



A STUDY ON INDIA'S BILATERAL TRADE WITH JAPAN

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Abstract

Purpose of the study: India and Japan share strong cultural and economic ties. The economic relationship between the two Asian giants strengthened with the signing of the CECA agreement during the year 2011. The current research would focus on assessing the bilateral trade relations between both the countries and attempts to identify the commodity trade potential to enhance the future trade between them.

Methodology: The study is based on secondary sources of data collected through the United Nations Conference for Trade and Development, WTO, IMF, RBI, and the Japanese Trade Databases. The annual data for the period 2005 to the year 2016 has been used to analyse the Intensity Indices and the Gravity Coefficient values between India and Japan. Similarly, the annual data from the year 2008 to 2015 is used to calculate the RCA and RID index values and finally, the average RCA and RID (2008-2016) are used for analysis to identify the commodity trade potential between both the countries.

Main Findings: The study concludes that the trade share of Japan in India's overall trade has been falling significantly over the years which could be seen through the declining Export Intensity and Import Intensity Indices of India with Japan. However, the overall analysis presents that 28 commodities were feasible for trade between India and Japan from the 56 commodities computed for the study which exhibits a strong potential for enhancing future bilateral trade relations between both the countries.

Applications of this study: India had made a strategic move with its *Look East Policy* during the year 1991 to accelerate its trade relations with the East Asian countries and later with its success the same was transformed into *Act East Policy* during the year 2014. The current study would prove to be useful in shaping the policy changes in this direction.

Novelty/Originality of this study: The study focuses on the bilateral trade relations between the two important Asian giants, India, and Japan during the post comprehensive economic cooperation agreement between the two. Further, the study identifies the areas of commodity trade potential which paves the direction for new trade between the countries to tap the untapped trade potential.

Keywords: India -Japan Trade, Bilateral Trade, Intensity Index, 'Revealed' Comparative Advantage, 'Revealed' Import Dependence.

INTRODUCTION

The two Asian giants India and Japan share strong cultural and economic ties since the era of World War-II, the relations further flourished with the establishment of strong diplomatic ties between the two. Today's modern states in both the nations have carried on the positive legacy shared by the old association between them, which had been further strengthened by shared values of their belief in democracy, individual freedom, and the rule of law in both the countries (Peng, 2013). Over the years, the countries have believed in these values and created a strong partnership based on noble principles and pragmatism. The strong bilateral ties between them have become much more strategic in the current globalized era due to the changing Asian landscape and the new balance of power and growth trajectory shifted towards the east (Mathur & Arpita). Another factor that is behind the rise of this significance has been the convergence in both the country's respective long-term political and economic goals and their objectives. To further strengthen their relationship in these lines, both the countries have also been engaged in crucial summits since the year 2005 along with the other initiatives such as strategic dialogue meets consultations on disarmament, ministerial-level economic dialogue partnership summits and the most importantly the agreement of Comprehensive Economic Co-operation Agreement (CEPA) signed in the year 2011, to intensify the economic and trade relations between the two nations (Mullen & Arora, 2017). Besides, Japan is also supporting India in strengthening the latter's candidature to join the regional group of Asia-Pacific Economic Cooperation (APEC) along with the other four multilateral forums of International Export Control Regimes; The Nuclear Suppliers Group, The Missile Technology Control Regime, Wassenaar Arrangement and the Australia Group, which are crucial for India to fulfil its current ambition of acquiring a strong base in the nuclear technology and material supplies segment. The bilateral trading regimes between India and Japan's economic co-operation has significantly grown over the past few years with Japan currently holding the fourth position as India's largest investor with a bilateral trade value of US\$ 14513 million during the year 2015-16, along with a cumulative figure of US\$ 19.43 billion of Japanese foreign investments sourced in India during the period 2000 to 2015. The two countries were also seen in engaging in crucial economic initiatives during the year 2011 with the signing of "India-Japan Comprehensive Economic Partnership Agreement" (CEPA), which seeks to eliminate around 94% of the tariffs

between India and Japan within the next 10 years period of time (Masanori, 2012). Also for both the nations the partnership is going to become crucial with respect to their divergent demographic profiles that would be experienced during the next 20 years period of time, with the increase in the working-age group population in India and Japan with the increase of the aged population.

In this context, the current research paper would focus to observe the bilateral trading relations between both the countries by using the framework of Intensity Indices (EII & III) and Gravity Coefficient (GC) along with the indices of 'Revealed' Comparative Advantage (RCA) and 'Revealed' Import Dependency Index (RID) to identify the future commodity trade potential between the two.

