
INDIA'S TRADE WITH ASEAN COUNTRIES IN PETROLEUM PRODUCTS

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Abstract

The paper discusses India's petroleum sector and its participation in India's trade. The sector needs special focus owing to the fact that India's has liberalized this sector by attracting private investment in refinery. The private sector invested in refineries exports petroleum products owing to the fact that a better price is expected overseas. Therefore, the current paper deals with the factors that affect India's exports of petroleum products with ASEAN countries. The paper finds that market size of ASEAN countries is affecting positively and significantly. However, it would important for India to diversify its energy exports to ASEAN particularly other ecofriendly energy resources.

Keywords: *India, ASEAN, Trade, Petroleum Products, FTA*

Introduction

Crude oil and petroleum products are the engine of economic activities in India. The demand for these products in the country remain high. In the year 2022-23, petroleum consumption in India was reported to be 223 million metric tonne. This was a rise of 12% in petroleum consumption over the last year. This rise in domestic consumption is fueled by increase in the automobile market and manufacturing sector. India is 4th largest refiner of petroleum products in the world with 4th largest LNG terminal capacity and 4th largest auto market.¹ With huge domestic demand, India's requirement of oil products will remain high in near future.

Another important aspect of India's oil economy is the increasing exports in this area. If we analyse data at 2-digit HS code, then it is found that India's export and import basket contains mineral fuels, mineral oils and products of their distillation; bituminous substances; etc. as the highest contributor (HS-Code 27). In the year 2022, the products constitute 22% of India's total exports

¹ PIB, Government of India <https://pib.gov.in/PressReleaselframePage.aspx?PRID=1940265>

with the world while the commodity group constituted 38% of India's total import. In the case of ASEAN countries, exports and imports of this commodity group constitute 25% of India's total exports and imports to and from ASEAN countries respectively. In this context, it becomes important to analyse India's trade pattern of crude oil and petroleum products. The HS code of crude oil is 2709 and the HS code of petroleum products is 2710. The names of the commodities are "Petroleum oils, oils from bituminous minerals, crude" and "Oils petroleum, bituminous, distillates, except crude". The current study looks into India's trade in these two commodities.

This rise in India's exports in these products, need a special focus. After liberalisation, private investment in refineries made them to sell petroleum products in international market. Therefore, the trade in petroleum product needs to be taken up as an important discussion with special reference to India's trade with ASEAN countries. There are few studies undertaken in this area. The current paper deals with the dynamics of India's exports of petroleum products to ASEAN countries. The paper has objective to identify factors that effect India's exports of such commodities to ASEAN. In the next section the paper deals with India's trade in Crude Oil and Petroleum Products with ASEAN countries viz-a-viz the world. Thereafter the paper brings out discussion on the direction of India's trade within ASEAN region. Methodology and results are discussed after this. In the end, the paper presents conclusion.

Trade in Crude Oil and Petroleum Products

In this section we analyse the trend of India's trade in these commodity group with the World and ASEAN as a regional. The section also brings out analysis of the trend of India's trade in these two commodities with respect to ASEAN member countries. Table 1 presents India exports of crude oil and petroleum products with ASEAN and the World. The data indicates that India has been exporting petroleum products (HS code 2710) with the world and the ASEAN region. The exports of crude oil (HS code 2709) is not happening from India as India is not the producer of crude oil. In fact, India is net importer of crude oil. India's exports of petroleum products to the world increased from US\$ 3354 million in 2003 to US\$ 94398 million in 2022. During this period of 20 years, India's exports of petroleum products increased by more than 28 times. In the case of ASEAN countries, India exports increased from US\$ 896 million in 2003 to US\$ 10661 million in 2022. This was an increase of almost 21-fold during this period. It is evident that India's exports of petroleum products to ASEAN region has increased at rate less than that of the world.

Compound annual growth of India's exports of petroleum products to ASEAN region during 2003-2022 was 12% compared to the same with the world which was 18%. India's exports in this product suggest that India has been importing crude oil and refines the same for selling in the world market, besides their usage in domestic market. India is also expanding its refinery capacity.

