Verma (2015), while studying IIT in agricultural sector come to conclusion that difference in factor endowment have negative effect on India's IIT in agricultural sector.

Kelkar and Burange (2016), studied India's vertical and horizontal intra-industry trade during the post liberalization period. For this purpose, they used the HS-eight-digit level data for the period from 1990-91 to 2013-14. In this study they found that during the study period there was significant increase in India's IIT. It increased from 37 percent in 1990-91 to 78 percent in 2013-14. They attribute this growth in IIT to trade liberalization that occurred during the study period. They also found that India's intra-industry trade is dominated by VIIT rather than HIIT. And within VIIT, they found that VIITL products were dominant over VIITH products.

Aggarwal and Chakraborty (2017) made an examination of the patterns and determinants of India's IIT with her 25 major trading partners. In this study they employed panel data framework for the period of 2001–2015. According to this study India's IIT increased with the selected partner countries during the study period. They also found that the India's IIT was predominantly vertical in nature with the partner countries. As far as the factors affecting India's IIT with these countries are concerned they found that with high income partners ‘’trade facilitation among partners" had significant positive effect on IIT but with low-income countries this factor was not significant in affecting IIT.

4.3 Data, Method, and Methodology:

To study the share of IIT in India- China trade we have divided the analysis into two parts. First part we will discuss the extent of IIT between India and China for the period 1992-2018. In the second part we will disentangle the IIT into vertical IIT and horizontal IIT and examine the share of these two types on the intra industry trade of India and China. The vertical intra industry trade is further divided into low VIIT and high VIIT, so we also examined the share of these two types of VIIT in our study. For this we have used another set of data from 1996-2018, because unit price data (for both exports and imports) which is required for disentangling was available only from 1996 to 2018. . The source of the data for the first part was WITS and for the second part we have collected data from the Export Import Data Bank of Ministry of Commerce, India.

For our analysis we have considered the Grubel – Lloyd Index to find out the extent of India's intra -industry trade with China and to find out the type of intra - industry trade (either horizontal or vertical intra-industry trade) we have used the method of disentangling. Let us discuss the two methods in turn.

Grubel – Lloyd Index:

To calculate the aggregate IIT we will used Grubel- Lloyd index. This is one of the earliest and commonly used indices and was developed by H. G. Grubel & P. J. Lloyd, P. J in 1971. This index is written as

$$GL_i = 1 - \frac{|X_i - M_i|}{X_i + M_i}$$

and $\quad 0 \leq GL_i \leq 1$

where GL_i = Grubel Lloyd index for product group i; X_i = export of product group i; M_i = import of product group i.

The value of GL_i lies between 0 and 1. If the value is O, it means that there is no intra-industry trade and if the value is, it means that there are 100 percent intra-industry trade.

Method of disentangling:

Intra industry trade (IIT) can be divided into Horizontal IIT (HIIT) and Vertical IIT(VIIT), i.e.,

IIT = HIIT + VIIT ---------- (2)

To disentangle IIT into HIIT and VIIT, we use the following equation

$$1 - \alpha \leq \frac{UV_X}{UV_M} \leq 1 + \alpha \text{ ---------- (3)}$$

In equation (3) UV_X denotes unit value and exports (X) and UV_M denotes the unit value of imports (M). UV_X and UV_M are calculated as the ratio of value of exports (X) or imports (M) and quantity (or units) of exports (X) or imports (M), given as

$$UV_X = \frac{\text{Value}_X}{\text{Unit}_X} \quad \text{and}$$

$$UV_M = \frac{\text{Value}_M}{\text{Unit}_M} \text{ ---------- (4)}$$

As far are values being concerned, they are expressed in terms of US $ on the other hand units (quantities) are concerned they are express in terms of kgs., tonne, etc. In the equation α is known as the ‘’dispersion factor” which is responsible for separating HIIT from VIIT. The most preferred value of α is 0 .15, even though there is no agreed value of α. In our study also we have used the value of α = 0.15. So, if the value of α is taken as 0.15 then the ratio of UV_X and UV_M lies between 0.85 and 1.15. When this happens, we call the product in question as horizontally differentiated product and if value lies outside that range i.e., if value is less than 0.85 or more than 1.15 then the product in question is called vertically differentiated product. Again, the product whose value is less than 0.85, it is called low quality

vertically differentiated product (VIITL) and if it is above 1.15, it is called high quality vertically differentiated product (VIITH).

4.4 Discussion:

4.4.1 Overall Aggregated IIT:

a. Year to Year IIT:

Table shows India's share of India's intra industry trade in overall trade with China for the period of 1992 – 2018. Both in the beginning and in the end of the period i.e., in 1991 and 2018 the share of intra industry trade was same at 23 percent. The highest share was observed in 2000, when 41 percent of the trade was intra-industry trade. On the other hand, the share of intra – industry trade in the total trade was minimum in 1992 and in 2008 at 19 percent.

Table 4.1: Aggregated Intra- Industry Trade

YEAR	IIT	YEAR	IIT	YEAR	IIT
1992	0.19	**2001**	0.37	**2010**	0.31
1993	0.25	**2002**	0.35	**2011**	0.29
1994	0.30	**2003**	0.33	**2012**	0.27
1995	0.33	**2004**	0.33	**2013**	0.31
1996	0.38	**2005**	0.30	**2014**	0.29
1997	0.28	**2006**	0.33	**2015**	0.23
1998	0.31	**2007**	0.24	**2016**	0.20
1999	0.37	**2008**	0.19	**2017**	0.23
2000	0.41	**2009**	0.25	**2018**	0.23

Author's calculation
Data source: WITS- COMTRADE

The table shows that the share of intra- industry trade doubled from 0.19 percent to 38 percent between 1992 to 1996 and after falling in 1997 to 28 percent it again increased from 31 percent in 1998 to 41 percent in 2000. There was a declining trend in the share between 2001 to 2005. The share of intra-industry trade declined from 37 percent in 2001 to 30 percent in 2005. The share increased to 33 percent in 2006 only to decline for the next two years to 24 percent in 2007 and 19 percent in 2008. After that the share again increased for next two years to 25 percent in 2009 and 31 percent in 2010. During next two years of 2011 and 2012, there was again a decline in the share of intra industry trade with 29 percent in 2011 and 27 percent in 2012. The share increased to 31 percent for the year 2013. The share declined for the next three years from 29 percent in 2014 to 20 percent in 2016. The share remains same

for the next two periods of 2017 and 2018 at 23 percent.

b. Five Year Average Intra-industry trade:

We have also calculated the five-year average share of intra- industry trade for the given period of 1992-2018. For this we have divided the period into six sub periods. The share of intra-industry trade was 29 percent during 1992-1996 which was increased by 9 percent point to 35 percent during the period of 1997-2001. In the next two periods the share of intra-industry trade declined continuously, first to 33 percent during 2002-2006 and then further to 26 percent during 2007-2011. The share remained 26 percent during the next period of 2012-2016, but during 2017-2018 it declined by 23 percent.

Table 4.2: Five Year Average Intra-Industry Trade

Period	1992-96	1997-2001	2002-2006	2007-2011	2012-2016	2017-2018
IIT	0.29	0.35	0.33	0.26	0.26	0.23

Author's calculation

Data source: WITS- COMTRADE

The share of intra-industry trade was highest during 1997-2001 and it was lowest during 2017-2018. The periods of 1997-2001 and 2002-2006 were comparatively better than other four periods in terms of the share of intra-industry trade. The situation was similar during the period of 2007-2011 and 2012-2016.

c. Decadal Intra-industry trade:

Again, we have calculated the decadal average share of intra -industry trade for the given period. Here we have divided the entire period into three sub periods of ten years each except for the period of 2012-2018 where we have only seven years. The last column shows the average intra-industry trade for the entire period (1992-2018).

Table 4.3: Decadal Intra-Industry Trade

Period	1992-2001	2002- 2011	2012-2018	1992-2018
IIT	0.32	0.29	0.25	0.29

Author's calculation

Data source: WITS- COMTRADE

During the period of 1992-2001, the average share of intra-industry trade was 32 percent, and it was the highest as compared to other periods. There was a decline in intra-industry trade during 2002-2011 period to 29 percent which further declined in 2012-2018 to 0.25 percent.

So, the trend shows that there was a decline in the share of India's intra-industry trade with China with every passing decade. The overall intra-industry trade during the entire period of 1992-2018 was 29 percent. So, on the basis of this analysis we can conclude

that India- China trade during the given period was inter-industry dominant rather than intra-industry.

4.4.2 Sector wise intra industry trade:

In previous section we discussed share of aggregated intra industry trade in the trade between India and China. In this section we will discuss intra industry trade between India and China in different sectors of goods. Here we have considered sixteen different sectors as been suggested in WITS (World Integrated Trade Solutions).

Table 4.4: Five-Year Average Sector -wise Intra- Industry Trade

Sector/Period	1992-96	1997-2001	2002-2006	2007-2011	2012-2016	2017-2018
Animal	0.32	0.13	0.14	0.15	0.10	0.03
Chemicals	0.33	0.49	0.65	0.31	0.25	0.36
Food Products	0.36	0.45	0.47	0.45	0.67	0.64
Footwear	0.20	0.69	0.72	0.85	0.76	0.51
Fuels	0.00	0.00	0.15	0.47	0.80	0.76
Hides and Skins	0.71	0.79	0.82	0.83	0.74	0.47
Mach and Elec	0.12	0.12	0.08	0.06	0.06	0.06
Metals	0.60	0.35	0.63	0.59	0.61	0.46
Minerals	0.34	0.41	0.13	0.06	0.13	0.16
Miscellaneous	0.04	0.22	0.23	0.10	0.09	0.08
Plastic or Rubber	0.48	0.47	0.59	0.52	0.42	0.40
Stone and Glass	0.53	0.56	0.20	0.38	0.20	0.23
Textiles and Clothing	0.35	0.64	0.47	0.80	0.80	0.71
Transportation	0.35	0.50	0.45	0.09	0.19	0.09
Vegetable	0.50	0.69	0.73	0.73	0.59	0.60
Wood	0.08	0.40	0.10	0.02	0.08	0.25

Author's calculation

Data Source: WITS- COMTRADE

For the sake of analysis, we have made two different tables. In first table we have divided the entire period into six groups of five years each except for the last period where we have considered three periods. Similarly, in the second table we have divided the entire period into three groups of 10 years each. Here also the last group contains only eight years. In the second table, we have considered the average of the entire period of 1991-2018.

In this section we will discuss the share of individual sectors first and then we will make a comparison among them.

Animal Sector:

The average share of intra-industry trade in animal sector was 32 percent during the first period of 1992-1996 which declined to only 4 percent during the last period of 2017-2018. During the second period of 1997-2001, the average share was 11 percent which was 20 percent less than the first period of 1992-1996. There was a slight increase in the

average share during 2002-2006 when the share was 14 percent. The share remained same at 14 percent as in 2002-2006 during 2007-2011. Then there was an average one percent decline in the share in 2012-2016 to 13 percent which further declined to 4 percent during the last period of 2017-2018 as mentioned earlier. Except for the first period of 19991-1995, the average share of intra industry trade in the animal sector was less than 15 percent.

Chemical Sector:

In chemical sector, the average share during the first period of 1992-1996 was 30 percent and during the last period of 2017-2018 was 32 percent i.e., a two percent increase. between the two extreme periods. But the maximum average share was observed during the period of 2002-2006 at 64 percent and the minimum average share was observed during the period of 2012-2016 when the average share was 25 percent. Looking at the trend of average share of intra industry trade during these six periods shows that there was increasing trend in share during the first three periods from 30 percent in 1992-1996 to 45 percent in 19996-2000 which further increased to 64 percent(maximum) during the period of 2001-2005. There was a fall in average share to 38 percent during the next period of 2007-2011 which further declined to 25 percent(minimum) during the 2012-2016 period. After that there was an average seven percent rise in the average share of intra-industry trade during the last period of 2017-2018. The share of intra industry trade was not less than 25 percent for the entire period.

Food products Sector:

In food products sector, the average share during 1992-1996 was 45 percent and it was 59 percent in 2017-2018. So, between these extreme periods there has been an increase in the average share by 14 percent. The minimum average share was observed during the period of 1997-2001 at an average share of 33 percent and maximum share was observed during 2012-2016 at 68 percent. Trend of the average share during these six periods shows that there was a fluctuation. The average share in 1992-1996 was 45 percent which declined to 33 percent(minimum) in 1997-2001. During 2001-2005, there was an increase of 20 percent in the share when the share of average intra- industry trade went to 53 percent. After that during the period of 2007-2011 average share was 40 percent which was 13 percent less than the previous period. During the next period of 2012-2016 the share shoots up to 68 percent (maximum), which was 28 percent more than the share of previous period. Again, in the last period of 2017-2018 the share was 59 percent which was 9 percent less than the previous period. So, the trend of the average share of intra industry trade in the food products sector fluctuated in each of these six periods. Except for the one period when the average share was less than 40 percent, percent on an average for entire period for the food product sector.

Footwear Sector:

In footwear sector the average share during 1992-1996 was 11 percent and it was 56 percent during 2017-2018. The highest share of intra – industry trade in this sector was 89 percent during 2007-2011 and lowest was 11 percent in 1992-1996. There was 78 percent difference between these two periods. Trend in the share average intra- industry trade in these six periods shows that the share increased from 1992-1996 till 2006- 2010. After that it declined during 2012-2016 and 2017-2018. The share increased from 11 percent (minimum) in 1992-1996 to 62 percent in 1997-2001, i.e., a difference of 51 percent. The share further increased to 69 percent in the next period of 2002-2006 and again to 89 percent(maximum) in 2007-2011. After that in the next period of 2012-2016, there was a 12 percent decline in the average share than the previous period i.e., the share come down from 89 percent to 77 percent during this period. Decline in the share continued during the period as well, when the share become 56 percent which was 21 percent less than the previous period. In this sector during this entire period, except for the first period of 1992-1996, the average share of intra industry trade was more than 50 percent and at one period it was around 90 percent. This is the sector which shows the tendency towards more intra industry trade than inter industry trade.

Fuel Sector:

In the fuel sector there was no intra- industry trade for the first two periods of 1992-1996 and 1997-2001. During 2001-2005, the share of intra- industry trade in this sector was only 13 percent and during 2017-2018 it was as high as 82 percent. The lowest average share of intra industry trade in this sector was zero percent during the first two periods and highest share was 82 percent during the last period of 2017-2018. The table shows that the average share of intra- industry trade had monotonically increased in every succeeding period. Except for the first two periods, the average share was 13 percent during 2001-2005, which was increased to 30 percent during 2007-2011. After that the share increased to 80 percent during 2012-2016. This was the highest inter-period increase in the share. During the last period of 2017-2018, the share was 82 percent(maximum) which was two percent more than previous period. Whereas interindustry trade was significant during the first three periods in this sector, but during the last two periods intra-industry trade was more important than the inter- industry trade as 80 percent or more or the trade in this sector was intra-industry in nature rather than inter- industry.

Hides and Skins Sector:

In the Hides and Skins sector, average share of intra-industry trade

during the first period of 1992-1996 was 67 percent whereas same was 53 percent during the last period of 2017-2018. The maximum share was exhibited during 2007-2011 when the share was 87 percent and minimum was registered during the last period of 2017-2018 with 53 percent of intra industry trade in this sector. The table shows that that there was no definite trend in the share of intra- industry trade between the period of 1992-1996 to 2007-2011. The share increased from 67 percent during 1992-1996 to 82 percent during 1997-2001. But in the next period of 2002-2006 it declined to 77 percent. Again during 2006 -2010 the share of intra industry trade increased to 87 percent (maximum). After this period the share continuously declined during the next two periods of 2012-2016 and 2017-2018. Their respective shares were 76 percent and 53 percent (minimum). Even though there was no definite trend in the share of intra-industry trade in this sector but during all the six periods the share of intra industry trade was more than 50 percent in this sector. This means that intra-industry trade is more significant for this sector than inter industry trade.

Machinery and Electrical Sector:

In Machinery and Electrical sector, average share of intra industry trade during first period of 1992-1996 was 24 percent and during the last period of 2017-2018 was only 6 percent. There was a huge decline in the share from first period to last period. In this sector the share of intra-industry trade was maximum in the first period of 1992-1996 with 24 percent and minimum was during the last three periods of 2007-2011, 2012-2016, and 2017-2018 with an average share of 6 percent each. The table shows a declining trend of average share in this sector from the period of 1992-1996 up to the period of 2007-2011 and after that the share remained stagnant at 6 percent for the next two periods. As the highest share of intra-industry trade in this sector was only 24 percent and lowest was 6 percent, this sector is predominantly based on inter-industry trade with insignificant share of intra-industry trade.

Metal Sector:

In metals sector, average share of intra industry trade during 1992-1996 was 61 percent and during it was 43 percent during the last period of 2017-2018. There was a difference of 18 percent between these two extreme periods. The highest share of intra-industry trade in this sector was achieved during 2012-2016 at 68 percent and lowest during the period of 19962000 at 41 percent. There was no period-to-period definite trend in the share of intra-industry trade in this sector. From 61 percent in 1992-1996, the share declined to 41 percent during 1997-2001 after that in 2002-2006 there was a rise in share to again 61 percent. The share again declined from 61 percent to 58 percent in 2006-2011. There was again arise in the share to 68 percent (maximum) during 2012-2016. In the period of 2017-2018, there was a

huge decline in the share from previous period to 43 percent i.e., a fall in share by 25 percent. In this sector, both intra-industry trade and inter-industry trade are equally important.

Minerals Sector:

In minerals sector, during the first period of 1992-1996 the share of intra-industry trade was 33 percent and during the last period it was 15 percent which was more than half of the share of first period. The highest share of intra-industry trade in this sector was 38 percent and lowest share was only 5 percent. The share increased from 33 percent during 19911995 to 38 percent during 1997-2001. The share declined for the two consecutive periods of 2002-2006 and 2007-2011 at 21 percent and 5 percent respectively. Then in the next two consecutive periods it rose from 5 percent to 13 percent during 2012-2016 and to 15 percent during 2017-2018. So, for the entire period the share of intra industry trade is less than 40 percent which means that trade in this sector is predominantly inter industry in nature than intra-industry trade.

Miscellaneous Sector:

In miscellaneous sector, the share of intra-industry trade was only 3 percent during the first period of 1992-1996 and it was 10 percent during 2017-2018. The share was maximum during 2002-2006 at 29 percent and it was minimum during the first period of 1992-1996 at 3 percent. The trend shows that the share increased for first three periods from 3 percent (minimum) to 14 percent between first two periods of 1992-1996 to 1997-2001 and from 14 percent to 29 percent (maximum) between 1997-2001 to 2001-2005. After that the share declined to 12 percent during 2007-2011 and further to 7 percent during 2012-2016. There was a slight increase in the share during the last period of 2017-2018 at 10 percent. The table shows that the share of intra -industry trade was less than 15 percent for most of the periods except for the period of 2002-2006 when the share was 29 percent. This shows that the nature of trade in this sector is also predominantly inter industry rather than intra industry.

Plastic and Rubber Sector:

In Plastic or Rubber sector, share of intra-industry trade during the first period of 1992-1996 and the last period of 2017-2018 were respectively 43 percent and 34 percent. This means that there was a difference of 9 percent share of intra -industry trade between the two periods in this sector. Highest average share was registered during 2007-2011 at 59 percent and the share was lowest during the last period of 2017-2018 at 34 percent. This shows that there was a huge gap of 25 percent between the highest and lowest average share of interindustry trade. The table shows that there was an increasing tendency of intra-industry trade in this sector from the period of 1992-1996 to 2007-2011. Whereas the average share was

43 percent during 1992-1996, it increased to 46 percent during 1996-1998 which further increased to 48 percent during 2002-2006 period and continued to increase during 2007-2011 at 59 percent (maximum). After reaching the highest during 2007-2011, the share declined to 49 percent during 2012-2016, a difference of 10 percent than previous period. The average share further declined and reached 34 percent (minimum) during the last period of 2017-2018. This sector can be identified to have a significant share of intra-industry trade even though during most of the period the share was less than 50 percent.

Stone and Glass Sector:

In the stone and glass sector, 50 percent of trade was intra-industry in nature during the first period of 1992-1996 and it was only 22 percent during the last period of 2017-2018. There was a decline of 28 percent in the average share of intra-industry trade between these two periods in this sector. A comparison of different period shows that the share was maximum during the period of 1997-2001 at 70 percent and it was minimum during the period of 2012-2016 at 19 percent. This means that the gap between the highest and lowest share was as high as 51 percent. The trend shows that there was a fluctuation in the share of intra-industry trade in each period i.e., the share increased at one period and declined in the immediate next period. The share increased from 50 percent in 991-1995 to 70 percent (maximum) during 1997-2001. In the next period of 2001-2006 there was a sharp decline in the share to 20 percent. After increasing to 40 percent in the next period of 2007-2011, it again declined to 19 percent (minimum) during 2012-2016. There was a slight increase in the share during the final period of 2017-2018 to 22 percent which was 3 percent higher than previous period. The share of intra-industry trade in this sector was 50 percent and more for the first two periods but it was 40 percent and less for the rest of the periods. It shows that even though the share of intra-industry trade was significant at the early periods but gradually its importance declined in this sector, and it became a sector predominantly based on inter-industry trade afterwards.

Textiles and Clothing Sector:

In Textiles and Clothing sector also, there was a huge gap between the average share of intra-industry trade during the first period of 1992-1996 and the last period of 2017-2018. Whereas the share was 24 percent during the first period, it was as high as 74 percent during the last period. This means that there was a difference of 50 percent between these two periods in the average share of intra-industry trade. The sector was more interindustry based during the first period, and it was intra-industry based during the last period. The highest share was 81 percent which was registered during 2012-2016 and lowest was 24 percent which

was registered during the first period of 1992-1996. Except for the two period of 1992-1996 and 2001-2005, the sector registered an average share of more than 70 percent in every other periods. From 24 percent during 1992-1996 share increased to 71 percent during 1997-2001, which was 47 percent more than previous period. Then there was a decline in the share during the next period to 43 percent. During 2007-2011 share again rise to 79 percent and there was an increase of other two percent in the share to 81 percent (maximum) during the next period of 2012-2016. And finally, during the last period of 2017-2018 the average share was 74 percent which was 7 percent short of the share of previous period. So, except for first period and third period , the share of intra-industry trade in this sector was more than 70 percent so the trade in this sector may be considered to be intra-industry based rather than inter-industry based.

Transportation Sector:

In Transportation sector also the gap of share of intra-industry trade between the first period and last period was wide. The share declined from 42 percent during the first period to as low as 8 percent during the last period. The table shows that the highest share in this sector was registered during 2002-2006 period at 53 percent and lowest share of 8 percent was registered during two different periods of 2006 -2010 and 2017-2018. The trend in the share shows that share remained same at 42 percent during the first two periods of 1992-1996 and 1997-2001. In the next period of 2001-2005, there was an increase in the share to 53 percent (maximum) . There was a huge decline in the share during the period of 2007-2011 to 8 percent (maximum) i.e., a fall of 45 percent share compared to previous period. The share increased to 19 percent during the next period of 2012-2016. But again, it declined to 8 percent during the final period of 2017-2018. So, there was significant share of intra-industry trade in this sector during the first three periods but after that the sector became predominantly interindustry in nature.

Vegetable Sector:

In Vegetable sector, during the first period of 1992-1996, the average share of intra-industry trade was significant 44 percent which rose to 64 percent during the last period of 2017-2018. So, between these two periods there was a 20 percent increase in the share of intra-industry trade. In this sector, the highest share was registered during the period of 2002-2006 at 75 percent and lowest was at 44 percent during the first period of 1992-1996. There was a rising trend in the share of intra-industry trade for the first three periods in this sector from 44 percent during 1992-1996 to 65 percent during 1997-2001 to 75 percent (maximum) during 2001-2005. But the share declined for the next two periods. The share was 72 percent during 2007-2011, which was 3 percent less than previous period which further

declined to 60 percent during 2012-2016, which was 12 percent less than previous period. There was a slight rise in share to percent during the last period of 2017-2018, which was 4 percent more than previous period. This sector on the basis of our discussion can be considered as a sector predominantly based on intra-industry trade where the average share of intra-industry trade was 60 percent and more in every period except for the first period when the share was 42 percent.

Wood Sector:

It was insignificant for every period except for the period of 1997-2001 when the share was 38 percent. The share during the first period of 1992-1996 was 6 percent whereas same for the last period of 2017-2018 was 19 percent. As far as highest share is concerned it was registered during the period of 1997-2001 as mentioned earlier at 38 percent . Similarly, the lowest share was registered during the period of 2007-2011 at meagre 2 percent. So, there was a difference of 36 percent between the maximum share and the minimum share. The trend in the share shows that the share increased from 6 percent to 38 percent (maximum) between 1992-1996 to 1997-2001. But there was a significant decline in the share to 14 percent during 2001-2005. The share further declined during the next period and reach its lowest at 2 percent (minimum). The period of 2012-2016 showed a little improvement in the share from previous period to 7 percent which further improved to 19 percent during the last period of 2017-2018. Even though there was improvement in the share of intra-industry trade during the last three periods, but value was not significant. Expect for the period of 1997-2001 when the share was 38 percent, in every other periods the share was less than 20 percent which includes the three periods where the share was less than 10 percent. So, this sector can be considered to be predominantly interindustry based sector where most of the trade was inter-industry in nature rather than intra-industry.

4.4.3 Comparing Shares of HIIT and VIIT in terms of sectors for the period 1996-2018:

In this section we discuss the distribution of HIIT and VIIT among the different sectors in percentage terms. The table above shows the percentage of sectors that exhibited either HIIT or VIIT. It shows that during the period of 1996 -2018, India China intra-industry trade was dominated by VIIT, as the percentage of sectors exhibiting VIIT was higher than that exhibiting HIIT during the period. The table shows that the percentage of sectors exhibiting VIIT range from 80 percent to 100 percent whereas the percentage of sectors exhibiting HIIT range from 0 percent to 20 percent during the period. So as compared to sectors exhibiting VIIT, the sectors exhibiting HIIT were relatively insignificant.

