Part 4

Sectoral Dimensions of International Trade

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Comparison of Trade Complementarities and Similarities between India and ASEAN Countries

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India–ASEAN Free Trade Agreement (IAFTA) generated intense debate on its likely fallout on India's economy, particularly on certain agricultural sub-sectors on which the livelihoods of large number of people are depended upon. For any Regional Trade Agreement (RTA) to be successful, it is imperative on partner countries to have complementary trade structure to be exploited for mutual benefits. RCA indices, despite their limitations, provide a useful guide to demonstrate the underlying comparative advantage and offer a further insight into the competitiveness of participating countries and hence reveal the possibility of increased trade cooperation between them. In this context, this chapter tries to identify complementary and competing sectors of trade between India and Association of South East Asian Countries (ASEAN) countries to consolidate their strengths and to overcome the deficiencies. Identification of synergies between India and ASEAN is important for further cementing the economic cooperation and deepening the relationship.

The proliferation of large number of RTAs in the international trading environment in the recent past is mainly due to the failure of the world trading system to provide a quick and acceptable solution to the problems it encountered during its existence. Multilateral trade negotiations are protracted and delayed as it encompasses large number of countries with diverse economic, political and social background leading to higher transaction costs and lost economic opportunity. The inability to arrive at consensus at the multilateral trade negotiations made countries to gang up under fiercely competing trade blocks such as European Union (EU), North American Free Trade Agreement (NAFTA), Southern Common Market or Mercosur and

ASEAN to benefit from discriminatory trade liberalisation and to get short-term market access.

Realising the importance of the Asian region for sustaining high trade growth, India initiated the 'Look East' policy in the early 1990s. India's sustained interest in and focused attention on improving economic relationship with the region resulted in the India–ASEAN Free Trade Agreement. The India–ASEAN total trade which was 2.9 billion US $ in 1993 which rose rapidly to 37.23 billion US $ in 2007. For the period 2003–2008, ASEAN exports to India grew at an average annual rate of 28.90 per cent while imports grew at 33.68 per cent.

Theoretical Developments and Empirical Studies

Theoretical studies on regionalism focused two important issues, namely how formation of regional trade blocks impact the welfare of the members and world at large and secondly whether regionalism helps or hinders the process of multilateral trade liberalisation. In his seminal work, Viner (1950) developed the theory of Customs Union (CU) which later received substantial theoretical improvement from Meade (1955), Lipsey (1960), Vanek (1965) and Ohyama (1972). Baldwin (1993, 1997) developed Domino theory of Regionalism and, along with Juggernaut theory, tried to answer the question of why countries prefer regional integration than multilateral liberalisation. The political economy dimension of regional trade agreements were empirically looked in to by Krishna (1998), Bird and Rajan (2002), Albertin (2008), etc.

Balassa (1965) introduced the concept of 'Revealed Comparative Advantage' (RCA) as a way to approximate Comparative Advantage (CA) in autarky and suggested that CA is 'revealed' by observed trade pattern. Balassa Index tries to identify whether a country has a RCA rather than to determine the underlying sources of CA. The advantage of using the CA index is that it considers the intrinsic advantage of a particular export commodity and is consistent with changes in an economy's relative factor endowment and productivity. The index of revealed CA (RCAij) is simple to interpret: it takes a value greater than one if a country is having revealed CA in that product.

There have been many studies that used RCA index developed by Balassa (1965). Chow (1990) and Leu (1998) assessed the shift in CA of Japan and the Asian Newly Industrialized Countries (NICs).

Lim (1997) in his study based on the RCA index showed if North Korea's CA had moved up from Ricardo goods to Heckscher Ohlin (HO) goods, it would be difficult for the country to move into the terrain of Product Cycle (PC) goods. Vollrath (1991) made improvement in Balassa index and offered three alternative ways of measurement of a country's RCA, namely the Relative Trade Advantage (RTA), the logarithm of the relative export advantage (ln RXA), and the Revealed Competitiveness (RC). Ferto and Hubbard (2002) used these modifications of the RCA index in the context of agricultural trade between Hungary and EU.

Methodology

This chapter uses Trade Intensity Index (TII) and RCA Index to see trade complementarity and similarity between India and ASEAN countries. The TII is used to determine whether the value of trade between the two is greater or smaller than would be expected on the basis of their importance in world trade. It is defined as the share of one country's exports going to a partner divided by the share of world exports going to the partner. It is calculated as:

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

Where x_{ij} and x_{wj} are the values of country i's exports and of world exports to country j and where X_{it} and X_{wt} are country i's total exports and total world exports respectively. An index of more (less) than one indicates a bilateral trade flow that is larger (smaller) than expected, given the partner country's importance in world trade.

