Estimating the Impact of the India−ASEAN Free Trade Agreement on Indian Industries

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What is This?

Estimating the Impact of the India–ASEAN Free Trade Agreement on Indian Industries

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Abstract

This study shows that intermediate goods will be more affected (both adversely and favourably) than final goods due to ASEAN–India FTA. Other interesting conclusions include tariffs do not matter at all for a major part of the industries and for them the agreement has no significance. In fact, some of the most debated commodities fall in this category. For them though tariff rates have steadily increased over time, so has imports imparting a wrong sign to the tariff elasticity which means that reasons other than tariffs determine their imports and there is no point in putting them in the sensitive or exclusion list.

JEL: F13, F15

Keywords

India ASEAN Free Trade Agreement, micro level impact, tariff elasticity

Introduction

The India–ASEAN Free Trade Agreement (FTA) has been implemented from January 2010. Since sufficient time has not yet elapsed since the implementation of the FTA, it is not possible to do an *ex-post* analysis of the FTA. However an *ex-ante* analysis can be done. This article attempts to do such a thing at the disaggregated level in a partial equilibrium framework.

The main question that we address in this article is: What are the industries that are expected to be adversely/favourably affected due to the implementation of the FTA? The analysis is conducted at the six-digit Harmonized Classification (HS)

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system for all the countries in ASEAN 6 at the individual level. The tariff elasticity of each HS six-digit product is first determined for the period between 1989 and 2009 in a Frictionless Gravity framework. The estimated equation is then used to simulate the trade impact under the alternative scenario of a Free Trade Agreement (FTA) between the two.

Though this exact issue has never been addressed in the context of this FTA, there are several other papers in the literature that addresses many other issues for the FTA. For example Pal and Dasgupta (2008) and Okamoto (2006) and Francis (2011) pointed out that production networking among Indian and ASEAN firms is expected to rise after the FTA. Pal and Dasgupta (2009) further point out that the automobile sector will emerge as one of the main beneficiaries while Chandran and Sudarsan (2012) argue that the fishing industry will be benefitted. Regarding most controversial products Veeramani and Gordhan (2011) found that the FTA leads to significant increase in India's import of plantation commodities from ASEAN countries. The possibility of ill effect was analyzed from a different perspective by Bhattacharyya and Mandal (2010) who argued that India's balance of trade will be adversely affected due to the FTA. Further Nagoor and Kumar (2010) pointed out that with a huge market for low priced tea and a large export price advantage enjoyed by Vietnam, India is in a disadvantageous position in the FTA. The welfare consequence of the FTA was also addressed. Nag and Sikdar (2012) showed that there will be welfare improvement for India but the gain will materialize only after the full implementation of the tariff elimination process. This is because the welfare improvement for India will come from realignment of production activities through allocative efficiency though the terms of trade effect will go against India as India will have to bring down tariff to a greater extent than the ASEAN countries. Net gain will depend on the capability of large firms to better their technology and quality. Observations were also made on India's strategy of signing the goods agreement before the services agreement. Since 'Service' is the sector of strength for India, by negotiating the two agreements together India could have leveraged a lot of concessions in the goods front by agreeing to offer some reprieve to the ASEAN countries in the services front especially since India is a net exporter of most of the services for which the ASEAN countries are net importers (Bhattacharya & Arif, 2002; Kumar, 2002; Sen, Asher & Rajan, 2004).

The rest of the article is organized as follows. The second section presents the detailed methodology of this study. Third to fifth sections present the results. Sixth section concludes the article.

Methodology

We use the gravity model for each HS six-digit code for trade between India and the ASEAN countries. We first estimate the frictionless gravity equation (see Anderson, (1979) for a theoretical derivation of the model) for India's and the foreign country's imports where the foreign country is a member of the ASEAN.

Next the predicted values are computed when the tariff the variable in these equations takes zero values and the predicted values so obtained is compared with the predicted values obtained with actual tariff rates. The time period for our analysis is 1989 to 2009. The relevant equations are:

$$\text{LnImp}^{\text{WT}}_{ijt} = \beta_0 + \beta_1^I Ln(GDP_{it} * GDP_{jt}) + \beta_2^I LnTar_{ijt} + u_{ijt} \tag{1}$$

$$\text{LnImp}^{\text{WT}}_{jit} = \beta_3 + \beta_4^A Ln(GDP_{it} * GDP_{jt}) + \beta_5^A LnTar_{jit} + u_{jit} \tag{2}$$

(i = India, j = ASEAN 6)

Where Imp^s_{ijt} is the import of country i (in our case India) from country j (the six ASEAN members considered here) in time period t for different situations: WOT—model without tariff and WT—model with tariff. GDP_{it} and GDP_{jt} are the income levels for India and ASEAN 6 for time period t respectively, Tar_{ijt} is the tariff imposed by India for imports from country j (ASEAN 6) in time t, Tar_{jit} is the tariff imposed by ASEAN members on India in time t and u_{ijt} is the error term. The effect of the FTA on India's imports is measured by:

$$\delta_{ijt} = \hat{\text{Imp}}^{\text{WOT}}_{ijt} - \hat{\text{Imp}}^{\text{WT}}_{ijt} \tag{3}$$

Where $\hat{\text{Imp}}^{\text{WT}}_{ijt}$ is the predicted value when actual tariff rates are used and $\hat{\text{Imp}}^{\text{WOT}}_{ijt}$ is the predicted value when Tar_{ijt} = 0.

