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Impact of ASEAN- India Free Trade Agreement (AIFTA) on Palm Oil Trade

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To analyse the trade creation and trade diversion effect of the ASEAN-India Free Trade Agreement (AIFTA) on palm oil trade among the member countries.
Data and Methodology: Data on palm oil exports of major Association of South East Asian countries (ASEAN) member countries such as Indonesia (64.10%), Malaysia (31.52%), Thailand (2.18%), Singapore (1.95%) and Philippines (0.25%) were collected for the period of 21 years (2000–2020) and used for the analysis. The Gravity model by Ordinary Least Square (OLS) and Poisson Pseudo-Maximum Likelihood (PPML) methods were estimated with the panel data.
Results: As expected gravity model variables the distance had a negative impact on the palm oil trade between India and ASEAN member countries. The tariff rates and export prices had a negative impact on the palm oil trade whereas; the population of ASEAN members (exporters), GDP of ASEAN members and exchange rate were insignificant. The AIFTA had a positive and significant effect on the palm oil trade from ASEAN member countries to India which denoted the trade creation effect between ASEAN members and India.

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Conclusion: The analysis showed a pure trade creation effect of AIFTA in the time and country fixed effect model. The results suggested that the palm oil trade could be pushed for further trade liberalisation in the AIFTA.

Keywords: AIFTA; exports; palm oil; trade creation.

1. INTRODUCTION

In recent years, palm oil has become ubiquitous and is considered to be the world's most versatile oil, used in a range of foods and even in the production of biofuels [1]. It was also used as a preservative in shampoos, cosmetics, and other products. As compared to other oil crops, palm fruit had a higher oil content, explaining its prevalence. From 2001 to 2018, Palm oil consumption in India increased by more than 230 per cent i.e., from 3 million tonnes to nearly 10 million tonnes [2]. In 2020, India was the world's top consumer of vegetable oil (25.29 million tonnes), and palm oil comprised 9.21 million tonnes and 8.41 million tonnes of palm oil were imported. India imported more than 70 per cent of vegetable oil; palm oil accounted for almost 60 per cent of the imports [2]. The major exporters of palm oil in India were Indonesia and Malaysia with shares of 62.97 and 29.72 per cent. Being the largest exporter, both Indonesia and Malaysia are members of similar Free Trade Agreements (FTA), which are part of the ASEAN Free Trade Area (AFTA). Trade agreements between countries would play a significant role in influencing changes in palm oil export proportions [3,4]. Between 2000 and 2012, there has been an expansion of ASEAN partnerships with China (2005), Korea (2007), Japan (2008), India (2010) and New Zealand (2010).

As two of the largest producers (Indonesia and Malaysia) and a major importer (India) joined the ASEAN-India Free Trade Agreement (AIFTA) would provide an opportunity to promote trade through the reduction of trade barriers. Palm oil is considered as a special product i.e., reduces tariff rates at a more gradual pace than other products. Under AIFTA, the base tariff of for Crude Palm Oil (CPO) and Refined Palm Oil (RPO) were 80 and 90 per cent; the tariff rate for CPO and RPO in 2010 was 76 and 86 per cent, while in 2019 the tariff rate were 37.5 and 45 per cent, respectively (ASEAN-India Trade in Goods Agreement). According to UN COMTRADE data, India imported 87.47 and 98.91 per cent of its palm oil from ASEAN member countries in 2010 and 2020, respectively. Among ASEAN member countries, Indonesia and Malaysia accounted for 63.66 and 30.05 per cent, respectively in 2020. The growth rate of Indonesia has decreased after signing AIFTA (1.39% per annum after signing AIFTA) whereas, in Malaysia, the growth rate of palm oil exports has increased by 7.66 per cent per annum [5,6]. With this background, the objective of the paper is to study whether AIFTA created trade or diverted the trade in palm oil.