TII is further divided in to Export Intensity Index (EII) and Import Intensity Index (III) for looking at the pattern of exports and Imports. Following Kojima (1964) and Drysdale (1969), the index of trade intensity is restated as follows:

$$\textit{EII between India and ASEAN} = \frac{X_{IA}/X_I}{(M_A/(M_W - M_I)}$$

X_{IA} = India's Export to ASEAN; X_I = India's total Export; M_A= Total Import of ASEAN; M_w= Total World imports M_I = Total Imports of India.

$$III \text{ between India and ASEAN} = \frac{M_{IA}/M_I}{(X_A/(X_W - X_I)}$$

M_{IA} = Import of India from ASEAN; M_I = Total Import of India; X_A = Total Export of ASEAN; X_W = Total World Export; X_I = Total Export of India.

TII is calculated for India and ASEAN countries for the period 1990 to 2007 taking data from *COMTRADE* (UN 2008) of UN and accessed through World Integrated Trade Solutions (WITS). Both EII and III are calculated for India and ASEAN taking partners' position in world trade. An index value of one indicates bilateral trade is following the pattern of rest of the world and the value above one shows there is higher trade intensity between partners.

RCA Index shows how competitive is a product in countries' export compared to the products share in world trade. A product with high RCA is competitive and can be exported to countries with low RCA. Measures of RCA have been used to assess a country's export potential. It can also provide useful information about potential trade prospects with new partners. Countries with similar RCA profiles are unlikely to have high bilateral trade intensities unless intra-industry trade is involved. RCA measures, if estimated at high levels of product disaggregation, can focus attention on other non-traditional products that might be successfully exported. The RCA index of country 'i' for product 'j' is often measured by the product's share in the country's exports in relation to its share in world trade:

$$RCA_{ij} = \frac{x_{ij}/X_{it}}{(x_{Wj} - X_{ut})}$$

Where x_{ij} and x_{wj} are the values of country i's exports of product j and world exports of product j and where X_{it} and X_{wt} refer to the country's total exports and world total exports. A value of less than unity implies that the country has a revealed comparative disadvantage in the product. Similarly, if the index exceeds unity, the country is said to have a RCA in the product.

In this chapter, RCA for ASEAN countries are calculated at three different levels namely Commodity Group level, HS-2 and HS-4, and compared then against India's RCA to see trade complementarity. WTO provide trade data at the commodity group level and based on this classification, RCA is calculated for eight ASEAN countries across 16 major commodity groups for 17 years to identify specific trade

advantage. The product groups for which RCA has been computed include agricultural products, food, fuels and mining, fuels, manufactures, iron and steel, machinery and transport equipment, office and telecom equipments, electronic data processing and office equipments (EDP & OE), telecom equipments, information communication and electronic components (IC&EC), pharmaceuticals, chemicals, automotive, textiles and clothing. Data for calculating RCA are also collected from IMF, WTO and ASEAN Statistical Yearbook.

In order to get RCA at the disaggregate level, RCA index at HS-2 digit level of classification are calculated for India and ASEAN countries for the period 2003 to 2006. RCA for four years are calculated for India and combined ASEAN countries (Cambodia, Malaysia, Philippines, Singapore and Thailand) and a mean RCA is arrived at for comparison. Export–Import data for India and ASEAN Countries at HS-2 level classification are extracted from *COMTRADE* of UN extracted through WITS. The absolute difference in RCA between India and ASEAN is calculated to understand the extent of complementarity in commodities. This is supplemented with trade performance under HS-4 digits classification to know finer specialisation of products by India and ASEAN countries.

Trade Intensity Index between ASEAN and India

India's export intensity (1.49 in 2007) as well as import intensity (1.61 in 2007) with ASEAN is above one in the recent past. This means India is trading more intensely with ASEAN countries compared with its trading pattern with rest of the world. The natural trading partner theory reveals countries tend to trade more with neighbours and close proximate partners. ASEAN countries being geographically closer to India, value of these indices are likely to come down once it is adjusted for geographical distance. ASEAN's EII (1.48 in 2007) is higher than III (1.40 in 2007) as it exports more to India compared to its imports.