Table 4.5: Shares of HIIT and VIIT (with α = .15)

Year	HIIT	VIIT	Year	HIIT	VIIT
1996	13.33	86.67	**2008**	12.50	87.50
1997	20.00	80.00	**2009**	12.50	87.50
1998	20.00	80.00	**2010**	12.50	87.50
1999	18.75	81.25	**2011**	0.00	100
2000	0.00	100.00	**2012**	6.25	93.75
2001	6.67	93.33	**2013**	12.50	87.50
2002	6.25	93.75	**2014**	6.25	93.75
2003	0.00	100.00	**2015**	12.50	87.50
2004	6.25	93.75	**2016**	12.50	87.50
2005	6.25	93.75	**2017**	0.00	100.00
2006	6.25	93.75	**2018**	18.75	81.25
2007	12.50	87.50			

Author's calculation:
Data source: Export Import Data Bank of Ministry of Commerce, India

The table also shows that the share of sectors exhibiting HIIT and that exhibiting VIIT remained same for most of the years. In 1997 and 1998, share of sectors exhibiting VIIT was 80 percent and that exhibiting HIIT was 20 percent. Similarly, from 2004-2006, the share of sectors with HIIT was 6.25 percent and that with VIIT was 93.75 percent. Again from 2007 – 2010, shares of sectors with HIIT were 12.5 percent and that with VIIT was 87.5 percent. Same thing happened during 2015-2016 as well when share of sectors with HIIT was 12.5 percent and that with VIIT was 87.5 percent. There were four occasions during the period when all the sectors exhibited VIIT. These were: 2000, 2003, 2011, and 2017

We will now discuss the trend in these two types of IIT during the period. Since total number of sectors are fixed at sixteen, so the number of sectors that exhibit VIIT cannot exhibit HIIT and vice versa so rise in the percentage of sectors exhibiting VIIT (HIIT) also means declining in the percentages of sectors exhibiting HIIT (VIIT). The maximum value either of VIIT or HIIT can take is 100 percent and minimum is 0 percent. So, if in any year VIIT(HIIT) is exhibited by 100 percent of sectors then this also means HIIT(VIIT) is exhibited by 0 percent of sectors. This means that if we discuss the trend of percentage of sectors exhibiting HIIT(VIIT) we automatically know the trend in percentage of sectors exhibiting VIIT(HIIT). So, with this logic in mind we discuss trend of percentage of sectors exhibiting VIIT for the given period of 1996-2018.

The percentage of sectors exhibiting VIIT in 1996 was 86.67 percent which declined to 80 percent in 1997 and this percentage continued in 1998 as well. In 1999, there was a slight increase in the percentage of sectors to 81.25. In 2000, 100 percent of the

sectors exhibited VIIT. There was decline in the percentage of sectors exhibiting VIIT to 93.33 percent in 2001 but after that it increased continuously for next two years to 93.75 percent and further to 100 percent again in 2003. In 2004 it declined to 93,75 percent and it continued for next two years of 2005 and 2006. In other words, the percentage of sectors exhibiting VIIT remain same at 93.75 percent continuously for three years. After that there was decline in the percentage to 87.5. This percentage continued for another three years from 2008 to 2010.

Then in 2011, again 100 percent of the sectors exhibited VIIT. After that there was a continuous decline of percentage of sectors exhibiting VIIT to 93.75 percent and further to 87.5 percent. The percentage of sectors again reached 93.75 percent in 2014 only to decline again in 2015 to 87.5 percent. There was no change in percent of sectors exhibiting VIIT in 2016. In 2017, again for the last time in the period 100 percent of the sectors exhibited VIIT. After that in final year of the period there was a decline in the percentage of sectors exhibiting VIIT to 81.25 percent.

During this period, the percentage of sectors exhibiting VIIT showed both declining trend as well as rising trend and in majority of years it remained constant. But the percentage of sectors exhibiting VIIT during this period never fall below 80 percent. In every year of the period the percentage was either 80 percent or more. Opposite is true for percentage of sectors exhibiting HIIT. During this period the percentage of sectors exhibiting HIIT was either 20 percent or below that. It never exceeded 20 percent mark. This clearly indicates that VIIT was more dominant in most of the sector in most of the years than HIIT in the context of India China intra-industry trade.

So, based on this discussion it is clear that India's IIT with China during the period of 1996-2018 was predominantly VIIT rather than HIIT.

VIIT can also be divided into low VIIT and high VIIT. In the next section we will discuss the prevalence of these two types of VIIT and find out which type is more dominant.

4.4.4 Comparing the shares of VIITH AND VIITL (1996-2018):

In this final section we have further discussed the components of VIIT viz. high VIIT and low VIIT to find out which type of VIIT was more dominant in India China intra -industry trade. In the table the percentages are the percentage of sectors that exhibited either high VIIT or low VIIT. The table shows that from 1996 to 2005, among the sectors that exhibited VIIT, majority were exhibiting low VIIT. Similarly, the situation reversed after 2006 when majority of sectors exhibiting VIIT were exhibiting high VIIT. Let us consider first the trend during 1996-2005 and then discuss the trend during 2006 -2018.

Table 4.6: Share of VIITH and VIITL in Total VIIT

Year	VIITH	VIITL	Year	VIITH	VIITL
1996	30.77	69.23	**2008**	57.14	42.86
1997	41.67	58.33	**2009**	64.29	35.71
1998	33.33	66.67	**2010**	64.29	35.71
1999	38.46	61.54	**2011**	62.50	37.50
2000	37.50	62.50	**2012**	60.00	40.00
2001	42.86	57.14	**2013**	71.43	28.57
2002	33.33	66.67	**2014**	66.67	33.33
2003	43.75	56.25	**2015**	64.29	35.71
2004	40.00	60.00	**2016**	64.29	35.71
2005	46.67	53.33	**2017**	62.50	37.50
2006	60.00	40.00	**2018**	61.54	38.46
2007	64.29	35.71			

Author's calculation

Data source: Export Import Data Bank of Ministry of Commerce, India

From 1996 to 2005 the percentage of sectors exhibiting either high VIIT or low VIIT continuously fluctuated. In 1996 the percentage of sectors with high VIIT was 30.77 and that of sectors with low VIIT was 69.23 percent. In 1997, there was an improvement in the percentage of sectors with high VIIT to 41.67 percent leading to decline in the percentage of sectors exhibiting low VIIT to 58.33 percent. In the next year of 1998 the percentage of sectors exhibiting high VIIT again declined to 33.33 percent leading to increase in the percentage of sectors exhibiting low VIIT to 66.67 percent. As the fluctuation continued, again in 1999, the percentage of sectors exhibiting high VIIT increased to 38.46 percent and those exhibiting low VIIT declined to 61.54 percent. The sectors exhibiting high VIIT again decline to 37.5 percent in 2000 leading to increase in the percentage of sectors exhibiting low VIIT to 62.5 percent. Again, after declining in 2000, the percentage of sectors exhibiting high VIIT again increased to 42.86 percent and those exhibiting low VIIT declined to 57.14 percent. As fluctuation continues, no change in the trend observed in 2002. In this year also sectors exhibiting high VIIT declined to 33.33 percent and that of low VIIT increased to 66.67 percent. In 2003, the percentage of sectors with high VIIT increased to 43.75 percent and that of low VIIT declined to 56.25 percent. In 2004 the percentage of sectors with high VIIT again declined to 40 percent and percentage of sectors with low VIIT increased to 60 percent. After declining in 2004 percentage of sectors with high VIIT again increased to 46.67 percent causing the

percentage of sectors with low VIIT to decline.

So, during the period between 1996 to 2005 the percentage of sectors exhibiting low VIIT were dominant relative to those exhibiting high VIIT. 69.23 percent in 1996 was the highest and 53.33 percent in 2005 was the lowest percentage of sectors exhibiting low VIIT during the period between 1996 -2005. Similarly, 46.67 percent was the highest and 30.77 percent was the lowest percentage of sectors exhibiting high VIIT during the same period. So, it is clear from this that during the period between 1996-2005 low VIIT was dominant as it was exhibited by majority of the sectors.

Now let us consider the trend in percentage of sectors exhibiting high VIIT and low VIIT from 2006-2018. In 2006, there was increase in the percentage of sectors exhibiting high VIIT to 60 percent and decline in the percentage of sectors exhibiting low VIIT to 40 percent. So, in 2006, percentage of sectors with high VIIT dominated the sectors with low VIIT and this trend continued throughout. In 2007 there was further increase in the percentage of sectors exhibiting high VIIT to 64.29 leading to further decline in percentage of low VIIT exhibiting sectors to 35.71 percent. But in 2008, there was declined in the percentage of sectors with high VIIT resulting in improvement in the percentage of sectors exhibiting low VIIT to 42.86 percent. After declining in 2008, the percentage of sectors exhibiting high VIIT again increased to 64.29 percent and continued with same percentage in 2010 as well. This results in decline in the percentage of sectors exhibiting low VIIT to 35.71 percent and it also continued in next year of 2010. So, there was no change in the share in 2010.

There was continuous decline in the percentage of sectors exhibiting high VIIT for next two years to 62.5 percent in 2011 and further to 60 percent in 2012 leading to continuous improvement in the percentage of sectors exhibiting low VIIT to 37.5 percent in 2011 and further to 40 percent in 2012. After declining in 2011 and 2012, the percentage of sectors exhibiting high VIIT again increased significantly to 71.43 percent resulting in significant decline in the percentage of sectors exhibiting low VIIT to 28.57 percent. In 2014, the percentage of sectors exhibiting high VIIT declined to 66.67 percent and further to 64.29 percent in 2015 and continued with same percentage of 64.29 percent in 2016 and after that it continuously declined for next two years to 62.5 percent in 2017 and further to 61.54 percent in 2018.

On the contrary, the percentage of sectors exhibiting low VIIT increased to 33.33 percent in 2014 and further to 35.71 percent in 2015 and remained at that level in 2016 the increased continuously for next two years to 37.5 percent in 2017 and further to 38.46 percent in 2018. So, during this period between 2006-2018, high VIIT was exhibited by

majority of the sectors among the sectors exhibiting VIIT in each and every year. The highest percentage of sectors exhibiting high VIIT was 71.43 percent and lowest percentage was 57.14 percent during this period. On the other hand , highest percentage of sectors exhibiting low VIIT was 42.86 percent and lowest percentage was 28.57 percent during this period.

So, from this discussion we come to the conclusion that both high and low VIIT were dominant but at different periods. Whereas high VIIT was dominant during the early period of 1996-2005 and low VIIT was dominant during the later period of 2006-2018. The maximum percent of sectors exhibiting high VIIT throughout the period from 1996-2018 was 71.43 and minimum was 30.77. Similarly, maximum percentage of sectors exhibiting low VIIT throughout was 69.23 percent and minimum percentage was 28.57 percent. Both maximum percentage and minimum percentage of sectors exhibiting high VIIT was higher than those exhibiting low VIIT. Not only that but in terms of number of years also high VIIT was dominant. The number of years when majority of the sectors exhibited high VIIT was 13 out of 23 and in the rest 10 years majority of the sectors exhibited low VIIT. So, we can conclude that even though both high and low VIIT dominated different phases of the period, but high VIIT was relatively more dominant than low VIIT in terms of duration.

Five Year Average percentage of sectors with VIITH and VIITL:

We can also discuss them by dividing the entire period into five sub periods. In the table four sub periods had five years each and fifth one has three years. The table shows that low VIIT was dominant in two continuous period of 1997-2001 and 2001-2005. During these two period the average percentage of sectors exhibiting low VIIT were 63.65 percent and 58.68 percent respectively. Similarly, during these two periods the percentage of sectors exhibiting high VIIT were 36.35 percent and 41.32 percent respectively. So, during these two sub periods the percentage of sectors exhibiting low VIIT had declined from average 63.65 percent to 58.68 percent and the percentage of sectors exhibiting high VIIT increased from average 36.35 percent in 1997-2001 to average 41.32 percent.

Table 4.7: Five Year Average Percentage of Sectors with VIITH and VIITL

TYPE/YEAR	1996 -2000	2001-2005	2006- 2010	2011 - 2015	2017-2018
VIITH	36.35	41.32	62.00	64.98	62.77
VIITL	63.65	58.68	38.00	35.02	37.23

Author's calculation

Data source: Export Import Data Bank of Ministry of Commerce, India

Even though the percentage of sectors exhibiting low VIIT declined but its share was more than 50 percent, so it was dominant against the other. The three periods from 2007-2011 to 2017-2018 showed that the percentage of sectors exhibiting high VIIT dominated

these three sub periods. In 2007-2011 its average percentage increased to 62 percent and further 64.98 percent in 20111-2015 but declined to 62.77 percent in 2017-2018. Similarly, the percentage of sectors exhibiting low VIIT declined significantly to average 38 percent in 2007-2011 and further to average 35.02 percent and it increased to 37.23 in the final period of 2017-2018. So, the high VIIT was more dominant than low VIIT as it dominated more periods than low VIIT. Whereas low VIIT dominates first two periods, but high VIIT dominates last three periods even though the last period had only three years.

Conclusion:

In this chapter we discussed various aspects of intra-industry trade between India and China for the given period of 1992-1018. First thing that we found in this discussion was that the share of Intra- industry trade was less than that of inter industry trade throughout the period. In other words, the share of intra-industry trade was less than 50 percent of the total trade during the given period. It was between 20 percent to 35 percent in most of the years during this period. This means that the intra industry trade between India and China was not very low rather it was moderate. Next, we discussed the intra- industry trade in each sector for the sixteen sectors. Here, we considered the average share for five-year period. The analysis showed that there was variation in the share of intra-industry trade in these sectors. Some sectors had high average share, and some had low average share. The sectors of Hides and Skins and Vegetables had more than 50 percent average share throughout. On the other hand, the shares in the sectors of Animal, Minerals, and Machinery and Electricals were less than 50 percent throughout. In sectors of Chemicals, Metals, and Stone and Glass, the share varied between less than 50 percent to more than 50 percent from period to period. In other words, the share of intra-industry trade not only varied among these sectors, but variation was also observed in same sectors at different periods of time. After that we

Another thing that we analysed in this chapter was the share of HIIT and VIIT. Here we found that the percentage of sectors exhibiting VIIT was much higher than the sectors exhibiting HIIT throughout the period. This means that intra- industry trade between India and China was VIIT dominated rather than HIIT. After that, we analysed the shares of VIITH and VIITL, which are the two types of VIIT. Here, we found that VIITL dominated the sectors exhibiting VIIT from 1996-2005 and from 2006-2018 VIITH was dominant. As the sixteen sectors that we had considered for this analysis exhibited both HIIT and VIIT (VIITH or VIITL) at different years of the given period, for our final analysis we discussed what type of IIT was exhibited by each of these sectors. For this analysis we had divided the entire period between 1997-2001 into four sub periods of five year each and one period of three years. Here we found that among the sixteen sectors, there was not a single sector which exhibited HIIT for entire period of five years in any of the periods. On the other hand, many sectors

exhibited VIIT for entire years of the period. This includes the exhibition of both VIITH and VIITL in all the five years of particular period. Along with this we also found that some sectors exhibited both VIIT and HIIT in different years of a particular sub period. Not only that but some sectors also exhibited VIITH and VIITL in different years of a particular period.

In conclusion, we can say that India had moderate intra-industry trade with China and the nature of IIT between these two countries was dominated by VIIT rather than HIIT. This result confirms the conclusions of studies by Veeramani (1999) where VIIT was found to be the dominant type of India's IIT. As far as the types of VIIT is concerned, even though in the former years of the period VIITL was dominant but in the latter years, VIITH was dominant.

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Chapter 05- An Analysis of Long-run Relationship Between India's Import and Export with China – A Cointegration Approach

5.1 Introduction:

India has persistent trade deficit with China. If this trade deficit is unsustainable, then this will have negative impact on Indian economy. What is desirable for India is sustainability in trade deficit. This sustainability in trade deficit is ensured by long run equilibrium relationship between imports and exports. Over the years the study of long- run equilibrium relationship between the exports and imports of a country is one of the most important studies in international economics. This study can be overall exports and imports of the country in the world, or it can be a relationship between exports and imports of a country with a specific country or a specific region.

In this chapter we intend to analyze the long run relationship between the exports of India to and its import from China. The objective of our analysis is to find out whether there exists a long run equilibrium relationship between India's exports to and imports from China.

The rest of the chapter is organized as follows: In section 5.2 we will make a review of relevant literatures. It is followed by section 5.3 where we discuss the data and methodology used in our study. After that in section 5.4 we present the results and interpretation of our study and finally we have conclusion in section 5.5.

5.2 Review of Literature:

For our study we have reviewed two types of relevant literatures which has been divided here into two groups. The first group contains the literatures related to various aspects of relationship between exports and imports. And in the second group we have literatures related to various aspects of relationship between exports and imports of India. Let us start with the first group:

A. Studies related to relationship between exports and imports:

S. Husted (1992) made an important study on the long run equilibrium relationship between exports and imports of United States. This study was based on the quarterly data from 1969-1989. The study found that there was cointegrating relationship between exports and imports of United States. According to him the existence of cointegrating relationship between exports and imports implies that country does not violate their

intertemporal budget constraint. The findings of this study support the effectiveness of macroeconomic policies in restoring long -run equilibrium

A. C Arize (2002), examined the cointegration relationship between exports and imports for 50 countries. For this he used quarterly data of respective countries for the period between second quarter of 1973 to first quarter of 1998. Using various econometric techniques, he inferred that out of 50 countries there were 35 countries which exhibited cointegration relationship between their respective exports and imports. He also found that out of these 35 countries 31 of them had positive export coefficient. On the basis of this study, he further concludes that countries in the regions of the Middle East, Latin America, and Europe as compared to other regions had more unstable cointegrating relations.

M. Bahmani-Oskooee (1994), studied the effectiveness of macroeconomic policies of Australia by investigating the long run relation between Australian import and exports. Australia's exports and imports were found to be cointegrated with cointegrating coefficient close to one. On the basis of this result, he concluded that Australia's macroeconomic policies are effective.

M. Bahmani-Oskooee & H. J Rhee (1997)

S Fountas & L Wu (1999) examined the long- run relationship between exports and imports of United States. For this study they used quarterly data for the period of 1967-1994. This study concludes that there exists no long- run cointegrating relationship exists between exports and imports of United States during the stud period.

P. K Narayan & S Narayan (2004) studied the long- run equilibrium relationship between exports and imports of two Pacific Island countries – Fiji and Papua New Guinea. The data used for Fiji was annual data between 1960-2000 and for Papua New Guinea was annual data between 1960-1998. Their study found cointegration relationship between exports and imports for both the countries.

P. K Narayan & S Narayan (2005), again in their study investigated the long run equilibrium relationship between exports and imports of 22 LDC countries mostly from Africa. The data used for this study was for the period of 1960-2000 for 15 countries, 1965-2000 for 1 country, 1967-2000 for 1 country, 1968-2000 for 1 country, 1970-2000 for 3 countries and data was not specified for 1 country. The result of their study shows that out of 22 LDCs, 16 countries show no cointegration relationship between their respective exports and imports and only 6 LDCs showed the evidence of the cointegration relationship between their respective exports and imports.

T Mukhtar and S Rasheed (2010) examined the long run equilibrium relationship between exports and imports of Pakistan. For this purpose, they used the quarterly data for the period between 1972 – 2006. On the basis of this study, they conclude that there exists a long run cointegration between exports and imports of Pakistan for the study period.

M. Z. Rahman (2011) examined the long-run equilibrium relationship between exports and imports for two ASEAN countries viz. Indonesia and Malaysia with 45 years annual data. This study concludes that cointegration between exports and imports exists only in case of Malaysia and no cointegration was found in case of Indonesia. For this analysis the author used Engel – Granger as well as Johanson cointegration test.

M. A Babatunde 2014), studied the long-run equilibrium relationship between exports and imports of Nigeria. This study was based on the annual data for the period between 1960 and 2013. This study found that there was a cointegrating relationship between exports and imports and cointegrating coefficient was found to be close to unity which implies that the country's macroeconomic policies were effective in stabilizing long- run relationship between exports and imports of the country.

B. Studies related to India:

M. Upendra (2007), in his study examined the long -run equilibrium relationship between India's exports and imports for the period between 1949-50 to 2004-05. This study found cointegration between India's exports and imports during the study period. According to this study, on the one hand the elasticity of India's exports relative to its imports was found to be greater than unity implying that with the increase in imports, the ratio of exports to imports keeps increasing. On the other hand, the elasticity of India's imports relative to exports was found to be less than unity implying that with the increase in imports the ratio of imports to exports keeps decreasing. According to this study the economic reforms which was initiated since 1992 was ineffective in correcting the disequilibrium during the post reform period.

L Konya and J. P Singh (2008) also investigated the equilibrium relation between exports and imports with the data between the same period from 1949-50 to 2004-05. For this purpose, they transformed both the variables in their natural logarithm form. Unlike the previous study, their study found that there was no cointegration between India's exports and imports during the study period and they concluded that India's macroeconomic policies were not effective in bringing India's exports and imports in equilibrium and India was in violation of her international budget constraint.

N Sohrabji, (2010), in his study of the sustainability of India's current account position during the post reform period found that there exists a cointegrating relationship between India's exports and imports. The author concludes that there has been an improvement in India's trade pattern. According to him, India's current account was sustainable during the study period despite India was experiencing trade deficit during that period.

A Tiwari (2010) examined the long run sustainability of India's trade deficit. The monthly data for the study considered was form April-1984-85 to March-2009-102. This study concludes that there was cointegration between India's exports and imports and India's macroeconomic policies were effective in facilitating India's exports and imports towards their long-run equilibrium .

A. K Tiwari (2011) investigated the long run relationship between exports and imports of India and China. This study was based on monthly data from January 1992 to February 2010. This study on the basis of Gregory-Hansen cointegration test found that exports and imports were cointegrated for India but not cointegrated for China. Again, cointegration result based on Saikkonen and Lütkepohl test shows that exports and imports of both India and China are cointegrated. On the basis of these results, author concludes that India's macroeconomic policies were strongly effective for long- run equilibrium relationship of its exports and imports.

M. J Holmes, T Panagiotidis, & A. Sharma. (2011), examined India's current account sustainability which requires the cointegration between exports and imports. This study was conducted with the annual data for the period between 1950-2003. According to this study the results were different for two different periods. It shows that India's exports and imports were cointegrated after 1991 and they were found to be not cointegrated during the period before 1991. This means that India's current account were unsustainable prior to 1991 and it became sustainable only after 1991.

M. Sahoo, M.S, Babu, & U Dash (2016)., made a study on long run sustainability of current accounts of India and China by examining the long-run relationship between exports and imports of respective countries. This study was based on annual data from 1980-2014. This study found that exports and imports of China were cointegrated, so its long run current account was sustainable but same is not true for India as results show that India's exports and imports were not cointegrated. This result is just opposite of the results of the study of A. K Tiwari (2011). This may be due to use of different cointegration test or different time period or something else.

5.3 Data and Methodology:

In this study we have analyzed the relationship between India's exports and imports with China for the period between 1996-2018. The frequency of the time series data for both the variables are quarterly in nature. Our period starts from second quarter of 1996 and ends at 4th quarter of 2018. The source of the data that has been used in this study is the repository of Federal Bank of St. Louis, USA. Data for both the variables has been transformed to their logarithmic form. This is important because logarithmic transformations reduces both skewness and heteroscedasticity in variables (Gujarati & Porter, 2009) .

We have used the Engel and Granger (1987) two step procedure of cointegration for this study. But before using this method, we have to ensure the stationarity of the given variables by finding their order of integration. A non- stationary process is integrated of order 1 or above whereas a stationary process is integrated of order 0 written as I(0). As far as stationarity is concerned "a stochastic process is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed" (Gujarati and Porter, 2009).

5.4 Results and Interpretations:

i) Unit Root Test:

This test is important to find out whether the variables considered are stationary or . To find out the presence of unit root in our variables we used Augmented Dickey Fuller test. The hypothesis for this test is

H_0 = The variable contains unit root at level

H_1 = The variable does not contain unit root at level

The result of the test is presented in table 5.1.

Table 5.1: Unit Root Test for lx_t and lm_t

Variables	Level	p-value	1st Difference	p-value
lx_t	-1.517	0.5250	-10.070	0.01486
lm_t	-1.403	0.5808	-10.280	0.00

The Dickey-Fuller test shows that , for both the variables i.e., Log_Import denoted by lm_t and Log_Exports denoted by lx_t the test statistics were not significant at level, so we accept the null hypothesis that both lm_t and lx_t contains unit root at level . Then again, we conducted the unit root test for both the variables but at their first differences. In this case we found that the test statistics for both the variables were significant

as shown in Table 5.1. This means that , at their first differences both the variables are stationary. Thus, we conclude that both the variables were I(1) at level and I(0) at first difference.

After testing the stationarity of both the variables now we will go for co-integration test. For cointegration test we have applied two step Engel Granger Test for Cointegration (1987). It is as follows:

ii) Two Step Engel Granger Test for Cointegration:

First, we estimate the cointegration regression equation given by

$$lx_t = \beta_1 + \beta_2 lm_t + \varepsilon_t \qquad (1)$$

The table below gives the estimation of cointegration regression

Table 5.2: Estimation of Cointegration Regression

lx_t	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval)	
lm_t	0.769757	0.025126	30.64	0	0.719832	0.819681
_cons |	0.861916	0.205403	4.2	0	0.453785	1.27004

Note: lx_t is dependent and lm_t is independent

The Table 5.2 shows the estimation of cointegration regression which is nothing but the ordinary least square regression between lx_t and lm_t where lx_t is the dependent and lm_t is the independent variable. After estimating the cointegration regression we will estimate to order of integration of error term, or we will find out the stationarity of error term. We take the following hypothesis for testing the order of integration or error term or the determine the unit root in error term.

H_0 = The error term contains unit root at level

H_1 = The error term does not contain unit root at level.