Table 1: Trend of India's Exports in Oil and Petroleum Products (US\$ in million)

Year	India's Exports to ASEAN		India's Exports to World	
	Petroleum oils and oils obtained from bituminous minerals, crude(HS Code-2709)	Petroleum oils and oils obtained from bituminous minerals (excl. crude); preparations containing ... (HS Code- 2710)	Petroleum oils and oils obtained from bituminous minerals, crude (HS Code-2709)	Petroleum oils and oils obtained from bituminous minerals (excl. crude); preparations containing ... (HS Code- 2710)
2003	11.1	895.9	23.1	3354.3
2004	11.5	1992.9	26.4	5915.2
2005	2.0	2269.1	15.7	10096.6
2006	2.7	4034.3	79.3	17401.4
2007	11.1	3896.1	29.0	22846.2
2008	0.7	5388.5	35.5	31558.8
2009	2.0	3061.6	2.1	23226.0
2010	0.0	6977.3	19.4	36641.3
2011	15.1	11450.8	15.5	54611.1
2012	0.0	10057.2	0.0	52763.9
2013	0.0	10789.5	0.0	67075.2
2014	0.0	7299.0	0.6	60838.6
2015	0.0	3955.4	0.0	29965.2
2016	0.0	4228.0	0.0	26947.7
2017	0.0	8714.6	0.0	34859.4
2018	0.0	9392.5	0.0	47181.2
2019	0.0	6045.3	0.0	42560.1
2020	0.0	5312.9	0.0	26174.7
2021	0.0	9371.3	0.0	54037.1
2022	0.0	10661.2	0.0	94398.7

Source: International Trade Data Centre, Geneva

Another aspect of trade in this area is India's imports in crude oil (HS Code 2709) and petroleum products (HS code 2710). The data is presented in table 2. This table brings out the fact that India's imports of both crude oil and petroleum products from the world is increasing but from ASEAN region is decreasing over time. India's imports of crude oil were US\$ 18076 million in 2003 which increased to US\$ 173515 million in 2022. This was an increase of more than 9-fold in the 2 years of span. On the other hand, imports of petroleum products were also increased from US\$ 1538 million in 2003 to US\$ 14815 million in 2022. Imports of these products from the world also increased by more than 9% during this period. In the case of India's imports from ASEAN, the

data is available from 2006. The imports of crude oil were US\$ 2058 million in 2006 which decreased to US\$ 1770 million in 2022. This was a decrease of 1.2 times during this period. India's imports of petroleum products were US\$ 992 million in 2003 which increased to US\$ 1444 million in 2022. This was an increase of 1.5 times during this period.

Table 2: Trend of India's Imports in Oil and Petroleum Products (US\$ in million)

Year	India's Imports from ASEAN		India's Imports from World	
	Petroleum oils and oils obtained from bituminous minerals, crude (HS Code- 2709)	Petroleum oils and oils obtained from bituminous minerals (excl. crude); preparations containing ...(HS Code- 2710)	Petroleum oils and oils obtained from bituminous minerals, crude	Petroleum oils and oils obtained from bituminous minerals, crude (HS Code- 2709)
2003	0.0	0.0	18076.4	1538.2
2004	0.0	0.0	24587.1	2713.0
2005	0.0	0.0	34792.5	5160.7
2006	2058.0	992.0	47587.5	6156.2
2007	2579.5	1994.2	54059.5	8618.1
2008	3391.8	3254.9	86582.5	12133.5
2009	1652.5	1541.2	64899.5	4563.2
2010	1557.2	2574.3	88611.0	5785.0
2011	2674.4	2606.3	122125.5	7353.3
2012	3023.4	1490.2	148757.0	5172.4
2013	2782.1	818.6	148046.7	4419.4
2014	3445.2	891.4	135826.2	4203.1
2015	2035.3	940.4	72365.7	3990.6
2016	2374.5	705.7	60866.0	3685.6
2017	2181.3	653.1	82065.0	3832.8
2018	2890.2	901.6	115082.8	5696.3
2019	2419.0	1141.2	101948.6	6684.4
2020	1488.2	994.6	64579.7	5880.0
2021	1796.9	1279.8	106406.8	9726.2
2022	1770.2	1444.4	173515.9	14815.2

