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ARTICLE

The Role of ASEAN+5 Trade Agreement in Boosting Agricultural Exports: Insights and Implications for the RCEP Agreement

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ABSTRACT

The ASEAN Regional Comprehensive Economic Partnership (RCEP) agreement is the world's largest free trade agreement, which aims to deepen economic integration in East Asia, with ASEAN as a hub. This study examines the impact of the ASEAN regional trade agreement with five major partner countries, which was then consolidated into a single free trade agreement, the Regional Comprehensive Economic Partnership, on Indonesian agricultural exports, including the three major commodities of palm oil, rubber, and coconut. The Poisson Pseudo-Maximum Likelihood (PPML) approach was employed to examine the impact of Indonesia's participation in the ASEAN+5 FTAs on its exports to 35 major partner countries over the period from 2000 to 2020. The empirical findings suggest that Indonesia's involvement in the ASEAN+5 agreement, which serves as a proxy for the Regional Comprehensive Economic Partnership (RCEP), has had a positive effect on its rubber exports, but a negative and significant impact on the exports of aggregate agriculture, palm oil, and coconuts.

Keywords: ASEAN; FTA; Trade Integration; Gravity Model; PPML

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1. Introduction

Free Trade Agreement (FTA) is one way to boost trade between countries. From the late 19th century to the early 2000s, free trade agreements have garnered the focus of several country groups. As of November 1, 2023, approximately 817 free trade agreements have been reported to the World Trade Organization (WTO), out of which 593 are currently active[1]. Economic integration, facilitated by these agreements, can lead to increased trade and additional benefits. These include the creation of a more competitive trading region through the elimination of trade and non-trade barriers and the unimpeded flow of goods and services[2].

Indonesia has participated in several free trade agreements, encompassing both Regional Trade Agreements (RTAs) and bilateral trade agreements. According to the RTA database notified to the WTO, by November 2023, Indonesia had joined 14 free trade agreements, predominantly within the Association of Southeast Asian Nations (ASEAN) framework[3]. These include 7 ASEAN RTAs, such as the intra-ASEAN trade agreement of AFTA, and 6 regional trade agreements with partner countries. The ASEAN RTAs primarily involve six major partner countries: China (ACFTA), including Hong Kong (AHFTA), Japan (AJFTA), South Korea (AKFTA), India (AIFTA), Australia, and New Zealand (AANZFTA)[4].To expand engagement and foster economic development, all ASEAN RTAs with these six major countries (ASEAN+6) were consolidated into a single ASEAN RTA, the Regional Comprehensive Economic Partnership (RCEP), which came into effect on January 1, 2022[5, 6]. However, in 2019, India withdrew from the agreement, transforming the RCEP into a free trade agreement among ASEAN+5 major trading partners[7, 8].

Theoretically, participation in free trade agreements is expected to increase trade among member countries due to reduced trading costs and the removal of trade barriers[9, 10]. Such policies could ultimately enhance market size and increase the competitiveness of the countries' products, potentially leading to economic growth and improved welfare. However, despite these potential benefits, trade liberalization has faced significant criticism regarding its impact on the economy, particularly in the agricultural sector[11, 12].

Regarding agricultural exports, **Figure 1**, sourced from the United Nations Commodity Trade Database displays data on Indonesia's agricultural exports from 2000 to 2021[13]. This figure shows that in 2021, agricultural exports reached US$ 52.8 billion, marking a more than tenfold increase from US$ 4.9 billion in 2000. Palm oil, rubber, and coconut are Indonesia's major agricultural commodities. In 2021, their export values were US$ 26.7 billion, US$ 4.01 billion, and US$ 2.9 billion respectively, cumulatively accounting for 63.5% of Indonesia's total agricultural exports.

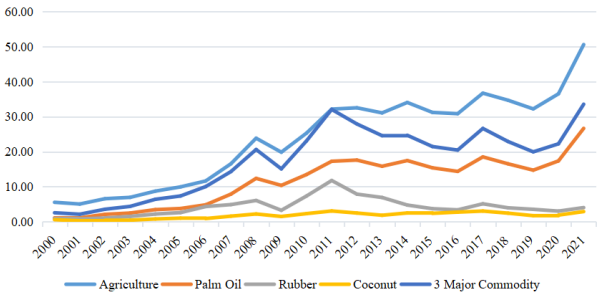

Figure 1. Trend of Indonesian agriculture export 2000–2021 (in US$ billion).

As one of the largest economies in the Southeast Asian region, Indonesia's membership in the ASEAN+5 free trade agreement presents an interesting area for further exploration, especially regarding its impact on trade in agricultural commodities. The ASEAN+5 or RCEP countries have been major trading partners for Indonesia's agricultural exports over the last two decades, accounting for US$ 20.7 billion in 2021, which represents nearly fifty percent of Indonesia's total agricultural exports (as shown in **Figure 2**). Consequently, the research question of this study is: Do the ASEAN+5 free trade agreements benefit Indonesian agricultural exports?