Country-wise look at the trade intensity showed India's export intensity is above one for Indonesia, Malaysia, Myanmar, Singapore, Thailand and Vietnam. For others (Brunei, Laos, Cambodia and Philippines), the export intensity is fluctuating over the years. Myanmar, Singapore and Vietnam are the three countries with whom India got high export intensity. For the year 2007, except Cambodia, Laos and Philippines, India got high trade intensity with all ASEAN countries.

Tables 10.1 gives the country-wise export and import intensity of India with ASEAN countries.

India is importing smaller volumes from the less developed countries of ASEAN which is reflected in the low III with Brunei, Cambodia and Lao PDR. Imports are also restricted with Philippines and Vietnam with import intensity well below one.

Table 10.1: India's Export and Import Intensity Index with ASEAN Countries

Year		*BRU*	*CAM*	*INDO*	*LAO*	*MAL*	*MYA*	*PHI*	*SING*	*THAI*	*VIET*
1990	EII	0.05	4.58	0.82	0.10	0.84	0.42	0.32	0.99	1.18	0.57
	III	0.00	0.00	0.94	0.82	2.60	30.93	0.07	1.83	0.38	3.30
1995	EII	0.28	0.20	2.06	0.09	0.77	1.52	0.72	1.08	1.00	1.95
	III	0.00	11.84	1.24	0.00	1.53	19.62	0.12	1.20	0.36	0.40
2000	EII	0.30	0.85	1.77	1.11	1.06	2.43	0.84	0.94	1.26	2.04
	III	0.01	0.12	1.87	0.00	1.78	11.40	0.20	1.35	0.61	0.11
2005	EII	2.17	0.95	2.56	0.40	1.08	3.37	1.08	2.80	0.94	1.93
	III	0.01	0.02	2.54	0.01	1.28	10.17	0.37	1.03	0.77	0.28
2006	EII	2.05	0.83	1.80	0.35	0.92	3.58	0.70	1.84	1.13	1.74
	III	0.01	0.01	2.01	0.01	2.23	8.86	0.18	1.97	0.98	0.24
2007	EII	1.21	0.53	1.77	0.32	1.19	3.07	0.59	1.90	1.25	1.49
	III	0.01	0.01	1.85	0.01	2.03	8.75	0.13	2.03	1.06	0.22

Source: Computed from COMTRADE (UN 2008).

India's import intensity was small with Thailand for many years but improved strongly after signing the bilateral trade agreement. India's imports from ASEAN was traditionally confined to Singapore and Malaysia. Import intensity is markedly high with Myanmar as it shares geographical border with India and is in close proximate with northeastern states of India. This exceptionally high import intensity is also due to Myanmar's low imports from the rest of the world due to political reasons. For all other countries, the index is stable without much deviation except for Cambodia in the year 1995.

Analysis of Revealed Comparative Advantage (RCA) between India and ASEAN

RCA at Product Groups Level

Table 10.2 gives the mean RCA of ASEAN countries and India for the period 1990 and 2006 for 16 product categories. The mean RCA for agricultural commodity is above one for India, Indonesia, Malaysia,

Table 10.2: Mean RCA for India and ASEAN in Major Commodity Groups

Commodity Categories	*INDIA*	*BRU*	*CAM*	*INDO*	*MALA*	*PHI*	*SING*	*THA*	*VIET*
Agriculture	**1.62**	0.01	0.34	**1.57**	**1.34**	**1.01**	0.40	**2.09**	**3.01**
Food	**1.84**	0.02	0.13	**1.38**	**1.07**	**1.18**	0.40	**2.25**	**3.47**
Fuel and mining	0.66	**7.33**	0.01	**2.63**	0.91	0.40	0.95	0.25	**1.77**
Fuels	0.41	7.76	0.00	2.96	1.09	0.17	1.13	0.23	2.27
Manufacture	**1.06**	0.09	**1.35**	0.66	**1.02**	**1.16**	**1.19**	**1.01**	0.66
Iron and steel	**1.28**	0.06	0.001	0.34	0.34	0.10	0.26	0.37	0.12
Chemicals	**1.04**	0.01	0.01	0.41	0.37	0.19	0.84	0.50	0.13
Pharmaceutical	**1.32**	0.01	0.07	0.04	0.03	0.41	0.07	0.02	
Machinery and transport equipment	0.23	0.10	0.02	0.27	**1.40**	1.57	**1.70**	0.98	0.21
Office and telecom equipments	0.09	0.03	0.004	0.48	**3.64**	4.17	**4.33**	**1.87**	0.30
EDP and office equipments	0.12	0.01	0.01	0.70	**3.63**	3.95	**3.53**	**2.21**	0.49
Telecom equipments	0.12	0.04	0.01	**1.05**	**2.53**	0.65	**1.50**	**1.26**	0.20
IC & EC products	0.07	0.00	0.00	0.29	**5.00**	**10.64**	**6.43**	**1.71**	0.14
Automotive	0.20	0.02	0.02	0.07	0.05	0.19	0.08	0.33	0.01
Textiles	**4.88**	0.12	0.48	**2.03**	0.49	0.41	0.37	**1.22**	0.92
Clothing	**4.07**	0.86	**24.46**	**2.23**	0.93	**3.52**	0.48	**2.29**	**4.81**