Source: International Trade Data Centre, Geneva

Direction of Exports and Imports of Petroleum Products in ASEAN Region

Analysis of direction of India's exports of petroleum products is given at 2-digit level of HS code. This includes all commodities under the HS Code 27 including petroleum and crude oil. As we have discussed earlier that India is exporting petroleum products (HS code 2710). Therefore, table 3 also brings out an overview of direction of trade for this commodity as well. As per the table,

India's exports in petroleum products and crude oil etc. is increasing overtime with countries like Singapore, Malaysia, Indonesia and Thailand. In 2022, Singapore, Indonesia and Malaysia constituted 98.5% of India's total exports of petroleum products of which Singapore and Indonesia had share of 49.7% and 33.1% respectively. Share of Malaysia was 15.7%. This implies that India's exports of these products are concentrated to these three countries only in the ASEAN region.

Table 3: Direction of India's Exports of Petroleum Products with ASEAN Countries (US\$ in million)

Country	2005	2010	2020	2021	2022
Singapore	2136.5	4884.9	3988.5	5608.2	5508.6
Indonesia	183.0	1884.1	140.0	1810.1	3665.5
Malaysia	12.9	289.0	1364.1	2114.7	1740.7
Thailand	7.3	42.8	20.3	19.4	113.7
Viet Nam	13.5	7.9	7.7	131.0	21.2
Philippines	7.2	5.7	38.7	26.2	21.0
Myanmar	1.9	2.8	8.7	22.9	6.9
Cambodia	0.0	0.0	0.5	0.6	0.2
Brunei Darussalam	0.0	0.0	0.0	0.0	0.0
Lao People's Democratic Republic	0.0	0.0	0.0	0.0	0.0

Source: International trade data centre, Geneva

Table 4 presents India's imports of petroleum products from ASEAN region. As pointed out earlier that India's imports from ASEAN countries are mainly Petroleum oils and oils obtained from bituminous minerals, crude (2709) which constituted 63% of India's total petroleum imports from ASEAN region. Other products imported are Coal; briquettes, ovoids and similar solid fuels manufactured from coal (2701), Petroleum gas and other gaseous hydrocarbons (2711) and Petroleum oils and oils obtained from bituminous minerals (excl. crude); preparations containing (2709). These four products together constituted more than 97% of India's petroleum imports from ASEAN. Thus, the table presents direction of India's imports in all these products. As evident from the table, India sourced major amount of petroleum oil and gases from Indonesia, Singapore and Malaysia. 98% of these products are sources from these three countries in 2022. In the case of Indonesia, Coal; briquettes, ovoids and similar solid fuels manufactured from coal constituted 97% of India's total imports of Petroleum products in 2022. Similar is the case of Singapore in 2022.

Table 4: India's Imports of Petroleum Products from ASEAN Region (US\$ in million)

Country	2005	2010	2020	2021	2022
Indonesia	778.3	3059.1	5103.0	6324.1	14731.9
Singapore	9.6	2359.5	1113.6	2304.4	4754.2
Malaysia	226.6	1559.6	1346.4	1373.8	1979.8
Brunei Darussalam	0.0	206.6	420.5	471.0	285.2
Thailand	3.0	8.5	77.5	109.0	113.7
Viet Nam	23.9	84.3	7.1	10.1	13.5
Philippines	0.0	20.3	2.3	1.2	12.8
Myanmar	0.0	0.0	0.1	0.0	0.0
Lao People's Democratic Republic	0.0	0.0	1.1	0.0	0.0

Source: International trade data centre, Geneva

Review of Literature

India's merchandise exports with ASEAN countries are widely discussed in economic literature. In particular, there are many studies which assessed both ex-ante and ex-post study of ASEAN India free trade agreement (AIFTA). Research by Batra (2006), Pal and Dasgupta (2009), Francis (2011a), Francis (2011b), Sikdar and Nag (2011), Nag (2016), Singh (2021), Bhattacharya and Mandal (2016), Jagdambe and Kannan (2020), Sikdar and Nag (2020), Srivastava and Mathur (2022) and Gulnaz and Maglani (2022) present a detailed discussion on the trade potential of India with ASEAN countries. There are also studies which brings out discussion on sectoral impact of AIFTA. For example, Nagoor and Kumar (2010) assessed the impact of the FTA on tea industry and Francis (2011) brings out sectoral impact of the FTA in their paper. Similarly, many studies have highlighted the impact of FTA on agricultural sector (see for example, Ratna and Kallumal, 2013; Veeramani and Saini, 2011; Jagdambe and Muazzam, 2019; Jagdambe and Kannan, 2020;). Besides these, there are several researches which assessed the impact of FTA on India's trade with ASEAN countries in specific industry. Masali (2016) brings out assessment of the FTA on manufacturing sector. Mandal (2018) discusses the effect of the FTA on India's trade in textile industry.