This study will focus on exports rather than overall trade, considering the significance of exports for developing countries like Indonesia. Previous research has generally examined the impact of individual ASEAN FTAs on Indonesian agriculture[14–16]. However, studies comparing the impacts of all ASEAN+5 FTAs, which are now consolidated into one single FTA of Regional Comprehensive Economic Partnership (RCEP), on the export of agricultural products are limited. Research on the potential impact of the RCEP trade agreement on agricultural ex-

ports is still limited. A recent study on the factors affecting China's agricultural exports to RCEP member countries indicates that bilateral free trade agreements have a positive impact on China's agricultural exports to other RCEP members [17]. Additionally, a SWOT analysis highlights that although RCEP could foster trade growth and strengthen economic ties among its members, it also introduces challenges to the agricultural trade structure and competitiveness [18]. In the case of Indonesia, a study reveals that the Intra-Industry Trade index for Indonesian agricultural products with RCEP countries is still low, emphasizing the need for government support to boost agricultural processing industries [19]. Considering the limited research on the potential effect of RCEP on agricultural exports, this study aims to assess the influence of ASEAN+5 free trade agreements on Indonesian agricultural exports, both in aggregate (agriculture) and disaggregate level (palm oil, rubber, and coconut). It is anticipated that this study will contribute to the development of research on the impact of Regional Comprehensive Economic Partnership (RCEP) free trade agreements on the export of agricultural products.

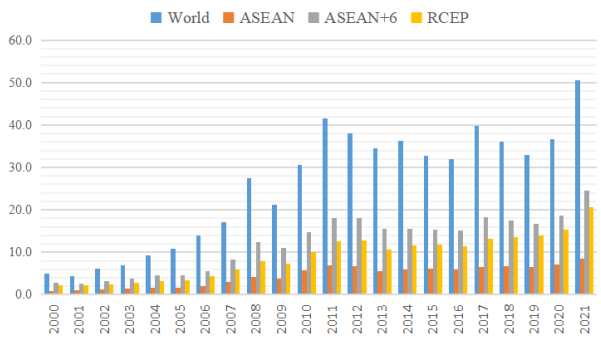

Figure 2. Indonesian agriculture export destination 2000–2021 (US$ billion).

2. Materials and Methods

Empirical research that analyzes the impact of free trade agreements (FTAs) has employed a range of techniques, spanning from simple descriptive and statistical approaches to complex computable general equilibrium (CGE) models, with econometric approaches in between, such as the gravity model. The gravity model has found application in various fields of study, including bilateral trade analysis, human migration, and investment flows [20–22]. Its predominant application appears to be in the realm of international trade [23, 24].

2.1. Estimation Model

The impact of the ASEAN+5 free trade agreement on Indonesia's agricultural exports can be analyzed using the gravity model. The gravity model, a widely used tool, assesses factors affecting agricultural trade flows, including aspects such as free trade agreements, exchange rates, common borders, language commonality, and arable land [25, 26].The traditional basic gravity model was first introduced by Tinbergen (1963) and Lineman (1966) [27, 28]. Similar to Newton's law of gravity, the gravity model suggests that trade between two countries is proportional to their economic size and inversely related to the distance between them [29]. The traditional estimation of the gravity model is as follows:

$$T_{ij} = \alpha \frac{GDP_i \times GDP_i}{D_{ij}^{\theta}} \quad (1)$$

The model underlying the value of trade (T_{ij}) from country *i* to country *j*, as a positive function of countries gross domestic product (GDP), reflects the economic size of the countries, but negatively related to the distance between countries (D_{ij}^{θ}) [30, 31].

A challenge arises when converting this equation into a linear form for estimation by applying the logarithm to both sides. Many country pairs report zero trade, and the log of zero is undefined, making this transformation problematic. The Poisson Pseudo Maximum Likelihood (PPML) model allows zero trade flows to be included in the estimation without the need to discard them or arbitrarily add a small constant to avoid taking the log of zero [32].

Moreover, in international trade, trade costs (such as tariffs, transportation costs, and non-tariff barriers) do not affect all country pairs equally. This leads to heteroskedasticity in the data, where the variance of trade flows differs across country pairs, violating a core assumption of ordinary least squares (OLS). The PPML estimator corrects this problem, ensuring that large trade flows do not disproportionately influence the estimation results. Therefore, this study utilized the Poisson Pseudo Maximum Likelihood (PPML) estimation technique as it

is advantageous in handling common data issues in trade flows, particularly the zero-trade issue and coping with the presence of heteroskedasticity [33, 34].

In addition, the PPML estimation also offers objective, consistent estimates that are resilient to the presence of heteroscedasticity in the data [32, 35]. The formulation of the PPML model closely resembles that of Equations (2) and (3); however, unlike these equations, the PPML model does not apply a logarithmic transformation to the dependent variable, which in this context is Indonesian agricultural exports.