Table 5.3: **Unit Root Test for Error Term**

parameter	coefficient	Table value*		
		(1%)	(5%)	(10%)
ε	-4.043**	-4.021	-3.405	-3.092

Note: *Mackinnon (1991); ** Significant at 1%

The result of the unit root test on error term is presented in Table 5.3. It shows that the calculated value (absolute) is higher than the tabulated value at 1% so we reject

the null hypothesis that the error term contains unit root. This means that there exists a long run relationship between lx_t and lm_t . In other words, the two variables are co -integrated.

Now, following the Granger Representation Theorem (GRT) which states that, if two variables are cointegrated the relationship between the two can be expressed as Error Correction Model, we now consider the Error Correction Model.

iii) Error Correction Model:

The ECM model is the short- run dynamics of the model. This model only includes I(0) variables. So, all our non-stationary variables are required to first differenced to produce I(0) or stationary variables. In this model we will incorporate error correction term (ECT). ECT are nothing but one- period lagged residual of long run equation (5.1). It is derived as follows:

$$e_{t-1} = lx_t - \beta_0 - \beta_1 lm_{t-1} \qquad (5.2)$$

After differencing lx_t and lm_t

$$\Delta lx_t = \beta_0 + \beta_1 \Delta lm_t + \beta_2 e_{t-1} + v_t \qquad (5.3)$$

Combining (5.2) and (5.3) we get

$$\Delta lx_t = \beta_0 + \beta_1 \Delta\, lm_t + \beta_2 (lx_t - \beta_0 - \beta_1 lm_{t-1}) + v_t \qquad (4)$$

The equation (4) is the Error Correction Model.

Table 5.4: **Estimation of Error Correction Model**

Source	**SS**	**df**	**MS**	**Number of obs**	90
Model	0.75629	2	0.378145	**F(2 , 87)**	4.84
Residual	6.792481	87	0.078074	**Prob> F**	0.0101
Total	7.548771	89	0.084818	**R-squared**	0.1002
				Adj R -squared	0.0795
				Root MSE	0.27942

D. lx_t	**Coef.**	**Std. Err.**	**t**	**P>|t|**	**[95% Conf. Interval]**	
d. lm_t	0.2437	0.26476	0.92	0.36	-0.282546	0.76995
l.error	-0.25269	0.08136	-3.1	0.003	-0.414408	-0.09097
_cons	0.02778	0.03226	0.86	0.392	-0.036353	0.0919

Note: Period: 1996:4-2018:4 (T = 90).

Dependent variable: d_lx_t

The ECT shows how fast our model returns to equilibrium following an exogenous disturbance. It is to be noted that the coefficient of error correction term should be negative, which indicates that the model is moving back to equilibrium. On the contrary if the

coefficient of error correction term is positive, it indicates movement of the model away from its equilibrium. Also, the value of the coefficient of error term lies between 0 and 1 (both inclusive). When its value is 1 it means there was full adjustment in one period later (in our case in one quarter later) and if its value is 0 it means there was no adjustment.

Any deviation from the long run equilibrium is corrected by error correction term through a series of short- term adjustments.

We estimated the Error Correction model with 90 observations. The estimated result of the Error Correction Model is given in Table 5.3 below. According to the table 5.3, the coefficient of error correction term is -0.25, and is statistically significant. As the value of the coefficient of ECT is negative, this means that model is moving back to equilibrium and as the absolute value of the coefficient is within the range of 0 and 1, this means that around 25% of the discrepancy between the long-run and short run is corrected within a quarter.

From our results we can write the long run and short run models as below::

Long run model

$$lx_t = 0.86 + 0.77\, lm_t + e_t \quad (5)$$

Short run model

$$lx_t = 0.03 + 0.24\, lm_t - 0.25\, (lx_t - \beta_0 - \beta_1 lm_{t-1}) + v_t \quad (6)$$

or,

$$lx_t = 0.03 + 0.24\, lm_t - 0.25\, e_{t-1} + v_t \quad (7)$$

5.5 Conclusion:

In this chapter we examined the relationship between India's exports and imports with China. Our very specific objective in this chapter was to find out the long-run relationship between the two variables of India's exports to and imports from China. The method that we had applied in this analysis was that of Engle – Granger Two Sep co-integration method. After conducting the analysis, we come up with the following findings. The cointegration test revealed that there exists cointegration between the two variables during the given period. After that, we further go for error correction model to see whether the discrepancy between long- run and short- run is corrected. Our study revealed that, even though India's imports and exports with China had a stable long-run relationship but this stability is so weak in nature that only about 25 percent of the disturbances between the long run and short run was corrected within the quarter of the period. On the basis of this result it is important for

India to focus on reducing trade deficit with China before it become unsustainable and unmanageable for India.

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Chapter 06: A Comparison of Export Performance of India and China in the World

6.1 Introduction:

India not only has a complementary trade relationship with China, but India also competes with China in the world trade. Since our focus in this chapter is to understand the competitive aspect of India China trade relation, we have considered only the exports performance of these two countries. We will begin our analysis by comparing the share of exports of the two countries in the world. This will give us an idea of the influences these two countries have in the world exports. Another indicator for comparing the performances of these two countries is their growth rates. To make sense of the increase in the value of exports over the years, we will use Export Value Index of each country and compare them. If the composition of exports of two countries are same, then it indicates that the two countries have competition. We will compare the export composition of India and China and find out whether they are similar or not. Along with this comparison of RCA also helps us to find out the extent of competition between the two nations. If the two countries have RCA in same products, then there exists competition between the two. So, we will make a comparison of RCAs to find out whether competition exists between them or not. After that we make a comparison between the direction of exports of the two countries. If two countries are exporting same type of products in same country or region, then this is indicative of competition between them.

The other indicators or measures that we have used to compare the performances of India and China includes, Trade dependence index which indicates the openness of a nation, Export Market Penetration and Export Propensity index for comparing the vulnerability of domestic producers of exportable, Herfindahl- Hirschman Index to compare the geographical concentration of exports and Trade Entropy Index to compare export diversification of the two countries.

The paper is structured as follows. In section 6.2 we review relevant literatures on the issue. Then in section 6.3 we discuss Data and Methodology used in this study. In the next section i.e., in section 6.4 we will discuss and analyze the performances of India and China in the world market. Finally in section 6.5 we have conclusion.

6.2 Review of Literature:

The study of the competition between India and China in the world trade has been an important area for scholars, researchers, and policy makers. A large volume of literature has been produced in last three decades on comparison of trade performance India

and China in the world. In this section we will review various literatures on the issues related to comparison and competition between India and China in world trade.

Y. Huang, and T. Khanna (2003), in their study made a comparison between India and China and observed that India and China adopted different types of development strategies. According to them even though India's performance is not at par with that of China, but India is doing better in certain important areas. And because of that there are possibilities that India not only catch up with China, but it may even outperform it. They conclude that if India outperforms China, then it proves that the India's strategy of prioritizing of home-grown entrepreneurship to long term economic development as well as how limited is China's FDI dependent approach.

A. G. Ahearne, J. G. Fernald, P. Loungani, and Schindler, J. W. (2003) in their study analysed the impact of China's exports on the exports of other emerging Asian economies. They wanted to find out whether increase in China's export has negative impact on exports of other emerging Asian economies. Their study finds that there was positive correlation between China's exports and the exports of other emerging Asian economies. For this analysis they controlled trade- partner income growth and real effective exchange rates. They also examined the relative importance of foreign income and exchange rates in explaining Asian export growth using VAR estimation of aggregate trade equations. They found that exchange rate has a role in export performance, but the role of income growth of trade partners was more important. They also found that China and emerging Asian economies are both companions in overall trade but are competitors in case of specific products.

P. Agrawal, & P. Sahoo(2003) paper examines the impact of China's accession to the WTO on its export's imports and foreign trade as well as on India's exports, imports, and foreign trade. According to them its accession to WTO will have positive impact on its economy as it will lead to increase in its economic activities which lead to higher GDP growth. After that they examined the impact of China's entry to WTO on India's exports, import and foreign direct investment. According to them China's entry to WTO has negative impact on India's exports as both India and China have comparative advantage in the exports of labour-intensive manufactured goods due to cheapness of labour. Along with this both composition and direction of exports of these two countries are same so China's entry will have negative impact in India's exports. In case of imports, they conclude that China's entry has positive impact on India's exports. One of the reasons for this surge in India's export to China was reduction is tariff as well as phasing out of subsidies by China making India's exports accessible to China. But since the negative impact on India's exports due to rise in China's

exports in stronger than positive impact on India's exports due to rise in China's imports, they conclude that overall impact of China's entry to WTO on India's trade in general and exports in particular will be negative.

T N Shrinivasan (2004), in his paper reviewed economic performances of Indian and China where he focused on the macroeconomy and the external sector. He observes that both countries had similar development strategies in the past. Both countries adopted reform policies, but China did it before India. After reforms, even though the exports of both India and China were increasing but China was growing much faster than India. He also concludes that the two countries have common interest in liberal world trading system as both compete in the world market. With reference to Doha round, he observes that the cooperation between India and China in the Doha Round of trade negotiation not only led to mutually beneficial result, but it will also promote the interest of developing countries.

B. Eichengreen, Y. Rhee, & H. Tong (2004) in their paper, analyzed the impact of growth of China's exports on the exports of other Asian countries. Based on the analysis using gravity model, their study concludes that China's export had significant impact only on markets of consumer goods and not in the markets of capital good. This means that impact was felt mostly by les s developed Asian nations and not by advanced Asian nations. Again, in terms of China's imports, it had significant impact in markets for capital goods which means that its impact was felt by advanced Asian economies rather than less developed ones. So, they conclude that the China's growth had impacted less developed and advanced Asian economies differently.

A. Batra, and Z. Khan(2005), in their paper analyzed the revealed comparative advantage for both India and China. One of their conclusions was that the pattern of comparative advantage varies at different levels of commodity disaggregation. According to their study there was difference in the value of the index of RCA and comparative advantage at the 6-digit constituent commodity level. Any sector which ranked high according to RCA does not retain the same rank when comparative advantage at the 6-digit constituent commodity level is used. Their analysis found that both India and China had maximum advantages in manufactures and then in agriculture and allied categories. Comparatively, China had higher advantage in manufactures while India had in Agriculture and allied category. As they measured comparative advantages for 2000 and 2003 for India and China, they found that India's advantage was predominantly in agriculture and allied product category. Along with that India's comparative advantage as compared China in global market were in resource-based manufactures and in miscellaneous manufactures. China's advantages were in both resource-

based manufactures along with machine and equipment. They also found that even though there were similarities in the structure of their comparative advantage, there was no correlation between the manufacturing sectors of India and China.

V.N. Balasubramanyam, and Y. Wei, (2005), in their study made a comparison of textiles and clothing exports between India and China and found that China has much higher share in both textiles and cloths exports in the world. Their study reveals that India had comparative advantage in women's garments and some types of men's shirts. According to them, the impact of abolition of Multi- Fiber Agreement (MFA) will bring gains to China at the expense of India in most items of exports of clothing. This gain includes the categories where India had higher share than China. They suggest that India should improve its competitive strength relative to China.

V. Cerra, S. A. Rivera, and S.C. Saxena (2005), in their paper examined the implication of China's accession to WTO for India's trade. For this study, they used econometrics and computable general equilibrium. Their analysis focuses on the impact of China's entry on India either directly or through competition. The result of their econometric analysis concludes that India's exports to USA was impacted by China's exports through trade diversion with the reduction in US tariffs on Chinese imports. They also found that the competition between India and China in the third market was only about 25 percent of the products. They also found that China's entry to WTO had positive impact on India's direct trade with China as with the growth in China's trade, there will be growth in India's exports of intermediate goods to China. Textile industry provide such opportunity for India along with some other sectors. Their conclusion from the general equilibrium model also confirmed the likely loss of India's export share in third markets like USA and EU. According to them, due to the loss of market share and deterioration in terms of trade, there will be decline in India's welfare. And this decline according to them was partially compensated by likely expansion exhibited by other sectors. So according to this study, China's accession to WTO has positive direct effect and negative competitive effect. In other words, China's accession to WTO may lead to rise in India's direct trade with China but on the other hand it will have negative effect on India's exports in the world.

T.N. Srinivasan. T. N (2006) In his article, observed that India and China were growing rapidly since 1980s and according to him their growth have had significant effect on world economy. According to him China is more integrated with the world economy than India. He observes that even though India has become major destination in global outsourcing and exports of information technology enabled services, India could not compete with China

in the exports of manufacture sector. But India has advantage over China in the form of its vibrant democracy and its legal and financial system. He concludes that even if India does not overtake China, but in the medium term both these countries become ‘’economic powerhouses’’ and their growth will have significant effect in the economy of the world.

T.P. Bhat, M.A. Guha, and M. Paul, (2006), reported that India along with other developing countries faces intense competition from China after its entry to WTO. According to them India faces competition from China in labor-intensive goods such as textiles, clothing, light manufacturing products, chemicals, and granite and leather products. The reasons for intensification of competition during that time were abolition of textile quota by countries like U.S. and Canada along with European Union and lowering of import duties on manufacturing inputs by China. Another reason was the increase in the inflow of FDI in China leading to improvement in the productivity of manufacturing sector. As far as export destinations are concerned, they observed that The U.S., the E.U., Japan and ASEAN countries are the major destination for both India and China. So, India faces major competition from China in these destinations. According to their report as compared to India China’s export had dominant presence in almost all these destinations.

F. Lemoine, and D. Ünal-Kesenci (2007), points out that India and China have successfully integrated with the world economy. And together, these two nations have affected both demand and supply in the in primary products, manufactured goods, and services. According to them the main reason for increasing importance of these two nations in world trade was due to huge and faster increase in outsourcing and offshoring since 1990s. According to them similarities between India and China was that both India and China faced increasing trade deficit in services related to transport and insurance, royalties etc., which were associated to merchandise trade. And difference between the two according to them was that on the one hand, China’s position in the international trade was based on its high- tech manufactured products on the other hand India’s position was based on higher price/ quality goods along with ‘’customized’’ products and services.

Arvind Panagariya (2007) observes that due to relatively poor performance of Indian industry, India’s performance was lagging behind that of China. On the one hand the share of industry grows from 42 percent in 1990 to 51 percent in 2000 in China’s GDP, on the other the share of industry in India’s GDP was almost stagnant. He also points out that even though India’s performance was poor in case of industry but the share of service in India’s GDP shows rapid growth from 41 percent in 1990 to 48 percent in 2001. This means

that industry is most important sector for China and service is for India. He also suggests that India must focus on its traditional labor-intensive industry and modern IT industry and strengthen through reforms as he believes that even though information technology sector strengthens India, but it cannot be considered the main engine of transformation.

K. Kalirajan, and K. Singh (2007), in their study concludes that the most important determinants for both potential and actual exports for both India and China are country specific factors including trade policy. According to their study, during the sample period China was able to reduce the gap between its potential and actual export with its partners but same is not true for India. According to them, China on the one hand was able to realize 86 percent of its potential export but India on the other hand was able to realize only 68 percent of its potential exports. According to them, India needs to intensify its reform measures to catch up with China's performance.

Przemyslaw Kowalski (2008), observes that both India and China have achieved much in terms of trade integration process and the economic outcomes. According to the author, China's reform and particularly in manufacturing sector was one of the most important determinants of China's economic performance but in service sector regulatory barriers are still dominant. India also has reduced its tariff on non-agricultural products but due to the persistence of moderate protection, Indian manufacturing sector Is still facing restrictions. In service sector, even though India enjoys comparative advantage, but it is still very restrictive. The author suggests that to promote trade led expansion India needs to phase out the remaining good and service trade barriers.

D. Greenaway, A. Mahabir and C. Milner. (2010). examined the impact of China's rising exports on other Asian countries using gravity model for the period of 1990-2003. In their study they found that overall effect of China's exports on other Asian country was of relatively small, but it was rising over time. They also found that the impact was more on more on markets of industrialized country. As compared to low- and middle-income Asian countries the impact of rising Chinese exports was more on advanced Asian exporters. Even though rising Chinese exports had adverse effect on advanced Asian exporters but rising Chines imports had beneficial effect on advanced Asian countries. They also conclude that the overall exports of Asia to China was not sufficient to balance the loss of exports of Asia to third markets due to rise in China's exports. So, there was negative net effect on the exports of Asian countries of China's rising exports.

G. Wignaraja,(2011), in his paper made a compared India and China empirically based on their economic reforms and exports. He observes that in case of

manufacture sector China was dominating as compared to India but in case of skill intensive services India is relatively ahead of China. According to the author, large markets and low-cost productive labour at the initial stages were the favorable conditions for the success of these countries. Regarding global financial crisis, the author points out that as both India and China faced uncertainty after global financial crisis, the future success of these countries depends on reforms they initiate and adopt.

N. Bagaria, S. Santra, and R. Kumar, (2014), in their paper examined the comparative advantage between India and China for the period of 2002-2012. For this purpose, they used Revealed Comparative Advantage index to test comparative advantage. According to this study, RCA was stable throughout the study period for some commodities and for some commodities they found large variation. The study concludes that India and China complement each other in some commodity groups and there was competition between the two countries in some other commodity groups in the world market.

C. Veeramani, and P. Gupta, (2014), analysed the role of extensive and intensive margins in the export market penetration of India and China for the period of 1995-2011. Their study found that in case of extensive margin, India was catching up with China so the gap in exports between the two countries reduced during the study period. But India's performance was not the same in case of intensive margin and India was lagging behind China. They observed that most important reason for China's success in exports was its focus on intensification rather than in diversification of exports. In case of India, the authors observed that the performance of India's capital-intensive products were better than that of labour-intensive products. The reason of poor performance of labour-intensive products according to them was the lack of depth in India's market presence. According to their study the authors argues that if India adopts a policy that increases the export growth at the intensive margin, India will be substantially benefitted.

Yingqi Wei, and V.N Balasubramanyam (2015), in their paper, observes that India's manufacture is different from that of China. They also observe that, in terms of both production and exports, China's manufacturing sector is far ahead of India. On the one hand India's manufacture is relatively capital intensive but on the other hand China's manufacturing sector is relatively labour intensive. The authors opposed the view that India should follow China's strategy to promote labour intensive manufactures as according to them is not feasible. They pointed out that India failed to develop and implement its agricultural strategy as China did for the supply of low wage labour force and low-price raw materials. They suggest that India should utilize its service sector in particular the information technology

service to promote its non -farm manufacturing sector. In this case according to the authors India can follow China's example.

R. Panda, M. Sethi, and M. Kumaran (2016), in their paper studied the bilateral trade flow of India and China. Their analysis concludes that both India and China had tendency to trade more with geographically proximate countries. On the one hand they found that it was found that India's trade was more with the countries with higher GDP but lower per capita income or in other words with populous countries. On the other hand, China's trade was more with countries with higher per capita income and with the countries having common language. In addition to these, their study concludes that India's trade was affected by post crisis and common colony.

I. Ahmad, M.H. Kunroo, and I.A. Sofi, (2018), in their study applied revealed comparative advantage (RCA) and bilateral RCA to compare short run and long run trade pattern of India and China. The specific objective of this study was to understand the pattern of exports and area of specialization of both India and China. According to this study both India and China performed well in merchandise exports since 2000. Both countries had rising trend in exports not only with each other but with the world as well even though these countries were institutionally and structurally different. According to the authors, the difference in pattern of exports of these two countries cannot be detected when analysis is based on SITC (Standard International Trade Classification) two- digit level but it can be observed when analysis is based on SITC four- digit level of disaggregation. On the basis of this analysis, it was found that the products which are advantageous in India's export basket were engineering goods and technologically driven goods. As compared to India, China's specialization and the range of technologically embedded goods are much larger. In other words, China is at superior position as compared to India in terms of specialization and range of technologically embedded products.

6.3 Data and Methodology:

For the analysis we have used various trade related indices and measures. The description of all the indices and measures used are given in the Appendix of this chapter. The data are collected from the WITS- COMTRADE website. We have used the annual data of exports, imports, and other relevant variables for the period from 1992-2018.

6.4 Discussion:

In this section we will compare the performances of India and China in the world trade using various trade related indices and measures.

6.4.1 Share in World Trade (%):

We start our discussion with making comparison between India and China in terms of their share in the world for the period of 1992 -2018.

The table shows that India's trade share was 0.92 percent in 1992 and 2.34 percent in 2018. During this period India's highest share was 2.34 in 2018 and lowest was 0.71 in 1997, 1998, and in 2000. The trend shows that India's trade share declined to 0.72 percent in 1995 from 0.92 percent in 1992. It further declined to 0.71 percent in 2000. In 2005 it increased to 1.1 percent and further to 1.78 percent in 2010. It further increased to 1.9 percent in 2015 and finally in 2018 it reached its peak to 2.34 percent. The trend shows that India's trade share continuously declined from 0.92 percent in 1992 to 0.71 percent in 1998. The trade share followed the increasing trend from 0.71 percent in 2000 to 2.04 percent in 2012. Then again it followed declining trend for next three years from 1.9 percent to 1.84 percent. In the last two years the share again increased to 1.99 percent in 2017 and further to 2.34 percent in 2018.

Table 6.1: Comparison of Shares in World Trade (%)

Year	India	China	Year	India	China	Year	India	China
1992	0.92	3.36	**2001**	0.72	3.90	**2010**	1.78	9.29
1993	0.80	3.43	**2002**	0.78	4.51	**2011**	1.99	9.51
1994	0.73	3.13	**2003**	0.82	5.29	**2012**	2.04	10.12
1995	0.72	2.98	**2004**	0.90	5.91	**2013**	2.03	10.52
1996	0.72	2.88	**2005**	1.10	6.47	**2014**	1.97	10.91
1997	0.71	3.04	**2006**	1.17	6.91	**2015**	1.90	11.48
1998	0.71	3.05	**2007**	1.25	7.44	**2016**	1.84	11.00
1999	0.78	3.25	**2008**	1.47	7.60	**2017**	1.99	11.07
2000	0.71	3.51	**2009**	1.69	8.42	**2018**	2.34	11.50

Authors calculation

Data source: WITS- COMTRADE

In case of China, the share was 3.36 percent in 1992, which declined to 2.98 percent in 1995. But in 2000, it increased to 3.51 percent and further to 6.47 percent in 2005. After that improvement continued and increased sharply to 9.29 percent in 2010. It reached 11.48 percent in 2015 and increased further to 11.50 percent in final year of 2018. The trend shows that from 3.36 percent in 1992 the share increased to 3.43 percent in 1993 but after that it declined continuously for next three years from 3.13 percent to 2.88 percent in 1996. After that for a long period from 1997 onwards till 2015 it increased continuously from 3.04

percent in 1997 to as high as 11.48 percent in 2015. In 2016 it declined to 11 percent but again it increased continuously for next two years to 11.07 percent in 2017 and further to 11.50 percent in 2018. The share of 2018 was the maximum share of China's trade in the world for the period.

So, in terms of the trade share China had outperformed India throughout the period. During this period on the one hand India struggled to achieve even the two percent share in world trade, China on the other hand achieved more than eleven percent share. Even the minimum share of China which was 2.88 percent was higher than India's maximum share of 2.34 percent. As far as the trend is concerned the gap between the share of these two countries instead of narrowing, further widened over the period.

6.4.2 Share in World Exports (%):

In this section we make a comparison between India and China in terms of their export share in the world for the period of 1992 -2018. Before comparing them, we will discuss the trends of export share of these two countries individually. We will first discuss trend in India's export share and then China's. After that we compare them.

Table 6.2: Comparison of Shares in World Exports (%)

Year	India	China	Year	India	China	Year	India	China
1992	0.84	3.46	**2001**	0.64	3.89	**2010**	1.31	9.37
1993	0.79	3.24	**2002**	0.69	4.50	**2011**	1.49	9.39
1994	0.70	3.22	**2003**	0.70	5.18	**2012**	1.44	10.16
1995	0.68	3.18	**2004**	0.74	5.8	**2013**	1.6	10.51
1996	0.67	3.02	**2005**	0.87	6.63	**2014**	1.52	11.22
1997	0.66	3.45	**2006**	0.91	7.25	**2015**	1.45	12.45
1998	0.63	3.49	**2007**	0.95	7.96	**2016**	1.47	11.83
1999	0.67	3.56	**2008**	1.03	8.10	**2017**	1.51	11.61
2000	0.60	3.53	**2009**	1.28	8.69	**2018**	1.51	11.67

Data Source: WITS-COMTRADE

The table shows that India's export share was 0.84 percent in 1992 and 1.51 percent in 2018. During this period India's highest share was 1.52 in 2014 and lowest was 0.60 in 2000. Throughout the period India's share in the world export never reached even two percent. It was only in 2008 that India crossed one percent share and in 2013 it crossed one and half percent share. So, India's share in the World export was insignificant throughout the period. Now let us discuss the trend of India's export share. In 1992 India's share was 0.84 percent. After that it continuously declined for the next six years between 1993 to 1998 from 0.79 percent in 1993 to 0.63 percent in 1998. The share increased to 0.67 percent in 1999 but

then again it declined to 0.60 percent in 2000. The eleven-year period between 2001 to 2011 was the period of expansion of India's export share. During this period the share increased from 0.64 in 2001 to 1.49 percent in 2011. So, India crossed one percent share during this period and almost reached one and half percent share. India's share never falls below one percent after 2008. In 2012, the share declined to 1.44 percent but again increased to 1.60 percent in the next year of 2013. After that India's share contracted continuously for next two years to 1.52 percent in 2014 and further to 1.45 percent in 2015. The next two years witnessed expansion in the share to 1.47 percent in 2016 and further to 1.51 percent in 20017. The share remained at 1.51 percent in 2018. So, during this period of 1992 to 2018, India's export share in the World exports experienced contraction in most of the years in 1990s and expansion in the entire period of 2000s, India's export share remained low and insignificant throughout the period.