LITERATURE REVIEW

India and Japan have shared a strong cultural and economic bonding since the prehistoric times and shared a mutual sense of togetherness which is very much evident in the cultural practices and habits of the people along with economic ties. Mullen & Arora (2017), finds that India and Japan constitute two of the oldest democracies in the Asian Continent besides being the Asia's two largest economies and would benefit from the complementarity in their demographic profiles as Japanese aging economy would benefit from trading with the young Indian economy. Further, it is observed that Comprehensive Economic Partnership Agreement (CEPA) boosted India's export trade in various sectors such as pharmaceuticals, agricultural products, and textiles as a result of reduction of tariff barriers and Japan got benefited in the area of automobiles and high value-added consumer goods, also the agreement has paved the way for increased Japanese investment in India (Observer Researcher Foundation, 2014). Reddy (2014), opines that it took fifty years for India and Japan to take their bilateral relations to the next level and accelerating bilateral trade with Japan has been one of the priorities of India's *Look East Policy*. The author also views that trilateral dialogue among the three: India, Japan and the USA had been the long sustained military alliance of importance; however, the economic co-operation remains the dominant feature of India-Japan bilateral co-operation. Another study in the same year finds that the serious effort to promote bilateral cooperation between the two countries had begun during the first decade of the 21st century and there are plenty of possibilities for future cooperation (Naoki Ono, 2014). In addition, another interesting research during the year 2014 finds that the FDI of Japan in India had been comparatively on the rise but there is still the untapped potential that needs to be tapped. In addition, India's requirements of FDI, especially in the manufacturing sector and infrastructure development could be efficiently catered by Japan (Raghuramapatruni, 2012). The author views that this potential needs to be exploited and the investments needs to be diverted into more broad-based market areas and he views that opportunities of collaboration between India and Japanese firms are in the area of energy efficiency and environmental technologies (Atrey, 2014). Sally & Sen (2012), observes that India's trade with Japan has been declining when compared with India's total global trade, besides a decline in Japan's investment in India. One of the recent study views that India and Japan have emerged at the forefront of Asian economies owing on their respective strengths in the global platform and the author also views that Japan has become an active partner for India in its investment regime by actively taking up investments in India's food sector, construction sector and the educational sector, besides the people to people exchange initiatives besides (Ambatkar, 2002). Chodhury (2018), observes that Japanese aid facilitated infrastructure development of health, water and sanitation programmes of India and its investments have flown into the sectors like automobile and the electronics. Pajon (2018), viewed that the strengthening of India-Japan strategic partnership is initially driven by geopolitical considerations and the bilateral relations have progressed slowly in terms of political values, interests, strategic convergence but their economic dimensions could not take off in the same pace. The authors opined that India has been one of the largest recipients of Japan's official development assistance (ODA) since the year 2003 and has made up to 2.2% of Japan's overall investment flows since the year 2016. The author viewed that India and Japan needs to boost their business links to make their bilateral partnership more instrumental as well as support India's long-term developmental goals. Similarly, the study of (Jain, 2017), explores the comparison of the ODA during the early post-war period and the current period from mid-2000 and argues that besides economic objective, the ODA of Japan also has a strategic political objective in its framework not only for India but also to the rest of Asia to gain the leverage. Another study (Business Line, 2018) finds that India & Japan shared a long-enduring strategic and economic partnership that was further elevated to the "special strategic and global partnership" status since the past four years. The study also views that Japan, which is the largest bilateral trade partner with India has been extending bilateral loans and assistance grants since the year 1958 and has been playing a vital role in financing the critical infrastructure to address the social and environmental causes. Masanori (2012), opines that the Japanese business community had identified India's potential as a market for Japanese products especially with the growing middle-class community in India. The second trait which is identified by the author is the diversification of the region's investment from the area surrounding the national capital, Delhi, to the other southern cities such as Chennai. The research also focussed on the remaining obstacles that are faced by the investors. The conclusions of the study present that the Japanese firms are slowly adjusting their business models to gradually suit the needs of the Indian markets which provide opportunities for both the economies. Raja Mohan (2008), views that India and Japan's relation had undergone a drastic shift that has attempted to build a strategic and global partnership between the two countries. He argues that there are some issues of arguments between the two countries with the changing global economic order and the rise of China, which has actually brought the two countries together and the current economic and political dynamics foresees the two countries coming closer in the future.

RESEARCH GAP AND PURPOSE

With this background, the major conclusions from the earlier reviews are that both the nations share strong bilateral trade relations with each other since the prehistoric times and this gradually got strengthened with the establishment of diplomatic ties between the two and their lies the immense potential for future trade between them. In this scenario, the current study aims to assess the intensity of the bilateral trade regime between the two countries and attempts to identify the potential commodities to tap the future bilateral trade potential between the two.

METHODOLOGY

The study employs various statistical approaches of Intensity Indices, Gravity Coefficient to assess the intensity of trade relations {Export Intensity Index (EII) and Import Intensity Index (III) between India and Japan -further the study employs a combination of 'Revealed' Comparative Advantage Index (RCA) which is matched with 'Revealed' Import Dependency Index (RID) to identify the commodity trade potential between the nations. The study uses various secondary sources databases of Reserve bank of India, UNCTAD database, IMF, Japanese Trade Database to extract the annual data for the period 2005 to 2016 and to analyze the Intensity Indices and Gravity Coefficient values between India and Japan. Similarly, the annual trade data since the year 2008 till 2015 is extracted to calculate the RCA and RID values, and the average values of RCA and RID (2008-2015) are matched to identify the commodity trade potential.

Intensity Indices

The value of the Intensity Index can be further classified as Export- Intensity Index (EII) and Import- Intensity Index (III) ([Brown, 1917](#) & [Kojima 1964](#)).

Export- Intensity Index (EII)

The value of EII can be given as the ratio of the export share of country i to j/region to the share of world exports going to a partner j.

$$XII_{ij} = \frac{x_{ij} / X_{iw}}{x_{wj} / X_{ww}}$$

Where x_{ij} is given as the total export value of country's 'i' to 'j', X_{iw} is the total export value of country 'i' to the world. x_{wj} is the total value of world exports to country 'j', and X_{ww} is the total value of world exports. An EII index value which is more than one indicates that trade flow between countries is greater than expected given their importance in the total world trade.

Import- Intensity Index (III)

The value of III can be given as the ratio of import share of country i to j/region to the share of world imports going to a partner j. Where $III_{ij} = M_{ij} / M_{iw} / M_{wj} / M_{ww}$

Where M_{ij} is the total value of imports of country or region 'i' to the country 'j', M_{iw} is the total value of the imports of country 'i' to the world, M_{wj} is the dollar value of world imports to country 'j', and M_{ww} is the total value of world imports. An index of more than one indicates higher import intensity between the nations taken for study.

Gravity Coefficient (GC)

This measure reflects those differences in trade shares of partner countries that cannot be attributed to the different sizes of partners. GC can be expressed as the country's trade with a partner country relative to the partner country's trade share in the total world trade. A gravity coefficient tells us about the trade dependence, of a country with a partner country.

$$GC = (X+M)_{ij} / (X+M)_{iw} / (X+M)_{jw} / (X+M)_w$$

$(X+M)_{jw}$ = Total trade (Export+Import) of country j with the world

$(X+M)_{ij}$: Total trade (Export+ import of a country I with j)

$(X+M)_w$: Total world trade (Export + import)

If the gravity coefficient exceeds one, it implies that the country i has high trade intensity with its partner. If the coefficient is below one, it implies low trade dependence with its partner. The Gravity Coefficient (GC) is calculated for India's trade with Japan for the period 2005 to 2016.