Under the gravity model, the most often used dependent variables in the gravity model are total trade (exports + imports), exports, and imports. While on the right-hand side, most researchers include country income level (GDP), geographical distance, land area, population, exchange rate, market openness, FTA membership and other geographic characteristics such as island, landlocked, language and so on [36, 37]. To this end, this study follow Handoyo, Sugiharti and Esquivias [38] and Timsina and Culas [39] specification model as follows:

$$\begin{gathered} LnExp_{ijt} = \beta_0 + \beta_1 LnGDP_{it} \\ +\beta_2 LnGDP_{jt} + \beta_3 LnDist_{ij} + \beta_4 LnP_{jt} \\ +\beta_5 LnLand_{jt} + \beta_6 LnEx_{jt} + \beta_7 AFTA_{ij} \\ +\beta_8 ACFTA_{ij} + \beta_9 AJFTA_{ij} + \beta_{10} AKFTA_{ij} \\ +\beta_{11} AIFTA_{ij} + \beta_{12} AANZFTA_{ij} \\ +\beta_{13} FTA1_{ijt} + \beta_{14} FTA2_{ijt} + \varepsilon_{ijt} \end{gathered} \tag{2}$$

Equation (2) demonstrates that Exp_{ijt} represents agricultural exports from Indonesia (*i*, exporter) to partner country *j* (importer) at time (year) *t*; GDP_{it} is the real annual Gross Domestic Product (GDP) of Indonesia (*i*, exporter) at time (year) t, and GDP_{jt} captures the real annual GDP of partner country *j* (importer); $Dist_{ij}$ is the distance between Indonesian capitals and partner country *j* (importer); P_{jt} is the population of the partner country *(j)* at time t; $Land_{jt}$ is the agricultural land area of partner country *(j)* at time t; and Ex_{jt} is the real exchange rate of the partner country *(j)* at time t. All these core variables are taken in natural logarithm form *(Ln)*.

To measure the impact of free trade agreements on exports, this study adds the FTA_{ijt} dummy variables (β_8 to β_{15}) that account for 1 if Indonesia and partner country join in a Free Trade Agreement (FTA), otherwise 0. This study examines the impact of free trade agreements, particularly those enacted by ASEAN countries including AFTA, ACFTA, AJFTA, AIFTA, AKFTA, and AANZFTA. In order to capture the impact of intra-block (ASEAN RCEP) and extra-block FTA, the dummy variables $FTA1_{ijt}$ and $FTA2_{ijt}$ are proposed in the model. More specifically, FTA1 is a dummy variable assigned the value of one when both Indonesia and its partner countries are members of the ASEAN+5 FTAs (ACFTA, AJFTA, AKFTA, AANZFTA), which then consolidated to the Regional Comprehensive Economic Partnership (RCEP) trade agreement, and zero in other cases. This is the main interest variable of this study since it examines the potential impact of the RCEP agreement on agricultural exports. Similarly, FTA2 is a dummy variable that assumes the value of one when the partner country is a member of a non-ASEAN+5 free trade agreement, and zero otherwise. Beyond the ASEAN+5 framework, Indonesia has established free trade agreements with several countries, including Japan (2008), Pakistan (2013), Hong Kong (2019), Chile (2019), Australia (2020), EFTA Countries (Iceland; Liechtenstein; Norway; Switzerland, 2021), Mozambique (2022), and South Korea (2023) [3].

The Equation (2) then expands to Equation (3) to capture the trade-specific shock arising from global economic conditions by adding dummy variable in specific years [38, 40]. Year1 and Year2 represent dummy variables of the year 2008 of the global crisis and the year of 2020 of the Covid-19 pandemic, respectively [41, 42]. Therefore, the Equation (3) is as follows:

$$\begin{gathered} LnExp_{ijt} = \beta_0 + \beta_1 LnGDP_{it} + \beta_2 LnGDP_{jt} \\ +\beta_3 LnDist_{ij} + \beta_4 LnP_{jt} + \beta_5 LnLand_{jt} \\ +\beta_6 LnEx_{jt} + \beta_7 AFTA_{ij} + \beta_8 ACFTA_{ij} \\ +\beta_9 AJFTA_{ij} + \beta_{10} AKFTA_{ij} \\ +\beta_{11} AIFTA_{ij} + \beta_{12} AANZFTA_{ij} \\ +\beta_{13} FTA1_{ijt} + +\beta_{14} FTA2_{ijt} \\ +\beta_{15} Year1_{ij} + \beta_{16} Year2_{ij} + \varepsilon_{ijt} \end{gathered} \tag{3}$$

2.2. Variable Description

Table 1 shows the summary description of variables included in the model. The dependent variable used in this study is total agricultural export ($LnExp_{ijt}$) of Indonesia (*i*) to partner countries (*j*) during the years

2000–2020 (t) measured in United States Dollar (US$). This study used panel data from 35 countries, which include 16 ASEAN+7 FTA countries and 19 non-FTA partner countries. These countries represent 91.1% of Indonesian agricultural exports during the period from 2000 to 2021. The details of the countries included in the study are presented in **Table A1**.

On the right-hand side, the independent variables include real Gross Domestic Product ($LnGDP_{ijt}$) measured in million US$, distance between Indonesia and partner countries ($LnDist_{ij}$) measured in kilometers, partner countries' population (LnP_{jt}) mesured in millions, agricultural land ($LnLand_{jt}$) measured in thousand hectares, partner countries real exchange rate ($LnEx_{ijt}$) and dummy variables being members of the same ASEAN regional trade agreements.