Source: Computed from WTO database (WTO 2008).

Philippines, Thailand and Vietnam and below one for Brunei, Cambodia and Singapore. This means there is a scope to trade agricultural commodities between India and low-RCA countries of ASEAN such as Brunei, Cambodia and Singapore. Food items form part of agricultural products and resemble the same pattern of RCA that of agricultural products. RCA for food is high for India, Indonesia, Malaysia, Thailand and Vietnam and low for Brunei, Cambodia, Philippines and Singapore. The average RCA showed that the two ASEAN countries namely Vietnam and Thailand are having a strong RCA of above two. But Brunei, Cambodia and Singapore got a very low RCA in food and India, which got a mean RCA of 1.8374, can export food articles to these nations.

Fuel and mining are resource-based products depending on the natural endowments of the country. However, industries can be established to process and refine these products. For mining and fuels, RCA is high in Brunei, India, Indonesia, and Vietnam and low in Cambodia, Malaysia, Singapore and Thailand. The mean RCA shows, that Brunei and Indonesia and Vietnam have got RCA for fuel and mining products and they can export fuel products to Cambodia, Philippines, Thailand, Malaysia, Singapore and India who have revealed comparative disadvantage. This shows that there is complementarity in trading fuel products in the ASEAN region. With regard to the mining products alone, India got the comparative advantage in many product categories and can export them to most of the ASEAN countries.

Manufactured commodities are value-added products and exports of these products depend on the industrial development of the country. The computation of RCA for manufacture products showed India, Cambodia, Malaysia, Philippines, Singapore and Thailand had RCA above one where as Brunei, Indonesia and Vietnam have got RCA below one. But the disaggregation of manufacture products into different categories showed that countries enjoy clear RCA in specific product categories. In the case of iron and steel industry, all the ASEAN countries got comparative disadvantage whereas India enjoys a high RCA in this product. This industry depends on the availability of natural resource in a country and India has got huge iron ore reserve in the country. India can export iron and steel to most of the ASEAN countries.

The computation of RCA for chemicals showed that India developed comparative advantage in this product category over the period

of time. Currently India is exporting different chemical products and increasing the share in its export basket. India has got RCA in chemicals whereas all the other ASEAN countries have revealed comparative disadvantage pointing out that India can improve trade in chemical products with the ASEAN countries. With regard to pharmaceutical products, the mean RCA suggests that India has got comparative advantage in this important category. India's comparative advantage in this knowledge-based industry is the reflection of the capacity developed over the period of time. All the ASEAN countries have comparative disadvantage in this category even though Philippines is slowly increasing its share over time. There is a prospect of higher trade between India and ASEAN countries in pharmaceutical products.

Singapore, Malaysia, Philippines and recently Thailand have been exporting more machinery and transport equipment and showing comparative advantage in this skill-based product category. The disadvantaged countries in the product group include India, Brunei, Cambodia, Indonesia and Vietnam. This reveals that there is scope for trading machinery and transport equipment within ASEAN countries and between ASEAN and India. In this high technology industry, Singapore, Malaysia, Philippines and Thailand have developed competencies and are exporting large share of products to other countries. The mean RCA is above two for Singapore, Philippines and Malaysia where as it is above one for Thailand. On the other hand, countries like India, Brunei, Cambodia, Indonesia and Vietnam have to go a long way in developing comparative advantage and exporting these products to other countries. This gives scope for higher intra-regional trade for office and telecom equipment and between Singapore, Malaysia, Thailand and India. If we take the electronic data processing and office equipment separately, it follows the same pattern. Singapore, Malaysia, Philippines and Thailand had higher mean RCA and rest of ASEAN and India have got comparative disadvantage.