‘Revealed’ Comparative Advantage Index (RCA Index)

The paper uses the model of ‘Revealed’ Comparative Advantage Index given by (Balassa, 1965) for export data. Different measures of ‘Revealed’ Comparative Advantage index (RCA) are in use to assess the country’s export potential to identify the country’s competitiveness. The paper uses SITC-2 digit level classification by following the Leamer’s Aggregation Scheme (Leamer, 1985), Countries with similar RCA indices will not have high bilateral trade intensities unless having a high intra industry trade values. The RCA index of a country ‘i’ for the product category ‘j’ can be measured as (Utkulu, Semen, 2004):

$$RCA_{ij} = (X_{ij} / X_{it}) / (X_{wj} / X_{wt})$$

Where X_{ij} and X_{wj} are the values of i^{th} country’s exports of product ‘j’ and world exports of product ‘j’ and where X_{it} and X_{wt} refer to the i^{th} country’s total exports and world’s total exports. A value of less than 1 presents the country’s ‘revealed’ comparative disadvantage of the product. Similarly, if the index value exceeds 1, the country has ‘revealed’ comparative advantage for the product.

The ‘Revealed’ Import Dependence Index (RID Index)

The ‘Revealed’ Import Dependency index (RID) index identifies the commodities, which have import dependence on the partner countries. The RID index presents the commodity dependence of the countries. The RID index can be written as commodity ‘i’’s share in the country’s total imports vis-à-vis its share in total world imports. The RID index can be written as:

$$RID (ia) = (M_{ia} / M_a) / (M_{iw} / M_w)$$

Where M_{ia} is equal to the total imports of the product ‘i’ from a given country ‘a’, M_a is equal to total imports of the country ‘a’, M_{iw} is equal to total value of the world imports of the product i and M_w is given as total world imports. The ‘Revealed’ Import Dependency index more than 1 presents a strong import dependence of the country on the importation of a specific item.

The ‘Revealed’ Comparative Advantage (RCA) analysis presents the comparative advantage of a country with respect to the exports of a specific product in general, it does not explain about the specific import requirements of the countries being focused for exports. Though India may have a comparative advantage in the export of certain products, but Japan might not have a requirement for the same products. The comparison of the RCA of the specific products in India with the RID of Japan will present a more reliable picture of the export potential of the Indian products with Japan and Vice versa. The product category of India has a RCA index greater than one, and if for the same product Japan, has an RID greater than one, such commodities could be mutually traded upon between India and Japan. The RCA and RID for the period 2010 to 2016 were analyzed and their respective average values were taken to assess the trade potential.

RESULTS & DISCUSSIONS

Review on the Bilateral Trade between India and Japan

India and Japan are the two oldest democracies of Asia in such a constructive spirit that makes them also the natural partners. Besides, the absence of serious disagreement such as territorial disputes gives a mature depth to the bilateral relations. There has been a significant decline in the total trade share of Japan in India’s total trade; and Japan remains as an important trading partner to India (Widgren 2005). But, India is still is a marginal trade partner with Japan and constitutes 0.6 percent of Japan’s total global exports as well as imports during the year 2005 but there has been a significant improvement since then, this could be seen more in the case of Japanese exports to India than for her imports from India which has been presented in the given Figure 1.

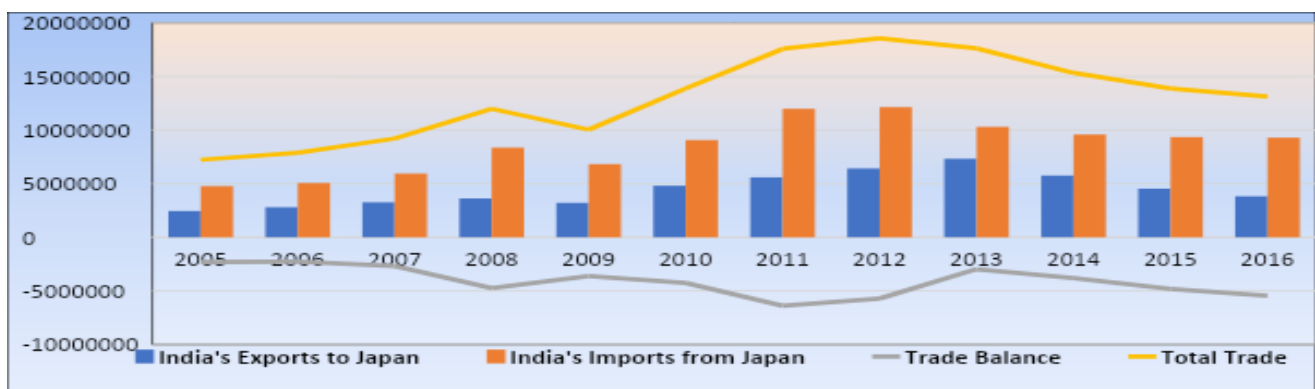


Figure 1: India’s Total Trade and Trade Balance with Japan

Source: Author’s Calculation based on Annexure. I

There was a gradual increase in India's exports to Japan, as for the initial year, 2005 the total exports of India to Japan was 1.59% of India's total exports this saw a gradual rise to 38,27,283.045 US\$ by the end of the year 2016 which was at 0.88 % of India's total exports. The decline in the share of India's exports to Japan started during the period of US subprime crisis where the share of Indian exports was 1.189 percent of the total exports to Japan and there was a gradual rise of exports to 1.562 percent and thereafter there was a gradual decline in the total exports of India to Japan. But in the case of India's imports, there was a gradual increase from 1.80 % during the initial period of 2005 till the year 2007, where the total imports stood at 8358254 US\$. Post the global economic crisis of 2008, there was a gradual decline till the year 2010 where the imports from Japan stood at 1.903 percent of the total imports of India and during the year 2016, the total imports from Japan were at 1.6060 percent of the total imports.

The Relative Trade share and the Gravity Co-efficient are measured for India and Japan for the period 2005 to 2016 and presented in the Figure 2. A declining trend could be observed with respect to relative trade share and the value of the gravity co-efficient between both the countries for the whole period during the study. The relative measure which presents the trade share computed for the year 2005 is 20.666 which gradually reduced to 16.1529 during the Global Economic crisis of 2008 and post crises this rose to 19.439 and thereafter there was a gradual decline in the value which was registered at 9.8816 during the year 2016. The gravity co-efficient index which measures the trade intensity is 6.8867 during the year 2005 and this declined to 5.9390 and further to 4.57024 during the year 2015 and to 3.2938 in the year 2016.