Now we will discuss China's export share in World exports. The table shows that in the beginning of the period China's share was 3.46 percent and at the end in 2018 it was 11.67 percent. So, China has a significant share in the World exports during this period and also there was a significant expansion in its share in World exports. The lowest share experienced by China was 3.02 percent in 1996 and highest was 12.45 percent in 2015. So, China's share never falls below three percent during this period. China's share was more than three percent in 1992. It took another 10 years to cross four percent share in 2002 but it did not take more than one year to cross five percent mark and crossed it in 2003. In another two years, i.e., in 2005 it crossed six percent mark. In the very next year in 2006 it crossed seven percent. It crossed eight percent in 2008, two years after it crossed seven percent. In another two years in 2010 it crossed nine percent mark and in two years after that in 2012 it crossed ten percent. It reached 11 percent in 2014. It crossed the highest share so far during this period of 12 percent in 2015. So, from 1992-2015 China's share in the world export expanded almost four times. Now, let us discuss trend of China's export share. In 1992, its share was 3.46 percent, but it declined continuously in the next four years. In 1993 it declined to 3.24 percent, and it continued till it reached 3.02 percent in 1996. After that there was continuous expansion in the share from 1997 to 2015. The share increased from 3.45 percent in 1997 to 12.45 percent in 2015. After that the share declined to 11.83 percent in 2016 and further to 11.61 percent in 2017 and in the final year it again expanded modestly to 11.67 percent. So, China's share in World export increased significantly during this period even though it experienced decline in the early years of the period and in the two years at the end of the period.

Let us compare India's and China's export share in the World. The lowest share experienced by India was 0.60 percent and that by China was 3.02 percent. So, China's lowest share was five times more than that of India. Similarly, India's highest share during this period was 1.60 percent and that of China was 12.45 percent which was almost eight times more than that of India. Even the lowest share of China was almost double than that of India's highest share. The gap between the shares of these two countries had widened over the period. The smallest gap between the two shares was registered in 1996 when the difference between the two shares was 2.35 percent. Similarly, the widest gap was experienced in 2015 when the difference was 11 percent. So, in terms of export share China had clearly outperformed India. in each year of the period. The rate of growth of export share of China was much higher than that of India as can be seen from the above graph where the slope of China's curve was steeper and that of India's curve was flatter.

6.4.3 Export Growth Rate (%):

The table shows the growth rate of exports of India and China for the period of 1992 -2018. India's growth rate was .37 percent in 1993 whereas in 2018 it was 9.49 percent. For China it was 8.01 percent in 1993 and 10.20 percent in 2018. During in these two years China's growth rate was marginally greater than that of India. As far as highest and lowest growth rates are concerned India's highest was 36.78 percent in 2011 and lowest was -16.74 percent in 2015. Similarly, highest rate for China was 35.39 percent and lowest was -16.01 percent.

The trend in India's growth rate shows that the growth rate increased to 18.41 percent in 1994 from 7.37 percent in 1993, which further increased to 20.39 percent in 1995. After that the growth rate slowed down in next three years After declining sharply to 5.58 percent in 1996 it further declined to 3.96 percent in 1997 and become negative for the first time in 1998. It was -4.56 percent. After that the growth increased to 11.18 percent in 1999 and further to 14.73 percent in 2000. The rate again declined sharply to 3.59 percent in 2001. From 2002 to 2005 the growth rate increased continuously from 14.17 percent to 32.21 percent. So, after increasing for four year the growth rate again slowed down to 20.77 percent in 2006 and further to 20.38 percent in 2007. The growth rate again revived to 24.65 percent in 2008. Another negative growth rate was registered in the next year of 2009 at -2.80 percent. After that there was a comparatively higher growth rate registered in the next two years with 24.69 percent in 2010 and further with 36.78 percent in 2011. Again, there was a dip in growth rate with – 3.95 percent. After growing at 16, 25 percent in 2012, the next three years registered negative growth rate in exports with -5.66 percent in 20114, -16.74 percent in 2015 and -1.53

percent in 2016. In the final two years growth increased to 13.07 percent but then declined to 9.49 percent in 2018.

Table 6.3 Comparison of Export Growth Rates (%)

Year	India	China	Year	India	China	Year	India	China
1992	_		**2001**	3.59	6.78	**2010**	24.69	31.30
1993	7.37	8.01	**2002**	14.17	22.36	**2011**	36.78	20.32
1994	18.41	31.90	**2003**	18.49	34.59	**2012**	-3.95	7.92
1995	20.39	22.95	**2004**	27.87	35.39	**2013**	16.25	7.82
1996	5.58	1.52	**2005**	32.21	28.42	**2014**	-5.66	6.03
1997	3.96	21.02	**2006**	20.77	27.16	**2015**	-16.74	-2.94
1998	-4.56	0.56	**2007**	20.38	25.92	**2016**	-1.53	-7.73
1999	11.18	6.05	**2008**	24.65	17.26	**2017**	13.07	7.90
2000	14.73	27.84	**2009**	-2.8	-16.01	**2018**	9.49	10.20
						2092-2018	11.13	13.88

Author's Calculation
Data Source: WITS-COMTRADE

Similarly, trend of rate of export growth of China shows that there was a sharp increase in growth rate in 1994 when the growth rate was 31.90 percent as compared to 8.01 percent in 1993. Then it declined to 22.95 percent in 1995 but the decline was shaper in next year in 1996 when the growth rate was only 1.52 percent. After the rate improved sharply in 1997 to 21.02 percent. But in the very next year it become less than one percent at 0.56 percent. Then the rate increased moderately to 6.05 percent in 1999 and then sharply to 27.84 percent. But again in 2001 it experienced a decline to 6.78 percent. From 2002 onwards it increased continuously for three years from 22.36 percent in 2002 to 35.39 percent in 2004. From 2205 to 2009 for five years the growth rate continuously declined and become negative in 2009. The rate was 28.42 percent in 2005 which come down to as low as – 16.01 percent in 2009. This was the worst growth rate in exports for China. 2010 saw a huge improvement in the rate when it registered 31.3 percent. But again, after that, a continuous trend of decline in growth rate followed from 2011 to 2016. It declined from a modest 20.32 percent in 2011 to as low as -7.73 percent in 2016. The next two years experienced increase in growth rate as it registered a comparatively high rate of 7.9 percent in 2017 and even higher rate of 10.2 percent.

Out of the 26 years period in the table China's growth rate outperformed India's in 16 different years and India's growth rate outperformed China's in 10 years. So, in that sense China's performance was better than India's in terms of growth rate. And again, China's base value of export from which these growth rates were calculated each

year during the period of 1992-2018 was greater than that of India. So, it can be said that China outperformed India in terms of export growth during this period.

6.4.4 Export Value Index(EVI):

Here we will discuss the change in EVI of India and China for the given period and compare them. This is another way to understand the growth in exports of these two countries. We will fist discuss the change in EVI for India and then for China and at the end we make a comparison between them.

For India, as compared to 1992, the value of EVI increased to 153.05 in 1995 and further to 204.52 in 2000. Then in 2005 it reached 484.53 and rose to 1064.19 in 2010. After that it reached 1276.51 in 2015 and further to 1556.12 in 2018. So as compared to 1992, the value of exports was more than 15 times greater in 2018. During this period highest value of exports was more than 16 times higher than the value in 1992. Trends shows that after 1992, from 1993 to 1997 the value continuously increased from 107.37 to 167.99. Then the value declined to 160.33 in 1998. After that from 1999 to 2011 the value continuously increased from 178.26 in 1999 to 1455.65 in 2011. the value declined to 1398.10 in 2012 but then increased to 1625.26 in 2013. There was decline in the value for next three years from 1533.20 in 2014 to 1256.93 in 2016. After that the value increased to 1421.28 in 2017 and further to 1556.12 in 2018. As compared to value of 1992, the value in 1995 was 1.5 times higher, in 2000 it was two times higher, in 2005 it was almost five times higher, in 2010 It was almost eleven times higher.in 2015, it was thirteen times higher and in 2018 it was sixteen times higher.

Table 6.4: Comparison of EVI (1992=100)

Year	India	China	Year	India	China	Year	India	China
1992	100.00	100.00	**2001**	211.86	313.28	**2010**	1064.19	1857.50
1993	107.37	108.01	**2002**	241.89	383.32	**2011**	1455.65	2234.98
1994	127.13	142.46	**2003**	286.61	515.93	**2012**	1398.10	2412.03
1995	153.05	175.16	**2004**	366.49	698.52	**2013**	1625.26	2600.67
1996	161.6	177.83	**2005**	484.53	897.05	**2014**	1533.20	2757.58
1997	167.99	215.20	**2006**	585.19	1140.73	**2015**	1276.51	2676.56
1998	160.33	216.40	**2007**	704.44	1436.38	**2016**	1256.93	2469.55
1999	178.26	229.49	**2008**	878.08	1684.36	**2017**	1421.28	2664.67
2000	204.52	293.39	**2009**	853.47	1414.70	**2018**	1556.12	2936.46

Author's calculation
Data Source: WITS - COMTRADE

China's EVI increased to 175.16 in 1995 and further to 293.39 in 2000 and reached 484.53 in 2005. After that it increased to 1857.50 in 2010 and further to 2676.56 in 2015. In 1018 its value rose to 2936.46. The trend in the value of EVI for China shows that it had a continuous and long rise from 108.01 in 1993 to 1684.36 in 2008. Then it declined to 1414.70 in 2009 but after that it again increased continuously form 1857.50 in 2010 to 2757.58 in 2014. Then the value declined for next two years firstly to 2676.56 in 2015 and then to 2664.67 in 2017. After that in the last two years the value increased to 2664.67 in 2017 and finally to 2936.46 percent in 2018. In case of China the highest value registered was 2936.46 in 2018. This means that China's export as compared to its value in 1992 increased by about 1.5 times in 1995 and by about 2 times in 2000 and further by almost five times in 2005. After that it increased almost by eleven times in 2010 and by about twenty-seven times in 2015. Finally in 2018 it increased by more than 29 times. The table shows that China grew relatively faster during the period from 2004 to 2008 and between 2010 to 2017.

On the basis of this discussion, it is clear that China's export's export growth was relatively higher than that of India's export growth. The table shows that the value of China's EVI outperformed India's during the entire period. And this can be easily confirmed by comparing the share of India's exports with China's in the world. In this index also India was far behind China during the given period of 1992-2018.

6.4.5 Export Composition:

Here we will discuss and compare the export composition by stages of processing of India and China in the world for selected years. In 1992, Consumer goods had the highest share of 41.38 percent followed by Intermediate goods in India's exports Capital goods had the lowest share of 5.61 percent. Similarly in China's exports also Consumer goods and Intermediate goods were the two major exports goods with a share of 55.88 percent and 19.77 percent respectively. In China's exports also Capital had the lowest share of 10.11 percent. In case of India there was not much difference between the shares of top two export goods but in case of China there was huge difference.

In 1995 also Consumer goods and Intermediate goods had the highest share in India's exports but in this year the share of Intermediated goods was higher than the share of Consumer goods. In this year the share of Intermediate goods increased from 39.39 percent to 41.82 percent and become the good with highest share in India's export and on the other hand the share of Consumer goods declined from 41.38 percent to 38.82 percent and become the good with second highest share. In this year also share of Capital goods was the

lowest share in India's exports. In case of China there was no change in the positions of goods with highest shares. Consumer goods continued to have the highest share in China's exports with 52.84 percent, and Intermediate goods with a share of 23.08 percent had the second highest share. As compared to shares of 1995, the share of Consumer goods was declined and that of intermediate goods had increased in this year. In this year with a share of 8.23 percent, Raw Materials replaced Capital goods as the good with lowest share in China's exports.

Table 6.5a: Comparison of Export Composition of Goods by Stages of Processing (%)

Year	1992		1995		2000		2005	
Goods by stage of processing	**India**	**China**	**India**	**China**	**India**	**China**	**India**	**China**
Intermediate goods	39.39	19.77	41.82	23.08	42.22	17.18	36.78	16.12
Capital goods	5.61	10.11	6.03	15.51	6.35	27.62	9.67	42.18
Raw materials	11.9	12.75	11.71	8.23	9.6	5.39	11.24	3.06
Consumer goods	41.38	55.88	38.82	52.84	39.84	49.61	41.13	38.43
Year	**2010**		**2015**		**2018**			
Goods by stage of processing	**India**	**China**	**India**	**China**	**India**	**China**		
Intermediate goods	34.87	15.64	32.56	16.26	32.56	16.7		
Capital goods	11.71	46.89	13.82	44.28	15.01	45.92		
Raw materials	9.69	1.99	8.26	1.67	7.43	1.67		
Consumer goods	41.77	35.39	44.5	37.77	44.92	35.49		

Source: WITS-COMTRADE

In 2000, the share of Intermediate goods increased slightly to 42.22 percent from 41.82 percent and continued to be the good with highest share in India's exports. It was followed by Consumer goods with a share of 39.64 percent which had increased from 38.82 percent in 1995. Even though the share of Capital goods was increased marginally in this year, but it still had the lowest share in India's exports. On the other hand, there was a slight change in China's export composition. Even though Consumer goods had the highest share with 49.61 percent but in this year Capital goods had the second highest share of 27.62 percent replacing Intermediate goods. In this year also Raw Materials had the lowest share in China's exports.

In 2005 also Consumer goods and Intermediate goods had the most shares in India's exports. With 41.13 percent Consumer goods had the highest share and with 36.78 percent Intermediate goods had second highest share in India's exports. As compared to 2000, on the one hand the share of Consumer goods was increased from 39.84 percent to 41.13 percent but on the other the share of Intermediate goods declined from 42.22 percent to 36.78 percent. Capital goods with a share of 9.67 percent had the lowest share in India's exports as

before. In case of China again there was a change in this year. In this year Capital goods replaced Consumer goods as the good with highest share in China's exports as its share increased sharply from 27.62 percent in 2000 to 42.18 percent. Consumer goods which had the highest share in the previous year had the second highest share with 38.43 percent. Raw material continued to have the lowest share as its share further decreased to 3.06 percent in this year.

Consumer goods and Intermediate goods continued to dominate India's exports in 2010 as well. With a share of 41.77 percent Consumer goods was the topmost good, followed by Intermediate goods with 34.87 percent. In this year the share of Consumer good was increased as compared to its share in 2005 and that of Intermediate goods declined. as its share was 36.78 percent in 2005. In this year Raw Materials replaced Capital goods as the good with the lowest share in India's exports. Its share was only 9.69 percent. China also did not any change in its composition. The most dominant goods remained Capital goods and Consumer goods. In this year the share of Capital goods further increased to 46.89 percent from 42.18 percent, but the share of Consumer goods had declined to 35.39 percent from 38.43 percent in 2005 In this year the share of Raw Materials was lowest as its share further declined from 3.06 percent in 2005 to 1.99 percent in 2010. So, in 2010, Raw Materials had the lowest share in the export compositions of both India and China.

The year of 2015 was also no different from 2010 for India's export composition as Consumer goods and Intermediate goods continued to have the highest and second highest share in total exports and Raw Materials continued to have the lowest share. Considering the change in percentage share we find that there was further increase in the share of Consumer goods from 41.77 percent in 2010 to 44.5 percent in 2015. But the share of Intermediate goods continued to decline from 24.87 percent in 2010 to 32.56 percent in 2015. The share of Raw Materials had also declined in this year from 9.69 percent in 2010 to 8.26 percent. In case of China also there was no change in the composition but only in the percentage share. In this year also with a share of 44.28 percent Capital good continued to have the highest share and with a share of 37.77 percent Consumer goods had the second highest share. Raw material continued to be the good with lowest share in China's exports with a share of 1.67 percent. In this year the share of Capital goods was declined from 46.89 percent in 2010 to 44.28 percent but the share of Consumer good improved from 35.39 percent to 37.77 percent. As far as the share of Raw Materials was concerned its share also showed reduction from 1.99 percent to 1.67 percent.

In the year of 2018, Consumer goods and Intermediate goods continue to dominate India's exports. Consumer goods had the highest share of 44.92 percent which was a marginal improvement from 2015. There was no change in the share of Intermediate goods as it remained at 32.56 percent. The share of Raw Materials which had the lowest share in this year also further declined to 7.43 percent from 8.26 percent. In case of China, with a share of 45.92 percent Capital goods continued to dominate the export composition of China. It was followed by Consumer goods with a share of 35.49 percent. Raw Materials with a share of 1.67 percent continued to have the lowest share in China's exports. As far as change in the share is concerned, there was a marginal increase in the share of Capital goods from 44.82 percent to 45.92 percent. But the share of Consumer goods declined from 37.77 percent to 35.49 percent. And finally, the share of Raw materials remained same at 1.67 percent.

To find out among the four types of goods which one was more dominant in India and China during these years we have used the Index of Rank Dominance. The table below shows the index values of these goods during the selected years.

Table 6.5b: Comparison of Index of Rank Dominance

Serial number	Goods	India	China
1	**Consumer goods**	0.93	0.86
2	**Intermediate goods**	0.82	0.76
3	**Raw materials**	0.79	0.57
4	**Capital goods**	0.71	0.79

Author's Calculation

Data Source: WITS-COMTRADE

On the basis of the above table, we find that in case of India, Consumer goods with index value of 0.93 was relatively most dominant good in India's exports during the period and it was followed by Intermediate goods with index value of 0.82. Capital good with index value of 0.71 was the least dominant good in India's exports. Similarly, in case of China's exports also Consumer goods was the most dominant good with index value of 0.86 and Capital goods was the second most dominant good with index value of 0.79. So, for both India and China the most dominant export item was Consumer goods, but they had different second most dominant goods in their respective exports. As far as the comparison of least dominant good is concerned then also these two countries had different least dominant goods. In case of India the least dominant good was Capital goods and in case of China it was Raw Materials.

6.4.6 Comparing sector wise RCA of India and China with the world:

Revealed comparative advantage(RCA) is another important indicator which helps us to understand the pattern of trade of different countries. Here we will discuss

the sector wise difference in RCA between India and China. For this we have considered RCA in different sectors of these countries for selected years in the period of 1992-2018.

In 1992 India had RCA in eight sectors of Stone and Glass, Minerals, Hides and Skins, Textiles and Clothing, Vegetable, Animal, Footwear, and Food Products. Whereas China had in six sectors of Footwear, Hides and Skins, Textiles and Clothing, Miscellaneous, Vegetable, and Minerals. There were five common sectors where both these countries had RCAs. These were: Footwear, Hides and Skins, Textiles and Clothing, Vegetables, and Minerals. Among these common sectors, only in the sector of Footwear where the value of China's RCA was greater than that of India's and all other four sectors' values of India's RCA were relatively higher than that of China's.

Table 6.6a: Sector-wise RCA of India and China (1992-2005)

Year	1992		1995		2000		2005	
Product Group	**India**	**China**	**India**	**China**	**India**	**China**	**India**	**China**
Food Products	1.21	0.87	0.74	0.63	0.95	0.53	0.65	0.38
Miscellaneous	0.17	1.63	0.23	1.90	0.27	1.71	0.25	1.48
Hides and Skins	5.04	4.85	5.24	5.09	4.06	4.79	3.11	3.62
Stone and Glass	5.82	0.61	6.16	0.62	6.37	0.69	7.27	0.78
Minerals	5.64	1.09	4.14	0.78	4.40	0.60	6.35	0.38
Animal	1.66	0.99	1.69	0.70	2.04	0.66	1.17	0.40
Transportation	0.12	0.08	0.22	0.10	0.19	0.15	0.28	0.17
Metals	0.92	0.65	0.83	0.77	1.12	0.84	1.25	0.86
Plastic or Rubber	0.33	0.59	0.40	0.70	0.54	0.81	0.74	0.70
Mach and Elec	0.16	0.53	0.19	0.81	0.22	1.08	0.27	1.66
Wood	0.12	0.45	0.15	0.42	0.21	0.53	0.22	0.59
Chemicals	0.76	0.52	0.80	0.46	1.25	0.40	1.14	0.36
Textiles and Clothing	4.02	3.75	4.14	3.26	4.22	2.96	3.62	2.67
Fuels	0.37	0.59	0.24	0.33	0.18	0.20	0.46	0.12
Vegetable	2.31	1.42	2.39	0.60	3.20	0.66	1.94	0.36
Footwear	1.65	7.78	1.97	8.10	1.79	6.96	1.62	4.83

Author's Calculation
Data Source: WITS-COMTRADE

India 1995, there were seven sectors where India had RCA. These sectors were: Stone and Glass, Hides and Skins, Minerals, Textiles and Clothing, Vegetables, Footwear, and Animal. On the other hand, China had RCA in Footwear, Hides and Skins, Textiles and Clothing, and Miscellaneous. There were three common sectors where both India and China had RCA. These sectors were: Footwear, Hides and Skin and Textiles and Clothing. In Footwear China had stronger RCA than India but in case of Hides and Skin and Textiles and

Clothing India's RCA was stronger than that of China in this year. In this year India lost RCA in one sector of Food Products and China lost RCA in two sectors of Vegetables and Minerals.

In 2000, India had RCA in nine sectors. These sectors were: Stone and Glass, Minerals, Textiles and Clothing, Hides and Skin, Vegetable, Animal, Footwear, Chemicals and Metals. On the other hand, China RCA in five sectors. They were Footwear, Hides and Skin, Textiles and Clothing, Miscellaneous and Machinery and Electricals. So, the common sectors in which both countries had RCA were Footwear, Hide and Skin, and Textiles and Clothing. Of the three, in two sectors of Footwear and Hides and Skin China had stronger RCA and in Textiles and Clothing India had stronger RCA. Again, as compared to 1995, India gained RCA in two more sectors of Chemicals and Metals. And China gained RCA in one sector of Machinery and Electricals.

Table 6.6b: Sector-wise RCA of India and China (2010-2018)

Year	2010		2015		2018	
Product Group	**India**	**China**	**India**	**China**	**India**	**China**
Food Products	0.74	0.31	0.70	0.28	0.59	0.30
Miscellaneous	0.24	1.36	0.33	1.25	0.38	1.40
Hides and Skins	2.43	2.95	2.50	2.14	2.33	2.08
Stone and Glass	5.22	0.65	3.56	0.50	4.00	0.51
Minerals	3.53	0.15	0.95	0.14	0.90	0.12
Animal	0.97	0.33	1.42	0.28	1.35	0.27
Transportation	0.46	0.32	0.55	0.28	0.57	0.32
Metals	1.00	0.86	1.23	1.05	1.33	0.95
Plastic or Rubber	0.55	0.72	0.63	0.79	0.76	0.85
Mach and Elec	0.37	1.90	0.34	1.90	0.39	1.96
Wood	0.27	0.65	0.27	0.66	0.31	0.64
Chemicals	1.20	0.45	1.55	0.48	1.64	0.54
Textiles and Clothing	3.33	2.71	3.34	2.22	3.16	2.10
Fuels	0.91	0.07	0.83	0.07	0.77	0.08
Vegetable	1.57	0.25	1.96	0.22	1.63	0.23
Footwear	1.56	4.05	1.62	2.97	1.49	2.63

Author's Calculation
Data Source: WITS-COMTRADE

In 2005, there was no change in the number of sectors where India had RCA. They remained same at nine. These sectors were: Stone and Glass, Minerals, Textiles and Clothing, Hides and Skin, Vegetables, Footwear, Metal, Animal and Chemicals. Similarly, the number of sectors were China had RCA also remained same at five. They were Footwear, Hides and Skin, Textiles and Clothing, Machinery and Electricals, and Miscellaneous. Again, the common sectors where both countries had RCA were Footwear, Hides and Skin and Textiles and Clothing. In this ear also China's

RCA were stronger in the sectors of Footwear and Hides and Skin and that of India in the sector of Textiles and Clothing. In this year the number of sectors both these two countries had RCA remained same as in 2000

In 2010, **(Table 6.6b)** India had RCA in eight sectors. These includes Stones and Glass, Minerals, Textiles and Clothing, Hides and Skin, Vegetables, Footwear, Chemicals and Metals. On the other had China continued to had RCA in five sectors. These includes Footwear, Hides and Skin, Textiles and Clothing, Machinery and Electricals, and Miscellaneous. In this year also the common sectors were both these countries had RCA were Footwear, Hides and Skin and Textiles and Clothing. And in this year also China continued to have stronger RCA in the sectors of Footwear and Hides and Skin and India in Textiles and Clothing. There was one sector as compared to 2005 where India lost its RCA. That sector was Animal sector.

In 2015 also India continues to have its RCA in eight sectors. These were: Stone and Glass, Textiles and Clothing, Hides and Skin, Vegetables, Footwear, Chemicals, Animal, and Metal. Even the number of sectors remain the same but in this year the sector of Minerals was replaced by the sector of Animal. On the other China had RCA in six sectors in this year. These were: Footwear, Textiles and Clothing, Hides and Skin, Machinery and Electricals, Miscellaneous and Metal. The new sector added was the Metal sector. In this year also there was no change in the common sectors where both these countries had RCA. These were Footwear, Hides and Skin, and Textiles and Clothing. Unlike the previous years, in this year India's RCA was stronger in Hides and Skin and in Textiles and Clothing, and China's RCA was stronger only in the sector of Footwear.

Finally, in 2018, the number of sectors were India had RCA continued to be eight. These includes Stones and Glass, Textiles and Clothing, Hides and Skin, Chemicals, Vegetables, Footwear, Animal and Metal. But there was reduction in number of sectors where China had RCA from six to five. These sectors were: Footwear, Textiles and Clothing, Hides and Skin, Machinery and Electricals, and Miscellaneous. The sector that lost RCA was Metal sector. The same three sectors of Footwear, Textiles and Clothing, and Hides and Skin were the common sectors where both these countries had RCA. Of these three again, India had stronger RCA in the sectors of Textiles and Clothing and Hides and Skin, and China had stronger RCA in the sector of Footwear.

So, during these selected years both these countries more or less had RCAs in the same types of sectors. India had RCA in more sectors than China. The common sectors where both these countries had RCA also did not change over the years. Among the

sixteen sectors, the number of sectors where these two countries had RCA was less than the number of sectors where these two countries lack RCA.