Table 1. Summary description of variables included in the model.

Variable	Description	Data Source
Export	Total annual export of agricultural products (HS. 01–24), palm oil (HS. 1511), rubber (HS. 4001), and coconut (HS. 1513) of Indonesia to partner countries during the years 2000–2020 measured in current US$	UN Comtrade
GDP	Annual Real Gross Domestic Product (GDP) of Indonesia and partner countries in million US$ (constant 2015 US$)	The World Bank
Distance	Distance between the capital city of Indonesia and partner countries in kilometers	CEPII
Population	Total annual population of Indonesia and partner countries	The World Bank
Land	Agricultural land of partner countries in hectares	FAO
Exchange rate	Real exchange rate of Indonesian partner countries, Local Currency Unit (LCU) per US$ (2010 = 100)	The World Bank
Dummy variable FTA	Dummy variable = 1 when country i and j are members of free trade agreement including AFTA, ACFTA, AJFTA, AKFTA, AIFTA, AANZFTA, FTA1 and FTA2 in year t, and 0 otherwise.	WTO,
Dummy variable Year (2008, 2020) for trade specific shock	Dummy variable Year1 = 1 if export takes place during the year 2008 (global financial crisis), and 0 otherwise.	Author creation

The annual data of agricultural export were obtained from Statistics Indonesia and the United Nations Commodity Trade Database[13].The data of Gross Domestic Product (GDP), population and exchange rate are obtained from the World Development Indicators (WDI) database of the World Bank[43]. Agricultural land data were derived from the Food and Agriculture Organization of the United Nations[44], and the distance between countries was collected from Centre d'Etudes Prospectives et d'Informations Internationales[45], while data on regional trade agreements were from the World Trade Organization Regional Trade Agreements (RTAs) Database[1] and the ASEAN Secretariat[46].

3. Results

3.1. Sample Statistics

This study investigates the impact of ASEAN+5 regional trade agreements on the export of Indonesian agricultural commodities to 35 major partner countries during 2000–2020. This period was selected as it covers the time before and after trade liberalization in agricultural commodities under ASEAN RTAs were enforced.

The descriptive statistics of all variables included in the model have been presented in **Table 2**. The average agricultural export of Indonesia to partner countries was 582 million US$, with the highest export value of 5.83 billion US$ and the lowest export being 1,071 US$. In terms of commodity export, palm oil was Indonesia's most exported agricultural commodity during the 2000–2020 period, with an average export value of 282 million USD, followed by rubber and chocolate with 111 million USD and 48.8 million USD respectively. The details about the export of agricultural products and three major commodities are presented in **Table 2**.

As mentioned in **Table 2**, the average value of Indonesian GDP was 687.3 billion US$, while that of the importing countries was 1,449 billion US$, indicating that Indonesia trades with countries that have larger economies. Previous studies suggest that the GDPs of

trading partners positively impact exports[47, 48]. This is attributed to the fact that an importer's GDP reflects the demand for commodities, thereby positively influencing exports[49]. Moreover, the average distance to Indonesia's trading partners was 6,935 kilometers, with the nearest and farthest partners being 886 and 16,180 kilometers away, respectively. Additionally, the largest population among the importers was 1.4 billion, and the average agricultural land of the partner countries was 48.15 million hectares, with the largest area being 175.4 million hectares. Land area represents the production base for a country's export commodities[50].

Table 2. Descriptive statistics.

Variable	Unit	Obs	Mean	S.D	Min	Max
Agricultural export	Nominal current US$	735	582,000,000	896,000,000	1,071	5,680,000,000
Palm oil export	Nominal current US$	735	282,000,000	617,000,000	0	5,260,000,000
Rubber export	Nominal current US$	693	111,000,000	275,000,000	0	2,790,000,000
Coconut export	Nominal current US$	714	48,800,000	117,000,000	0	898,000,000
GDP of Indonesia	Real value 2015 US$	735	687,335	212,566	395,012	1,049,330
GDP of importer	Real value 2015 US$	735	1,449,152	3,125,248	4,982	19,900,000
Distance	Distance in kilometers	735	6,935	4,024	886	16,180
Population of importer	Total annual population	735	138,000,000	292,000,000	333,926	1,410,000,000
Importer land	Total agricultural land in hectares	735	74,700,000	130,000,000	660	529,000,000
Importer exchange rate	Real exchange rate per US$ (2010 = 100)	735	105.59	32.90	36.56	466.35
AFTA	Dummy variable = 1 when a country is a member of AFTA	735	0.21	0.41	0	1
ACFTA	Dummy variable = 1 when a country is a member of ACFTA	735	0.20	0.40	0	1
AJFTA	Dummy variable = 1 when a country is a member of AJFTA	735	0.16	0.37	0	1
AKFTA	Dummy variable = 1 when a country is a member of AKFTA	735	0.14	0.34	0	1
AIFTA	Dummy variable = 1 when a country is a member of AIFTA	735	0.15	0.36	0	1
AANZFTA	Dummy variable = 1 when a country is a member of AANZFTA	735	0.14	0.34	0	1
AHFTA	Dummy variable = 1 when a country is a member of AHFTA	735	0.01	0.12	0	1
FTA1	Dummy variable = 1 when a country is a member of ASEAN+5 FTA (RCEP)	735	0.26	0.44	0	1
FTA2	Dummy variable = 1 when a country is a member of FTA	735	0.02	0.15	0	1

Source: ASEAN Secretariat; CEPII; FAO; The World Bank; UN Comtrade; WTO.