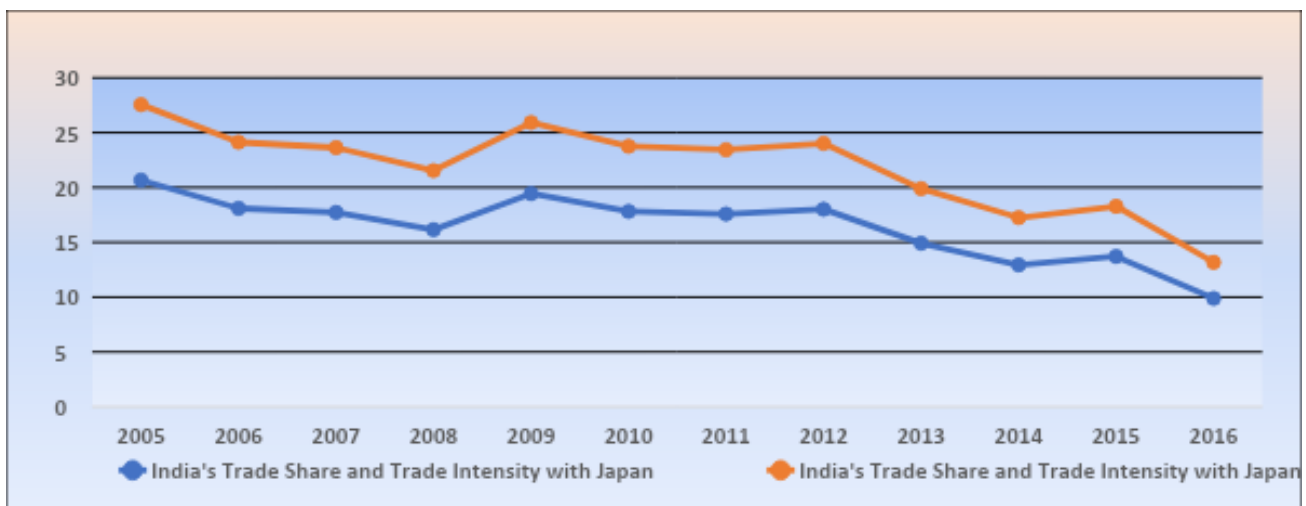


Figure 2: India's Trade Share (Gravity Coefficient) and Trade Intensity with Japan

Source: Author's Calculation based on Annexure.2

Japanese Foreign Direct Investment in India

Japan holds the position of India's fourth-largest investor during the financial year 2015-16, along with a cumulative figure of US\$ 19.43 billion of Japanese foreign investment into India from the year 2000 to 2015. Both the countries are actively engaged in crucial economic initiatives including the "Comprehensive Economic Partnership Agreement (CEPA)" during the year 2011 and "India-Japan Investment Promotion Partnership" agreement signed in the year 2014 where the Japanese government agreed to invest US\$ 33.61 billion in India following the next five years. Both the countries also remain engaged in negotiations for the creation of a "Regional Comprehensive Economic Partnership (RCEP)" which seeks to promote regional supply chains and is crucial for India's Act East Policy. Japan also had signed an agreement for investing US\$ 744m worth infrastructure road project for the most crucial north-eastern part of India, which has been disconnected from the mainland bordering the states of Assam, Meghalaya and Mizoram and are considered as the gateway to connect India to the East Asian countries. This further gained prominence with India's Act East Policy strategy. Similarly, for the first time, the Indian government had allowed FDI in the archipelago in the Southern Andaman Islands of India by the Japan, as these islands have closer proximity to the Straits of Malacca as these are placed in the strategic position for surveillance for the crucial sea lines of communication (Rajamohan, Bahadur & Jabin, 2008). Besides, these islands are also crucial as about a third, of India's Exclusive Economic Zone lies around them. Despite the increased economic engagement between the countries the amount of Japanese FDI in India remains low. The exponential growth in the Japanese FDI from US\$ 139 million in 2004 to US\$ 5,551 million in 2008 was largely due to a few major deals especially the one related to the acquisition of Indian company Ranbaxy by Japanese company Saichi Sankyo. Since this deal of Japanese FDI to India has failed to report similar kind of growth with the total investment in the fiscal year 2014-15 being less than that registered during the year 2011-12. The recent trend in Japan's FDI investments in India is presented in figure 3.

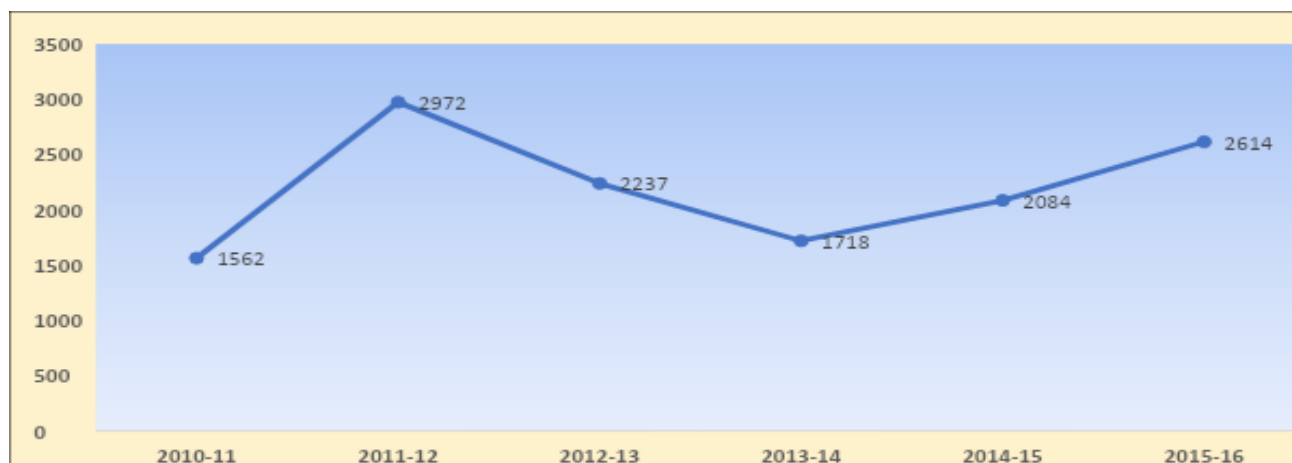


Figure 3: Japanese FDI Inflows into India (US\$m)

Source: Indian Development Co-operation Research (IDCR) Programme at the Centre for Policy Research

Yet the situation is likely to improve on the eve of active economic engagements between the two countries through an increased number of agreements and memorandum of understanding (MOUs). Which reduces the cost of doing business and thus in the process provided an impetus to the Japanese companies investing in India especially in the investments of the manufacturing sector. The recent bilateral agreement for co-operation in the peaceful uses of nuclear energy is crucial for India to fulfill its energy needs and sustain economic growth (Geetanjali, Nataraj & Ashwini, 2014). Overall, the forecast of Japanese FDI investment in India is also likely to remain positive as it is largely focused on automobile, electrical equipment, telecommunications, chemicals, and pharmaceutical sectors all of these are expected to witness a positive trend in the coming future.