Similarly, the influence of FTA on India's export is,

$$\delta_{jit} = \hat{\text{Imp}}^{\text{WOT}}_{jit} - \hat{\text{Imp}}^{\text{WT}}_{jit} \tag{4}$$

Note that the gravity model has been used in its frictionless version as all the countries in the ASEAN are very close to each other—though they differ significantly in terms of GDPs—making distance irrelevant as a variable that determines trade flows. The distance variable when computed turns out to be almost similar to the constant term with a correlation greater than 0.9.

Note that the estimates should ideally internalize the fact that the rates of decline in tariff (and hence the terminal year for achieving the zero tariff point) for different products are different. There are also some products for which the zero tariff point will never be reached as they are outside the ambit of the FTA. Pace of reduction of tariffs of a particular industry will depend on the track in which it is included. Though we have discussed this in section 2.2 we have also added the year for which the tariff rate will actually become zero.

Finally, it should be pointed out that the methodology that we have used has several limitations. First is regarding data availability. For running the regressions we need continuous trade and tariff data at six-digit HS from 1988 to 2009.

HS Combined, in which the TRAINS data set is reported, has a total of 5050 products. Table 3, column 2 lists the number of products that could be used in this analysis—the rest had to be abandoned due to non availability of data (especially continuous tariff data over time). Since the analysis could not be conducted on many products it has imparted a bias to our results and the results are not comparable to Bhattacharyya and Mandal (2010) which dealt exclusively with the aggregate data. Second, Ordinary Least Square method (adjusted for autocorrelation) was used and hence the estimates are biased. The method is however justified in this case as we do not have a long enough time series to implement the standard methods of time series analysis such as determining their level of stationarity and their long-run relationship. To recognize this problem we have reported the correlation between tariffs and imports (and tariff of the ASEAN countries and India's export) wherever possible.

Impact on India's Import

Estimating the Tariff Elasticity

The average values of the tariff elasticity and the intercept term for all the regressions conducted at the six-digit level are reported in Table 1. There are several points to note regarding the table. First, the tariff elasticities are higher for Philippines and Singapore compared to other countries. Second, the magnitude of the intercept term is high (though with a higher standard deviation and a higher coefficient of variation). Thus, the level of trade with these countries will be high 'even if the GDPs and the tariff are zero'. This in turn means that these countries have extremely firm and secured trading relations with India. And tariff plays a relatively small part in aggregate trade between them.

Table 1. Tariff Elasticity and Intercepts for Tariff Significant Products (India's Import)

Country	No. of Six-Digit Products	Mean Intercept	Standard Deviation (SD) Intercept	Mean Tariff Elasticity	Standard Deviation (SD) Tariff Elasticity	Correlation between Tariff Elasticity and Intercept
(1)	(2)	(3)	(3)	(4)	(5)	(6)
Brunei	44	NA	NA	NA	NA	NA
Indonesia	2,803	77.63	89.53	–5.65	5.42	–0.64
Malaysia	3,186	98.58	108.74	–5.84	5.92	–0.62
Philippines	1,270	105.75	123.07	–6.11	3.85	–0.52
Singapore	4,451	127.71	405.37	–6.08	13.57	–0.97
Thailand	3,796	114.33	157.90	–5.89	6.13	–0.74

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

Impact at the Level of Industries

As we have explained in the section on methodology we follow the following strategy while interpreting the results: expected changes in import will be reported by using the gravity model as it controls for both the demand and the supply side effect of import changes.

Table 2 points out that at the aggregate level the following industries will be affected the most: electrical machinery (HS 85), iron and steel (HS 72) aluminium (HS 76), rubber (HS 40) and organic chemicals (HS 29). Note that all of these are among the top-10 industries in terms of aggregate import from the ASEAN countries. Interestingly some of the most debated industries like palm oil, tea, coffee, pepper and rubber do not appear in the top-10 product categories in Table 4.