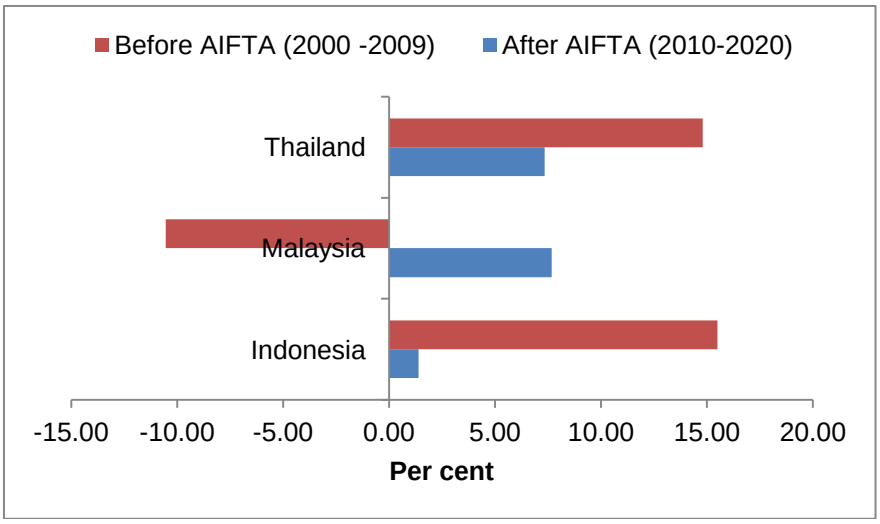

Fig. 1. ASEAN export growth rate of palm oil to India (2000 to 2020)
Source: Authors calculation based on UNCOMTRADE

2. REVIEW OF LITERATURE

The benefits of the Free Trade Agreement (FTA) to member countries and the rest of the world had been debated by economists for many years [7]. According to some scholars [8,9], trade creation (TC) was a positive outcome of FTAs, whereas others claimed trade diversion (TD) [10]. A country's welfare would be improved when the TC effect was more significant than the TD effect when trade was undertaken. Through reduced trade barriers, FTAs would help member countries to improve their income and resource efficiency. A lower commodity price would shift the production frontier toward the most efficient producers and consumers would benefit [11]. In certain situations, TD effects might outweigh TC effects. As a result of FTAs, members were always given special preferences and nonmembers were subject to certain trade barriers [12].

According to Jayasinghe & Sarker [13], North America Free Trade Agreement (NAFTA) had a significant TC and TD impact on six major agriculture commodities and there was an increase in intra-NAFTA trade. A similar study by Lambert and McKoy [14] examined the impact of major FTAs on agricultural and food products intra and extra-bloc. The study resulted in trade creation of the NAFTA on agricultural and food trade increased by 145 per cent and the trade diversion effect was observed for the Central American Common Market (CACM) and Common Market for Eastern and Southern Africa (COMESA).

An analysis by Sun and Reed [15] found that ASEAN-China PTAs, EU-15 (European Union), EU-25, and Southern African Development Community (SADC) agreements increased agricultural trade. In the EU-15, there was a significant diversification of exports and imports, but the creation of the SADC increased agricultural exports to non-member countries. Until the early 2000s, agriculture was excluded from FTAs, making it appear that only a few studies had examined the impact of FTAs on the agriculture trade. Since the Doha Round of Development in 2001, agriculture has been incorporated into many free trade agreements. There was limited empirical evidence on the effects of the ASEAN-India Free Trade Agreement (AIFTA) on the palm oil trade. The present study uses the gravity model to analyze how AIFTA affects the palm oil trade between India and ASEAN members, considering this research gap in the literature.

3. DATA AND METHODOLOGY

3.1 Data

The annual secondary data were collected from the UN COMTRADE, Centre d'Etudes Prospective at d' Informations Internationales (CEPII) and the World Bank database for the period of 21 years (2000 to 2020). The analysis to examine the trade effect in palm oil exports was conducted for the following ASEAN countries: Indonesia (65%), Malaysia (32%), Thailand (2%), Singapore (2%) and the Philippines (0.25%) which had a major share in exports of palm oil to India during triennium average of 2016 to 2020 (Fig. 2). The variables and their sources are presented in Table 1. The Non-Tariff Measure (NTM) used for the analysis was D21 i.e., a countervailing measure that was imposed by India on Indonesia, Singapore and Thailand in 2018.