Table 3 presents data on Indonesia's export of agricultural products, and palm oil, to major partner countries over the last two decades (2000 to 2020) as reported to the United Nations Commodity Trade[13]. Indonesia's agricultural exports have witnessed a transformation over the past two decades, marked by significant growth and diversification. A closer examination of exports to ASEAN versus non-ASEAN countries reveals a strategic deepening of trade ties within the region and an expansion into new markets outside it. China and India emerged as the largest importers of Indonesian agricultural exports during this period. In terms of individual commodities, the majority of palm oil exports were directed to India, China, and Malaysia.

Table 4 shows Indonesia's export trends for rubber and coconut commodities to FTA and non-FTA partners from 2000 to 2020. Exports to ASEAN+6 countries, particularly FTA partners like China, Japan, and South Korea, increased significantly for rubber, with FTA export shares boosting from 25.8% in 2000 to 47.3% in 2020. Moreover, Rubber exports to ASEAN countries decrease from $60 million (6.73% share) in 2000 to $49 million (1.64% share) in 2020. A decline in exports also occurred in coconut to ASEAN countries from $50 million (31.80% share) to $29 million (19.28% share), primarily to Singapore and the Philippines. The increase in

proportion of rubber and coconut exports to ASEAN+6 countries, while on the other hand the decrease in share of exports to ASEAN countries, shows a shift toward FTA markets and reduced reliance on ASEAN on these two commodities. Japan, along with China and India, was a significant importer of rubber. Furthermore, China and Malaysia were the primary destinations for coconut exports over the last two decades.

Table 3. Indonesian export of agricultural and palm oil products to FTA and non-FTA partners (million US$).

Partners Countries	**Agriculture**			**Palm Oil**		
ASEAN	**2000**	**2010**	**2020**	**2000**	**2010**	**2020**
Brunei Darussalam	7.2	12.2	19.6	0.13	0.91	2.47
Cambodia	19.8	173.8	297.3	0.07	0.29	1.31
Lao PDR	0.1	0.2	0.1	0.00	0.00	0.00
Malaysia	297.5	2,994.9	2,033.2	15.00	1,210.76	784.28
Myanmar	12.0	133.4	662.8	9.50	129.30	592.98
Philippines	46.6	386.6	1,260.5	0.22	23.51	296.93
Singapore	460.0	1,234.4	950.3	72.83	565.58	234.38
Thailand	82.9	255.4	777.8	0.65	0.03	0.23
Vietnam	20.9	515.1	1,148.5	12.16	160.48	403.17
Total ASEAN	947	5,706	7,150	111	2,091	2,316
% ASEAN export	17.11%	22.54%	19.57%	10.17%	15.52%	13.34%
ASEAN+6						
Australia	49.3	166.4	340.8	0.02	0.04	0.00
China	207.5	2,804.0	5,681.2	123.19	1,866.51	2,492.12
India	545.4	4,702.9	3,459.5	438.30	4,340.21	2,985.38
Japan	939.5	956.2	1361.1	2.52	32.14	203.01
South Korea	84.8	239.4	529.3	0.42	6.42	156.73
New Zealand	8.0	94.9	201.8	0.02	1.88	0.06
Total ASEAN+6	1,835	8,964	11,574	564	6,247	5,837
Total FTA export	2,782	14,670	18,724	675	8,338	8,153
Non-FTA export	2,753	10,641	17,820	412	5,131	9,211
% FTA export	50.3%	58.0%	51.2%	62.1%	61.9%	47.0%
World	5,534	25,311	36,544	1,087	13,469	17,364

According to **Tabel 3** and **Table 4**, in 2000, the agricultural exports to ASEAN countries represented 17.11% of Indonesia's total agricultural exports, indicating a solid regional trade presence. By 2020, this percentage slightly increased to 19.57%, despite the absolute value showing a substantial rise. This increase underscores the ASEAN region's consistent demand for Indonesian agricultural goods. Meanwhile, the exports to non-ASEAN countries have exhibited a dramatic upswing, from constituting 50.8% of Indonesia's total agricultural exports in 2000 to 61.2% in 2020. This shift reflects Indonesia's successful penetration into new markets and the diversification of its export destinations beyond its traditional regional trading partners.