Table 2. Industry Level Effect for India's Imports from ASEAN 6 (Values are in '000 US$)

Product (HS_2 Digit)	Product Name	Predicted Import (With Tariff)	Actual Import	Predicted Import (Without Tariff)	Actual Increase
(1)	(2)	(3)	(4)	(5)	(6)
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers and parts and accessories of such articles	8,045.55	5,212.58	11,908.78	3,863.23
26	Ores, slag and ash	4,140.62	4,276.63	5,209.80	1,069.18
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	3,583.11	3,461.57	4,221.57	638.46
76	Aluminium and articles thereof	619.37	575.70	803.27	183.90
40	Rubber and articles thereof	340.26	353.73	424.26	84.00
29	Organic chemicals	956.94	916.69	1033.45	76.51
72	Iron and steel	885.82	874.79	948.82	63.00
54	Man-made filaments; strip and the like of man-made textile materials	484.46	258.77	547.06	62.60
44	Wood and articles of wood; wood charcoal	175.08	111.13	230.22	55.13
87	Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof	88.14	93.03	135.05	46.90

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

The rank for palm oil (HS 15) is 22 and that for plantation commodities like tea, coffee and pepper (HS 09) is 33. One reason might be that since these commodities are mixed with many other commodities at this two-digit level, their actual values are not reflected here. This will therefore be taken up below.

Effects at the Product Level

An Overall Look at the Impacts on Individual Commodities

In reporting the impact at the industry level we will first distinguish between the effect on the affected industries vis-à-vis the aggregate effect on overall imports. This will help us to highlight situations where even though the effect is small compared to the overall import of all commodities, those that are affected find themselves in more than a spot of bother. The second effect is recorded in column 2 in Table 3. To determine the first effect one has to read this column in conjunction with column 5 of the table. Thus for instance, in Indonesia, there will be a 22.9 per cent rise in imports of products for which the tariff term is significant, but since these products account for 42.7 per cent of total trade the aggregate impact is only about 10 per cent. Reading through this table it is clear that the maximum effect on India's import will be from Singapore followed by Indonesia and Thailand. As already stated there are many reasons to consider results pertaining to Singapore with caution. First, since Singapore is a shipping hub and goods from all over the world enters India through this port the nature of the commodities may not be a good representative of the kind of commodities

Table 3. India's Import from ASEAN 6 (Analysis of Gravity Model) ('000 US$)

Country	% Increase of Predicted Import from Positive Tariff to Zero Tariff	Actual Import in 2009	Actual Import (Tariff Sig) in 2009	% Share
	Gravity Model		Gravity Model	Gravity Model
(1)	(2)	(3)	(4)	(5)
Brunei	0	1,129.24	0	0.00
Indonesia	22.90	23,292.37	9,961.37	42.77
Malaysia	5.39	27,606.05	6,979.81	25.28
Philippines	11.02	837.05	191.09	22.83
Singapore	53.20	39,819.96	10,442.30	26.22
Thailand	22.62	21,515.72	11,269.41	52.38

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

Notes: 1. Actual Import (Tariff Significant)—Actual import in case of products for which tariffs are significant.

2. Actual Import means actual total import of India from ASEAN 6.

that come exclusively from ASEAN. Further, it is expected that the rules of origin clause will take care for this kind of trade. Second, India has already signed a comprehensive economic cooperation agreement with Singapore on 8 April 2003; so that the average tariff rates with Singapore has been already been reduced to a significant extent and the resultant increases in imports are manifested in the data on which the regression is run. It appears, therefore, that the response of import to tariff reduction is higher at lower levels of tariff. This is also supported by the relatively high value for Thailand with which India has an early harvest scheme. If this is the true picture then with no such ongoing trade treaty Indonesia's increase looks nothing short of spectacular. India needs to pay special attention to this country when negotiating the comprehensive economic cooperation agreement with it.

As far as Brunei is concerned, the main import of India from Brunei is in crude oil. It is not surprising, therefore, that none of the industries showed significant tariff elasticity in the gravity framework. The sudden spurt in tariff sensitivity in the import demand function approach is due to the fact that 80 to 90 per cent of Brunei's GDP is accounted for by crude oil production and roughly the same proportion of India's import is accounted for by crude oil so that their export and their GDP has moved in tandem most of the time.

Product Wise Results

Table 4 reports the product-wise results. In Table 4, where we report the top-10 industries for which the value of import is expected to increase significantly, of the top-10 products, seven belong to the engineering industry, six of which belong to electrical and electronic industry. As far as BEC categories are concerned, eight of the top-10 products are intermediate goods, four of which are capital goods and two belong to the 'parts and accessories' category. Interestingly, all of these are in the normal track. The predominance of intermediate goods in the table is not surprising as most of the top products imported by India from the ASEAN are of this variety.