Malaysia enjoys high export performance of telecom equipment and thereby possesses significant comparative advantage, followed by Singapore and Thailand in the region. Indonesia, whose RCA was above one during early 2000, slipped from its position after 2005 when RCA fell below one. The less developed countries of ASEAN, Philippines and India have got comparative disadvantage in this product category giving scope for higher trade among these countries. Integrated circuits and electronic components are an important input

for the development of electronics and communication industry which is growing at a rapid rate in this information age. East Asian countries like Singapore, Malaysia, Philippines and Thailand have developed competencies in this sector and have a strong RCA. The high mean RCA of Philippines (10.64), Singapore (6.43), Malaysia (5.00) and Thailand (1.71) shows the strong export performance of this high-value technology sector. On the other hand, the remaining East Asian countries like Brunei, Cambodia, Indonesia, Vietnam and India have got revealed comparative disadvantage in this category. This shows that large potential exists for bilateral trade for this important input component and increased trade among ASEAN countries and between India and ASEAN.

Automotive is an important component in the manufacturing sector with strong backward linkage and employment potential. But ASEAN countries as well as India do not have comparative advantage in this sector. This is because of the dominance of Japanese companies for long and Korea recently. India has been attracting foreign entry and investment in this sector and exporting cars manufactured by multinational (Maruti Suzuki, Hyundai), particularly to European nations but is yet to develop RCA for sizable export share and market dominance.

Textiles is labour-intensive sector with high employment potential and most of the developing countries of Asia depend on their export to earn their foreign exchange. India traditionally exported large quantity of textile products and revealed significant comparative advantage. Indonesia and Thailand also have high RCA as their textile export shares are much above the world textile export share. The mean RCA computed in the study is 4.88 for India, 2.03 for Indonesia and 1.22 for Thailand. Most of the ASEAN countries have low RCA showing the complementarity existing in the sector and they can trade more with India for their requirement. But the dismantling of MFA (Multi Fibre Agreement) brought in strong players like China who dominate the market and India needs to equip itself to take care of this advantage. There is increased competition in the clothing sector in the East Asian region as most of the developing countries having strong comparative advantage along with India. The mean RCA for Cambodia (24.46), Vietnam (4.81), Philippines (3.52), Thailand (2.29), and Indonesia (2.23) are high and these countries are major exporters of clothing to the rest of the world. India is also a major exporter of clothing to the world and there is limited complementarity between India and ASEAN countries for increased trade in this sector.

RCA greater than or less than one is the classification used in the studies to ascertain the comparative advantage for a country in a given product. But the degree of comparative advantage is useful in getting the relative position of the commodity in the country's export basket. If the RCA index is slightly lower than one, the country can make concentrated efforts to move towards comparative advantage compared to a commodity whose RCA is closer to zero. This facilitates easy comparison of relative position of comparative advantage across countries and product groups. For this purpose, mean RCA of countries are classified into four categories based on their export performance. These categories are high comparative disadvantage (RCA 0 to 0.5) low comparative disadvantage (RCA 0.5 to 1), high comparative advantage (RCA 1 to 2) and strong comparative advantage (RCA above 2). RCA above one in the Table 10.3 is given in bold showing comparative advantage enjoyed by the country. High and low revealed comparative disadvantaged countries cannot trade as they do not have efficiency in commodity production. High and strong RCA countries have comparative advantage but face similar export structure. Finer specialisation in production can lead to possible intra-industry and increased trade between these categories of countries. But trade is genuinely possible between countries with complementary trade structure like High Disadvantage–Strong Advantage, High Disadvantage–High Advantage, High Disadvantage–Strong Advantage and Low Disadvantage–High comparative advantage.

India's Comparative Advantage with ASEAN Countries — Product Category-wise

For agricultural commodities, India has got a high RCA and can export to Brunei, Cambodia and Singapore who have disadvantage in this product category. Food products are part of agricultural products and follow the same pattern as that of agricultural products. For fuel and mining products Brunei, Indonesia and Vietnam have comparative advantage and can trade with India. India has got comparative disadvantage in fuel and can import it from Brunei, Indonesia and Vietnam who are the oil exporters of ASEAN, or from Malaysia and Singapore who refine crude oil and export it to other countries.