Analyzing the trade patterns at a commodity level, palm oil exports to ASEAN countries increased from 116 million USD in 2000 to 2,403.17 million USD in 2020, demonstrating Indonesia's stronghold in the regional palm oil market. Rubber exports to ASEAN countries showed modest growth, from 0.61 million USD in 2000 to 13.03 million USD in 2020, perhaps indicating increased regional production or competition. In stark contrast, coconut exports to non-ASEAN countries, particularly China, surged from a negligible 0.39 million USD in 2000 to an impressive 467.95 million USD in 2020. This stark increase highlights China's burgeoning demand for Indonesian coconut products. The trade patterns suggest that while Indonesia continues to maintain and grow its agricultural trade within the ASEAN region, it has also strategically capitalized on the opportunities afforded by Free Trade Agreements (FTAs) and non-FTA partnerships, particularly in commodities where it has a competitive advantage, resulting in a diversified and robust export economy.

Table 4. Indonesian export of rubber and coconut commodities to FTA and non-FTA partners (million US$).

Partners Countries	Rubber			Coconut		
ASEAN	**2000**	**2010**	**2020**	**2000**	**2010**	**2020**
Brunei Darussalam	0.00	0.00	0.00	0.00	0.00	0.01
Cambodia	1.78	0.00	0.00	0.00	0.00	0.00
Lao PDR	0.00	0.00	0.00	0.03	0.00	0.00
Malaysia	0.80	25.26	23.97	46.93	702.52	265.63
Myanmar	0.00	0.00	0.00	0.05	0.43	0.15
Philippines	0.63	19.04	5.28	0.02	0.21	30.70
Singapore	56.57	361.04	0.81	3.44	13.20	26.05
Thailand	0.02	0.32	0.00	0.00	13.03	37.44
Vietnam	0.01	13.03	19.29	0.00	0.04	1.30
Total ASEAN	60	419	49	50	729	361
% ASEAN export	6.73%	5.71%	1.64%	9.03%	31.80%	19.28%
ASEAN+6						
Australia	8.54	19.04	5.89	1.36	0.01	0.39
China	21.59	1,305.83	406.92	15.80	426.93	467.95
India	0.04	301.17	246.89	29.29	221.59	57.21
Japan	91.62	973.58	526.85	0.00	0.01	41.00
South Korea	46.54	281.11	189.48	14.31	48.00	38.89
New Zealand	1.24	0.03	0.00	0.55	0.11	0.21
Total ASEAN+6	170	2,881	1,376	61	697	606
Total FTA export	229	3,299	1,425	112	1,426	967
Non-FTA export	660	4,030	1,587	447	868	907
% FTA export	25.8%	45.0%	47.3%	20.0%	62.2%	51.6%
World	889	7,329	3,012	559	2,294	1,874

3.2. Estimation Result

The gravity model estimation results for agriculture exports, as shown in **Tables 5** and **6**, demonstrate significant factors influencing agricultural exports and three major commodities under Equations (1) and (2). The estimated coefficients from the Poisson Pseudo-Maximum Likelihood (PPML) present consistent and robust insights. Additional tests using fixed effects as mentioned in **Tables A2** and **A3** of **Appendix B** further confirm the reliability and consistency of the results. Empirical results illustrate that the conventional variables of the gravity model (i.e., GDP as a measure of economic size, distance as a proxy for trade costs, importer population, land area, and exchange rate) have a significant impact on Indonesian agricultural and three major commodities exports.

The ASEAN Free Trade Area (AFTA), as the most prominent and established trade agreement within the ASEAN community, demonstrates a positive and significant impact on aggregate agriculture and rubber exports, yet exerts a negative influence on palm oil exports. Furthermore, the ASEAN-China Free Trade Area (ACFTA), which includes China—one of ASEAN's largest trading partners—shows a positive and significant impact on aggregate agricultural exports, including two major commodities: palm oil and coconut. Similarly, the trade agreement with Japan, under the ASEAN-Japan Comprehensive Economic Partnership (AJCEP), also reveals positive and significant effects on palm oil and coconut exports, respectively. A trade agreement is deemed beneficial when it promotes trade creation among its members [51].

Moreover, the ASEAN-India Free Trade Area (AIFTA), an ASEAN trade agreement with India—the second-largest trading partner—exhibits a positive and significant impact on both rubber and coconut exports. Finally, the coefficients for the ASEAN-Australia-New Zealand Free Trade Area (AANZFTA) reveal negative and significant effects on all commodities examined in this study, suggesting that the trade agreement with Australia and New Zealand was not advantageous for Indonesian agricultural exports. The detrimental effects of trade agreements like AANZFTA on commerce indicate a diversion of exports within the trading block [39].

Table 5. Estimation results.