If we look at the entire data set, then the percentage of imports accounted for by intermediate goods, whose tariff elasticities are significant, is 89 per cent. Clearly, therefore, the impact of the FTA will mainly be on import of intermediate goods rather than goods for final consumption. Intermediate goods that are not in the exclusion list are divided further into intermediate capital goods such as radiators (HS 732219) and intermediate processed goods such as stainless steel pipes (HS 730411), parts and accessories such as tools for drilling (HS 820750) and primary goods such as natural titanium oar (HS 261400). Of the intermediate goods, primary goods, capital goods and processed goods account for approximately equal shares (about 27 per cent). Of the 22 per cent accounted for by goods for final consumption, durable goods contribute 60 per cent and semi-durable goods 31 per cent. The contributions of the rest are negligible.

Table 5 lists the products according to the BEC category. Of the intermediate goods for which tariff is expected to increase significantly, the maximum number

Table 4. India's Import of Top-10 Six-digit Products from ASEAN 6 (Values are in '000 US$) (Gravity Model)

Products	BEC Category	Product Name	Goods	Actual Increase in Value (Predicted Imp WOT- Predicted Imp WT)	Country	Track	Date of Zero Tariff
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
854239	PA	Other Electronic integrated circuits, other than amplifiers/memories/processors and controllers	Intermediate Goods	2,639.96	Singapore, Thailand	NT-1	December 2013
260300	Primary	Copper ores and concentrates	Intermediate Goods	1,069.08	Indonesia	NT-1	December 2013
852849	Durable	Other cathode-ray tube monitors, not of a kind solely/ principally used in an automatic data processing system of heading 84.71	Final Good	413.16	Thailand	NT-1	December 2013
852380	SD	Discs, tapes, solid-state non-volatile storage devices, smart cards and other media for the recording of sound/ of other phenomena, whether/not recorded, incl. matrices and masters for the production of discs, but excl. products of Ch.37, other n.e.s.	Final Good	302.50	Singapore	NT-1	December 2013
844520	CG	Textile spinning machines	Intermediate Goods	295.37	Singapore	NT-1	December 2013
760410	Processed	Bars, rods and profiles, of aluminium, not alloyed	Intermediate Goods	157.38	Thailand	NT-1	December 2013
844339	CG	Other printers, copying machines and facsimile machines, whether/not combined , excl. 8443.31 and 8443.32	Intermediate Goods	100.58	Singapore	NT-2	December 2016

852550	CG	Transmission apparatus for radio-broadcasting/television	Intermediate Goods	70.00	Singapore	NT-1	December 2013
854370	CG	Other machines and apparatus for electrical machines and apparatus, other than machines and apparatus for electroplating/electrolysis/electrophoresis/signal generators/particle accelerators.	Intermediate Goods	64.91	Singapore	NT-1	December 2013
848710	PA	Ships'/boats' propellers and blades therefore	Intermediate Goods	58.16	Singapore	NT-2	December 2016

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

Table 5. Details of BEC Category Products for India's Import from ASEAN 6

Country	CG		Durable		HHC		ND		Other		P & A		Primary		Processed		SD	
	No.	% Rise	No.	% Rise	No.	% Rise	No.	% Rise	No.	% Rise	No.	% Rise	No.	% Rise	No.	% Rise	No.	% Rise
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Indonesia	10	14.91	5	6.36	3	18.21	3	7.79			14	19.09	4	25.83	39	5.81	8	7.57
Malaysia	36	3.31	12	6.65	8	51.90	8	18.51			20	0.92	4	7.38	73	9.59	6	27.72
Philippines	6	16.42					3	9.48	1		7	9.93	1	6.84	11	7.18	1	11.56
Singapore	53	24.08	14	7.41	9	29.09	7	10.38		15.35	16	131.47	4	6.74	76	7.55	20	45.06
Thailand	48	10.13	19	32.98	16	45.31	16	8.53			34	30.02	12	15.74	129	16.61	29	38.97

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

Notes: CG—Capital Goods (Except Transport Equipments): Intermediate Good, Durable: Final Good; HHC—Mainly for Household Consumption: Final Good; MI—Mainly For Industry: Final Good; ND—Non Durable: Final Good, Non-industrial: Intermediate Good, Other: Intermediate Good; P & A—Parts and Accessories: Intermediate Good, Primary: Intermediate Good, Processed: Intermediate Good; SD—Semi-durable: Final Good.

are from the processed good category followed closely by capital goods. If we categorize the goods in terms of the expected increase in import (in percentages) then the top product group turns out to be Parts and Accessories, which once again, of course, is an intermediate good. However, the second in terms of percentage increase is household accessories, which is a final good. The country from which the maximum number of products will be imported is Thailand. In percentage terms, however, the maximum rise will occur from Singapore.