6.4.7 Direction of Exports:

The table shows the direction of exports of India and China for the selected years. In 1992 the top three export destinations among the seven sectors for India were: Europe & Central Asia with 31.85 percent share, then it was East Asia & Pacific with 21.84 percent share and the third was North America with 20 percent share. The region with least export share of India was Latin America and Caribbean. Its share was 0.86 percent i.e., not even one percent in 1992. On the other hand, the top three export destinations of China were East Asia and Pacific with 68.59 percent, then Europe and Central Asia with 12.82 percent and the third one was North America with 10.89 percent share. So, the top three export destinations for the two countries were common even though their ranking were different as the export destinations for these two countries. India's first and second major export destinations were China's second and first major destinations. The third major export destination was common for both the countries in 1992. The Sub- Saharan Africa was the region with least share in China's export.

In 1995, India's major three export destinations in order of their share were: Europe & Central Asia with 29.85, East Asia & Pacific 25.25, and North America 18.33. So, there was no change in the position of these regions as major export destinations for India, but their share had changed. Whereas there were decline in the shares of Europe and Central Asia and North America as compared to their shares in 1992, but the share of East Asia and Pacific had increased. In this year also Latin America and Caribbean remained the region with least share in India's exports with a share of 1.26 percent. For China, even though the major three export destinations remained same as in 1992, but their positions and share had chained in 1995. In this year East Asia and Pacific with 57.04 percent remained topmost destination but its share was relatively less than in 1992, North America with a share of 17.65 percent become the second major export destination of China and Europe and Central Asia with 15.07 percent share become the third major destination. So, the position of North America and Europe and Central Asia had been reversed in 1995 relative to their positions in 1992 in terms of their shares. Sub Saharan Africa continued to be the region with least share in China's exports.

Europe and Central Asia continued to be the topmost export destination of India in 2000 with a share of 28.53 percent followed by North America with 23.49 percent and East Asia and Pacific was the region with third highest share in India's exports. So, during this period there had been a decline in the share of Europe and Central Asia and that of East

Asia and Pacific and increase in the share of North America as compared to 1995. There was no change in the region with least share in India's exports. Latin America with a share of 2.81 percent remained the region with least share in India's exports. For China East Asia and Pacific continued to be the region with highest export share even though there was continuous decline in its share. Its share was 48.15 percent in this year as compared to 57.03 percent in 1995. North America continued to occupy the second position in terms of export share with a share of 22.20 percent which was an increase as compared to 17.65 percent in 1995. Even though there was an increase in the share of Europe and Central Asia to 18.72 as compared to 15.07 in 1995, it remained the third highest export destination for China. For China also, Sub- Saharan regions with a share of 1.42 percent remained the region with lowest share in China's exports.

Table 6.7 Comparison of Direction of Exports

Year	1992		1995		2000		2005	
Region	**India**	**China**	**India**	**China**	**India**	**China**	**India**	**China**
World	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
East Asia & Pacific	21.84	68.59	25.25	57.03	21.39	48.15	26.85	41.32
Europe & Central Asia	31.85	12.82	29.85	15.07	28.53	18.72	25.21	22.99
Latin America & Caribbean	0.86	1.26	1.12	2.10	2.09	2.85	2.81	3.05
Middle East & North Africa	10.58	2.54	9.64	2.46	12.25	3.09	16.17	3.65
North America	20.00	10.89	18.33	17.65	23.49	22.20	17.47	22.96
South Asia	4.17	1.28	5.47	1.69	4.06	1.52	5.38	2.09
Sub-Saharan Africa	2.87	0.98	4.52	1.19	4.16	1.42	5.26	1.74
unspecified	7.82	1.63	5.82	2.80	4.03	2.05	0.85	2.19
Year	**2010**		**2015**		**2018**			
Region	**India**	**China**	**India**	**China**	**India**	**China**		
World	100.00	100.00	100.00	100.00	100.00	100.00		
East Asia & Pacific	27.78	37.09	22.77	39.78	24.67	37.86		
Europe & Central Asia	21.07	24.30	20.02	19.25	20.92	20.71		
Latin America & Caribbean	4.20	5.77	4.13	5.75	4.09	5.93		
Middle East & North Africa	21.60	5.10	20.69	6.17	17.32	5.07		
North America	11.27	19.42	16.04	19.34	16.89	20.66		
South Asia	5.04	3.65	6.53	4.15	7.65	4.73		
Sub-Saharan Africa	6.43	2.78	7.85	3.45	6.42	3.00		
unspecified	2.60	1.90	1.98	2.12	2.05	2.04		

Data source: WITS-COMTRADE

In 2005, East Asia and Pacific become the region where India exported the most. Its share was 26.85 percent as compared to 21.39 percent in 2000. This region was

in third position in 2000. Europe and Central had the second highest share with 25.21 percent which was not much different from the share of East Asia and Pacific. In 2000, it was the topmost export destination in terms of share. The region of North America was the third major destination for India's export with a share of 17.47 percent. This region was in second position in terms of export share in 2000. Even though the share of Latin America and Caribbean increased to 2.81 percent from 2.09 percent , it continued to remain as the regions with lowest share in India's exports. In case of China also, the top three major export destinations in order of their share were East Asia and Pacific, Europe and Central Asia and North America which was the same order as that of India. But there were differences in their share. As far as the share of these three regions in China's exports are concerned, the share of East Asia and Pacific even though it remained the topmost destination continued to decline as compared to previous years to 41.32 percent. The share of Europe and Central Asia which was the second major export destination for China's had increased to 22.99 percent in 2005. Similarly, the share of third major export destination of China i.e., North America's share also increased marginally to 22.96 percent as compared to 22.20 percent in 2000. Sub – Saharan region continued to be the region with lowest share of China's exports even though there was increase in its share from 1.42 percent in 2000 to 1.74 percent in 2005.

In 2010, the three major export destinations for India's export were East Asia and Pacific, Middle East and North Africa and Europe and Central Asia. So, in this year North America was replaced by Middle East and North African regions as one of the three major export destinations for India. As compared to 2005, the share of East Asia and Pacific was increased to 27.78 percent from 26.85 percent in 2005. The share of second major export destination, Middle East and North Africa had also increase in 2010 to 21.60 percent but the share of Europe and Central Asia had declined in this year to 21.05 percent. So, in this year along with East Asia and Pacific and Europe and Central Asia, Middle East and North Africa also gained more importance as a major export destination of India. In 2010 also with a share of 4.2 percent continued to be the region with lowest share in India's exports. As compared to 2005, the share of this regions had increased to 4.20 percent in 2010. On the other hand, in case of China there was no change in the three major export destinations and their positions. East Asia and Pacific regions continued to be the top export destination with a share of 37.09 percent which was comparatively less than its share of 41.32 percent in 2005. Europe and Central Asia was the second major export destination with a share of 24.30 percent which was an improvement as compared to 22.99 percent in 2005. Even though America remained the third major export destination, but its share had declined in 2010 to 19.42 percent as compared

to 22.96 percent. With a share of 2.78 percent Sub Saharan Africa continued to be the least export Region for China. Even though it was an improvement as compared to 1.74 percent in 2005.

In 2015, the major three export destinations of India's export remained the same along with their position but share of all these three regions declined as compared to 2010. The share of East Asia and Pacific declined from 27.78 percent in 2010 to 22.78 percent in 2015 and that of Middle East and North Africa declined to 20.69 percent from 21.60 percent. Similarly, the share of Europe and Central Asia declined from 21.07 percent to 20.02 percent. Latin America and Caribbean which continue to be the regions with lowest share had a share of 4.13 percent. The three major export destination for China continue to be East Asia and Pacific which had the highest share of 39.78 percent followed by North America with a share of 19.24 percent and then Europe and Central Asia with a share of 19.25 percent. The share of East Asia and Pacific had comparatively increased during this year but that of North America and Europe and Central Asia declined. In this year also Sub-Saharan Africa had the lowest share in China's export with a share of 3.45 percent.

In the final year of 2018, the same three regions dominated India's exports. As before East Asia and Pacific had the highest share of 24.67 percent which was followed by Europe and Central Asia with a share of 20.92 percent and with a share of 17.32 percent Middle East and North Africa was the third major export destination for India's exports. Contrary to this, in 2015 Middle East and North Africa was second major export destination whereas Europe and Central Asia the third. In this year also Latin America had the lowest share in India's exports with a share of 4.09 percent. For China also the three major export destinations were East Asia and Pacific was the topmost region with a share of 3.86 percent, followed by Europe and Central Asia with a share of 20.71 percent and the region with third highest share was North America with a share of 20.66 percent. In this year there was not much difference between the shares of Europe and Central Asia and North America. Like before Sub-Saharan Africa was the region with lowest share in China's exports. Its share was only 3 percent in 2018.

So, there was no major change taken place in the export destinations of India and China. For India regions with major shares of exports were East Asia and Pacific, Europe and Central Asia, North America and Middle East and North Africa. On the other hand, the major regions for China's exports were East Asia and Pacific, Europe and Central Asia and North America. As far as the region with lowest share is concerned, it was Latin America and Caribbean for India and Sub- Saharan Africa for China in all the years considered.

6.4.8 Export Import Coverage:

Export import coverage: We will now compare the export import coverage of India and China for the said period. This will help us to understand whether the country's export is capable of covering its imports or not. The table below shows the values of export import coverage for India and China.

The table clearly shows that India's export was not enough in any of the years to cover its imports. The highest coverage was 95 percent in 1993 and lowest was 52 percent of the exports in 2018. On the other hand, China's export was capable of covering its import obligations except for one year in 1993. In this year its export covered 88 percent of its imports. Highest coverage for China was 135 percent in 2015 and lowest coverage was 88 percent in 1993. So, comparison shows that China had very strong export import coverage as compared to India.

Table 6.8: Comparison of Export Import Coverage

Year	India	China	Year	India	China	Year	India	China
1992	0.85	1.05	**2001**	0.87	1.09	**2010**	0.63	1.13
1993	0.95	0.88	**2002**	0.87	1.10	**2011**	0.65	1.09
1994	0.92	1.05	**2003**	0.82	1.06	**2012**	0.59	1.13
1995	0.87	1.13	**2004**	0.77	1.06	**2013**	0.72	1.13
1996	0.86	1.09	**2005**	0.71	1.15	**2014**	0.69	1.20
1997	0.84	1.28	**2006**	0.68	1.22	**2015**	0.68	1.35
1998	0.78	1.31	**2007**	0.67	1.28	**2016**	0.73	1.32
1999	0.74	1.18	**2008**	0.58	1.26	**2017**	0.66	1.23
2000	0.80	1.11	**2009**	0.66	1.20	**2018**	0.52	1.17

Author's Calculation
Data Source: WITS-COMTRADE

Now we will discuss the trend in export import coverage between India and China. In case of India in 1992 its coverage was 85 percent which increased to 95 percent in 1993 but after that it continuously declined from 92 percent in 1994 to 74 percent in 1999. This was a huge decline or gap between export and import. After that in 2000, there was an increase in the coverage to 80 percent which further increased to 87 percent in 2001. The coverage remained same as in 2001 in 2002. It was followed by decline in the coverage continuously from 82 percent in 2003 to as low as 58 percent in 2008. In 2009, there was some improvement in the coverage to 66 percent but then declined to 63 percent in 2010. In 2011, there was slight improvement in coverage to 65 percent. But again, it reduced to 59 percent. After improving to 72 percent in 2013, the coverage declined marginally first to 69 percent in 2014 and further to 68 percent in 2015. In 2016 it again improves to 73 percent but then it declined continuously for last two years to 66 percent in 2017 and further to as low as only 52

percent in 2018. So, India's export import coverage was weak and deteriorated most of the years throughout the period and could not cover its 100 percent import obligations in any of the years of the period.

China's export import coverage in 1992 was 105 percent which was more than required to cover its import obligations in that year. But it declined to 88 percent in 1993. This was the only year in case of China when its exports were unable to cover its import obligations. In 1994 it again reached 105 percent and further to 113 percent in 1995. After declining slightly in 1996 to 109 percent it again improved continuously for next two years to 128 percent in 1997 and further to 131 percent in 1998. Then in declined to 111 percent in 2000 and further to 109 in 2001. In 2002 it improved marginally to 110 percent but again declined to 106 percent in 2003 and continued in 2004. From 2005 to 2007 there was an improvement in coverage from 115 percent in 2005 to 128 percent in 2007. After this improvement the coverage declined continuously for next four years from 126 percent in 2008 to 109 percent in 2011. In 2012 and 2013 coverage remained at 113 percent but after that improved to 120 percent in 2014 and further to 135 percent in 2015. The last three years showed declining trend in coverage from 132 percent in 2016 to 117 percent in 2018. So, in case of China except for 1993, the coverage never falls short of the value of its imports. So, China's export import coverage was very strong as compared to that of India.

6.4.9 Export Market Penetration:

This index as calculated as the ratio of no of countries to whom a country exports a particular good and number of countries that import that particular good in a year. If the value of this index is zero, then the country is not exporting to any country and if it is 100 then it is exporting to maximum number of countries. The table below shows the export market penetration of India and China.

Table 6.9: Comparison of Export Market Penetration

Year	India	China	Year	India	China	Year	India	China
1992	7.44	12.15	**2001**	17.58	33.60	**2010**	27.22	53.70
1993	8.34	13.85	**2002**	18.63	35.72	**2011**	27.06	53.62
1994	9.82	16.24	**2003**	19.92	39.09	**2012**	27.52	53.53
1995	10.33	17.84	**2004**	20.49	41.66	**2013**	28.53	54.22
1996	11.29	19.34	**2005**	22.85	44.87	**2014**	28.56	54.50
1997	12.31	21.89	**2006**	23.80	48.42	**2015**	29.40	54.90
1998	13.18	23.69	**2007**	25.01	51.01	**2016**	29.83	55.27
1999	14.06	25.47	**2008**	25.77	51.22	**2017**	30.29	55.92
2000	16.74	31.10	**2009**	25.79	51.73	**2018**	29.95	54.51

Data Source: WITS- COMTRADE

The value of export market penetration had increased for both India and China from 1992-2018. The maximum value for India was 30.29 percent in 2017 and minimum was 7.44 percent in 1992. Similarly, the maximum value for China was 55.92 in 2017 percent and minimum was 12.15 in 1992. Co incidentally, both India's and China's maximum was registered in same year of 2017 and minimum in 1992. Now, we will consider trend in this index for both India and China.

For India, in 1992, the penetration was only 7.44 percent which increased to 10.33 percent in 1995. It further increased to 16.74 percent in 2000 and reached 22.85 percent in 2005. In 2010 the penetration was 27.22 percent and in 2015 it was 29.40 percent. Finally in 2018 penetration was 29.95 percent. So, India's export market penetration had increased over the years from 1992 to 2018 but still it was around 30 percent only.

For China, in 1992 the penetration was 12.15 percent which increased to 17.84 percent in 1995. After that it increased sharply to 31.10 percent in 2000 and reached 44.87 percent in 2005. In 2010 it reached 53.70 percent which was more than 50 percent of the export market penetration. In 2015 its penetration was 54.90 percent. And finally in 2018 its penetration was 54.51 percent. China's export market penetration crossed 50 percent mark from 2007 and continued till 2018. Its penetration was below 30 percent from 1992 to 1999 and from 2000 to 2006 it was below 50 percent and after 2007 onwards its penetration was 50 percent and above.

So, China's penetration during the period of 1992-2018 was comparatively much higher than India's penetration. And the gap between China's penetration and that of India's penetration had widened over the years. This means that rate of increase in China's penetration was higher than that of India. In this indicator also China performance was superior to that of India.

6.4.10 Export Propensity Index:

The table below shows the export propensity index of India and China in the world. Here we will discuss and compare export propensity index of India and China in the world.

The highest value of this index for India was 18.13 and lowest was 7.19. The value was 7.19 in 1992 which increased continuously for next three years from 7.96 in 1993 to 8.80 in 1995. It was followed by three years continuous decline from 8.52 in 1996 to 7.88 in 1998. After that the value again improved to 9.04 in 2000 and in 2001 it remained same at 9.04 then the value showed continuous improvement for next five years from 9.73 in 2002 to 12.89 in 2006. In 2007 the value declined to 11.99 but again improved to 15.17 in 2008. The

value declined continuously for next two years first to 13.17 in 2009 and then marginally to 13.15 in 2010. It again improved to 16.54 in 2011 followed by decline in value to 15.84 in 2012. After that the value again improved to 18.13 in 2013. This improvement was followed by continuous decline in the value for next four years from 15.57 in 2014 to 11.10 in 2017. Finally in 2018 there was improvement in the value of this index to 11.93. On the basis of this discussion, we can say that the value of export propensity index for India had increased for most of the years during the given period, but it never crossed 20 in any of the years. So even though the dependence of India's producers in world market had increased over the years but this dependence was not very high.

First, we will discuss it for India and then for China and finally we will compare them.

Table 6.10: Comparison of Export Propensity Index

Year	India	China	Year	India	China	Year	India	China
1992	7.19	19.90	**2001**	9.04	19.87	**2010**	13.15	25.92
1993	7.96	20.63	**2002**	9.73	22.14	**2011**	16.54	25.14
1994	8.05	21.44	**2003**	9.77	26.39	**2012**	15.84	24.01
1995	8.80	20.25	**2004**	10.70	30.34	**2013**	18.13	23.08
1996	8.52	17.49	**2005**	12.23	33.33	**2014**	15.57	22.36
1997	8.37	19.01	**2006**	12.89	35.21	**2015**	12.57	20.55
1998	7.88	17.86	**2007**	11.99	34.36	**2016**	11.34	18.67
1999	8.05	17.82	**2008**	15.17	31.14	**2017**	11.10	18.39
2000	9.04	20.57	**2009**	13.17	23.55	**2018**	11.93	17.95

Author's calculation
Data Source: WITS-COMTRADE

In case of China, the highest value of the index was 35.21 in 2006 and lowest was 17.49 in 1996. The trend shows that in 1992 the value was 19.90 which increased continuously for next two years first to 20.63 in 1993 and then to 21.44 in 1994. After that it declined continuously for next two years first to 20.25 in 1995 and then to 17.49 in 1996. In 1997 it improved to 19.01 but again declined continuously for next two years first to 17.86 in 1998 and then to 17.82 in 1999. It again improved to 20.57 in 2000 but declined again to 19.87 in the very next year of 2001. This was followed by continuous improvement in the value for next five years from 22.14 in 2002 to 35.21 in 2006. The next three years showed continuous decline in the value of the index from 34.36 in 2007 to 23.55 in 2009. IN 2010 the value again improved to 25.92 but after that it declined continuously for next eight years from 25.14 in

2011 to 17.95 in the final year of 2018. This discussion shows that the value of this index improved for most of the years during this period for China but in the later years it showed declining trend. This means that in most of the years there was increase in the dependence of China's domestic producers in world market, but the later years of the period showed declining trend in the dependence of domestic producers in world market for China.

Comparing the values of index for India and China we find that the value of index for China was higher than India in all the years of the period. This means that the dependence of domestic producers of China was relatively higher than that of India or the dependence of domestic producers of India was relatively lower than that of China. This may make China's domestic producers relatively more vulnerable than India to the external shocks.

6.4.11 The Herfindahl-Hirschman Index (HHI):

This index is the measure of market concentration. Higher value of the index means the market is concentrated in fewer firms and smaller the value of this index more competitive will be the market of the concerned country. Here we will discuss HH index of India and China for the given period of 1992-2018.

The table shows that in 1992 the value of HHI was 0.12 then it declined to 0.07 in 1995. In 2000 also the value was 0.07 but in 2005 in declined to 0.06. There was further decline in the value to 0.04 in 2010. After that the value increased to 0.05 in 2015 and in 2018 the value remained at 0.05. This means that India's market had become more competitive over the years even though in 1992 also as the value of HHI was low so India's markets were competitive during that time also. But over the years it has become even more competitive.

Table 6.11 Comparison of The Herfindahl-Hirschman Index (HHI)

Year	India	China	Year	India	China	Year	India	China
1992	0.12	0.19	**2001**	0.06	0.13	**2010**	0.04	0.06
1993	0.09	0.21	**2002**	0.07	0.12	**2011**	0.04	0.06
1994	0.08	0.19	**2003**	0.06	0.11	**2012**	0.04	0.06
1995	0.07	0.17	**2004**	0.06	0.10	**2013**	0.04	0.06
1996	0.06	0.17	**2005**	0.06	0.09	**2014**	0.05	0.06
1997	0.06	0.16	**2006**	0.05	0.09	**2015**	0.05	0.07
1998	0.07	0.16	**2007**	0.05	0.07	**2016**	0.06	0.08
1999	0.08	0.15	**2008**	0.04	0.07	**2017**	0.05	0.06
2000	0.07	0.14	**2009**	0.04	0.07	**2018**	0.05	0.06

Data Source: WITS-COMTRADE

In case of China the value of HHI was 0.19 in 1992 which declined to 0.17 in 1995 and further to 0.14 in 2000. In 2005 the value further declined to 0.09. It reached

0.06 in 2010 but increased to 0.07 in 2015 and in final year of 2018 the value declined to 0.06. This means that the value of HHI for China also declined over the years and its market also become relatively more competitive in later years.

Now comparison of value of HHI between India and China shows that the China's market was relatively more concentrated than India's market throughout the period but over the years the gap between them reduced. In other words, the markets of both India and China become more competitive over the years as their values of HHI declined. And on the basis of values of HHI we can say that India's market was relatively more competitive than that of China during this period.

6.4.12 Trade Dependence Index:

This index is also known as Openness index and is defined as the value of total trade as a percentage of country's GDP. This index measures the openness of an economy in the world. The table below shows the values of trade dependence index of India and China in percentage terms for the given period of 1992-2018.

Table 6.12 Comparison of Trade Dependence Index (%)

Year	India	China	Year	India	China	Year	India	China
1992	14.99	38.77	**2001**	19.31	38.05	**2010**	34.41	48.86
1993	15.88	44.00	**2002**	20.54	42.21	**2011**	42.09	48.23
1994	15.85	41.93	**2003**	21.64	51.26	**2012**	43.03	45.32
1995	18.13	38.24	**2004**	24.88	59.05	**2013**	42.02	43.46
1996	18.08	33.56	**2005**	29.56	62.2	**2014**	38.53	41.06
1997	18.38	33.81	**2006**	31.93	63.97	**2015**	31.47	35.74
1998	18.14	31.48	**2007**	31.19	61.31	**2016**	27.29	32.81
1999	18.01	32.96	**2008**	43.03	55.79	**2017**	28.25	33.36
2000	20.05	39.15	**2009**	31.46	43.27	**2018**	31.07	33.27

Data Source: WITS-COMTRADE

In 1992 the value was 14.99 percent for India which increased to 18.13 percent in 1995. It further increased to 20.05 percent in 2000. The value increased to 29.56 percent in 2005 which further increased to 34.41 percent in 2010. There was a decline in the value of this index in 2015 to 31.47 percent and further to 31.07 percent in 2018. The maximum value was registered in 2008 and 2012 at 43.03 percent and minimum in the first year of the period i.e., in 1992 at 14.99 percent. The trend in the value of this index shows that during this period India had gradually opened to the world as openness index increased from 15 percent to as high as 43 percent. The change was more visible between 2002 to 2012 when the value of this index increased from 20.54 percent to 43.03 percent even though there were fluctuations in between. After the value declined continuously for next four years from 42.02 percent in

2013 to 27.29 percent in 2016. The value increase in the last two years to 28.25 percent in 2017 and further to 31.07 percent in 2018.

In case of China the value of the index in 1992 was 38.7 percent but declined to 38.24 percent in 1995. There was slight improvement in its value to 39.15 percent in 2000 but after that in 2005 there was a sharp improvement to as high as 62.2 percent. In 2010 the value again declined to 48.86 percent which further declined to 35.74 percent in 2015 and again in the final year of 2018 to 33.27 percent.

Now let us consider the trends in the value of trade dependence index in China. The value declined from 44 percent in 1993 to 31.48 percent in 1998 after than it increased for the next two years to 32.96 percent in 1999 and further to 39.15 percent in 2000. Then it declined to 38.05 percent in 2001. After that the value increased continuously from 42.21 percent in 20002 to 63.97 percent in 2006. It declined for the next three years after that and reached 43.27 percent in 2009. The value again increased to 48.86 percent in 2010 but then it declined continuously from 48.23 percent in 2011 to 32.81 percent in 2016. In 2017 it increased slightly to 33.36 percent but again declined marginally to 33.27 percent. So, the value of trade dependence index for China was more than 30 percent throughout the period and it reached as high as around 64 percent. In the period between 2002 to 2014 the value was above 40 percent, and this was the period when the value grew more rapidly and even reached its maximum.

Comparing India and China on this index shows that during the study period, the value of this index increased for both the nations. And even though the performance of China was relatively better than India but improvement in the performance of India was clearly visible as the gap between the value of China and India for this index was found to be reduced over the years. Even though India's performance in this index improved over time but we have to conclude that during the study period China was relatively more open than India.

6.4.13 Trade Entropy Index (TEI):

This is an index of geographical concentration or dispersion of exports. If a country's exports are diversified, then it will exhibit higher trade entropy index and vice versa. The table below shows the TEI for India and China for the given period.

The table shows that the value of TEI was more than 1 for both India and China. This means that the exports of both these countries were diversified across the geographical locations, and we had already discussed that in direction of exports section.

In 1992, the value of TEI for India was 1.74 which increased to 1.76 in 1995. In 2000 it remained at 1.76. But in 2005 its value declined marginally to 1.75. There was

an improvement in the TEI value for India in 2010 to 1.82 which further improved to 1.87 in 2015. The value declined marginally to 1.86 in 2018. During this period the highest value of TEI was 1.89 in 2011 and lowest value was 1.67. Trend shows that the value continuously increased from 1.73 in 1992 to 1.80 in 1998 then declined to 1.67 in 1999. After that it increased to 1.76 in 2000 and further to 1.82 in 2001. The value declined for the next two years to 1.78 in 2002 and further to 1.76 in 2003 In 2004 in increased to 1.77 but again declined to 1.5 in next year. The value again increased continuously from 1.78 in 2006 to 1.89 in 2011. After declining in 2012 to 1.84 it again increased to 1.87 and continued with that for next two years. In 2016 there was a decline in value to 1.86 and further to 1.84 in 2017 Then finally in 2018 it again increased to 1.86. It clearly shows that India's export was diversified not only during the early years of the period, but it become relatively more diversified in the latter half of the period.