The review of literature indicates that there is a gap of research in assessing the impact of AIFTA on India's export of petroleum products with ASEAN countries. In fact, very few literature has discussed the India's export potential in this sector with the world. Several research is available on India's demand for oil (Goldar and Mukopadhyay, 1990; Ghosh, 2006 and Agarwal, 2015). Rajan (2012) discusses in brief about the emergence of this sector and its role in India's international trade. Azhar (2021) presents a detailed analysis of the emergence of this sector in India's export basket. The paper in fact starts academic discussion on this issue. The paper highlights that how privatization leads to the export of petroleum products from Indian markets. A similar work is

undertaken by Kulkarni et.al (2023). The focus of this paper is assessing the impact of Covid-19 on India's exports and imports of petroleum products.

With the above discussion on the available literature, it is evident that there is a lack of research on India's petroleum trade with ASEAN countries. The current paper fills this gap. With the objective to assess the impact of FTA on India's petroleum exports, the current paper assesses factors that affect India's petroleum export to ASEAN countries.

Methodology

With the objective to identify determinants of India's petroleum trade with ASEAN countries, gravity model was estimated based on the equation 1.

$$\text{LnX}_p = a + b_0 \text{LnGDP}_i + b_1 \text{LnGDP}_j + b_2 \text{Ln PCI}_i + b_3 \text{Ln PCI}_j + b_4 \text{Ln Pop}_i + b_5 \text{Ln Pop}_j + b_6 \text{Ln TO}_j + b_7 \text{Ln TO}_i + b_8 \text{LnTi} + b_9 \text{LnTj} + b_{10} \text{Ln Distance} + b_{11}C + b_{12}Cl + b_{13}L + u \dots\dots\dots(1)$$

Where

Ln X_p = Natural log of India's petroleum exports

LnGDP_i = Natural log of GDP of country i (India) at time t

LnGDP_j = Natural log of GDP of country j (partner countries) at time t

Ln PCI_i = Natural log of percapita income of country i (India) at time t

Ln PCI_j = Natural log of percapita income of country j (partner countries) at time t

Ln Pop_i = Natural log of population of country i (India) at time t

Ln Pop_j = Natural log of population of country j (partner countries) at time t

Ln TO_j = Natural log of trade as % of GDP of country j (partner countries) at time t

Ln TO_i = Natural log of trade as % of GDP of country i (India) at time t

LnTi = Natural log of India's tariff rate (simple average)

LnTj = Natural log of tariff rates of partner countries (simple average)

Ln D = Log of distance

C = Contiguity

Cl = Common Colony

L = Common official language

The dependent variable is India's petroleum exports to ASEAN countries. Data for India's exports with ASEAN countries was taken from World Bank's WITS database for the period from 1990 to 2021. Rest of the data was taken from World Development Indicators (WDI) and time invariant variables are from Centre of Etudes Prospectives and Information Internationales (CEPII). The export data of India was taken at 2-digit level of HS code. With this sample, the equation was estimated. Prior to run the model, diagnostics tests were run. It was found that data is stationary using Levin Lin Chu test and also the presence of panel heteroscedasticity. Tests also suggests that data has cross sectional interdependence. Also, the data suffers from serial correlation. Therefore,

feasible generalised least square method is used to estimate the equation based on panel data removing heteroscedasticity and serial correlation.

Result and Discussion

The FGLS estimate taken with both the issue of heteroscedasticity and serial correlation corrected. The estimated equation is presented in table 5. The results present two types of estimates. The One without removing autocorrelation but removing heteroscedasticity whereas the second estimate presents results of FGLS removing both heteroscedasticity and serial correlation corrected. One of the reasons behind choosing this method is the fact that number o time period is larger than the number of panels. Number of panels is 11 whereas time period is 32. The result with the assumption of no autocorrelation suggests that India's exports in petroleum product is significantly and positively affected by the market size of the partner economies. On the other hand, the percapita income of the partner countries effect significantly and negatively. Tariff rates of partner countries has positive and significant effect on India's petroleum product. Population has negative and significant effect of partner economies. Time invariant factors are also affecting India's petroleum exports to ASEAN countries significantly.