Impact on India's Exports

Tariff Elasticity of India's Export

The average values of the tariff elasticity and the intercept term for all the regressions conducted at the six-digit level are reported in Table 6. Comparing Tables 1 and 6 we immediately notice that the mean tariff elasticity for India's imports (–5.91) is higher than exports (–5.08). Hence, the result of a reduction of tariffs will be asymmetric, while ASEAN's access to markets in India will rise to a significant extent, India will get lesser access to their markets due to the FTA. Though this holds in the aggregate sense, country-wise results are different. For instance, tariff elasticities are higher for India's exports to Indonesia and Malaysia as compared to that for India's imports from Indonesia and Malaysia. Thus, the increase in India's exports to Indonesia and Malaysia (US$ 4155 million) is much higher than that of India's imports (US$ 2978 million) to these countries. The magnitude of the intercept term is lower than in Table 1. Thus, tariffs and GDP play a bigger role for India's exports compared to India's imports.

Table 6. Tariff Elasticity and Intercepts of Tariff Significant Products (India's Exports to ASEAN 6)

Country	No. of Six-Digit Products	Mean Intercept	SD Intercept	Mean Tariff Elasticity	SD Tariff Elasticity	Correlation Tariff Elasticity and Intercept
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Brunei	293	–14.80	180.07	–0.05	3.04	–0.03
Indonesia	3,297	21.69	101.94	–7.10	18.10	–0.17
Malaysia	2,956	83.96	183.55	–13.01	31.15	–0.70
Philippines	3,313	–9.62	102.58	–0.49	4.65	–0.19
Singapore	474	NA	NA	NA	NA	NA
Thailand	3,930	67.66	173.62	–4.75	12.16	–0.51

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

Impact at the Level of Industries

Continuing with the same strategy as discussed in the section Impact at the Level of Industries under the section Impact on India's Imports, we have estimated the impact of the FTA on industries of ASEAN 6 at HS two-digit level. This is reported in Table 7. First, note that actual increase in India's exports to ASEAN 6 is much higher than that of Indian imports at the industry level (compare column six in Tables 2 and 7). The average increase in India's imports (US$ 614 million) is higher than that of India's exports (US$ 439 million). There are several points to note regarding the table.

Table 7. Industry Level Effect (India's Exports to ASEAN 6)

Product (HS_2 Digit)	Product Name	Predicted Export (With Tariff)	Actual Export	Predicted Exports (Without Tariff)	Actual Increase
(1)	(2)	(3)	(4)	(5)	(6)
29	Organic chemicals	807.15	723.22	4,373.60	3,566.45
73	Articles of iron or steel	410.86	483.55	582.02	171.16
72	Iron and steel	1,047.71	553.28	1,192.69	144.98
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers and parts and accessories of such articles	119.86	84.12	255.57	135.71
87	Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof	254.23	218.89	332.06	77.83
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes	94.81	95.82	171.61	76.80
70	Glass and glassware	676.41	25.63	750.28	73.87
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	142.74	129.90	212.66	69.91
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	2,702.89	2,628.33	2,742.31	39.42
95	Toys, games and sports requisites; parts and accessories thereof	2.92	3.33	36.98	34.06

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

Table 7 also points out that at the aggregate level the following industries will be benefitted the most: organic chemicals (HS 29), iron and steel (HS 72), electrical machinery (HS 85) and glass and glassware (HS 70). Interestingly five of the top-10 industries are common in Tables 2 and 7. Clearly, therefore, two-digit HS is an inadequate level of disaggregation of products to arrive at any conclusion regarding the products that will be adversely affected vis-à-vis the products that will be favourably affected. It is well known that the level of intra-industry trade increases with the level of aggregation of the products. The result is a further confirmation of this fact. Keeping in mind this observation most of the analysis in this article is at HS six-digit level where the chances of singling out particular products is much higher.

Effects at the Product Level

An Overall Look at the Impacts on Individual Commodities

As already pointed out, the effect on the affected industries vis-à-vis the aggregate effect on overall exports will help us to highlight situations where even though the effect is small compared to the overall exports of all commodities, those that are affected find themselves in more than a spot of bother. The second effect is recorded in column 2 in Table 8. To determine the first effect, one has to read this column in conjunction with column 5 of the table. Thus for instance, in Indonesia, there will be a 77 per cent rise in exports of products for which the tariff term is significant, but since these products account for 44 per cent of total trade the aggregate impact is about 34 per cent. Going through this table it is clear that the maximum effect on India's exports will be from Indonesia followed by Malaysia and Thailand in case of gravity model results. There may be several reasons behind this observation. First, India is planning to have a comprehensive economic cooperation agreement with Indonesia in near future. Second, Indonesia is the third largest economy in ASEAN 6 and its GDP growth rate is the highest among them. Third, India signed a Comprehensive Economic Cooperation Agreement (CECA) with Malaysia on 18 February 2011 that is in effect from 1 July 2011, and a framework agreement with Thailand which was implemented in January 2004 with an Early Harvest Scheme for tariff elimination. And finally the average tariffs of Indonesia, Malaysia and Thailand in 2009 are 6.77, 6.77 and 9.88 per cent, respectively. It appears, therefore, that the response of exports to tariff reduction is higher at lower levels of tariff. On the other hand, Singapore turns out to be an exception. This needs an explanation. India has already signed a comprehensive economic cooperation agreement with Singapore on 8 April 2003. So the average tariff rates with Singapore has already been reduced to a significant extent and the resultant increases in exports are manifested in the data on which the regression is run (nil). The reason of no increase in India's exports to Singapore after the implementation of FTA is that Singapore's average tariff for India in 2010 was zero.