Table 6.13: Comparison of Trade Entropy Index

Year	India	China	Year	India	China	Year	India	China
1992	1.73	1.08	**2001**	1.82	1.43	**2010**	1.82	1.64
1993	1.74	1.35	**2002**	1.78	1.44	**2011**	1.89	1.65
1994	1.74	1.30	**2003**	1.76	1.46	**2012**	1.84	1.64
1995	1.76	1.31	**2004**	1.77	1.48	**2013**	1.87	1.62
1996	1.77	1.31	**2005**	1.75	1.50	**2014**	1.87	1.65
1997	1.79	1.33	**2006**	1.78	1.54	**2015**	1.87	1.67
1998	1.80	1.42	**2007**	1.79	1.58	**2016**	1.86	1.66
1999	1.67	1.41	**2008**	1.80	1.61	**2017**	1.84	1.67
2000	1.76	1.41	**2009**	1.82	1.62	**2018**	1.86	1.67

Author's Calculations
Source: WITS-COMTRADE

The value of TEI in 1992 was 1.08 for China which increased to 1.31 in 1995 and further to 1.41 in 2000. The value reached 1.50 in 2005 and again increased to 1.64 in 2010. There was further improvement in the value in 2015 to 1.67. In the final year of 2018 the value remained at 1.67. The trend shows that the value increased from 1.08 in 1992 to 1.35 in 1993 but declined to 1.30 in 1994. From 1995 it again improved from 1.31 to 1.42 in 1998. after that it declined to 1.41 in 1999 and remained same in 2000. Interestingly, from 2001 up to 2011 there was continuous improvement in the value of TEI from 1.43 in 2001 to 1.65 in 2011. n 2012 The value again declined to 1.64 and even further to 1.62 in 2013. In 2014 it again increased to 1.65 and further to 1.67 in 2015. The year of 2012 showed marginal decline in the value of TEI to 1.66. which was compensated by a marginal increase in the value to 1.67 in 2017. There was no change in the value in 2018

The comparison shows that India outperformed China in this index as the value of this index for India was higher than that of China for the entire period. But over the years the gap had been narrowed between the two. So, from this discussion we can conclude that during the given period India's exports was relatively more diversified than that of China's exports.

6.4.14 Export Similarity Index:

The last index that we have employed in our analysis is called Export Similarity Index (ESI). This index helps us to understand the extent of competition between India and China in the world market. If the value of this index is high , the competition between the two countries will be high and vice versa.

Now, we will discuss the trend in this index. The value of index was 0.79 in 1992 which reduced to 0.73 in 1993. After that it increased continuously for next two years, first to 0.74 in 1994 and then to 0.76 in 1995. It was followed by decline in value to 0.72 in 1996. In 1997 the value remains same at 0.72 and then increased marginally to 0.73 in 1998. There was a deterioration in value in 1999 to 0.67 but after that there was continuous improvement in value for next two years, first to 0.69 in 2000 and then to 0.71 in 2001.

Table 6.14: Export Similarity Index(ESI)

Year	ESI	Year	ESI	Year	ESI
1992	0.79	**2001**	0.71	**2010**	0.65
1993	0.73	**2002**	0.67	**2011**	0.67
1994	0.74	**2003**	0.68	**2012**	0.66
1995	0.76	**2004**	0.68	**2013**	0.67
1996	0.72	**2005**	0.67	**2014**	0.70
1997	0.72	**2006**	0.67	**2015**	0.70
1998	0.73	**2007**	0.66	**2016**	0.69
1999	0.67	**2008**	0.67	**2017**	0.68
2000	0.69	**2009**	0.66	**2018**	0.69

Author's Calculations
Source: WITS-COMTRADE

In 2002 the value declined to 0.67 which increased to 0.68 in 2003 and same value was continued in 2004 as well. Then in 2005 the value declined marginally to 0.67 which continued in 2006 as well then in 2007 a marginal decline took place and value become 0.66 which again increased marginally to 0.67 in 2008. After that the value declined continuously for next two years, first to 0.66 in 2009 and then to 0.65 in 2010. In 2011 it again improved to 0.67 but again declined to 0.66 in 2012. The fluctuation continued and in 2013 it again improved to 0.67 which further improved to 0.70 in 2014. The value remains same in 2015 at 0.70. Then there was continuous decline in the value for next two years, first to 0.69 in

2016 and then to 0.68 in 201. In 2018 there was marginal improvement in value to 0.69. So, the value of this index remains high during the study period. And also, it was observed that there was no large fluctuation in the value of this index. This means that India's competition with China in the world remain high throughout the period.

6.5 Conclusion:

In this chapter we compared the export performances of India and China in the world using various trade related indices. The comparison of shares of exports of India and China shows that China's share in the world exports was much higher than that of India. It was found that even the lowest share of China exports was higher than highest share of India's exports in the world during the period. As far as comparison of growth in exports are concerned, we found that there were not many differences in growth rates of two countries. Growth rates were 11.13 percent and 13.88 percent at CAGR for India and China respectively. Comparison of export volume index revealed that India's exports increased as high as 16 times relative to its value in base year of 1992. Similarly, China's exports increased as high as 29 times more than the value in base year of 1992. So, performance of China in this case was much better than India. Another observation that we made was with respect to composition of exports. Our comparison of export composition of two nations shows that, the stage of processing level, consumer goods was the most contributing export sector for both the nations. So, India may face most of the competition in this sector from China.

Again, our study finds that both India and China had comparative advantages in same types of exports sectors which means that India faces fierce competition from China in these sectors. This result is further confirmed by export similarity index. As far as comparison of openness is concerned China was found to be more open than India but the comparison of export diversification shows that India's exports were relatively more diversified than that of China. We also analyze the vulnerability of domestic producers of these two nations and found that the domestic producers of China were relatively more vulnerable to external shocks than that of India. So, during the study period not only China outperformed India in export performances in the world market, but India faced also faced fierce competition from China in the world market. Comparatively India was found to be much weaker than China in world exports.

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Appendix:

i) Growth rate of exports:

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 period; X^1 is the bilateral total export flow in the end 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.

ii) 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. 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.

iii) Export Import 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.

iv) Export Market Penetration:

This index as calculated as the ratio of number of countries to whom a country exports a particular good and number of countries that import that particular good in a year. If the value of this index is zero, then the country is not exporting to any country and if it is 100 then it is exporting to maximum number of countries

v) Export Propensity Index:

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.

vi) The Herfindahl- Hirschman Index:

This index is the measure of geographical concentration of exports. This tells us the degree to which a region or country's exports are dispersed across different destinations. This index is defined as the square root of the sum across destinations of the squared export share for the region under study to all destinations. This index is given by

$$\sqrt{\sum\nolimits_d \left[\frac{\sum_s X_{s\,d}}{\sum_{sw} X_{sw}}\right]^2}$$

Here, s is the set of source countries under study; d is the set of destinations; w is the set of countries in the world; and X is the bilateral flow of exports form the source to the destination. The value of

this index lies between o and 1. Higher value of this index indicates that exports are concentrated on fewer markets and lower value indicates exports are diversified.

vii) 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

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

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 $+\infty$

viii) Revealed Comparative Advantage(RCA):

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 we 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.

ix) Trade Entropy Index:

This index is a measure of the ''geographical concentration'' or dispersion of exports. This measure tells us the degree of integration of a country in study with the world economy and it can be used to understand the vulnerability of the country in question to external shocks when it relies on limited number of partners. This index is calculated by summing the export shares multiplied by natural log of the reciprocal of the export share (this is a weight which decreases with the size of the share) of the country under stud across all destinations. This can be expressed as

$$\sum_d \left(\frac{\sum_s X_{sd}}{\sum_{sw} X_{sw}}\right) \ln \left(\frac{1}{\sum_s X_{sd} / \sum_{sw} X_{sw}}\right)$$

Here, s is the set of source countries under study; d symbolizes set of destination countries; w is the set of countries in the world; X is the bilateral export flow from source country to destination country. The sets d and w contain the same elements as we want to sum over all destinations. Entropy index can be calculated using imports or exports shares as well. This index takes the values ranging from 0 to $+\infty$.

Higher value of this indicator means greater uniformity in geographical dispersion of exports. Maximum value of this index indicates that the export share in every market is same.

x) Export Similarity Index:

This index measures the degree of similarity between the export profiles of two economies .The more similar the export profile of two economies, more likely that they are competitors in global market. It is the sum over export categories of the smaller of the sectoral exports share (as a percentage) of each country under study. This index is given by

$$\sum_i min\left(\frac{\sum_w X_{isw}}{\sum_w X_{sw}}, \frac{\sum_w X_{idw}}{\sum_w X_{dw}}\right) \text{ x } 100$$

Here, d and so are the countries of interest, w is the set of all countries in the world, i is the set of industries; x is the commodity export flow; and X is the total export flow. As far as the range of values of this index is concerned , a value of 0 indicates no overlap in the export profile and countries are considered as not competitors. And a value of 100 indicates that two countries are fierce competitors.

Chapter 7: Summary, Recommendation and Conclusion

7.1 Introduction:

In this chapter we will summarize what we did in this work and then we make some recommendations based on the findings of the study and finally we conclude. There are seven chapters in this study (including this chapter). Except for chapter 01 which is introduction and chapter 07 which is summary, recommendation, and conclusion, in each of the remaining chapters we have examined and analysed various aspects of India China trade relations. Now we will make a summary of these chapters.

7.2 Summaries of the chapters:

As first chapter is introductory one, and this one is the last chapter so we will summarize from chapter 02 to chapter 06.

a. Summary of Chapter 02:

In chapter 02 we analysed the performance of India's trade during the period between 1992-2018 using various measures and trade indices. Our study shows that the performance of both exports and imports and thus of total trade improved considerably during the period. As far as exports is concerned it grew at 11.3 percent at CAGR and import grew at 13.65 at CAGR. This means that India's imports grew faster than India's exports. In case of share in world trade, India's performance was dismal as it fluctuated around 2 percent throughout the period. Comparing the shares of exports and imports during this period shows that the share of imports was relatively higher than that of exports. Even though share of India's trade was stagnated during the period but both exports and imports grew tremendously during the said period. This is reflected in the export value index (EVI) and import value index (IVI) during the period. With the value of 1992 as base, we found that the EVI increased as much as 1556.12 in 2018 i.e., as compared to the value of base year India's export was more than fifteen time higher in 2018. On the other hand, India's imports were more than twenty-one times higher. So even though both exports and import grew tremendously but the growth in imports was higher than that in exports. To find out whether India's exports were adequate to cover its imports we calculated import Export- Import Coverage (EIC) index. It shows that India's exports during the period was never enough to cover its import bills. In fact, throughout the study period the value of EIC was less than one, which is the indication that India's exports never met its import obligations during the period. Another important measure was India's comparative advantage as measured by RCA. Our study found that India had RCA throughout

in all the selected years were Stone and Glass, Hides and Skin, Textiles and Clothing, Vegetable. and Footwear. Whereas in the sector of Fuels, Plastic or Rubber, Machinery and Electricals, Miscellaneous, Transportation and Wood, India has comparative disadvantage. In the sectors like Minerals and Animal India had comparative advantage in the early years but advantage was lost in the later years. On the contrary in the sectors like Metals and Chemicals India gained comparative advantages in the later years. During the study period India's trade was found to be diversified across many countries rather than concentrated in few countries. We come to this conclusion on the basis of the Hirshman Herfindahl Index. Not only India's trade had diversified during the period, but its exports was also seen to be diversified as shown by another index that we have used – Trade Entropy Index. The index that we used to find out the reliance of domestic producers in foreign markets was called Export Propensity Index (EPI). We found that there was increase in the value of this index during the study period which means that the reliance of domestic produces had increased over the years during the study period. On the basis of Import Penetration Index (IPI), we found that during the given period there was increase in reliance on imports for satisfying domestic demand. Increase in the value of this index is a cause of concern as it makes Indian economy vulnerable to external shocks.

As far as composition of India's exports and imports were concerned. The top export sectors of India during the first five years were in order of their share Textiles and Clothing, Stone and Glass, Vegetables, Chemicals and Metals. In the last five years it was Stone and Glass, Fuels, Chemicals, Textiles and Clothing, and Machinery and Electricals. So, some changes were observed in India's export composition over the years. The top export sectors constituted more than 60 percent of India's total exports throughout the period. On the other hand, the top import sectors of India during the first five years were Fuels, Machinery and Electricals, Chemicals. Stone and Glass and Metals. In the last five years the top imports were Fuels, Machinery and Electricals, Stone and Glass, Chemicals, and Metals. So, there was not much change found in composition of India's top imports. These top imports constituted more than 70 percent of India's imports throughout the period.

During the study period there was no significant change found in India's direction of both exports and imports Our study shows that during the first five years the regions of East Asia and Pacific, North America and Europe and Central Asia were the top three export destinations of India and in the last five years the top three destinations were East Asia and Pacific, Europe and Central Asia and Middle East and North Africa. So, over the years Middle East and North Africa become relatively more important export destination for India than North America. Continuous improvements were seen in the export's shares of South Asia, Latin

America and Caribbean, and Sub- Saharan Africa during the period. Similarly, India's top three imports destinations were the regions of Europe and Central Asia, East Asia and Pacific, and Middle East and North Africa during the first five years. During the last five years these destinations were East Asia and Pacific, Middle East and North Africa and Europe and Central Asia. So, there was no change in top three import destinations of India during the study period.

b. Summary of Chapter 03:

Chapter- 03 was on the India- China trade relations. In this Chapter we examined India's complementary trade relationship with China during the given period. We conclude this chapter by making following observations. The share of China in India's total export was relatively higher than India's share in China' total exports. But the size of the share was not. Similarly, the share of China in India's total imports was found to be significantly higher than the share of India in China's total imports. India was importing relatively more from China as compared to China's imports from India. So, 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 growth rate of India's exports to China was 19.54 percent at CAGR during the stud period but the growth rate of India's imports was 28.23 percent at CAGR during the same period. The comparison of export value index and import value index shows that India's exports to China grew as high as 110 times of the export value of 1992, on the other hand India's import value grew as high as 642 times of the import value of 1992. The study shows that India's imports rise much faster than India's exports during the period.

The export composition shows that India's exports to China was dominated by Intermediate goods and Raw materials throughout the period even though over the years the shares of Capital goods and Consumer goods improved at the costs of shares of Intermediate goods and Raw materials. In 2018 the share of Consumer goods was higher than that of Raw Materials. India's import from China during the given period was dominated by Intermediate goods and Raw Materials in the early years but at the latter years the shares of Capital goods and Consumer goods also increased at the expense of Raw materials and Intermediate goods. The share of Capital goods increased so much that after 2001 it had second highest share replacing Raw materials and from 2006 onwards it had the highest share in India's imports from China. So, there was notable change observed in India's imports from China during the period.

On the basis of Export Propensity index and Import Penetration index our study concludes that both Indian producers and Indian consumers were vulnerable to shocks in China's domestic market. The Import Export coverage index reveals that except for 1992 India's exports to China never matched its import from China. Rather over the years the value of this index declined signifying that India's balance of trade deficit with China had widened over the time. Situation was so worse during 2007- 2018 that during this period India's export to China failed to cover even 50 percent of its import from China. And in the last four-year India's exports to China was not able to cover even 20 percent of India's imports from China.

On the basis of the Trade Dependence index, we observe that India's dependence on China increased over time, but it was not very significant as compared to India's overall dependence. This again conforms that India's economy is relatively more vulnerable to shock in world economy than shock in economy of China. Another index that we employed was Trade Intensity Index to find whether the bilateral trade flow between India and China were as expected or not. This index also confirmed to other previous indices and concludes that bilateral trade flow between India and China was less than expected in majority of the years during the period. We compared the relative importance of India and China in each other's trade with the help of Trade Complementarity index. This index reveals that for India China is an important partner but for China, India is not an important partner.

We also analysed the diversification of India's exports to China using Herfindahl-Hirschman Product Concentration Index. It shows that even though India's exports to China was diversified throughout the period, but diversification was not smooth i.e., in some years diversification was relatively high and in some was relatively less diversified. To find the comparative advantage of India with respect to China we employ Revealed Comparative Advantage index. It revealed that throughout the period India had strong comparative disadvantages in Capital goods and Consumer goods. India had clear comparative advantage in Intermediate goods throughout the period (except for 1992) and it improved over time. India also had strong comparative advantages in Raw materials for majority of the years and it lost its comparative advantage from 2014 onwards. We also made a comparison of tariffs imposed by India and China to each other using MFN weighted average tariff. It shows that India's tariff was relatively much higher than China in the early years but over the years the gap was narrowed. This conclusion is true not only for aggregated tariff but is also true from individual good -wise tariff.

c. Summary of Chapter 04:

In chapter 04 we discussed various aspects of intra-industry trade between India and China for the given period of 1992-1018. First thing that we found in this discussion was that the share of Intra- industry trade was less than that of inter industry trade throughout the period. In other words, the share of this type of trade was less than 50 percent of the total trade during the given period. The share was between 20 percent to 35 percent in most of the years during this period. the intra industry trade between India and China was not very low rather it was moderate. Next, we discussed the intra- industry trade within a sector for the sixteen sectors. Here, we considered the average share for five-year period. The analysis showed that there was variation in the share of intra-industry trade among these sectors. Some sectors have high average share, and some had low average share. On the basis of their average value, we have divided these sectors into three groups. In first group we have following sectors: Minerals, Wood, Animal, Miscellaneous, and Machinery and Electricals. The average share of IIT in these sectors lie between 0 to 29 percent. Similarly, in second group we have Stone and Glass, Fuels, Chemicals and Plastic or Rubber. The average share of these sectors lies between 30 to 49 percent. Lastly, in third group we have Food and Products, Metals, Footwear. Textiles and Clothing, Vegetables, and Hides and Skins. The average share of IIT in these sectors lie between 50 to 75 percent. The first group of sectors are the sectors with low IIT, second group with moderate IIT and the third group are the sectors with high IIT.

Another thing that we analysed in this chapter was the share of HIIT and VIIT. Here we found that the percentage of sectors exhibiting VIIT was much higher than the sectors exhibiting HIIT throughout the period. This means that intra- industry trade between India and China was VIIT dominated rather than HIIT. After we have found that intra- industry trade between India and Chian was VIIT dominated, we again analysed the shares of VIITH and VIITL, which are the two types of VIIT. Here, the analysis showed that VIITL dominated the sectors exhibiting VIIT from 1996- 2005 and from 2006-2018 VIITH was dominant. As the sixteen sectors that we had considered for this analysis exhibited both HIIT and VIIT (VIITH or VIITL) at different years of the given period, for our final analysis we discussed what type of IIT was exhibited by each of these sectors. For this analysis we had divided the entire period between 1997-2001 into four sub periods of five year each and one period of three years. Here we found that among the sixteen sectors, there was not a single sector which exhibited HIIT for entire period of five years in any of the periods. On the other hand, many sectors exhibited VIIT for entire years of the period. This includes the exhibition of both VIITH and VIITL in all the five years of particular period. Along with this we also found that some

sectors exhibited both VIIT and HIIT in different years of a particular period. Not only that but some sectors also exhibited VIITH and VIITL in different years of a particular period. In conclusion, we can say that India had moderate intra-industry trade with China and the nature of IIT between these two countries was dominated by VIIT rather than HIIT. This result confirms the conclusions of studies by Veeramani (1999) where VIIT was found to be the dominant type of India's IIT. As far as the types of VIIT is concerned, even though in the former years of the period VIITL was dominant but in the latter years, VIITH was dominant.

d. Summary of Chapter 05:

In chapter 05 we analysed the long-run equilibrium relationship between India's import and export with China for the period of 1996-2018 with quarterly data. The method that we used for this analysis was Engel- Granger (1988) Cointegration test. The Augmented Dickey- Fuller (1980) test was used to find out the stationarity of the variables. We found that both the variables were non – stationary at level but stationary at first difference. This means that both variables were integrated of order I i.e. I (1) at level and integrated of 0 i.e., I (0) at first difference. The cointegration test revealed that there exists cointegration between the two variables during the given period. As cointegration relationship was established between the given variables, we further go for error correction model to see whether the disturbances between long- run and short- run is corrected. It was found that 25 percent of the disturbances between long- run and short run were corrected within the quarter of the period during the study period.

e. Summary of Chapter 06:

In chapter 06 we compared the trade performances of India and China during the period between 1992-2018 with a focus on export performances of the two countries. Various trade related indices and other measures were used for this purpose. As far as the comparison of shares of these two countries in the world trade is concerned, our study shows that the share of China in the world trade was relatively much higher than that of India during the study period. The pattern shows that while on the one hand India's share stagnated of fluctuate around same low value on the other hand China's share in the world trade increased rapidly, particularly after its accession to WTO in 2001. It was seen that even the highest share of India (2.34 percent) was lower than lowest share of China (2.88 percent). Same pattern was seen in export performances of the two countries. Here also India's highest share was found to be less than China's lowest share. On the one hand China's lowest share was five times higher than India's lowest share and China's highest share was six times higher than India's highest

share. Even China's lowest share was almost double than that of India's highest share. So, it is clear that India had no competition with China in the world export market.

Even though India's share in the world exports was not significant but its growth rate was as comparable to growth rate of China. We found that the growth rate of India's exports during the study period was slightly lower than China. India's growth rate was 11.13 percent at CAGR as compared to 13.88 percent of China at CAGR. Growth in the exports can also be seen from the comparison of Export Value Index of India and China. The comparison shows that India's exports increased as high as sixteen times more than its value in 1992. On the other hand, China's exports increased as high as twenty-nine times more than it value in 1992. This confirms the dominance of China in export performance over India.

If the composition of exports of two countries are similar, then there are chances of increased competition. So, to find out extent of India's competition with China in export market we compared the export composition of these two countries. Our study shows that at stage of processing level, India's export item in order of importance were Consumer goods, Intermediate goods, Raw Materials and Capital goods whereas China's most important export items in order of their importance were Consumer goods, Capital goods, Intermediate goods, and Raw Materials. Since consumer sector was common most important export sector for both the nations, India faces fierce competition from China in this sector.

Another index that we had employ to analyse the competitiveness of exports of these two countries was RCA (Revealed Comparative Advantage). Our study shows that both India and China had RCAs in the same types of sectors in the world over the years. This may be one important reason that India faces competition from China. Our study found that during the early years of the period Europe and Central Asia, East Asia and Pacific, and North America were the three major destinations for India's exports but on the other hand China's exports was concentrated in East Asia and Pacific but slowly it diversified its exports to other regions importantly to Europe and Central Asia and North America. Over the years India also diversified its exports to Middle East and North Africa which become third major destination of India's exports in the later years replacing North America. This can also mean that India's exports are diversified in more regions than that of China's exports. In the three regions of Latin America and Caribbean, South Asia, and Sub- Saharan African the export shares of both nations were relatively lower.

Another comparison was made on the basis of export import coverage. In this index China outperformed India. Our analysis shows that except for the year of 1993, China's exports comfortably covered its import bills throughout the period. In other words,

China maintained trade surplus throughout the period (except for 1993 as said earlier). On the other hand, India's export struggled to cover its import bills throughout the period. In other words, India had trade – deficit throughout the period.

We had also used other indices to capture and compare the export performances of these two countries. One index was Export Market Penetration Index and other was Export Propensity Index. Analysis of these indices revealed two things. First, the values of both indices increased for both the nations over the years and second, China's outperformed India in both the indices. These results indicates that the domestic producers of China were relatively more dependent on foreign markets than India making them relatively more vulnerable to external shocks (i.e., any shocks or disturbance in export destinations of the country). The Herfindahl- Hirschman Index was used to compare the geographical concentration of exports. Our analysis shows that over the years the value of this index declined for both nations but the value of this index for India was relatively less than that of China during the study period, so we conclude that India's exports was relatively more diversified than that of China. Same result was confirmed by Trade Entropy Index.

For the comparison of openness, we employed Trade Dependence index. Our analysis reveals that there was increase in openness of both the countries, but China was relatively more open than India during the study period.

At last, we conclude that in the world market India performance was dismal as compared to China as our study found that China outperformed India in most of the indices that we used in this analysis.

7.3 Suggestions and Recommendations:

On the basis of our study, we can make following suggestions and recommendations:

a. The government should focus on increasing India's exports share in the world trade by facilitating exporters and providing them with various incentives.

b. Measures should be taken to reduce India's dependence on China and must explore other partners for its import needs.

c. India should take measures to reduce rising balance of trade deficits with China either by promoting more exports to China or discouraging imports from China.

d. India should identify all the exportable where it has comparative advantage and provide incentives and subsidies to the producers of such products to encourage exports.

e. The government should take adequate initiatives to create a favourable environment to facilitate and encourage exporters. This can help the exporters to produce goods which can compete with the exporters like China in the world market.

7.4 Conclusion:

In our study we have attempted to address two broad aspects of India-China trade relations. These are complementary aspects and competitive aspects. As we have already said that our focus is mostly on the complementary aspect of the relation as compared to competitive aspects. This is why we have dedicated three chapters on analysing and examining this aspect and one chapter is dedicated to competitive aspect.

As far as the complementary relation is concerned our study revealed that China is at a dominant position and India's dependence on China for its import needs was relatively much higher than that of China's dependence on India. In terms of exports also China was found to be in much better position than India as it was found that China maintained a consistent export surplus with India during the study period. Thus, our study finds China to be more important trade partner for India be same is not true for India as a trade partner of China. One positive aspect of complementary trade relation between the two was rising share of intra-industry trade between the two countries that also in vertical intra-industry trade where the two countries were trading with each other in same sector but at different stages of processing. In other words, the two countries provided each other with necessary inputs to each other in same sector which enhances the production and production capacity of these countries. This is one important complementary relationship that has been emerged between the two nations during the study period. As far as the relationship between India's exports to and import from China is concerned, the two countries were found to have stable but weak long run relationship. These were the complementary aspects of India- China trade relations. The discussion of competitive aspect of India- China trade relation revealed that India's performance in world trade was far behind that of China in almost all the indicators. India's performance was found to be very weak relative to the performance of China in the world trade. This means that China's performances, both as a partner and as a competitor was superior to that of India during the study period. Even though our study reveals China to be an important partner of India and India vastly depends on China for both its exports and imports but too much dependence on single country makes India vulnerable to any kind of shocks in Chinese economy. India must therefore slowly diversify its exports and imports from China to avoid over dependence and vulnerability. We must learn from Chinese trade policies as well as device our own idiosyncratic policies to improve the performance of India's external sectors and to increase the share and influence in the world trade.