Dependent Variable	Agriculture		Palm Oil	
	Eq (1)	Eq (2)	Eq (1)	Eq (2)
GDP_i	1.268***	1.340***	1.630***	1.736***
	(0.113)	(0.121)	(0.156)	(0.166)
GDP_j	0.439***	0.442***	0.0684*	0.0786*
	(0.0292)	(0.0286)	(0.0416)	(0.0421)
Distance	−0.565***	−0.574***	−0.500***	−0.526***
	(0.114)	(0.114)	(0.184)	(0.185)
$Population_j$	0.318***	0.319***	0.711***	0.704***
	(0.0669)	(0.0644)	(0.102)	(0.0960)
$Land_j$	−0.0561***	−0.0547**	−0.149***	−0.143***
	(0.0217)	(0.0214)	(0.0364)	(0.0357)
Exchange	−0.312**	−0.282**	−0.389*	−0.335*
$Rate_j$	(0.140)	(0.138)	(0.201)	(0.197)
$AFTA_{ijt}$	0.415***	0.418***	−0.512**	−0.547**
	(0.148)	(0.149)	(0.230)	(0.228)
$ACFTA_{ijt}$	0.483***	0.446***	2.356***	2.376***
	(0.115)	(0.118)	(0.358)	(0.369)
$AJFTA_{ijt}$	0.0179	0.0301	0.273	0.375
	(0.118)	(0.119)	(0.408)	(0.415)
$AKFTA_{ijt}$	0.143	0.165	1.070***	1.144***
	(0.178)	(0.178)	(0.396)	(0.409)
$AIFTA_{ijt}$	−0.185	−0.197	−0.0305	−0.0703
	(0.164)	(0.165)	(0.203)	(0.205)
$AANZFTA_{ijt}$	−0.239	−0.109	−1.395**	−1.433**
	(0.167)	(0.203)	(0.699)	(0.717)
$FTA1_{ijt}$	−0.599***	−0.598***	−2.365***	−2.446***
	(0.105)	(0.105)	(0.429)	(0.439)
$FTA2_{ijt}$	0.733***	0.734***	0.599***	0.623***
	(0.134)	(0.133)	(0.154)	(0.149)
Year1(2008)	-	0.356*	-	0.464*
		(0.182)		(0.262)
Year1(2020)	-	−0.142	-	−0.236*
		(0.119)		(0.123)
Constant	−1.409	−2.542	−7.759***	−9.332***
	(1.886)	(1.987)	(2.752)	(2.847)
R-squared	0.715	0.719	0.701	0.710
Prob > F	0.0000		0.0000	
No. Obs	735	735	735	735

Note: Standard errors are in parentheses; *** p < 0.01; ** p < 0.05; * p < 0.1. Eq1 denotes Equation (1) and Eq2 denotes Equation (2).

Additionally, FTA2 demonstrates a positive impact on agriculture, palm oil, and rubber exports, but exerts a negative impact on coconut exports. FTA2 is a dummy variable that assumes the value of one when the partner country is a member of a non-ASEAN+5 free trade agreement, and zero otherwise. These findings reflect the varied impact of FTA on Indonesian agricultural exports. The diverse effects of different Free Trade Agreements (FTAs) highlight the complexity of trade relationships and underscore the need for tailored policy measures to support countries' agricultural exports. Previous studies have shown that Indonesia's participation in free trade agreements has had a positive impact on agricultural exports [15, 52].

Trade diversion refers to the redirection of trade flows, which are not encompassed by a Free Trade Agreement (FTA), due to a shift in the production locus from a low-cost third country to a high-cost partner country. Trade creation is often perceived as a trade loss because it distorts the allocation of resources. However, under certain conditions, these losses may be partially or fully mitigated by differences in prices and tariffs among FTA member countries [53, 54].

Another finding reveals that the Gross Domestic

Table 6. Estimation results.

Dependent Variable	Rubber		Coconut	
	Eq (1)	Eq (2)	Eq (1)	Eq (2)
GDP_i	−0.169	0.0126	−0.169	0.0126
	(0.169)	(0.171)	(0.169)	(0.171)
GDP_j	1.038***	1.044***	1.038***	1.044***
	(0.0712)	(0.0670)	(0.0712)	(0.0670)
Distance	0.475**	0.435**	0.475**	0.435**
	(0.202)	(0.184)	(0.202)	(0.184)
$Population_j$	0.277***	0.273***	0.277***	0.273***
	(0.0718)	(0.0705)	(0.0718)	(0.0705)
$Land_j$	−0.233***	−0.226***	−0.233***	−0.226***
	(0.0306)	(0.0299)	(0.0306)	(0.0299)
Exchange	−0.485	−0.412	−0.485	−0.412
$Rate_j$	(0.330)	(0.317)	(0.330)	(0.317)
$AFTA_{ijt}$	1.355***	1.283***	1.355***	1.283***
	(0.358)	(0.345)	(0.358)	(0.345)
$ACFTA_{ijt}$	−0.384	−0.358	−0.384	−0.358
	(0.322)	(0.326)	(0.322)	(0.326)
$AJFTA_{ijt}$	−0.134	−0.0299	−0.134	−0.0299
	(0.291)	(0.292)	(0.291)	(0.292)
$AKFTA_{ijt}$	0.281	0.361	0.281	0.361
	(0.329)	(0.322)	(0.329)	(0.322)
$AIFTA_{ijt}$	0.647**	0.550*	0.647**	0.550*
	(0.303)	(0.292)	(0.303)	(0.292)
$AANZFTA_{ijt}$	−2.093***	−2.062***	−2.093***	−2.062***
	(0.344)	(0.351)	(0.344)	(0.351)
$FTA1_{ijt}$	1.080***	0.987***	1.080***	0.987***
	(0.363)	(0.349)	(0.363)	(0.349)
$FTA2_{ijt}$	0.598*	0.656**	0.598*	0.656**
	(0.312)	(0.303)	(0.312)	(0.303)
Year1(2008)	-	0.528***	-	0.528***
		(0.143)		(0.143)
Year1(2020)	-	−0.711***	-	−0.711***
		(0.138)		(0.138)
Constant	2.494	−0.0413	2.494	−0.0413
	(2.901)	(2.805)	(2.901)	(2.805)
R-squared	0.668	0.694	0.668	0.694
Prob > F	0.0000		0.0000	
No. Obs	693	693	693	693