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Table 8. India's Export to ASEAN 6 (Analysis of Gravity Model) ('000 US$)

	% Increase of Predicted Export from Positive Tariff to Zero Tariff		Actual Export (Tariff Sig)	% Share
Country	Gravity Model	Actual Export	Gravity Model	Gravity Model
(1)	(2)	(3)	(4)	(5)
Brunei	24.68	42.25	13.10	31.01
Indonesia	76.91	9,011.49	3,953.74	43.87
Malaysia	41.70	8,900.51	639.48	7.18
Philippines	18.43	3,635.52	837.17	23.03
Singapore	0.00	28,439.51	0.00	0.00
Thailand	29.99	8,021.90	481.66	6.00

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.
Note: See notes in Table 3.

With regard to Brunei, few number of HS six-digit products (only 17) are significant as far as tariff elasticity is concerned. On the other hand, out of these 17 products almost all are in either exclusion list or in sensitive track. So, high percentage of supply effect may lead to wrong conclusions.

Product Wise Results

Table 9 reports the product wise results. In Table 9, where we report the top-10 industries for which the value of exports is expected to increase significantly, of the top-10 products three belong to the organic chemical industry and two belong to iron and steel industry. As far as BEC categories are concerned, all of the top-10 products are intermediate goods, two of which are capital goods and remaining belong to the 'processed goods' category. The predominance of intermediate goods in the table is not surprising as most of the top products exported by India from the ASEAN are of this variety.

Reading through the entire data set, we see that percentage of exports accounted for by intermediate goods whose tariff elasticity are significant is 85 per cent. It clearly indicates that the impact of FTA will be mainly on exports of intermediate goods rather than final goods. Intermediate goods that are not in the exclusion list are divided further into intermediate capital goods such as ploughs (HS 843210), intermediate processed goods such as paints and varnishes (HS 320810), parts and accessories such as switches (HS 853650) and primary goods such as granite (HS 251612). Of the intermediate goods percentage of processed goods, capital goods, parts and accessories and primary goods are 63 per cent, 17 per cent, 16 per cent and 4 per cent, respectively. Of the 15 per cent accounted for by goods for final consumption, semi-durable goods contribute 27 per cent, goods for household consumption and non durable goods contribute 21 per cent each.

Table 9. India's Exports of Top-10 Six-digit Products to ASEAN 6 (Values are in '000 US$) (Gravity Model)

Products	BEC Category	Product Name	Goods	Actual Increase in Value (Predicted Exp WOT-Predicted Exp WT)	Country	Track
(1)	(2)	(3)	(4)	(5)	(6)	(7)
290243	Processed	p-Xylene	Intermediate goods	3,048.80	Indonesia	NT-I
290124	Processed	Buta-1,3-diene and isoprene	Intermediate goods	166.26	Indonesia	NT-I
730511	Processed	Line pipe of a kind used for oil/gas pipelines, having circular cross-sections, the external diameter of which exceeds 406.4mm, longitudinally submerged arc welded	Intermediate goods	156.72	Malaysia	EL
290241	Processed	o-Xylene	Intermediate goods	137.15	Indonesia	NT-I
290410	Processed	Sulphonated/nitrated/nitrosated derivatives of hydrocarbons, whether/not halogenated, containing only sulpho groups, their salts and ethyl esters	Intermediate goods	95.51	Indonesia	NT-I
720839	Processed	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, hot-rolled, not clad/plated/coated, in coils, not further worked than hot-rolled (excl. pickled), of a thickness of < 3mm	Intermediate goods	90.34	Philippines	EL
854370	CG	Other machines and apparatus for electrical machines and apparatus, other than machines and apparatus for electroplating/ electrolysis/electrophoresis/signal generators/particle accelerators.	Intermediate goods	83.19	Thailand	NT-I

(Table 9 Continued)

(Table 9 Continued)

Products	BEC Category	Product Name	Goods	Actual Increase in Value (Predicted Exp WOT-Predicted Exp WT)	Country	Track
(1)	(2)	(3)	(4)	(5)	(6)	(7)
290242	Processed	m-Xylene	Intermediate goods	82.29	Indonesia	NT-1
701091	Processed	Aluminium hydroxide	Intermediate goods	47.28	Indonesia	NT-1
281830	Processed	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, hot-rolled, not clad/plated/coated, in coils, not further worked than hot-rolled, pickled, of a thickness of < 3mm	Intermediate goods	40.10	Philippines	NT-2

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

Table 10 reports the products according to the BEC category. Of the intermediate goods for which tariff is expected to increase significantly, the maximum number are from the processed good category (210) followed by capital goods (54) and parts and accessories (52). If we categorize the goods in terms of the expected increase in import (in percentages) then the top product group turns out to be Parts and Accessories, which once again of course is an intermediate good. However, the second in terms of percentage increase is household accessories, which is a final good. The country from which the maximum number of products will be imported is Indonesia. In percentage terms however the maximum rise will occur from Malaysia.