India's RCA for manufacture is high and there is a possibility to trade with Indonesia and Vietnam who have got low comparative advantage. All the ASEAN countries have weak comparative advantage

Table 10.3: Country Classification Based on Mean RCA of Commodities

Commodity classification	*High comparative disadvantage RCA<0.5*	*Low comparative disadvantage 0.5<RCA>1*	*High RCA RCA 1 to 2*	*Strong RCA RCA above 2*
Agricultural products	Brunei, Cambodia, Singapore	–	**India**, Indonesia, Malaysia, Philippines	Thailand, Vietnam
Food	Brunei, Cambodia, Singapore	–	**India**, Indonesia, Malaysia, Philippines	Thailand, Vietnam
Fuels and MP	Cambodia, Philippines, Thailand	**India**, Malaysia, Singapore	Vietnam	Brunei, Indonesia
Fuels	**India**, Cambodia, Philippines, Thailand Brunei, Indonesia, Vietnam	–	Malaysia, Singapore	
Manufacture	Brunei	Indonesia, Vietnam	**India**, Cambodia, Malaysia, Philippines, Singapore, Thailand	–
Iron and steel	Brunei, Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam	–	**India**,	–
Chemicals	Brunei, Cambodia, Indonesia, Malaysia, Philippines, Vietnam	Singapore, Thailand	**India**	–
Pharmaceuticals	Brunei, Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand	–	**India**	–
Machinery and transport equipments	**India**, Brunei, Cambodia, Indonesia, Vietnam	Thailand	Malaysia, Philippines, Singapore	–

Office and telecom equipments	**India**, Brunei, Cambodia, Indonesia, Vietnam	–	Thailand	Malaysia, Philippines, Singapore
EDP and OE	**India**, Brunei, Cambodia, Vietnam	Indonesia	–	Malaysia, Philippines, Singapore, Thailand
Telecom	**India**, Brunei, Cambodia, Vietnam	Philippines	Indonesia, Singapore, Thailand	Malaysia
IC and EC	**India**, Brunei, Cambodia, Indonesia, Vietnam Malaysia, Philippines, Singapore	–	Thailand	
Automotive	**India**, Brunei, Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam	–	–	–
Textiles	Brunei, Cambodia, Malaysia, Philippines, Singapore	Vietnam	Thailand	
Clothing	**India**, Indonesia Singapore			
	Brunei, Malaysia	–	**India**, Cambodia, Indonesia, Philippines, Thailand, Vietnam	

Source: Computed from WTO database (WTO 2008).

in iron and steel and there is a trade complementarity between them and India. India's export of chemical products is increasing and reveals a high comparative advantage. RCA for chemicals is weak for Brunei, Cambodia, Indonesia, Malaysia, Philippines and Vietnam and low for Singapore and Thailand. This complementarity in trade structure gives opportunity for India to export more chemical products to ASEAN countries. Similarly, India has got high RCA in pharmaceutical products and export them to weak RCA ASEAN countries.

Table 10.4 highlights the complementary sectors between India and ASEAN for trade promotion. For iron and steel and chemical and pharmaceuticals, India has got complementarity with all ASEAN countries. For textiles and fuels, India has got trade complementarity with four ASEAN countries. With regard to countries, India's complementarity is highest with Singapore (13 sectors), followed by Malaysia (11), Brunei (10), Philippines (8), Indonesia (07), Thailand (7), Cambodia (6) and Vietnam (6). With regard to machinery and transport equipment, India has got comparative disadvantage and can import them from high RCA ASEAN countries such as Malaysia, Philippines and Singapore.

Revealed Comparative Advantage for HS-2 digits Classification

In order to get RCA at a disaggregated level, an attempt is made to calculate RCA at the HS-2 digits level taking data from the COMTRADE. The 97 HS-2 digits are grouped into seven categories, namely agricultural commodities, chemical products, manufactured products, textile products, industrial inputs, mineral products and electrical machinery and parts. With regard to agricultural commodities, of the 24 HS-2 digits commodities, 9 categories showed trade complementarity between India and ASEAN. These include edible vegetables and certain roots (HS-07), edible fruits and nuts; peel of citrus fruit or melon (HS-08), products of the milling industry; malt; starches; inulin; wheat gluten (HS-11); oil seed, oleagi fruits; miscellaneous grain, seed, fruit etc (HS-12); animal/vegetable fats and oils and their clea (HS-15); preparation of meat, fish or crustaceans (HS-16); residues and waste from the food industry (HS-23); and tobacco and manufactured tobacco (HS-24). The highest RCA for India in agricultural products is in vegetable plaiting materials (HS14) and coffee, tea, matï and spices (HS-09) and for ASEAN is Animal or vegetable fats, oils and waxes (HS15) and preparation of meat, fish or crustaceans