The descriptive statistics summarise the characteristics of the data so they can be understood and given in Table 2. The relationships of the variables were presented in Table 3. Since the gravity model would be estimated in logarithmic function, which includes 'ln' subscript log-linear functional form was used.

3.2 Methodology

The Gravity model has been widely studied in international trade analysis since the 1990s due to interest in economic geography, which considered geographical and other forms of distance as important factors in economic activities and it has been mostly used to study the effects of international trading systems such as the World Trade Organisation (WTO) and regional trading arrangements such as Free Trade Agreements (FTA) on international trade.

3.2.1 Framework of gravity model

The gravity model was based on Newton's law of gravitation, which states that gravitational pulls between two objects are proportional to their body weight divided by their squared distance.

$$GFij = \frac{m_i m_j}{d_{ij}^2}$$

Table 1. Description of variables

Variables	Description of variable	Expected Sign	Data Source
lnT_{ijt}	Natural logarithm of trade (export/import) flow between countries 'i' and 'j' in time 't'	Dependent variable	UN COMTRADE
lnDistij	Natural logarithm of the bilateral distance between countries 'i' and 'j',		CEPII
$lnPop_j$	Natural logarithm of Country j (ASEAN member country's) population	+/-	CEPII
lnGDPit and lnGDPjt	Natural logarithm of GDP of importer 'i' and exporters 'j' at time't	+	CEPII
$lnER_j$	Natural logarithm of the exchange rate of ASEAN country	+/-	World Bank
lnTR	Natural logarithm of Tariff rate of selected commodity	-	TRAINS
lnNTM	Natural logarithm of Coverage ratio of Non Tariff Measure	+/-	TRAINS
lnTPr	Natural logarithm of export/import price of the selected commodity	-	UN COMTRADE
FTA	Binary variables that take the value 1 if countries have common membership in the AIFTA, and 0 otherwise	+/-	Dummy variable

Table 2. Summary statistics of variables

	Mean	Standard Error	Kurtosis	Skewness	Minimum	Maximum	Count
lnT_{ijt}	15.14	0.79	-0.35	-1.10	0.00	22.67	105
lnTR	3.14	0.16	-0.45	-0.98	0.00	4.82	105
$lnDist_{ij}$	8.31	0.02	-0.94	-0.54	7.98	8.54	105
$lnPop_j$	10.74	0.13	-0.75	-0.57	8.30	12.52	105
$lnGDP_{jt}$	19.37	0.06	-0.35	0.18	18.15	20.84	105
$lnER^j$	3.68	0.30	-0.49	0.86	0.22	9.59	105
lnNTM	0.75	0.16	1.47	1.84	0.00	4.61	105
FTA	0.52	0.05	-2.03	-0.10	0.00	1.00	105
lnTPr	-0.41	0.04	-0.53	-0.59	-1.51	0.20	105

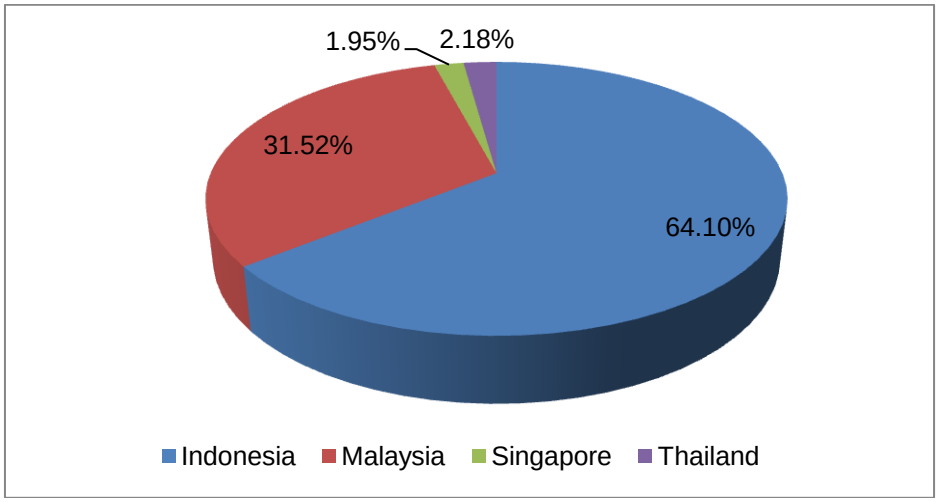

Fig. 2. Share of ASEAN country's palm oil export to India (Triennium ending, 2016 -2020)
Source: Authors calculation based on UN COMTRADE