An Analysis of Intensity Indices between India and Japan

India-Japan economic cooperation has grown over the past few years. The two countries are also seen engaging in crucial economic initiatives including the 2011 joint “India-Japan Comprehensive Economic Partnership Agreement” (CEPA), which seeks to eliminate around 94% of the tariffs between Japan and India within the next 10 years and expected to enhance the bilateral trade and investment relations between the two Asian giants. The Export Intensity Index (EII) and Import Intensity Index (III) of India with Japan and Japan with India were calculated for the period 2005-2016 to observe the intensity of trade relations between both the countries (Table 1, Figure 4). Table 1 given below presents a declining share of Japan in India’s total trade share, which is evident from the registered values of Export Intensity Indices which were declining between them, but Japan had always been an important trade partner for India, as this has not been the same with Japan with India being only a marginal trading partner with it. During the year 2005, India’s trade value was 0.6 % of Japan’s total global exports and imports. The bilateral trade between both the countries had started to improve since then and the gradual shift had actually begun during this period which had gradually started to improve in the more recent period. This change could be clearly seen in the Japanese exports to India from the values of EII computed for the Japanese exports (Table 1) rather than for the imports from India. For the initial period of study, the EII value is 1.04 during the period 2005 and there was a gradual decline after that, as this declined to a value of 0.547 during the period 2010 and further to 0.358 by the year 2016. The year 2010-11 and 2011-12 saw a relative growth of 33% in the bilateral trade between India and Japan but the subsequent years saw a relative stagnation in the overall trade. During the year 2005, the value of Import Intensity Index (III) is 0.46887, and this declined to 0.3639 by the year 2010 and thereafter there has been a gradual rise to 0.60628 and 0.6744 respectively during the subsequent years of 2015 and 2016.

Table 1: Trade Intensity Indices

Year	INDIA		JAPAN	
	Export Intensity-Index (EII)	Import Intensity-Index (III)	Export Intensity-Index (EII)	Import Intensity-Index (III)
2005	1.045089	0.468871	0.343211	0.433991
2006	0.886705	0.495121	0.373529	0.457213
2007	0.780764	0.425632	0.441296	0.406212
2008	0.570503	0.363912	0.425481	0.383462
2009	0.577882	0.346066	0.444597	0.340891
2010	0.547896	0.377816	0.412193	0.380424

2011	0.467167	0.330132	0.442655	0.344022
2012	0.515556	0.312299	0.416491	0.342142
2013	0.602342	0.361227	0.399066	0.358552
2014	0.466581	0.352919	0.372273	0.334832
2015	0.418243	0.606828	0.408721	0.28953
2016	0.358883	0.674482	0.408819	0.28472

Source: Author's Calculation based on data from www.unctad.org

Japan's Export Intensity Index (EII) stood at 0.3432 for the initial period 2005 and this has gradually increased to 0.44459 in the year 2009 and declined to 0.412193 in the following year 2010, thereafter there was a gradual decline to 0.408819 during the year 2016. Japan had experienced a substantial decline in its trade balance since 2008 owing to the global financial crisis of 2007-08. Similarly, the Import Intensity index (III) is 0.43399 during the initial year of study (2005) and this gradually declined to 0.34214 during the year 2012 and further to 0.2847 for the period 2016 as a result of the global economic slowdown. But despite such crucial and diverse initiatives, the intensity of the bilateral trade volumes between the two remains to be much below the potential levels. Yet the situation is likely to improve especially on the back of active economic engagement between the two countries through an increased number of agreements and memorandum of understandings (MoUs).

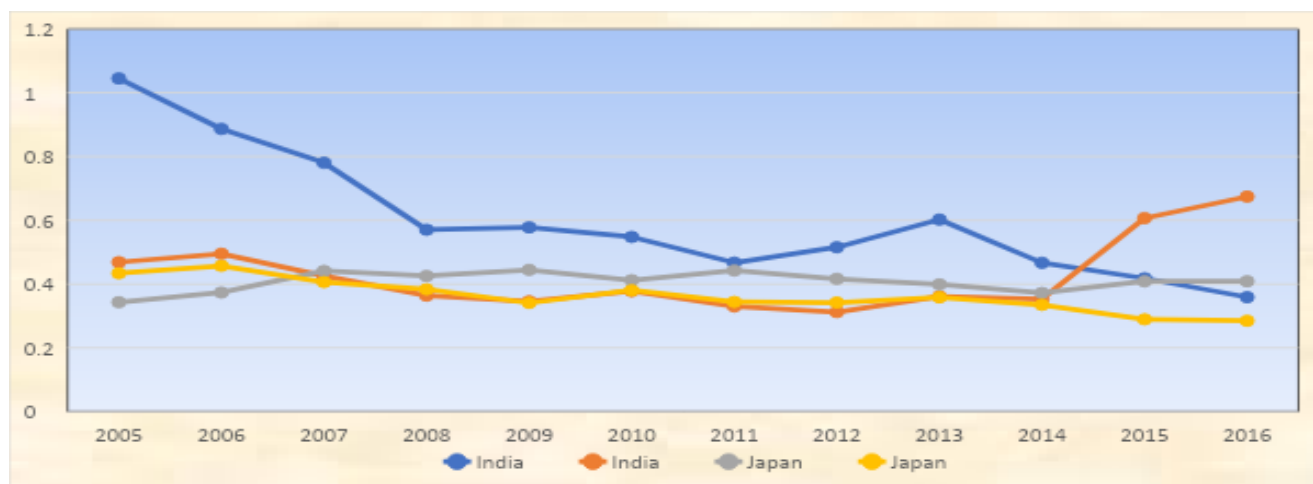


Figure 4: Trade Intensity Indices (EII & III) of India & Japan

Source: Author's Calculation based on Table 1

Competitive Advantage Index between India & Japan

India and Japan have complementarity in the economic structures. Japan has high-end technology in manufacturing, good working disciplines along with highly developed infrastructures, but declining population numbers and aging society are the major challenges of Japan. India, on the other hand, has an aspirational young population, rich natural resources; it needs FDI especially in the manufacturing sector, and also has vast infrastructure investment requirements that need to be catered. India's advantage lies in the services trade and Japan's advantage is in the manufacturing commodity exports make their economies complementary for trade, besides Japan's surplus capital for investments could meet the huge infrastructure demand needs of the Indian economy.