Table 10.4: India–ASEAN Trade Complementarity from Computed RCA

INDIA—Product groups	*Brunei*	*Cambodia*	*Indonesia*	*Malaysia*	*Philippines*	*Singapore*	*Thailand*	*Vietnam*
Agricultural products	H-W	H-W	H-H	H-H	H-H	H-W	H-S	H-S
Food	H-W	H-W	H-H	H-H	H-H	H-W	H-S	H-S
Fuels and MP	L-S	L-W	L-S	L-L	L-W	L-L	L-W	L-H
Fuels	W-S	W-W	W-S	W-H	W-W	W-H	W-W	W-S
Manufacture	H-W	H-H	H-L	H-H	H-H	H-H	H-H	H-L
Iron and steel	H-W	H-W	H-W	H-W	H-W	H-W	H-W	H-W
Chemicals	H-W	H-W	H-W	H-W	H-W	H-L	H-L	H-W
Pharmaceuticals	H-W	H-W	H-W	H-W	H-W	H-W	H-W	
Machinery and transport equipments	W-W	W-W	W-W	W-H	W-H	W-H	W-L	W-W
Office and telecom equipments	W-W	W-W	W-W	W-S	W-S	W-S	W-H	W-W
EDP and OE	W-W	W-W	W-L	W-S	W-S	W-S	W-S	W-W
Telecom	W-W	W-W	W-H	W-S	W-L	W-H	W-H	W-W
IC and EC	W-W	W-W	W-W	W-S	W-S	W-S	W-H	W-W
Automotive	W-W	W-W	W-W	W-W	W-W	W-W	W-W	W-W
Textiles	S-W	S-W	S-S	S-W	S-W	S-W	S-H	S-L
Clothing	S-L	S-S	S-S	S-L	S-S	S-W	S-S	S-S

Source: Computed from WTO database (WTO 2008).

(HS-16). The highest absolute difference in RCA is for vegetable plaiting materials (HS-14) and coffee, tea, mate and spices (HS-09).

For chemical products, the trade complementarity is present in salt, sulphur, earth and stone; plaste (HS-25); ores, slag and ash (HS-26); mineral fuels, oils & product (HS-27); tanning/dyeing extract; tannins (HS-32) and explosives; pyrotechnic prod; match (HS-36). Interestingly, India has a higher RCA than ASEAN for all product categories. India's highest RCA is for ores, slag and ash (5.66) and salt, sulphur, earth and stone, lime and cement (HS-25) and these two products have highest absolute difference in RCA.

For other manufactured products, the complementarity is present in rubber and articles thereof (HS-40), raw hides and skins (HS-43) and articles of leather, saddlery/harne (HS-43). India has strong comparative advantage in articles of leather, saddlery/harne and raw hides and skins (other than fu) where ASEAN has got high comparative advantage in rubber and articles thereof. India's strong comparative advantage in textiles and related products include silk (HS-50), cotton (HS-52), vegetable textile fibers nesoi, yarns and woven, etc, (HS-53), man-made filaments (HS-54), carpets and other textile floor coverings (HS-57), art of apparel and clothing access (HS-61), art of apparel and clothing access (HS-62) and other made-up textile articles (HS-63) and these products have export markets in ASEAN countries. The mean RCA for ASEAN countries taken together do not reveal comparative advantage in textiles and related products even though individual countries show high revealed comparative advantage.

In the category of industrial inputs, the complementarity is present in prepared feathers and down; artificial flower (HS-67) and natural/cultured pearls, precious stone (HS-71) in which India has got very strong comparative advantage. Pearls and precious stones are important items of export as these are used in jewellery and artifacts.

India enjoys comparative advantage in many mineral products compared to ASEAN countries. These include iron and steel (HS-72), articles of iron or steel (HS-73), copper and articles thereof (HS-74) and zinc and articles thereof (HS-79) in which India has got high RCA against ASEAN. ASEAN's comparative advantage lies in tin and articles thereof (HS-80) and India can import this from ASEAN as the absolute difference is highest in this category.