Table 3. Bivariate correlation of variables

	lnT_{ijt}	lnTR	$lnDist_{ij}$	$lnPop_j$	$lnGDP_{jt}$	$lnER^J$	lnNTM	FTA	lnTPr
lnT_{ijt}	1.00								
lnTR	0.05	1.00							
$lnDist_{ij}$	-0.11	0.21	1.00						
$lnPop_j$	0.16	0.50	0.28	1.00					
$lnGDP_{jt}$	0.41	-0.01	0.14	0.43	1.00				
$lnER^J$	0.25	0.35	0.44	0.88	0.52	1.00			
lnNTM	0.13	-0.06	-0.75	0.13	0.04	-0.02	1.00		
FTA	0.13	-0.12	0.02	0.06	0.71	-0.01	-0.02	1.00	
lnTPr	-0.48	-0.10	0.22	0.02	0.27	-0.09	-0.17	0.53	1.00

Tinbergen (1962) first applied the model to international trade and Linneman (1966) related the trade flows between two countries were proportional to the Gross Domestic Product (GDP) of each country divided by the distance between their respective economic centers - usually the distance (D) between their capital cities. Thus, it had postulated that the trade flow between the two countries was directly proportional to their income and inversely proportional to the distance between them, which is a proxy for the trade costs [16].

$$\mathrm{Tij} = \frac{\mathrm{GDP_i GDP_j}}{\mathrm{D_{ij}}}$$

The present study used the gravity model to identify the trade effect (trade creation and trade diversion) of the Free Trade Agreement (FTA) in palm oil trade between India and ASEAN member countries from 2000 to 2020 with the panel data. However, the exploitation of country heterogeneity was made possible by the use of panel data [17,16,18]. The model used in the analysis was multiplicative, so a natural logarithm has been used to obtain a linear relationship between the variables and the equation;

$$lnT_{ijt} = \beta_0 + \beta_1 lnDist_{ij} + \beta_3 lnPop_j + \beta_4 lnGDP_{it} + \beta_5 lnGDP_{jt} + \beta_6 lnER_j + \beta_7 lnTR + \beta_8 lnNTM + \beta_9 lnExPr + \beta_{10} FTA + u_{it}$$

where,

u_{it}= Error-term, which is assumed to be normally distributed with zero mean and constant variance for all observations and to be uncorrelated.

A difficulty rises when zero trade flow is estimated i.e., the log-linear model was not valid when $X_{ij} < 0$. However, leaving out zero-value observations poses major issues because it eliminates vital information on low levels of trading [19]. The problem of heterogeneity results in biased and inconsistent model estimates because of the invariant variable of distance and the dummy variable Free Trade Agreement (FTA). Hence, for the problem of zero trade flow and heterogeneity problem, Baier and Bergstrand [20] recommended the introduction of country and time fixed effects simultaneously in a panel data analysis to obtain unbiased estimates from the gravity equation while, Silva and Tenreyro [21] suggested Poisson Pseudo-Maximum Likelihood (PPML) as a robust estimator that addresses the heteroscedasticity problem and measurement errors. Even Fally [22] also suggested the Poisson Pseudo-Maximum Likelihood (PPML) model, which was structurally consistent with importer and exporter fixed effects for appropriate estimation.