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The Extent of Indo-China Intra-Industry Trade: An Evaluation

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Abstract

This study thoroughly covers the extent of intra-industry trade in total trade between India and China for the period between 1996-2018. It was observed that there was an improvement in the share of intra-industry trade between India and China. As far as the type of intra-industry trade is concerned, it is found that intra-industry trade between the countries are dominated by vertical intra-industry trade as against horizontal intra-industry trade. In case of vertical intra-industry trade, it was found that during the period between 1992-2005 of the study period low vertical intra-industry trade was dominant whereas during the period between 2006-2018 high vertical intra-industry trade was dominant.

Keywords: Intra-industry trade, horizontal, vertical, low vertical, high vertical

Intra industry trade is simply the trade within the same industry unlike in case of inter industry trade where trade takes place between industries. Traditionally, the trade theories were directed towards the study of inter-industry trade, but many scholars find a mismatch between the traditional trade theories and empirical evidence and especially since 1960s intra-industry trade become an important area of study in international trade.

Even though in earlier times intra-industry trade was expected predominantly to be related to developed industrialized nations and most of the studies were conducted with focus on developed nations, but over the years this phenomenon was also examined in developing countries as it was realized that intra industry is a phenomenon not only present in developed industrialized nations but also found in the developing nations.

India was virtually a closed and a developing economy during 1960s. So, we cannot find any significant studies concerning the intra -industry trade of India. Most of the work regarding intra industry trade in India was conducted during 1990s as India was opening and started to integrate its economy with the world economy by adopting new economic policy (1991).

We will examine here the issues related to intra-industry trade between India and China. We will try to find out the share of intra industry trade in India's total trade with China. We also identify the sectors which are important from this standpoint. Importantly we will try to find out the role of different factors responsible for the intra-industry trade between the two countries.

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The analysis is organized as follows. In section-2, we make a thorough review of relevant literature. It is followed by description of data and methods used in this paper in section-3. In section-4, we have discussed and analysed intra-industry trade between India and China. Last section, i,e.,section-5 concludes.

REVIEW OF LITERATURE

1. Theoretical development of IIT

Here we will discuss the theoretical evolution of IIT since 1906s.

Pieter Verdoorn (1960) was among the first to observe the phenomenon on intra-industry trade. In his study of trade pattern of Benelux countries after the formation of their Customs union he found that there was increase in intraindustry trade between them rather than interindustry trade.

Bela Balassa (1966), in his study of trade pattern of ECC countries found the similar pattern as concluded by Verdoorn. That is, he also found the increasing trend of intraindustry trade among these countries as compared to interindustry trade. Balassa is also attributed to have used the term ''intra-industry trade'' for the first time. He is also responsible for developing the first ever measure of intra-industry trade. His work was basically focused on trade of manufactured goods.

H.G. Grubel (1967) made an empirical study on intra-industry trade. In this study he studied the trade pattern of ECC countries with an objective to establish relationship between intra-industry trade and trade liberalization.

H.G. Grubel and P.J. Lloyd (1971) were among the first to study the importance of intra-industry trade empirically.

H.G. Grubel and P.J. Lloyd (1975) continued their empirical study and were able to identify the factors which were responsible for the emergence of intra-industry trade. In their study they found that the most import factor for the emergence of intra-industry trade was product differentiation. They also developed an index which later known as Grubel- Lloyd index, to measure the degree of intra-industry trade. This index is one of the most popular and important indices for measuring intra-industry trade.

These works were followed by many important theoretical works as many researchers and economists were drawn to work in this direction. As a result, many important theories and models were developed for explaining intra-industry trade and related issues.

M. Spence (1976), in his study concluded that as compared to other types of markets it is monopolistic competition where maximum product differentiation happens implying that most intra-industry trade happens in monopolistic competition.

A. Dixit and J. Stiglitz (1977), like work of Spence (1976) used Chamberlin's monopolistic competition model in their study. To explain intra-industry trade, they had used product diversity argument. The approach used by them is known as love for variety approach. They found different reasons were responsible for demand and supply of variety of products.

Studies related to HIIT and VIIT

Intra -industry trade has been divided into two types. They are Horizontal intra-industry trade (HIIT) and Vertical Intra-industry Trade (VIIT). Most of the studies after 1977 were focused on the development of theories and models of these two types of intra-industry trade.

M. An Andersen (2003) has provided the definitions of HIIT and VIIT. According to him, HIIT is "characterized by products with similar quality levels with different attribute' and VIIT "is characterized by products with significantly different quality levels (high and low quality)". These definitions shows that as far as quality of product is concerned it is important in the context of VIIT only and not for HIIT. As said earlier, studies on specific type of IIT begin after 1977 with the works of Dixit and Stiglitz (1977). We will now review some of the important studies first on HIIT and after that on VIIT.

(A) HIIT

As far as theoretical works on HIIT is concerned the most important contributions were made by Dixit and Stiglitz (1977), Krugman (1979, 1980, 1981) Lancaster (1979), Helpman (1981) and Helpman and Krugman (1985).

Dixit and Stiglitz (1977) were responsible for modelling product differentiation in formal analysis

of IIT. They introduced the 'love of variety' approach to HIIT.

Lancaster (1979) made another important contribution in the study of HIIT. In this work he introduced another approach known as 'favourite variety' approach to HIIT.

These two works were followed by many other works which were either based on the approach followed by Dixit and Stiglitz (1977) or that followed by Lancaster (1979). The theoretical works that followed the approach followed by Dixit and Stiglitz (1977) were Krugman (1979, 1980), Dixit and Norman (1980), Helpman and Krugman (1985) Similarly, the studies that followed the approach of Lancaster (1979) were Lancaster (1980) and Helpman (1981).

(B) VIIT

In case of theoretical works on VIIT, the most important contributions were made by Falvey (1981), Caves (1981), Shaked and Sutton (1983), Falvey and Kierzkowski (1987).

Rodney E Falvey (1981), was among the first to develop a theoretical model of VIIT. He used partial equilibrium approach in his model. On the basis of his 2×2×2 model, he argues that it is possible to explain simultaneously the existence of VIIT and inter industry trade. According to him a capital abundant country produces high quality manufacture products and labour abundant country produces low quality manufacture products. Concludes that there is a positive relationship between the share of VIIT and difference in factor endowment or per capita income between trade partners.

Richard E Caves (1981) made an empirical study of 13 industrialized countries with their 94 industries. In this study he used Standard International Trade Classification at the three -digit level of aggregation. This study concludes that factors like product differentiation and liberalization had positive effect on IIT and particularly on VIIT.

R.E. Falvey and H. Kierzkowski (1987), developed a model for explaining VIIT. They argue that VIIT is caused by difference in quality of products which is caused by difference in factor endowments in different countries. They also infer that dissimilarity in income distribution between two countries causes the share of VIIT to rise between them. According to the model market size and share of VIIT has positive correlation.

H. Flam and E. Helpman (1987), while working on VIIT developed a model of North- South trade. In this model North produces and exports high quality manufactured products whereas South produces and exports low quality manufactured products. This study concludes that IIT (which is VIIT) between North and South arises due to overlapping of income distribution.

2. India and Intra-industry trade

Now we will discuss various studies related to India's intra-industry trade and related issues.

There are very few works related to IIT of India prior to 1990s. There may be various reasons for this. One of the reasons may be the field of study of IIT was very new during that time. Another reason may be the fact that IIT was considered to be an advanced industrialized country phenomenon and India being a poor developing nation there was no scope for studying IIT in the context of India's trade. Yet another reason may be the policy that India adopted prior to 1991 about its industries and external sector. India before the 1991's New Economic Policy was virtually a closed economy with heavy restrictions on trade. Whatever may be the reasons the result was that prior to 1990s there was not much interest among researchers to study the role of IIT in India's trade. After 1990s, with liberalization and opening of India's economy, relatively more researchers were attracted to the study of IIT in Indian context. In these studies, varied areas and issues related to India and its IIT were covered. During the pre-reform period the main focus of the researchers was to determine the share of IIT in India's trade.

Pant and Barua (1986) in their empirical study on India's IIT, for the period 1960-1980, found that even though on the one hand India experienced an increasing trend in her foreign trade during the study period but on the other hand it concluded that the share of IIT in India's trade was very low.

Bhattacharyya (1994), In his empirical study of pre reform period, used various methods to measure India's IIT. Along with that the sensitivity of results were tested at various level of aggregation.

Kantawala (1997) made an analysis of India's share of IIT with SAARC countries for the period between 1981-1992. His conclusion was similar to that of Pant and Barua (1986).

Veeramani (1999), conducted his study on India's IIT for a capital goods industry for a period of three year. In this study he found that nature of India's IIT was predominantly vertical (VIIT) in nature.

Veeramani (2002), in his study observes the significant role played by liberalization process on expansion of share of IIT in India's trade. According to him expansion in IIT was due to faster growth of exports. As far as the direction of IIT is concerned he concludes that India's IIT was more with high income countries than with developing ones.

Veeramani (2003), analysed factors which were specific to industry that affected India's IIT.

Banerjee and Bhattacharyya (2004) in their study of India's IIT between 1971- 2000. They observed that IIT grew continuously during the study period. On the basis of cointegration analysis they conclude that economic development played an important role in the expansion of India's IIT during the study period.

Chakraborty and Chakraborty (2005), in their study found that economic reforms had an important role in expansion of India's IIT.

Burange and Chaddha (2008), while studying India's IIT with respect to various regions of the world for the period between 1987-88 to 2005-06, found that even though there is an expansion in IIT but there was an uneven distribution of share of India's IIT in these regions. According to them India's share of IIT increased with the countries of Asia and Europe more than any other regions. They also demonstrated that in the context of growth of IIT, India's IIT is growing faster with the countries of America, Middle East and Africa compared to other regions.

Eshleman and Kotcherlakota (2010), while working with the data for period 2002- 2008 concludes that there was high IIT between India and countries of European Union.

Srivastava and Medury, (2011), analysed the nature and pattern of India's IIT at 6-digit level. Their study concludes that there was significant increase not only in the degree of IIT but also in its share in total trade. Their study also reveals that Ind a's IIT is predominantly Vertical IIT in nature.

Das and Dubey (2014), conclude that India's active presence in Free Trade Area (FTA) is an important factor affecting IIT.

Singh (2014), in his study argued that institutional parameters play an important role in affecting India's IIT in both short run and long run.

Verma (2015), while studying IIT in agricultural sector come to conclusion that difference in factor endowment have negative effect on India's IIT in agricultural sector.

Kelkar and Burange (2016), studied India's vertical and horizontal intra-industry trade during the post liberalization period. For this purpose, they used the HS-eight-digit level data for the period from 1990-91 to 2013-14. In this study they found that during the study period there was significant increase in India's IIT. It increased from 37 percent in 1990-91 to 78 percent in 2013-14. They attribute this growth in IIT to trade liberalization that occurred during the study period. They also found that India's intra-industry trade is dominated by VIIT rather than HIIT. And within VIIT, they found that LVIIT products were dominant over HVIIT products.

Aggarwal and Chakraborty (2017) made an examination of the patterns and determinants of India's IIT with her 25 major trading partners. In this study they employed panel data framework for the period of 2001–2015. According to this study India's IIT increased with the selected partner countries during the study period. They also found that the India's IIT was predominantly vertical in nature with the partner countries. As far as the factors affecting India's IIT with these countries are concerned they found that with high income partners ''trade facilitation among partners" had significant positive effect on IIT but with low-income countries this factor was not significant in affecting IIT.

DATA, METHOD, AND METHODOLOGY

To study the share of IIT in India- China trade we have divided the analysis into two parts. First part we will discuss the extent of IIT between India and China for the period 1992-2018. In the second part we will disentangle the IIT into vertical IIT and horizontal IIT and examine the share of these two types on the intra industry trade of India and China. The vertical intra industry trade is further divided

into low VIIT and high VIIT, so we also examined the share of these two types of VIIT in out study. For this we have used another set of data from 1996-2018, because unit price data (for both exports and imports) which is required for disentangling was available only from 1996 to 2018. The source of the data for the first part was WITS and for the second part we have collected data from the Export Import Data Bank of Ministry of Commerce, India.

For our analysis we have considered the Grubel – Lloyd Index to find out the extent of India's intra -industry trade with China and to find out the type of intra -industry trade (either horizontal or vertical intra-industry trade) we have used the method of disentangling. Let us discuss the two methods in turn.

Grubel – Lloyd Index

To calculate the aggregate IIT we will used Grubel-Lloyd index. This is one of the earliest and commonly used indices and was developed by H.G. Grubel & P.J. Lloyd in 1971. This index is written as:

$$GL_i = 1 - \frac{|X_i - M_i|}{X_i + M_i} \quad \ldots(1)$$

and $0 \le GL_i \le 1$

where GL_i = Grubel Lloyd index for product group i; X_i = export of product group i; M_i = import of product group i.

The value of GL_i lies between 0 and 1. If the value is O, it means that there is no intra-industry trade and if the value is, it means that there are 100 percent intra-industry trade.

Method of disentangling

Intra industry trade (*IIT*) can be divided into Horizontal *IIT* (*HIIT*) and Vertical *IIT*(*VIIT*), i.e.,

$$IIT = HIIT + VIIT \quad \ldots(2)$$

To disentangle *IIT* into *HIIT* and *VIIT*, we use the following equation:

$$1 - \alpha \le \frac{UV_X}{UV_M} \le 1 + \alpha \quad \ldots(3)$$

In equation (3) UV_X denotes unit value and exports (X) and UV_M denotes the unit value of imports (M). UV_X and UV_M are calculated as the ratio of value of exports (X) or imports (M) and quantity (or units) of exports (X) or imports (M), given as;

$$UV_X = \frac{Value_X}{Unit_X} \text{ and}$$

$$UV_M = \frac{Value_M}{Unit_M} \quad \ldots(4)$$

As far are values being concerned, they are expressed in terms of US $ on the other hand units (quantities) are concerned they are express in terms of kgs., tonne, etc.

In the equation α is known as the "dispersion factor" which is responsible for separating HIIT from VIIT. The most preferred value of α is 0 .15, even though there is no agreed value of α. In our study also we have used the value of α = 0.15. So, if the value of α is taken as 0.15 then the ratio of UV_X and UV_M lies between 0.85 and 1.15. When this happens, we call the product in question as horizontally differentiated product and if value lies outside that range i.e., if value is less than 0.85 or more than 1.15 then the product in question is called vertically differentiated product. Again, the product whose value is less than 0.85, it is called low quality vertically differentiated product (LVIIT) and if it is above 1.15, it is called high quality vertically differentiated product (HVIIT).

DISCUSSION

1. Overall aggregated IIT

(a) Year to Year IIT

Table 1 shows India's share of India's intra industry trade in overall trade with China for the period of 1992 – 2018. Both in the beginning and in the end of the period i.e., in 1991 and 2018 the share of intra industry trade was same at 23 percent. The highest share was observed in 2000, when 41 percent of the trade was intra-industry trade. On the other hand, the share of intra – industry trade in the total trade was minimum in 1992 and in 2008 at 19 percent.

The table 1 shows that the share of intra- industry trade doubled from 0.19 percent to 38 percent

between 1992 to 1996 and after falling in 1997 to 28 percent it again increased from 31 percent in 1998 to 41 percent in 2000. There was a declining trend in the share between 2001 to 2005. The share of intra-industry trade declined from 37 percent in 2001 to 30 percent in 2005. The share increased to 33 percent in 2006 only to decline for the next two years to 24 percent in 2007 and 19 percent in 2008. After that the share again increased for next two years to 25 percent in 2009 and 31 percent in 2010. During next two years of 2011 and 2012, there was again a decline in the share of intra industry trade with 29 percent in 2011 and 27 percent in 2012. The share increased to 31 percent for the year 2013. The share declined for the next three years from 29 percent in 2014 to 20 percent in 2016. The share remains same for the next two periods of 2017 and 2018 at 23 percent.

Table 1: Aggregated Intra- Industry trade for (1992-2018)

YEAR	IIT	YEAR	IIT	YEAR	IIT
1992	0.19	2001	0.37	2010	0.31
1993	0.25	2002	0.35	2011	0.29
1994	0.30	2003	0.33	2012	0.27
1995	0.33	2004	0.33	2013	0.31
1996	0.38	2005	0.30	2014	0.29
1997	0.28	2006	0.33	2015	0.23
1998	0.31	2007	0.24	2016	0.20
1999	0.37	2008	0.19	2017	0.23
2000	0.41	2009	0.25	2018	0.23

Authors' calculation.

Data source: WITS- COMTRADE

(b) Five Year Average Intra-industry trade

We have also calculated the five-year average share of intra- industry trade for the given period of 1992-2018. For this we have divided the period into six sub periods. The share of intra-industry trade was 29 percent during 1992-1996 which was increased by 9 percent point to 35 percent during the period of 1997-2001. In the next two periods the share of intra-industry trade declined continuously, first to 33 percent during 2002-2006 and then further to 26 percent during 2007-2011. The share remained 26 percent during the next period of 2012-2016, but during 2017-2018 it declined by 23 percent.

The share of intra-industry trade was highest during 1997-2001 and it was lowest during 2017-2018. The periods of 1997-2001 and 2002-2006 were comparatively better than other four periods in terms of the share of intra-industry trade. The situation was similar during the period of 2007-2011 and 2012-2016.

Again, we have calculated the decadal average share of intra -industry trade for the given period. Here we have divided the entire period into three sub periods of ten years each except for the period of 2012-2018 where we have only seven years. The last column shows the average intra-industry trade for the entire period (1992-2018). During the period of 1992-2001, the average share of intra-industry trade was 32 percent, and it was the highest as compared to other periods. There was a decline in intra-industry trade during 2002-2011 period to 29 percent which further declined in 2012-2018 to 0.25 percent.

Table 2: Five Year Average Intra-industry trade

Period	1992-96	1997-2001	2002-2006	2007-2011	2012-2016	2017-2018
IIT	0.29	0.35	0.33	0.26	0.26	0.23

Authors' calculation

Data source: WITS- COMTRADE

(c) Decadal Intra-industry trade

So, the trend shows that there was a decline in the share of India's intra-industry trade with China with every passing decade. The overall intra-industry trade during the entire period of 1992-2018 was 29 percent. So, on the basis of this analysis we can conclude that India- China trade during the given period was inter-industry dominant rather than intra-industry.

Table 3: Decadal Intra-industry trade

Period	1992-2001	2002- 2011	2012-2018	1992-2018
IIT	0.32	0.29	0.25	0.29

Author' calculation

Data source: WITS- COMTRADE

2. Sector wise Intra-industry trade

In previous section we discussed share of aggregated intra industry trade in the trade between India and

China. In this section we will discuss intra industry trade between India and China in different sectors of goods. Here we have considered sixteen different sectors as been suggested in WITS. For the sake of analysis, we have made two different tables. In first table we have divided the entire period into six groups of five years each except for the last period where we have considered three periods. Similarly, in the second table we have divided the entire period into three groups of 10 years each. Here also the last group contains only eight years. In the second table, we have considered the average of the entire period of 1991-2018.

Table 4: Five-year average sector wise Intra- Industry trade

Sector/Period	1992-96	1997-2001	2002-2006	2007-2011	2012-2016	2017-2018
Animal	0.32	0.13	0.14	0.15	0.10	0.03
Chemicals	0.33	0.49	0.65	0.31	0.25	0.36
Food Products	0.36	0.45	0.47	0.45	0.67	0.64
Footwear	0.20	0.69	0.72	0.85	0.76	0.51
Fuels	0.00	0.00	0.15	0.47	0.80	0.76
Hides and Skins	0.71	0.79	0.82	0.83	0.74	0.47
Mach and Elec	0.12	0.12	0.08	0.06	0.06	0.06
Metals	0.60	0.35	0.63	0.59	0.61	0.46
Minerals	0.34	0.41	0.13	0.06	0.13	0.16
Miscellaneous	0.04	0.22	0.23	0.10	0.09	0.08
Plastic or Rubber	0.48	0.47	0.59	0.52	0.42	0.40
Stone and Glass	0.53	0.56	0.20	0.38	0.20	0.23
Textiles and Clothing	0.35	0.64	0.47	0.80	0.80	0.71
Transportation	0.35	0.50	0.45	0.09	0.19	0.09
Vegetable	0.50	0.69	0.73	0.73	0.59	0.60
Wood	0.08	0.40	0.10	0.02	0.08	0.25

Authors' calculation

Data Source: WITS- COMTRADE

In this section we will discuss the share of individual sectors first and then we will make a comparison among them.

Animal Sector

The average share of intra-industry trade in animal sector was 32 percent during the first period of 1992-1996 which declined to only 4 percent during the last period of 2017-2018. During the second period of 1997-2001, the average share was 11 percent which was 20 percent less than the first period of 1992-1996. There was a slight increase in the average share during 2002-2006 when the share was 14 percent. The share remained same at 14 percent as in 2002-2006 during 2007-2011. Then there was an average one percent decline in the share in 2012-2016 to 13 percent which further declined to 4 percent during the last period of 2017-2018 as mentioned earlier. Except for the first period of 19991-1995, the average share of intra industry trade in the animal sector was less than 15 percent.

Chemical Sector

In chemical sector, the average share during the first period of 1992-1996 was 30 percent and during the last period of 2017-2018 was 32 percent i.e., a two percent increase between the two extreme periods. But the maximum average share was observed during the period of 2002-2006 at 64 percent and the minimum average share was observed during the period of 2012-2016 when the average share was 25 percent. Looking at the trend of average share of intra industry trade during these six periods shows that there was increasing trend in share during the first three periods from 30 percent in 1992-1996 to 45 percent in 19996-2000 which further increased to 64 percent (maximum) during the period of 2001-2005. There was a fall in average share to 38 percent during the next period of 2007-2011 which further declined to 25 percent (minimum) during the 2012-2016 period. After that there was an average seven percent rise in the average share of intra-industry trade during the last period of 2017-2018. The share of intra industry trade was not less than 25 percent for the entire period.

Food products Sector

In food products sector, the average share during 1992-1996 was 45 percent and it was 59 percent in 2017-2018. So, between these extreme periods there has been an increase in the average share by 14 percent. The minimum average share was observed during the period of 1997-2001 at an average share of 33 percent and maximum share was observed during 2012-2016 at 68 percent. Trend of the average share during these six periods shows that there was a fluctuation. The average share in 1992-1996 was 45

percent which declined to 33 percent (minimum) in 1997-2001. During 2001-2005, there was an increase of 20 percent in the share when the share of average intra- industry trade went to 53 percent. After that during the period of 2007-2011 average share was 40 percent which was 13 percent less than the previous period. During the next period of 2012-2016 the share shoots up to 68 percent (maximum), which was 28 percent more than the share of previous period. Again, in the last period of 2017-2018 the share was 59 percent which was 9 percent less than the previous period. So, the trend of the average share of intra industry trade in the food products sector fluctuated in each of these six periods. Except for the one period when the average share was less than 40 percent, percent on an average for entire period for the food product sector.

Footwear Sector

In footwear sector, the average share during 1992-1996 was 11 percent and it was 56 percent during 2017-2018. The highest share of intra – industry trade in this sector was 89 percent during 2007-2011 and lowest was 11 percent in 1992-1996. There was 78 percent difference between these two periods. Trend in the share average intra- industry trade in these six periods shows that the share increased from 1992-1996 till 2006- 2010. After that it declined during 2012-2016 and 2017-2018. The share increased from 11 percent (minimum) in 1992-1996 to 62 percent in 1997-2001, i.e., a difference of 51 percent. The share further increased to 69 percent in the next period of 2002-2006 and again to 89 percent(maximum) in 2007-2011. After that in the next period of 2012-2016, there was a 12 percent decline in the average share than the previous period i.e., the share come down from 89 percent to 77 percent during this period. Decline in the share continued during the period as well, when the share become 56 percent which was 21 percent less than the previous period. In this sector during this entire period, except for the first period of 1992-1996, the average share of intra industry trade was more than 50 percent and at one period it was around 90 percent. This is the sector which shows the tendency towards more intra industry trade than inter industry trade.

Fuel Sector

In the fuel sector there was no intra- industry trade for the first two periods of 1992-1996 and 1997-2001. During 2001-2005, the share of intra- industry trade in this sector was only 13 percent and during 2017-2018 it was as high as 82 percent. The lowest average share of intra industry trade in this sector was zero percent during the first two periods and highest share was 82 percent during the last period of 2017-2018. The table shows that the average share of intra- industry trade had monotonically increased in every succeeding period. Except for the first two periods, the average share was 13 percent during 2001-2005, which was increased to 30 percent during 2007-2011. After that the share increased to 80 percent during 2012-2016. This was the highest inter-period increase in the share. During the last period of 2017-2018, the share was 82 percent(maximum) which was two percent more than previous period. Whereas interindustry trade was significant during the first three periods in this sector, but during the last two periods intra-industry trade was more important than the inter- industry trade as 80 percent or more or the trade in this sector was intra-industry in nature rather than inter- industry.

Hides and Skins Sector

In the Hides and Skins sector, average share of intra-industry trade during the first period of 1992-1996 was 67 percent whereas same was 53 percent during the last period of 2017-2018. The maximum share was exhibited during 2007-2011 when the share was 87 percent and minimum was registered during the last period of 2017-2018 with 53 percent of intra industry trade in this sector. The table shows that there was no definite trend in the share of intra-industry trade between the period of 1992-1996 to 2007-2011. The share increased from 67 percent during 1992-1996 to 82 percent during 1997-2001. But in the next period of 2002-2006 it declined to 77 percent. Again during 2006 -2010 the share of intra industry trade increased to 87 percent (maximum). After this period the share continuously declined during the next two periods of 2012-2016 and 2017-2018. Their respective shares were 76 percent and 53 percent (minimum). Even though there was no definite trend in the share of intra-industry trade in this sector but during all the six periods the share of intra industry trade was more than 50 percent in this sector. This means that intra-industry trade is more significant for this sector than inter industry trade.