Comparing Tables 2 and 7 we see that the problem (at the two-digit level) of finding the same set of industries for which export as well as import rises is almost entirely solved at the six-digit level. Only one product is common in Tables 2 and 7: Apparatus for electrical machines (HS 854370). Intra-industry trade in this product is genuinely high.

We can recall from the sections Impact at the Level of Industries and Impact at the Level of Industries in India's Imports and Exports that the following industries figured in the top-10 industries both for exports and imports: organic chemicals (HS 29), iron and steel (HS 72), nuclear reactors (HS 84), electrical machinery and equipments (HS 85) and vehicle other than railway (HS 87). A little more analysis reveals that the following products among others will be favourably affected within these industries: sulphonated/nitrated/nitrosated derivatives of hydrocarbons (HS 290410), flat-rolled products of iron/non-alloy steel (HS 720839), side cars for motorcycles (HS 871190), machinery for the preparation of fruits/nuts/vegetables (HS 843860) and dividing heads and other special attachments for machine-tools (HS 846630). On the other hand, the following products will be adversely affected: electronic integrated circuits (854239), cathode-ray tube monitors (HS 852849), textile spinning machines (HS 844520), transmission apparatus for radio-broadcasting/television (HS 852550) and static converters (850440). There are still some products for which both exports and imports are high. For instance, lifts (i.e., passenger elevators) and skip hoists (HS 842810), apparatus for electrical machines (HS 854370), electric conductors (HS 854442) and brakes and servo-brakes (870830) have very high level intra-industry trade in six-digit level and therefore winners and losers cannot be identified for these products even at this level.

Note on the Debated Commodities

During the negotiation process of the agreement names of certain commodities cropped up a number of times both in the media as well as in academic discourses. Six such commodities are: coffee (HS 090111), black tea (HS 090240), pepper (HS 090411), crude palm oil (HS 151110), refined palm oil (HS 151190) and natural rubber (HS 400122). Note that for all these commodities except pepper

Table 10. India's Export to ASEAN 6 (Gravity Model)

Country	CG No.	% Rise	Durable No.	% Rise	HHC No.	% Rise	MI No.	% Rise	Non Durable No.	% Rise	Non Industrial No.	% Rise	P & A No.	% Rise	Primary No.	% Rise	Processed No.	% Rise	Semi Durable No.	% Rise
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
Brunei			1	22.69	2	28.26											1	10402.69	2	24.00
Indonesia	21	68.57	4	10.41	5	19.21			3	22.59	1	6.83	24	15.67	3	14.70	83	170.31	4	6.23
Malaysia	11	207.83	2	19.74	10	20.62	2	420.86	4	9.26	1	30.61	13	20.04	3	0.44	42	39.36	7	9.68
Philippines	13	9.62	1	18.03	4	32.12	1	54.95	8	9.46	3	25.77	5	58.26	2	44.03	41	16.01	3	79.14
Thailand	9	198.25	10	14.17	6	7.38	3	15.07	6	45.10			10	101.90	8	7.30	43	14.23	13	34.47

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

Note: CG—Capital Goods (Except Transport Equipments): Intermediate Good, Durable: Final Good; HHC—Mainly for Household Consumption: Final Good; MI— Mainly For Industry: Final Good; ND—Non-durable: Final Good, Nonindustrial: Intermediate Good, Other: Intermediate Good; P & A—Parts and Accessories: Intermediate Good, Primary: Intermediate Good, Processed: Intermediate Good; SD—Semi-durable: Final Good.

and rubber, the applied tariff rates are 100 per cent. For pepper it is 70 per cent, while for rubber it is 20 per cent. According to India's offer to ASEAN 9 (except Philippines) all these products except rubber are in the special product category. This means that their tariffs will be reduced slowly up to a point. For coffee, black tea and crude palm oil, the minimum rate will be 45 per cent and that will be achieved in December 2019. The minimum rates for pepper and refined palm oil will be 50 per cent and 37.5 per cent respectively on the same year. For Philippines, the minimum rates are same but the terminal year is 2022, rather than 2019. Rubber, on the other hand, is in the exclusion list and its tariff will never reduce from the current 20 per cent.