The endogeneity and zero trade flow problems were addressed in this study by using fixed effects in a panel setting. The panel data of the top five ASEAN member countries were selected based on the percentage share of palm oil exports. The Ordinary Least Square (OLS) and Poisson Pseudo – Maximum Likelihood (PPML) estimation methods were employed to analyse the trade creation and trade diversion effect due to the ASEAN – India Free Trade Agreement (AIFTA) of selected commodities. PPML estimation included the zero trade flow in contrast to an OLS estimation which excluded zero trade flows.

The functional misspecification of each of the models was then checked using the heteroscedasticity Robust Regression Specification Error Test (RESET) with the null hypothesis of no misspecification against the alternate hypothesis of the presence of misspecification problem [16,23].

4. RESULTS AND DISCUSSION

A panel data analysis was conducted to examine the trade effects of the FTA between India and

ASEAN member countries using the effects of time and country (fixed effects). Four panel specification tests were conducted. Specifically, column I represented simple regression, while columns II, III and IV represented only the time effect, only the country effect, and both the time and country effect, respectively. Both OLS and PPML were employed in the analysis for the period of 2000 to 2020. According to Khurana and Nauriyal [16], PPML will provide the most accurate specification when considering time and country effects. Hence, the results of PPML estimation with time and country effects were discussed.

As from the results of Table 4, the coefficient of distance was negative and significant in pooled, OLS estimation of time effect and PPML of time and country effect analyses. Whereas the GDP of India (importer) had a negative and significant relationship with imports of palm oil from ASEAN member countries in columns I, II and PPML estimation of both effects whereas, the GDP of the exporter (ASEAN countries) had a positive and significant impact on imports of palm oil in columns I, II and III analyses. The population of ASEAN member countries also had a positive impact and significant impact in columns I and II only. The exchange rate had a negative and significant relation with exports, except in column IV. Tariff rates had an inverse and significant relationship with palm oil imports from ASEAN member countries to India except in pooled regression. Non-Tariff Measure (NTM) had a positive and significant relationship in columns II and IV. Whereas, there was a negative relationship between the export prices and palm oil imports to India. The Free Trade Agreement (FTA) between ASEAN and India had a positive and significant relationship with imports except in pooled estimation and OLS estimation with only time effect.

Table 4. Estimation of gravity equation – Palm oil (HS 1511)

Column	**I**	**II**		**III**		**IV**	
Variables	**Pooled**	**Only time effect**		**Only country effect**		**Time and country specific**	
	OLS	**OLS**	**PPML**	**OLS**	**PPML**	**OLS**	**PPML**
$lnDist_{ij}$	-19.71***	-24.00***	0.74 ^{NS}	-3.80 ^{NS}	-2.29 ^{NS}	9.29 ^{NS}	-5.60**
	(6.91)	(7.83)	(1.10)	(17.56)	(1.75)	(17.90)	(2.69)
$lnPop_{j}$	5.35***	6.18***	0.31***	-12.18 ^{NS}	-0.03 ^{NS}	-12.94 ^{NS}	0.72 ^{NS}
	(1.45)	(1.57)	(0.12)	(12.70)	(1.11)	(13.50)	(0.95)
$lnGDP_{it}$	-20.35***	-73.74*	-9.79***	-2.05 ^{NS}	-0.41 ^{NS}	-45.82 ^{NS}	-8.78***
	(4.24)	(39.11)	(2.37)	(4.47)	(0.30)	(32.52)	(2.35)
$lnGDP_{jt}$	27.48***	26.93***	1.52***	6.75*	0.83***	4.17 ^{NS}	0.39 ^{NS}
	(4.33)	(5.14)	(0.47)	(4.62)	(0.31)	(6.16)	(0.43)
$lnER_{j}$	-5.02***	-5.39***	-0.28**	-6.55**	-0.80***	-2.73 ^{NS}	-0.09 ^{NS}
	(1.06)	(1.23)	(0.11)	(3.39)	(0.21)	(4.17)	(0.24)
lnTR	-0.41 ^{NS}	-0.66*	-0.07**	-0.81**	-0.08**	-0.89**	-0.12***
	(0.40)	(0.42)	(0.03)	(0.34)	(0.03)	(0.3)	(0.04)
lnNTM	0.63 ^{NS}	0.69 ^{NS}	-0.02 ^{NS}	2.90***	0.41***	2.57***	0.41***
	(0.56)	(0.59)	(0.08)	(0.57)	(0.16)	(0.63)	(0.11)
FTA	1.08 ^{NS}	98.80 ^{NS}	16.50***	3.08*	0.24*	85.91*	16.43***
	(2.08)	(68.71)	(4.31)	(1.71)	(0.14)	(57.21)	(4.36)
lnTPr	-11.67***	-16.91***	-2.46***	-8.75***	-0.81***	-13.66***	-2.39***
	(1.67)	(2.08)	(0.42)	(1.77)	(0.18)	(2.15)	(0.47)
Intercept	-296.67***	730.68 ^{NS}	159.39***	169.86 ^{NS}	22.04*	951.15 ^{NS}	208.25***
	(73.58)	(780.63)	(46.76)	(153.17)	(12.73)	(665.82)	(54.96)
R^2	0.65	0.76	0.64	0.80	0.69	0.85	0.77
N	105	105	105	105	105	105	105
RESET Test	F (2,105) =10.97 Pr >F =0.00	F (2,105) =30.13 Pr>F = 0.00	χ^2 (2) = 45.39 Pr>χ^2 = 0.81	F (2,105) =17.06 Pr>F = 0.00	χ^2 (2) =45.84 Pr>χ^2 =0.80	F (2,105) = 37.42 Pr>F = 0.00	χ^2 (2) =51.26 Pr>χ^2 = 0.78