To analyze the comparative advantage of India and Japan the 'revealed' comparative advantage (RCA) has been used to assess the country's export potential and the 'Revealed' Import Dependence (RID) index to identify the commodities, which have import dependence on the partner countries.

Table 2: Commodities Feasible for Trade between India and Japan where RCA>1 (India) and RID>1 (Japan)

Commodity Description	India (RCA)	Japan (RID)
1. Raw Material		
Metalliferous Ores (23)	1.33941	3.61791
2. Tropical Agriculture		
Fruits, Vegetables (05)	1.78809	1.86612
Coffee, Tea, Cocoa, Spices (07)	1.1239	1.46257
Sugar (06)	1.57772	1.09633

3. Animal Products		
Meat Preparations (01)	4.62386	2.22469
Fish Preparations (03)	1.73244	3.63971
4. Cereals etc.		
Cereals, Preparations (04)	1.98029	2.51938
Oilseeds Nuts, Kernels (22)	1.62493	1.40333
Fixed Vegetable Oils (42)	1.98693	1.98701
5. Labor Intensive Manufactures		
Clothing (84)	1.75803	2.66987
Footwear (85)	1.00873	1.42694
6. Capital Intensive Manufacturers		
Leather Manufacturers (61)	2.12711	1.16281
Rubber Manufactures (62)	1.01789	1.96922
Textile Yarn (65)	5.43238	1.96605
Iron and Steel (67)	3.26451	1.89623
Metal Manufactures (69)	1.12232	1.95164
7. Chemicals		
Chemical Elements (51)	3.09423	1.65545
Dyeing, Tanning, coloring (53)	1.57919	1.94743
Essential Oils (55)	1.66296	1.97786

Source: Author's Calculation based on data from Annexure 3

With the given background when the 'Revealed' Comparative Advantage (RCA) possessed by the commodities of India that could be exported are matched by the 'Revealed' Import Dependency (RID) for the commodities of Japan that are imported would present a picture of export potential that exists between both the countries. Therefore when for one product the 'Revealed' Comparative Advantage exists ($RCA > 1$), and for the same product Japan's 'Revealed' Import Dependency ($RID > 1$) could be seen than such commodities are feasible for bilateral trade between both the countries. The 'Revealed' Comparative Advantage for India and 'Revealed' Import Dependency of Japan and vice versa were calculated for the period 2005 to 2016 (Commodities as per Leamer's Aggregation Scheme @SITC -2 digit level presented in Annexure.3) and their respective average values were computed and matched to identify the trade potential between both the countries.

India's 'Revealed' Comparative Advantage Index

The 'Revealed' Comparative Advantage (RCA), computed for India presents that India has a comparative advantage in 20 commodities under 8 commodity categories except for the commodity categories categorized under Machinery and Forest Products where the RCA indices for all the commodities under this category is lower than one. India's comparative advantage could be observed in the commodities such as Metalliferous Ores (23), Non-Ferrous Metal (68), Fruits, Vegetables (05), Sugar (06), Coffee, Tea, Coca, spices (07), Meat preparations (01), Fish Preparations (03), Cereals Preparations (04), Oilseeds Nuts, Kernels (22), Fixed Vegetable Oils (42), Chemicals (84), Footwear (85), Leather & Leather Manufactures (61), Rubber Manufacturers (62), Textile Yarn (65), Iron & Steel (67), Metal Manufacturers (69), Chemical Elements (51), Dyeing, Tanning, Colouring (53), Essential Oils (55) where the RCA index(average) computed for them is greater than one for the period 2012-2016. India's comparative advantage could be seen in the commodity categories of agriculture and labor-intensive product categories. The 'Revealed' Import Dependency Index (RID) could be observed in the product category Petroleum (33), Crude Fertilizers (27), Coke, Coal, Briquettes (32), Natural Manufactures Gas (34), Non-Ferrous Metal (68), Pulp, Waster Paper (25), Paper, Paperboards (64), Fruits, Vegetables (05), Crude Rubber (23), Fixed Vegetable Oils (42), Travel Good, Handbags (83), Textile Yarn (65), Iron & Steel (67), Non-Electrical Machinery (71), Electrical Machinery(72), Chemical Elements (51), Mineral Tar, Crude Chemicals (52), Dyeing, Tanning, Colouring (53), Fertilizers (56) and Chemical Materials, n.e.s (59) where the RID index registered is greater than 1. The 'Revealed' Import Dependency could be observed within sophisticated and high-end commodity categories.

Japan's 'Revealed' Comparative Advantage & 'Revealed' Import Dependency Index

Japan's 'Revealed' Comparatives Advantage could be observed in Coke, Coal, Briquettes (32), Non-Ferrous Metal (68), Pulp, Waste Paper (25), Paper, Paperboards (64), Postal Packs (91), Rubber Manufacturers (62), Non-Electrical Machinery (71), Electrical Machinery (72), Transport Equipment (73), Professional Goods (86), Chemical Elements

(51), Mineral Tar, Crude Chemicals (52), Chemical Materials, n.e.s. (59) in 13 commodities under 6 commodity categories where the comparative advantage is greater than one, the 'Revealed' Import Dependency Index (RID) could be observed with respect to Petroleum (33), Metalliferous Ores (23), Coke, Coal, Briquettes (32), Natural Manufactured Gas (34), Non-Ferrous Metal (68), Wood, Lumber, Cork (24), Wood, Cork Manufactures (63), Sugar (06), Coffee, Tea, Cocoa, Spices (07), Crude Rubber (23), Meat Preparations (01), Fish Preparations (03), Cereals Preparations (04), Tobacco Manufactures (12), Oilseeds Nuts, Kernels(22), Fixed Vegetable Oils, Fats (41), Travel Goods, Handbags (83), Clothing (84), Footwear (85), Leather & Leather Manufactures (61), Rubber Manufactures (62), Textile Yarn (65), Iron & Steel (67), Metal Manufactures (69), Professional Goods (86), Chemical Elements(51), Dyeing, Tanning, Colouring (53) and Essential Oils (1.977) in 28 commodities under all the 10 commodity categories of Leamer's Aggregation Scheme, where the RID index computed is lower than one. Japan's competitiveness could be observed in the production of Machinery, Chemicals, and Capital Intensive commodity categories and import dependency could be observed under the labor-intensive commodity categories and farm products.