In Table 11, we have computed the average growth rates of tariffs and imports of the debated commodities in the first decade of this century. Tariffs have predictably grown in all these commodities except natural rubber while they have remained the same for black tea and palm oil (both crude and refined). Interestingly, except black tea and refined palm oil imports have also increased for all these commodities. Thus, non-tariff factors determine their imports and it does not matter whether their tariffs are increased or they are put in the sensitive or exclusion lists. For black tea and palm oil much of the same argument remains valid as their applied tariff rates have not changed though their imports have fallen clearly indicating that imports have fallen due to some other reason and tariff factors do not play a role in regulating their imports. Thus, the overall conclusion appears to be that much of the debate that occurred over these commodities was misdirected in the sense that it does not really matter as to where these goods are to be located in the tariff schedule of the India ASEAN FTA—tariffs in general are irrelevant to determine their quantum of imports.

Summary and Conclusions

The objective of the article was to identify the industries/set of products that are expected to be adversely as well as favourably affected by the India–ASEAN Free Trade Agreement. At the very broad level, these industries were identified as the ones that will be adversely affected: electric machinery (HS 85), ores, slag and ash (HS 26), nuclear reactors (84), aluminium and articles thereof (HS 76), rubber and articles thereof (40), organic chemicals (HS 29), iron and steel (HS 72), man-made textiles materials (HS 54), woods and articles of wood (HS 44), vehicles other than railway (HS 87) and the ones that will be favourably affected in the sense that their exports are expected to rise significantly due to the fall in tariffs resulting from the FTA are: organic chemicals (HS 29), articles of iron and steel (HS 73), iron and steel (HS 72), electric machinery (HS 85), vehicles other than railway (HS 87), inorganic chemicals (HS 28), glass and glassware (HS 70), nuclear reactors (84), mineral fuels (HS 27) and toys, games and sports requisites (HS 95). There are also industries at this broad level (two-digit level) for which there will be substantial increase imports as well as exports. To highlight the products within these industries

Table 11. Investigating the Debated Commodities

HS Code	Product Name	Applied Rate	Track	Correlation between Tariff and Import	Growth Rate of Import (%)	Growth Rate of Tariff (%)	Tariff Difference
				Aggregate Country-wise ASEAN			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
090111	Coffee, not roasted, not decaffeinated	100	Special Product	0.30	289.88	4.76	90
090240	Tea, black (fermented) and partly fermented	100	Special Product	−0.17	−11.47	0.00	90
090411	Pepper (genus Piper), neither crush	70	Special Product	−0.12	13.26	6.25	30 (100 to 70)
151110	Palm oil, crude	80	Special Product	0.27	22.23	0.00	25 (125 to 100)
151190	Palm oil, other than crude and fractions	90	Special Product	−0.08	−18.35	0.00	35 (125 to 90)
400122	Natural Rubber	20	EL	−0.18	106.57	−1.05	40 (60 to 20)

Source: Values in the table are calculated by the authors from the data available in the UN Comtrade CD Rom.

that will be affected in different ways the analysis was re-conducted at the HS six-digit level. Since it is impossible to report all products that will be affected either ways, we have looked at the top-10 products in each category. Some of the products that are expected to be hurt are: Other electronic integrated circuits (HS 854239), copper ores and concentrates (HS 260300), other cathode-ray tube monitors (HS 852849), discs, tapes, solid-state non-volatile storage devices, smart cards (HS 852380), textile spinning machines (HS 844520), bars, rods and profiles, of aluminium (HS 760410), other printers, copying machines and facsimile machines (HS 844339), transmission apparatus for radio-broadcasting/television (HS 852550), other machines and apparatus for electrical machines (HS 854370), ships'/boats' propellers and blades (HS 848710), while others that will benefit are: organic chemical p-xylene (HS 290243), buta-1,3-diene and isoprene (HS 290124), line pipe of a kind used for oil/gas pipelines (HS 730511), organic chemical o-xylene (HS 290241), sulphonated/nitrated/nitrosated derivatives of hydrocarbons (HS 290410), flat-rolled products of iron/non-alloy steel (HS 720839), other machines and apparatus for electrical machines and apparatus, other than machines (HS 854370), organic chemical m-xylene (HS 290242), aluminium hydroxide (HS 701091), flat-rolled products of iron/non-alloy steel (HS 281830).

Finally, the article highlights the importance of factors other than tariffs that affect the volume of trade across geographical entities. We find several instances that tariff centricity, especially in the context of FTAs, often imparts a bias in the analysis of trade flows and trade levels often do not respond to tariff changes. Roughly, 50 per cent of the tariff elasticity that we calculated turned out to be insignificant. In almost all cases in each they were significant, the GDP terms were also significant and the intercept term was large especially for India's imports. Most significantly in our analysis the tariff argument did not figure as an important argument for most of the products on which long debates were held during the tariff negotiations.

Acknowledgements

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