Machinery and Electrical Sector

The share of intra-industry trade in Machinery and Electrical sector during 1992-1996 was 24 percent and during 2017-2018 was only 6 percent. There was a huge decline in the share from first period to last period. In this sector the share of intra-industry trade was maximum in the first period of 1992-1996 with 24 percent and minimum was during the last three periods of 2007-2011, 2012-2016, and 2017-2018 with an average share of 6 percent each. The table shows a declining trend of average share in this sector from the period of 1992-1996 up to the period of 2007-2011 and after that the share remained stagnant at 6 percent for the next two periods. As the highest share of intra-industry trade in this sector was only 24 percent and lowest was 6 percent, this sector is predominantly based on inter-industry trade with insignificant share of intra-industry trade.

Metal Sector

In metals sector, average share of intra industry trade during 1992-1996 was 61 percent and during it was 43 percent during the last period of 2017-2018. There was a difference of 18 percent between these two extreme periods. The highest share of intra-industry trade in this sector was achieved during 2012-2016 at 68 percent and lowest during the period of 19962000 at 41 percent. There was no period-to-period definite trend in the share of intra-industry trade in this sector. From 61 percent in 1992-1996, the share declined to 41 percent during 1997-2001 after that in 2002-2006 there was a rise in share to again 61 percent. The share again declined from 61 percent to 58 percent in 2006-2011. There was again arise in the share to 68 percent (maximum) during 2012-2016. In the period of 2017-2018, there was a huge decline in the share from previous period to 43 percent i.e., a fall in share by 25 percent. In this sector, both intra-industry trade and inter-industry trade are equally important.

Minerals Sector

In minerals sector, during the first period of 1992-1996 the share of intra-industry trade was 33 percent and during the last period it was 15 percent which was more than half of the share of first period. The highest share of intra-industry trade in this sector was 38 percent and lowest share was only 5 percent. The share increased from 33 percent during 19911995 to 38 percent during 1997-2001. The share declined for the two consecutive periods of 2002-2006 and 2007-2011 at 21 percent and 5 percent respectively. Then in the next two consecutive periods it rose from 5 percent to 13 percent during 2012-2016 and to 15 percent during 2017-2018. So, for the entire period the share of intra industry trade is less than 40 percent which means that trade in this sector is predominantly inter industry in nature than intra-industry trade.

Miscellaneous Sector

In miscellaneous sector, the share of intra-industry trade was only 3 percent during the first period of 1992-1996 and it was 10 percent during 2017-2018. The share was maximum during 2002-2006 at 29 percent and it was minimum during the first period of 1992-1996 at 3 percent. The trend shows that the share increased for first three periods from 3 percent (minimum) to 14 percent between first two periods of 1992-1996 to 1997-2001 and from 14 percent to 29 percent (maximum) between 1997-2001 to 2001-2005. After that the share declined to 12 percent during 2007-2011 and further to 7 percent during 2012-2016. There was a slight increase in the share during the last period of 2017-2018 at 10 percent. The table shows that the share of intra -industry trade was less than 15 percent for most of the periods except for the period of 2002-2006 when the share was 29 percent. This shows that the nature of trade in this sector is also predominantly inter industry rather than intra industry.

Plastic and Rubber Sector

In Plastic or Rubber sector, share of intra-industry trade during the first period of 1992-1996 and the last period of 2017-2018 were respectively 43 percent and 34 percent. This means that there was a difference of 9 percent share of intra -industry trade between the two periods in this sector. Highest average share was registered during 2007-2011 at 59 percent and the share was lowest during the last period of 2017-2018 at 34 percent. This shows that there was a huge gap of 25 percent between the highest and lowest average share of interindustry trade. The table shows that there was an increasing tendency of intra-industry trade in this sector from

the period of 1992-1996 to 2007-2011. Whereas the average share was 43 percent during 1992-1996, it increased to 46 percent during 1996-1998 which further increased to 48 percent during 2002-2006 period and continued to increase during 2007-2011 at 59 percent (maximum). After reaching the highest during 2007-2011, the share declined to 49 percent during 2012-2016, a difference of 10 percent than previous period. The average share further declined and reached 34 percent (minimum) during the last period of 2017-2018. This sector can be identified to have a significant share of intra-industry trade even though during most of the period the share was less than 50 percent.

Stone and Glass Sector

In the stone and glass sector, 50 percent of trade was intra-industry in nature during the first period of 1992-1996 and it was only 22 percent during the last period of 2017-2018. There was a decline of 28 percent in the average share of intra-industry trade between these two periods in this sector. A comparison of different period shows that the share was maximum during the period of 1997-2001 at 70 percent and it was minimum during the period of 2012-2016 at 19 percent. This means that the gap between the highest and lowest share was as high as 51 percent. The trend shows that there was a fluctuation in the share of intra-industry trade in each period i.e., the share increased at one period and declined in the immediate next period. The share increased from 50 percent in 991-1995 to 70 percent (maximum) during 1997-2001. In the next period of 2001-2006 there was a sharp decline in the share to 20 percent. After increasing to 40 percent in the next period of 2007-2011, it again declined to 19 percent (minimum) during 2012-2016. There was a slight increase in the share during the final period of 2017-2018 to 22 percent which was 3 percent higher than previous period. The share of intra-industry trade in this sector was 50 percent and more for the first two periods but it was 40 percent and less for the rest of the periods. It shows that even though the share of intra-industry trade was significant at the early periods but gradually its importance declined in this sector, and it became a sector predominantly based on inter-industry trade afterwards.

Textiles and Clothing Sector

In Textiles and Clothing sector also, there was a huge gap between the average share of intra-industry trade during the first period of 1992-1996 and the last period of 2017-2018. Whereas the share was 24 percent during the first period, it was as high as 74 percent during the last period. This means that there was a difference of 50 percent between these two periods in the average share of intra-industry trade. The sector was more interindustry based during the first period, and it was intra-industry based during the last period. The highest share was 81 percent which was registered during 2012-2016 and lowest was 24 percent which was registered during the first period of 1992-1996. Except for the two period of 1992-1996 and 2001-2005, the sector registered an average share of more than 70 percent in every other periods. From 24 percent during 1992-1996 share increased to 71 percent during 1997-2001, which was 47 percent more than previous period. Then there was a decline in the share during the next period to 43 percent. During 2007-2011 share again rise to 79 percent and there was an increase of other two percent in the share to 81 percent (maximum) during the next period of 2012-2016. And finally, during the last period of 2017-2018 the average share was 74 percent which was 7 percent short of the share of previous period. So, except for first period and third period , the share of intra-industry trade in this sector was more than 70 percent so the trade in this sector may be considered to be intra-industry based rather than inter-industry based.

Transportation Sector

In Transportation sector also the gap of share of intra-industry trade between the first period and last period was wide. The share declined from 42 percent during the first period to as low as 8 percent during the last period. The table shows that the highest share in this sector was registered during 2002-2006 period at 53 percent and lowest share of 8 percent was registered during two different periods of 2006 -2010 and 2017-2018. The trend in the share shows that share remained same at 42 percent during the first two periods of 1992-1996 and 1997-2001. In the next period of 2001-2005, there was an increase in the share to 53 percent (maximum) . There was a huge decline in the share during the

period of 2007-2011 to 8 percent (maximum) i.e., a fall of 45 percent share compared to previous period. The share increased to 19 percent during the next period of 2012-2016. But again, it declined to 8 percent during the final period of 2017-2018. So, there was significant share of intra-industry trade in this sector during the first three periods but after that the sector became predominantly interindustry in nature.

Vegetable Sector

In Vegetable sector, during the first period of 1992-1996, the average share of intra-industry trade was significant 44 percent which rose to 64 percent during the last period of 2017-2018. So, between these two periods there was a 20 percent increase in the share of intra-industry trade. In this sector, the highest share was registered during the period of 2002-2006 at 75 percent and lowest was at 44 percent during the first period of 1992-1996. There was a rising trend in the share of intra-industry trade for the first three periods in this sector from 44 percent during 1992-1996 to 65 percent during 1997-2001 to 75 percent (maximum) during 2001-2005. But the share declined for the next two periods. The share was 72 percent during 2007-2011, which was 3 percent less than previous period which further declined to 60 percent during 2012-2016, which was 12 percent less than previous period. There was a slight rise in share to percent during the last period of 2017-2018, which was 4 percent more than previous period. This sector on the basis of our discussion can be considered as a sector predominantly based on intra-industry trade where the average share of intra-industry trade was 60 percent and more in every period except for the first period when the share was 42 percent.

Wood Sector

It was insignificant for every period except for the period of 1997-2001 when the share was 38 percent. The share during the first period of 1992-1996 was 6 percent whereas same for the last period of 2017-2018 was 19 percent. As far as highest share is concerned it was registered during the period of 1997-2001 as mentioned earlier at 38 percent . Similarly, the lowest share was registered during the period of 2007-2011 at meagre 2 percent. So, there was a difference of 36 percent between the maximum share and the minimum share. The trend in the share shows that the share increased from 6 percent to 38 percent (maximum) between 1992-1996 to 1997-2001. But there was a significant decline in the share to 14 percent during 2001-2005. The share further declined during the next period and reach its lowest at 2 percent (minimum). The period of 2012-2016 showed a little improvement in the share from previous period to 7 percent which further improved to 19 percent during the last period of 2017-2018. Even though there was improvement in the share of intra-industry trade during the last three periods, but value was not significant. Expect for the period of 1997-2001 when the share was 38 percent, in every other periods the share was less than 20 percent which includes the three periods where the share was less than 10 percent. So, this sector can be considered to be predominantly interindustry based sector where most of the trade was inter-industry in nature rather than intra-industry.

3. Comparing Shares of HIIT and VIIT in terms of sectors for the period 1996-2018

In this section we discuss the distribution of HIIT and VIIT among the different sectors in percentage terms. The table above shows the percentage of sectors that exhibited either HIIT or VIIT. It shows that during the period of 1996 -2018, India China intra-industry trade was dominated by VIIT, as the percentage of sectors exhibiting VIIT was higher than that exhibiting HIIT during the period. The table shows that the percentage of sectors exhibiting VIIT range from 80 percent to 100 percent whereas the percentage of sectors exhibiting HIIT range from 0 percent to 20 percent during the period. So as compared to sectors exhibiting VIIT, the sectors exhibiting HIIT were relatively insignificant.

The table 5 also shows that the share of sectors exhibiting HIIT and that exhibiting VIIT remained same for most of the years. In 1997 and 1998, share of sectors exhibiting VIIT was 80 percent and that exhibiting HIIT was 20 percent. Similarly, from 2004-2006, the share of sectors with HIIT was 6.25 percent and that with VIIT was 93.75 percent. Again from 2007 – 2010, shares of sectors with HIIT were 12.5 percent and that with VIIT was 87.5 percent. Same thing happened during 2015-2016 as well when share of sectors with HIIT was 12.5 percent and

that with VIIT was 87.5 percent. There were four occasions during the period when all the sectors exhibited VIIT. These were: 2000, 2003, 2011, and 2017.

Table 5: Share of HIIT and VIIT for 1996-2018

Year	HIIT	VIIT	Year	HIIT	VIIT
1996	13.33	86.67	2008	12.5	87.5
1997	20	80	2009	12.5	87.5
1998	20	80	2010	12.5	87.5
1999	18.75	81.25	2011	0	100
2000	0	100	2012	6.25	93.75
2001	6.67	93.33	2013	12.5	87.5
2002	6.25	93.75	2014	6.25	93.75
2003	0	100	2015	12.5	87.5
2004	6.25	93.75	2016	12.5	87.5
2005	6.25	93.75	2017	0	100
2006	6.25	93.75	2018	18.75	81.25
2007	12.5	87.5			

(α = .15)

Authors' Calculation

Data source: Export Import Data Bank of Ministry of Commerce, India

We will now discuss the trend in these two types of IIT during the period. Since total number of sectors are fixed at sixteen, so the number of sectors that exhibit VIIT cannot exhibit HIIT and vice versa so rise in the percentage of sectors exhibiting VIIT (HIIT) also means declining in the percentages of sectors exhibiting HIIT (VIIT). The maximum value either of VIIT or HIIT can take is 100 percent and minimum is 0 percent. So, if in any year VIIT(HIIT) is exhibited by 100 percent of sectors then this also means HIIT(VIIT) is exhibited by 0 percent of sectors. This means that if we discuss the trend of percentage of sectors exhibiting HIIT(VIIT) we automatically know the trend in percentage of sectors exhibiting VIIT(HIIT). So, with this logic in mind we discuss trend of percentage of sectors exhibiting VIIT for the given period of 1996-2018.

The percentage of sectors exhibiting VIIT in 1996 was 86.67 percent which declined to 80 percent in 1997 and this percentage continued in 1998 as well. In 1999, there was a slight increase in the percentage of sectors to 81.25. In 2000, 100 percent of the sectors exhibited VIIT. There was decline in the percentage of sectors exhibiting VIIT to 93.33 percent in 2001 but after that it increased continuously for next two years to 93.75 percent and further to 100 percent again in 2003. In 2004 it declined to 93,75 percent and it continued for next two years of 2005 and 2006. In other words, the percentage of sectors exhibiting VIIT remain same at 93.75 percent continuously for three years. After that there was decline in the percentage to 87.5. This percentage continued for another three years from 2008 to 2010.

Then in 2011, again 100 percent of the sectors exhibited VIIT. After that there was a continuous decline of percentage of sectors exhibiting VIIT to 93.75 percent and further to 87.5 percent. The percentage of sectors again reached 93.75 percent in 2014 only to decline again in 2015 to 87.5 percent. There was no change in percent of sectors exhibiting VIIT in 2016. In 2017, again for the last time in the period 100 percent of the sectors exhibited VIIT. After that in final year of the period there was a decline in the percentage of sectors exhibiting VIIT to 81.25 percent.

During this period, the percentage of sectors exhibiting VIIT showed both declining trend as well as rising trend and in majority of years it remained constant. But the percentage of sectors exhibiting VIIT during this period never fall below 80 percent. In every year of the period the percentage was either 80 percent or more. Opposite is true for percentage of sectors exhibiting HIIT. During this period the percentage of sectors exhibiting HIIT was either 20 percent or below that. It never exceeded 20 percent mark. This clearly indicates that VIIT was more dominant in most of the sector in most of the years than HIIT in the context of India China intra-industry trade.

So, based on this discussion it is clear that India's IIT with China during the period of 1996-2018 was predominantly VIIT rather than HIIT.

VIIT can also be divided into low VIIT and high VIIT. In the next section we will discuss the prevalence of these two types of VIIT and find out which type is more dominant.

4. Comparing the shares of HVIIT AND LVIIT (1996-2018)

In this final section we have further discussed the components of VIIT viz. high VIIT and low VIIT to find out which type of VIIT was more dominant in India China intra -industry trade. In the table

the percentages are the percentage of sectors that exhibited either high VIIT or low VIIT. The table shows that from 1996 to 2005, among the sectors that exhibited VIIT, majority were exhibiting low VIIT. Similarly, the situation reversed after 2006 when majority of sectors exhibiting VIIT were exhibiting high VIIT. Let us consider first the trend during 1996-2005 and then discuss the trend during 2006 -2018.

From 1996 to 2005 the percentage of sectors exhibiting either high VIIT or low VIIT continuously fluctuated. In 1996 the percentage of sectors with high VIIT was 30.77 and that of sectors with low VIIT was 69.23 percent. In 1997, there was an improvement in the percentage of sectors with high VIIT to 41.67 percent leading to decline in the percentage of sectors exhibiting low VIIT to 58.33 percent. In the next year of 1998 the percentage of sectors exhibiting high VIIT again declined to 33.33 percent leading to increase in the percentage of sectors exhibiting low VIIT to 66.67 percent. As the fluctuation continued, again in 1999, the percentage of sectors exhibiting high VIIT increased to 38.46 percent and those exhibiting low VIIT declined to 61.54 percent. The sectors exhibiting high VIIT again decline to 37.5 percent in 2000 leading to increase in the percentage of sectors exhibiting low VIIT to 62.5 percent. Again, after declining in 2000, the percentage of sectors exhibiting high VIIT again increased to 42.86 percent and those exhibiting low VIIT declined to 57.14 percent. As fluctuation continues, no change in the trend observed in 2002. In this year also sectors exhibiting high VIIT declined to 33.33 percent and that of low VIIT increased to 66.67 percent. In 2003, the percentage of sectors with high VIIT increased to 43.75 percent and that of low VIIT declined to 56.25 percent. In 2004 the percentage of sectors with high VIIT again declined to 40 percent and percentage of sectors with low VIIT increased to 60 percent. After declining in 2004 percentage of sectors with high VIIT again increased to 46.67 percent causing the percentage of sectors with low VIIT to decline.

So, during the period between 1996 to 2005 the percentage of sectors exhibiting low VIIT were dominant relative to those exhibiting high VIIT. 69.23 percent in 1996 was the highest and 53.33 percent in 2005 was the lowest percentage of sectors exhibiting low VIIT during the period between 1996 -2005. Similarly, 46.67 percent was the highest and 30.77 percent was the lowest percentage of sectors exhibiting high VIIT during the same period. So, it is clear from this that during the period between 1996-2005 low VIIT was dominant as it was exhibited by majority of the sectors.

Table 6: Annual share of HVIIT and LVIIT in total VIIT

Year	HVIIT	LVIIT	Year	HVIIT	LVIIT
1996	30.77	69.23	2008	57.14	42.86
1997	41.67	58.33	2009	64.29	35.71
1998	33.33	66.67	2010	64.29	35.71
1999	38.46	61.54	2011	62.50	37.50
2000	37.50	62.50	2012	60.00	40.00
2001	42.86	57.14	2013	71.43	28.57
2002	33.33	66.67	2014	66.67	33.33
2003	43.75	56.25	2015	64.29	35.71
2004	40.00	60.00	2016	64.29	35.71
2005	46.67	53.33	2017	62.50	37.50
2006	60.00	40.00	2018	61.54	38.46
2007	64.29	35.71			

Authors' Calculation

Data source: Export Import Data Bank of Ministry of Commerce, India

Now let us consider the trend in percentage of sectors exhibiting high VIIT and low VIIT from 2006-2018. In 2006, there was increase in the percentage of sectors exhibiting high VIIT to 60 percent and decline in the percentage of sectors exhibiting low VIIT to 40 percent. So, in 2006, percentage of sectors with high VIIT dominated the sectors with low VIIT and this trend continued throughout. In 2007 there was further increase in the percentage of sectors exhibiting high VIIT to 64.29 leading to further decline in percentage of low VIIT exhibiting sectors to 35.71 percent. But in 2008, there was declined in the percentage of sectors with high VIIT resulting in improvement in the percentage of sectors exhibiting low VIIT to 42.86 percent. After declining in 2008, the percentage of sectors exhibiting high VIIT again increased to 64.29 percent and continued with same percentage in 2010 as well. This results in decline in the percentage of sectors exhibiting low VIIT to 35.71 percent and it also continued in next year of 2010. So, there was no change in the share in 2010.

There was continuous decline in the percentage of sectors exhibiting high VIIT for next two years to

62.5 percent in 2011 and further to 60 percent in 2012 leading to continuous improvement in the percentage of sectors exhibiting low VIIT to 37.5 percent in 2011 and further to 40 percent in 2012. After declining in 2011 and 2012, the percentage of sectors exhibiting high VIIT again increased significantly to 71.43 percent resulting in significant decline in the percentage of sectors exhibiting low VIIT to 28.57 percent. In 2014, the percentage of sectors exhibiting high VIIT declined to 66.67 percent and further to 64.29 percent in 2015 and continued with same percentage of 64.29 percent in 2016 and after that it continuously declined for next two years to 62.5 percent in 2017 and further to 61.54 percent in 2018.

On the contrary, the percentage of sectors exhibiting low VIIT increased to 33.33 percent in 2014 and further to 35.71 percent in 2015 and remained at that level in 2016 the increased continuously for next two years to 37.5 percent in 2017 and further to 38.46 percent in 2018. So, during this period between 2006-2018, high VIIT was exhibited by majority of the sectors among the sectors exhibiting VIIT in each and every year. The highest percentage of sectors exhibiting high VIIT was 71.43 percent and lowest percentage was 57.14 percent during this period. On the other hand , highest percentage of sectors exhibiting low VIIT was 42.86 percent and lowest percentage was 28.57 percent during this period.

So, from this discussion we come to the conclusion that both high and low VIIT were dominant but at different periods. Whereas high VIIT was dominant during the early period of 1996-2005 and low VIIT was dominant during the later period of 2006-2018. The maximum percent of sectors exhibiting high VIIT throughout the period from 1996-2018 was 71.43 and minimum was 30.77. Similarly, maximum percentage of sectors exhibiting low VIIT throughout was 69.23 percent and minimum percentage was 28.57 percent. Both maximum percentage and minimum percentage of sectors exhibiting high VIIT was higher than those exhibiting low VIIT. Not only that but in terms of number of years also high VIIT was dominant. The number of years when majority of the sectors exhibited high VIIT was 13 out of 23 and in the rest 10 years majority of the sectors exhibited low VIIT. So, we can conclude that even though both high and low VIIT dominated different phases of the period, but high VIIT was relatively more dominant than low VIIT in terms of duration.

Five Year Average percentage of sectors with HVIIT and LVIIT

We can also discuss them by dividing the entire period into five sub periods. In the table four sub periods had five years each and fifth one has three years. The table shows that low VIIT was dominant in two continuous period of 1997-2001 and 2001-2005. During these two period the average percentage of sectors exhibiting low VIIT were 63.65 percent and 58.68 percent respectively. Similarly, during these two periods the percentage of sectors exhibiting high VIIT were 36.35 percent and 41.32 percent respectively. So, during these two sub periods the percentage of sectors exhibiting low VIIT had declined from average 63.65 percent to 58.68 percent and the percentage of sectors exhibiting high VIIT increased from average 36.35 percent in 1997-2001 to average 41.32 percent.

Table 7: Five Year Average percentage of sectors with HVIIT and LVIIT

TYPE/ YEAR	1996 -2000	2001-2005	2006-2010	2011 - 2015	2017-2018
HVIIT	36.35	41.32	62.00	64.98	62.77
LVIIT	63.65	58.68	38.00	35.02	37.23

Authors' Calculation

Data source: Export Import Data Bank of Ministry of Commerce, India

Even though the percentage of sectors exhibiting low VIIT declined but its share was more than 50 percent, so it was dominant against the other. The three periods from 2007-2011 to 2017-2018 showed that the percentage of sectors exhibiting high VIIT dominated these three sub periods. In 2007-2011 its average percentage increased to 62 percent and further 64.98 percent in 20111-2015 but declined to 62.77 percent in 2017-2018. Similarly, the percentage of sectors exhibiting low VIIT declined significantly to average 38 percent in 2007-2011 and further to average 35.02 percent and it increased to 37.23 in the final period of 2017-2018. So, the high VIIT was more dominant than low VIIT as it dominated more periods than low VIIT. Whereas low VIIT dominates first two periods, but high VIIT dominates last three

periods even though the last period had only three years.

CONCLUSION

We have so far discussed various aspects of intra-industry trade between India and China for the period: 1992-1018. First thing that we found in this discussion was that the share of Intra- industry trade was less than that of inter-industry trade throughout the period. In other words, the share of this type of trade was less than 50 percent of the total trade during the given period. The share was between 20 percent to 35 percent in most of the years during this period. The intra- industry trade between India and China was not very low rather it was moderate. Next, we discussed the intra- industry trade within a sector for the sixteen sectors. Here, we considered the average share for five-year period. The analysis showed that there was variation in the share of intra-industry trade in these sectors. Some sectors have high average share, and some had low average share. For example, the sectors of Hides and Skins and Vegetables had more than 50 percent average share of intra-industry trade throughout. On the other hand, the shares of intra-industry trade in the sectors like Animal, Minerals, and Machinery and Electricals were less than 50 percent throughout. In some sectors like Chemicals, Metals, and Stone and Glass, the share varied between less than 50 percent to more than 50 percent from period to period. In other words, the share of intra-industry trade not only varied among these sectors, but variation was also observed in same sectors at different periods of time.

Another thing that we analysed in this paper was the share of HIIT and VIIT. Here we found that the percentage of sectors exhibiting VIIT was much higher than the sectors exhibiting HIIT throughout the period. This means that intra- industry trade between India and China was VIIT dominated rather than HIIT. After we have found that intra-industry trade between India and Chian was VIIT dominated, we again analysed the shares of HVIIT and LVIIT, which are the two types of VIIT. Here, the analysis showed that LVIIT dominated the sectors exhibiting VIIT from 1996- 2005 and from 2006-2018 HVIIT was dominant. As the sixteen sectors that we had considered for this analysis exhibited both HIIT and VIIT (HVIIT or LVIIT) at different years of the given period, for our final analysis we discussed what type of IIT was exhibited by each of these sectors. For this analysis we had divided the entire period between 1997-2001 into four sub periods of five year each and one period of three years. Here we found that among the sixteen sectors, there was not a single sector which exhibited HIIT for entire period of five years in any of the periods. On the other hand, many sectors exhibited VIIT for entire years of the period. This includes the exhibition of both HVIIT and LVIIT in all the five years of particular period. Along with this, we also found that some sectors exhibited both VIIT and HIIT in different years of a particular period. Not only that but some sectors also exhibited HVIIT and LVIIT in different years of a particular period. In conclusion, we can say that India had moderate intra-industry trade with China and the nature of IIT between these two countries was dominated by VIIT rather than HIIT. This result confirms the conclusions of studies by (Veeramani (1999); Srivastava and Medury, (2011) where VIIT was found to be the dominant type of India's IIT. As far as the types of VIIT is concerned, even though in the former years of the period LVIIT was dominant but in the latter years, HVIIT was dominant.

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