The second estimate is more robust as it corrects the issue of autocorrelation. The result indicates that India's exports of petroleum products are significantly affected by variables like market size of the partner countries, population and time invariant factors.

Table 5: Determinants of India's Petroleum Exports to ASEAN Countries

Ln Export	FGLS Estimate with Heteroscedasticity Corrected				FGLS Estimate with both Heteroscedasticity and Serial Correlation Corrected			
	Coef.	Std. Err.	z	P>z	Coef.	Std. Err.	z	P>z
LnGDPi	4.68	4.48	1.05	0.30	4.82	5.60	0.86	0.39
LnGDPj	38.71	13.97	2.77	0.01***	22.95	11.77	1.95	0.05**
LnPCIj	-36.90	13.96	-2.64	0.01***	-21.20	11.75	-1.80	0.07*
LnPCi	-2.54	6.06	0.42	0.68	-3.52	7.51	0.47	0.64
LnTj	0.51	0.11	4.80	0.00***	0.12	0.11	1.08	0.28
LnTi	-0.09	0.13	0.69	0.49	-0.07	0.16	0.41	0.68
LnPopj	-36.65	13.96	-2.62	0.01***	-20.98	11.74	-1.79	0.07*
LnToj	0.69	0.35	2.00	0.05**	0.34	0.49	0.70	0.48
LnD	0.56	0.92	0.61	0.54	0.42	1.54	0.27	0.79
CL	1.56	0.69	2.27	0.02**	1.71	1.07	1.60	0.11

C	1.50	1.27	1.18	0.24	0.49	1.96	0.25	0.80
L	1.40	0.36	3.91	0.00***	1.22	0.57	2.15	0.03**
Constant	-164.99	82.56	-	2.00	0.05**	-156.31	103.59	1.51
Number of obs	320				320			
Wald chi2(12)	1224.08				391.35			
Prob > chi2	0.0000				0.0000			

*** significant at 0.01, ** significant at 0.05 * significant at 0.1

Conclusion

The paper presents a discussion on the factors effecting India's petroleum exports to ASEAN countries using panel data model. The data used for the analysis is for 10 countries of ASEAN and India. The result indicates that India's petroleum products is positively affected by the market size of the partner countries. This variable is affecting positively. It simply means that India's exports in petroleum products will rise with the rise in income level of ASEAN countries. However, per capita GDP which represents the level of economic progress of the population affect significantly and negatively. This implies that India's exports of petroleum products will decrease as the economic progress increases. In other words, the countries of ASEAN region will reduce imports of oil as its development happens suggesting that they may opt for alternative energy resources.

In the end, variables like tariff rates are affecting positively and population is affecting negatively, this suggests that as the tariff rates rises, India's exports of petroleum products to ASEAN countries rises. This suggests limited impact of FTA over India's petroleum exports. The rise in population affect negatively or as population rises less of these products from India will be demanded. This has an important implication. The population of ASEAN countries is steadily rising. The growth rate is less than 1% and it is expected to rise at 0.8% annual rate of growth in the coming few years. Therefore, the demand for fuel and products of petroleum and gases in ASEAN countries from India will not be diminished due to this. However, it is important to note ASEAN region particularly countries like Singapore, Indonesia, Malaysia and Vietnam are moving towards more sustainable practices. Therefore, it would be important for India to diversify its exports of energy resources. Particularly, exports of energy resources to neighboring countries like Myanmar and Thailand. The study finds out that there is limited impact of FTA on India's petroleum exports to ASEAN. This further suggests that exports of petroleum products are required to be studied with prices taking under the model. The current paper does not take price fluctuations in the model estimate. One of the reasons for this is the nor of standard gravity model. However, it is suggested to use domestic and overseas prices as factors for exports of such products owing to the fact that if prices in domestic market rises, the private refineries prefer to sell in domestic market and vice versa.

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