Commodities Feasible for Trade between India and Japan

Overall the analysis presents that a total of 19 commodities are feasible for trade between India and Japan where the RCA of India (>1) is matched with the RID of Japan (>1) which can be observed from the Table 3. One significant observation that could be seen is the change in the commodity basket of Indian exports as the economy is seen switching over to capital intensive exports and sophisticated commodity category exports that could be observed from the table 3. The commodities are **Raw Materials:** Metalliferous ores (23), **Tropical Agriculture:** Fruits, Vegetables (05), Coffee, Tea, Cocoa, Spices (07), Sugar (06), **Animal Products:** Meat Preparations (01), Fish Preparations (03), **Cereals:** Cereals, Preparations (04), Oilseeds Nuts, Kernels (22), Fixed Vegetable Oils (42), **Labour Intensive Manufactures:** Clothing(84), Footwear (85), **Capital Intensive Manufactures:** Leather & Leather Manufactures(61), Rubber Manufacturers (62), Textile Yarn(67), Iron & Steel (67), Metal Manufactures (69), **Chemicals:** Chemical Elements (51), Dyeing Tanning Colouring (53), Essential Oils.

There have not been any significant changes in the export basket of Japanese exports which have been centered on machinery, transport equipment, electronic goods, chemicals, and metal products (Madhavan, 2000). Similarly, a total of 9 commodities were seen to have the potential for trade between Japan and India (Table 4) where the RCA of Japan is matching for RID of India under **Raw Materials:** Coke, Coal, Briquettes (23), Non-Ferrous metal (68): **Forest Products:** Pulp, Waste Paper (25), Paper, paperboards (64): **Machinery:** Non-Electrical Machinery (71), Electrical Machinery (72): **Chemicals:** Chemical Elements(51), Mineral Tar, Crude Chemicals (52), Chemical Materials, n.e.s (59), where the RCA for Japan is greater than 1 and RID for India is greater than one. The economy of Japan is largely based on exports from the service sector and huge dependency could be seen for import of commodities as for the commodities have taken for analysis RID could be observed for 28 commodities and largely Japan's competitive advantage is seen in the products which are categorised on the upper side of the global value chains and India's advantage is found in the products which are categorized in the lower side of the global value chain ladder (Naidu, 2004). Totally 28 commodities are found to be feasible for trade between both the countries India and Japan (Table 2 & Table 3).

Table 3: Commodities Feasible for Trade between India and Japan where RCA>1(Japan) and RID>1 (India)

Commodity Description	India (RCA)	Japan (RID)
1. Raw Material		
Coke, Coal, Briquettes (32)	5.43189	1.16014
Non-Ferrous Metal (68)	2.01364	1.98273
2. Forest Products		
Pulp, Waste Paper (25)	1.17504	1.98417
Paper, Paperboards (64)	1.07848	1.96322
3. Machinery		
Non-Electrical Machinery (71)	1.98912	2.79566
Electrical machinery (72)	1.97151	2.73483
4. Chemicals		
Chemical Elements (51)	1.76289	1.20534
Mineral Tar, Crude Chemicals (52)	2.36101	1.28525
Chemical Materials, n.es. (59)	1.97204	2.34759

Source: Author's Calculation based on data Annexure 3



The paper's final analysis presents an immense potential for bilateral commodity trade co-operation between both the economies (Table 2 & 3). Nearly 28 commodities from the 56 commodities computed for the study exhibits potential for trade between both the countries. As aging Japan requires the right trading partner to source its imports and India is looking for investments in its crucial infrastructure projects ([Lahency & Warren, 2010](#)). India, to cater to this demand of the partner country Japan, there is an immense need to diversify its export basket, as Japan's RID value in the huge import category presents the potential for Indian exports which are untapped. Currently, the bilateral trade and investment flows are much below the potential level on either sides or when the investments from Japan to India are compared this is just 3% of investments of Japan to China ([Kumar, 2002](#)). This calls for the implementation of the India-Japan Comprehensive Economic Partnership Agreement (CEPA) in its real spirit to tap the untapped trade potential that both would be beneficial for both the countries ([Murthy 1986](#)).

CONCLUSION

Over the past few years, the continuous engagement between India and Japan has transformed the bilateral relationship into a significant, strategic and broad-based one ([Singh, 2016](#)). Both sides have been intent on strengthening the ties in both the defence and economic domain and are working towards growing as a powerful and influential force in the future Asia-Pacific landscape ([Murthy 1993](#)). Most importantly both the economies have complementarity in their export structures thus making the trade feasible among them. Japan is also providing India with capital and technology and also started investing heavily in its core sectors and also is amending its constitution to allow defence relations with it, playing a role in India's high-end infrastructural development and making a drastic exemption to enter into an extremely crucial and significant civil nuclear deal with India are all signs of a much stronger India-Japan relationship soon.

LIMITATION AND STUDY FORWARD

The study could be further carried out covering the tariff levels between India and Japan and also could be extended to cover the services trade.

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The first author contributed towards the computation of the intensity and competitive indices for the study and the contribution of the second author is towards review of the earlier literature and analysis.