ASEAN has strong RCA for electrical machinery, equipments, parts thereof (HS-85) and high RCA for nuclear reactors, boilers, machinery (HS-84) against India and exports lots of these items to India. On the other hand, India's RCA include ships, boats and floating structure (HS-89), clocks and watches and parts thereof (HS-91) and works of art, collectors' pieces etc. (HS-97).

RCA under HS-4 Digits Classification

RCA is calculated for four ASEAN countries, namely Malaysia, Philippines, Singapore and Thailand for the year 2008 and compared against India's RCA to see trade complementarity at the more disaggregated level. The exercise could not be done for other ASEAN countries due to non-availability of data at the HS-4 digits level. The following section gives the analysis of RCA of ASEAN and India in HS-4 digits commodity classification.

The top five HS-4 commodities in terms of export share for India are petroleum oils and oils obtained from bituminous minerals (17.35 per cent with a RCA of 3.84); diamonds, whether or not worked, but not mounted or set (8.19 per cent with a RCA of 15.13); iron ores and concentrates included (3.10 per cent with a RCA of 46.30); rice (1.56 per cent with a RCA of 10.05); and other organic compounds (1.31 per cent with a RCA of 46.30). Among agricultural commodities, India has got comparative advantage in coconuts, pepper, vanilla, seeds of anise, badian, fennel, rice, groundnut, copra and oil cakes and other residues.

For Malaysia, the top five HS-4 commodities in terms of export share are automatic data processing machines (7.20 per cent with a RCA of 3.37), petroleum gases and other gaseous hydrocarbons (7.07 per cent with a RCA of 3.56), petroleum oils and oils obtained from bituminous minerals (6.65 per cent with a RCA of 1.21), palm oil and its fractions, whether or not refined, but not chemically modified (6.41 per cent with a RCA of 47.18) and parts and accessories, other than covers, carrying cases and the like (5.47 per cent with a RCA of 6.30).

The top five HS-4 commodities in terms of export share for Philippines are electronic integrated circuits and (9.73 per cent with a RCA of 6.28); automatic data processing machines (7.65 per cent with a RCA of 3.58); parts and accessories of the motor (4.19 per cent with a RCA of 2.24); diodes, transistors and similar items

(3.67 per cent with a RCA of 6.75); and parts and accessories, (other than covers, carrying cases and the like (3.35 per cent with a RCA of 3.85).

Singapore's top five export items are petroleum oils and oils obtained from bituminous minerals (24.16 per cent with a RCA of 5.35), electronic integrated circuits and parts (11.26 per cent with a RCA of 7.28), parts and accessories (other than covers, carrying cases and the like) suitable for use solely or principally with machines of headings 8469 to 8472 (4.28 percent with a RCA of 4.92); automatic data processing machines (3.77 per cent with a RCA of 1.77) and prepared unrecorded media for sound (1.72 per cent with a RCA of 9.61).

The top five HS-4 export for Thailand include automatic data processing machines (7.62 per cent with a RCA of 3.57); petroleum oils and oils obtained from bituminous minerals (5.05 per cent with a RCA of 1.12); electronic integrated circuits and parts (4.07 per cent with a RCA of 2.63); natural rubber, balata, gutta-perch (3.82 per cent with a RCA of 37.09); and rice (3.47 per cent with a RCA of 22.31).

Conclusion

Inferences from the trade indices computed for understanding the trade structure between India and ASEAN reveal that there are complemetary sectors and products available for enhancing trade cooperation between the trading partners. ASEAN countries are in different stages of economic development and India can have trade cooperation with some of them in all product categories. While India can export food grains to small and developed countries of ASEAN, it can import edible and other agricultural products from other ASEAN countries. India enjoys advantage in minerals whereas it can import crude oil from ASEAN. India possesses advantage in some manufactured items like chemicals, iron and steel, jems and jewellery and can export them to many ASEAN countries. ASEAN has comparative advantage in electrical and electronic components and India can import them from ASEAN. With regard to textiles and clothing, there is intense competition between ASEAN and India to increase market share. India's average tariff is higher than ASEAN countries and reduction of tariffs from RTA will have short-term adverse impact on India's exports but can consolidate in the medium

term through productivity gains and efficiency. Also, emerging global economic structure warrants greater cooperation from India in the regionalisation efforts of Asia.

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Notes

1. 'Ricardo' goods incorporate those goods which use natural resources for their production.
2. 'HO' goods are produced using standard technology and are characterised by lower costs in R&D.
3. 'PC' goods essentially are technology-intensive and are characterised by high R&D.

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