Figures in parentheses are standard error

*^{NS} Non significance, * p<0.10, ** p<0.05, *** p<0.01*

According to the PPML estimation of both effects (column IV in Table 4), if distance and the GDP of India (importer) increased by one per cent then imports of palm oil decreased by 5.60 and 8.78 per cent. The negative coefficient of the GDP of India (importer) indicated the low domestic absorption capacity of the country (Martinez and Lehmann, 2003). While the exchange rate, population and GDP of ASEAN members were insignificant to the palm oil trade. The tariffs and export price showed a negative and significant impact on palm oil exports from ASEAN members at one per cent level i.e., if one per cent increase in these variables, then palm oil imports to India would decrease by 0.12 and 2.39 per cent respectively. Non- Tariff Measure (NTM) indicated that 0.41 per cent of palm oil imports in India would be increased if one unit of NTM measure increased i.e., the NTM had a positive and significant impact on imports of palm oil in India. The same results were noted in the study of Thangavel [24], Chandra (2012), Moenius (2004) and Wood et al., [25].

There was a positive impact of AIFTA on the import of palm oil to India i.e., the presence of the trade creation effect. Similar results were confirmed in the study by Bhattacharyya and Mandal [26]; Ahmed [27] and Nag & Sikdar [11]. Indonesia and Malaysia are the leading producers and exporters of palm oil and India had declared palm oil free of taxes (45% free of importing taxes) and this increased the demand in this region [28] which led to the trade creation effect.

5. CONCLUSION

To analyse the impact of AIFTA on the palm oil trade, a gravity model was used and estimated by OLS and PPML methods. OLS and PPML results showed that there was a negative relationship between tariffs and export prices, while the NTM measure had a positive impact. The coefficient of the AIFTA dummy variable was positive, which indicated the trade creation effect at 10 per cent significance level in the PPML estimation of both effects and also in the OLS and the PPML estimation of only country effect which indicated trade creation rather than trade diversion. The PPML method showed more consistent and robust results than the OLS estimation [18]. The results of PPML estimation of both effects revealed that the standard variables of the gravity model, i.e., GDP of the exporter (ASEAN) and distance reported expected signs. The negative coefficient of tariffs showed that a reduction in a tariff would increase exports from ASEAN countries to India. AIFTA had a positive and significant coefficient which indicated a stronger trade creation effect in the palm oil trade. Based on the results of this study, the palm oil trade can be pushed to the forefront of further trade liberalization in the FTAs. Furthermore, in the event of an increase in imports, adequate safety measures may be put in place to protect the livelihoods of farmers.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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