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APPENDIX

Annexure 1: India's Trade with Japan

Year	India's Exports to Japan	India's Imports from Japan	Trade Balance	Total Trade
2005	2455238.945	4771289	-2316050.055	7226527.945
2006	2804219.727	5065538	-2261318.273	7869757.727
2007	3263388.699	5946461	-2683072.301	9209849.699
2008	3624208.847	8358254	-4734045.153	11982462.85
2009	3215708.76	6820708	-3604999.24	10036416.76
2010	4805076.573	9066378	-4261301.427	13871454.57
2011	5592607.804	11978611	-6386003.196	17571218.81
2012	6415550.048	12128039	-5712488.952	18543589.05
2013	7325476.418	10298531	-2973054.582	17624007.42
2014	5756878.753	9569516	-3812637.247	15326394.75
2015	4529718.159	9350635	-4820916.841	13880353.16

2016	3827283.045	9291958	-5464674.955	13119241.05
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Source: Author's Calculation based on www.unctad.org

Annexure 2: India's Trade Share and Gravity Coefficient (Trade Intensity) with Japan

Year	Relative Measure (Trade Share)	Gravity Coefficient (Trade Intensity)
2005	20.66602628	6.888675427
2006	18.09343689	6.03114563
2007	17.72401859	5.908006195
2008	16.15295673	5.384318911
2009	19.43919142	6.479730475
2010	17.81720946	5.93906982
2011	17.57742227	5.859140755
2012	18.01408804	6.004696013
2013	14.91693941	4.972313138
2014	12.93803715	4.312679051
2015	13.71072497	4.570241656
2016	9.881649488	3.293883163

Source: Author's Calculation based on www.unctad.org

Annexure 3: Leamer's Aggregation Scheme (Average 2012-2016)

Aggregate Description		India	Japan
RCA		RID	RCA
RCA		RID	RID
I. Petroleum	Petroleum, Related Products (33)	0.01024	1.02268 0.0001 6.06177
II. Raw Materials	Crude Fertilizers (27)	0.09715	8.28479 0.04809 0.73375
	Metalliferous Ores (23)	1.33941 0.38972 0.71467	3.61791
	Coke, Coal, Briquettes (32)	0.36063	5.43189 1.16014 2.80334
	Natural Manufactured Gas (34)	0.01024	1.02268 0.00001 6.06177
	Electrical Energy (35)	0.03992	- - -
	Non-Ferrous Metal(68)	1.98669 2.01364 1.98273	1.57967
III. Forest Products	Wood, Lumber, Cork (24)	0.41946	0.33955 0.07214 2.58721
	Pulp, Waste Paper (25)	0.00634	1.17504 1.98417 0.87339
	Wood, Cork Manufacturers (63)	0.40747	0.16445 0.03995 2.97972
	Paper, Paperboards (64)	0.32874	1.07848 1.96322 0.54087
IV. Tropical Agriculture	Fruits, Vegetables (05)	1.78809 1.95087	0.04303 0.866
	Sugar (06)	1.57721 0.5623 0.56214	1.0963
	Coffee, Tea, Cocoa, Spices (07)	1.12396	0.13454 0.03936 1.46257
	Beverages (11)	0.0283	0.15493 0.23361 0.72263
	Crude Rubber (23)	0.11935	1.77127 0.0017 2.53971
V. Animal Products	Live Animals (00)	0.03643	0.02202 0.02632 0.31184
	Meat Preparations (01)	4.62386 0.003	0.06351 2.22469
	Dairy Products, Eggs (02)	0.21431	0.03002 0.0207 0.22361
	Fish Preparations (03)	1.73244 0.03194	0.37087 3.63971
	Hides, Skins, fur skins (21)	0.01375	0.32697 0.50437 0.54438
	Animals, Veg Materials (29)	0.03643	0.02202 0.02632 0.31184
	Processed Oils, Fat (43)	0.37336	0.05706 0.25372 0.17327
	Animals, nes (94)	0.85252	0.79675 0.15054 0.65483
VI. Cereals etc	Cereals, Preparations (04)	1.98029 0.11538	0.00045 2.51938
	Misc. Food Preparations (09)	0.15713	0.13377 0.08287 0.73595

Tobacco Manufacturers (12)	0.42539	0.03802	0.20679	3.86622
Oilseeds Nuts, Kernels (22)	1.62493	0.04682	0.00372	1.40333
Animal Oils, Fats (41)	0.85252	0.79675	0.15054	0.65483
Fixed Vegetable Oils (42)	1.98693	5.89532	0.00667	1.98701

VII. Labour Intensive

Manufacturers Furniture (82)	0.24896	0.30257	0.1803	0.2809
Travel Goods, Handbags (83)	0.24376	1.99783	0.0237	2.84171
Clothing (84)	1.75803	0.15715	0.06743	2.66987
Footwear (85)	1.00873	0.17429	0.01386	1.42694
Misc. Manufacturers, n.e.s (89)	0.41257	0.41202	0.29054	0.75798
Postal Packs (91)	0.71489	0.58537	3.17552	0.02199

VIII. Capital Intensive

Manufactures Leather & Leather Manufactures (61)	2.12712	0.25612	0.56212	1.16281
Rubber Manufacturers (62)	1.01789	0.22837	2.3149	1.96922
Textile Yarn (65)	5.43238	0.80764	0.72287	1.96605
Iron and Steel (67)	3.26451	0.86923	0.62345	1.89623
Metal Manufacturers (69)	1.12232	0.49785	0.73588	1.95164
Sanitary Fixtures Fabrics (81)	0.30257	0.24896	0.1803	0.33216

IX. Machinery Non-Electrical Machinery (71) 0.48818 **1.98912** **2.79566** 0.31447

Electrical machinery (72)	0.2631	1.97151	2.73483	0.02119
Transport Equipment (73)	0.40255	0.04287	4.12789	0.10478
Professional Goods (86)	0.58537	0.71489	3.17552	1.02199
Firearms, Ammunition (81)	0.42454	0.3377	0.35754	0.37593

X. Chemicals Chemical Elements (51) **3.09423** **1.76289** **1.20534** **1.65545**

Mineral Tar, Crude Chemicals (52)	0.49177	2.36101	1.28525	0.17487
Dyeing, Tanning, colouring (53)	1.5799	1.60072	0.28429	1.94743
Medicinal, Pharmaceuticals Products (54)	0.60313	0.45976	0.0639	0.38738
Essential Oils (55)	1.66296	0.41382	0.24964	1.97786
Fertilizers (56)	0.06365	3.33216	0.0639	0.38738
Explosives (57)	0.52018	0.26028	0.19604	0.87106
Plastic Materials (58)	0.15114	0.18866	0.579.6	0.76378
Chemical Materials, n.es. (59)	0.33051	1.97204	2.34759	0.05593

Source: Author's Calculation based on data of unctad.org

The indices in bold indicate the comparative advantage or disadvantage of the country where the index is greater than one for India and Japan respectively.

Commodity Classification as per [Leamer, E.E. \(1984\)](#), Sources of International Comparative Advantage: Theory and Evidence, Cambridge Mass, MIT Press.