Note: Standard errors are in parentheses; *** p < 0.01; ** p < 0.05; * p < 0.1. Eq1 denotes Equation (1) and Eq2 denotes Equation (2).

Product (GDP) of both exporting and importing countries exhibits a significant positive correlation with exports in aggregate agriculture, palm oil, rubber, and coconut, suggesting that economic growth is associated with an increase in exports. Previous studies have confirmed that GDP is a significant driver of agricultural exports, as it reveals the capacity to export [15, 55].

Indonesia's GDP is demonstrated to positively influence the exports of aggregate agricultural commodities, including palm oil and coconuts. Furthermore, the GDP of partner countries has a significant and positive impact on the exports of agriculture and coconuts. A higher GDP is believed to enhance the production efficiency of a country's agricultural sector and boost exports [56, 57].

The distance variable, as a proxy for transportation costs [58], shows a negative coefficient and significantly impacts on agriculture, palm oil and coconut exports, a conventional result since greater distances typically reduce trade [59]. However, the variable representing distance exhibits a positive coefficient in relation to rubber exports. This positive coefficient of distance could be attributed to the fact that it is embodies not just transport expenses but also disparities among partners. Another reason for the positive impact of distance on rubber ex-

ports may be due to the development of transportation systems [60]. This nuanced view dismisses distance as a hindrance to Indonesia's trade expansion globally [16].

The populations of partner countries exhibit a positive and significant impact on exports, with the exception of coconuts. The results show that importer population size is associated with increased exports in agriculture, palm oil, and rubber. The positive impact from the populations of importing countries indicates that larger foreign markets offer demand opportunities for Indonesian agricultural export commodities, as proved by previous studies that population boosts agricultural exports [61]. These results also in line with other studies suggesting that population growth may boost demand for palm oil products and lead to increased exports [62, 63]. However, the analysis revealed negative effects of the importer's population on coconut exports. This result suggests that an increase in the importer's population enhances its productivity, attributable to a heightened capacity to produce and supply more output to the market [64], thereby reducing the demand for coconut products from Indonesia. The negative impact demonstrated by the populations of partner countries is a sign of insufficient domestic absorption capability [65].

Furthermore, the agricultural land of importers has been demonstrated to adversely affect Indonesian agricultural exports, palm oil and rubber. Concurrently, the exchange rates of partner countries display a negative and significant impact on exports. The exchange rate and exports have a negative relationship. Therefore, depreciation promotes exports while discouraging imports [66]. Previous research has underscored the exchange rate as a pivotal factor influencing agricultural exports [67, 68].

The dummy variables Year2008 and Year2020 reveal significant impacts of the 2008 financial crisis and the 2020 Covid-19 pandemic on exports. Year2008 shows that the financial crisis significantly positively impacted aggregate agriculture, palm oil and rubber exports. Conversely, Year2020, which represents the Covid-19 pandemic crisis, shows a negative impact on rubber and coconut exports. In conclusion, this study indicates that the 2008 financial crisis benefited Indonesian agricultural exports while the 2020 Covid-19 crisis negatively impacted exports. Covid-19 has caused an unprecedented shock in the global agricultural supply chain, affecting exports in both the short and the long run [69]. Previous studies also showed that although average agricultural trade declined during the pandemic, the exports of agricultural oil products were not affected by the pandemic [42].

4. Discussion

This research analyses the impact of the ASEAN+5 free trade agreement on Indonesia's agricultural exports. The estimation results from **Tables 5** and **6** reveal a range of effects from different trade agreements on Indonesian agricultural commodities exports. The coefficients for these variables across equations exhibit both positive and negative signs, suggesting that the impact of these trade agreements on exports is complex and varies by agreement.

As indicated in **Tables 5** and **6**, the FTA1 variable as a proxy of the ASEAN+5 trade agreement, which was later consolidated into the Regional Comprehensive Economic Partnership (RCEP) of the ASEAN+5 trade agreement and the main interest variable in this study, exhibits outcomes that range from positive to negative impacts. Among the ASEAN+5 FTAs serving as proxies for RCEP, the ACFTA has demonstrated a positive and significant effect on overall agricultural and palm oil exports. Likewise, the AKFTA positively influences palm oil exports. Previous studies indicate that while AKFTA leads to both trade creation and trade diversion on Indonesian exports, the overall impact of trade creation outweighs that of trade diversion [70]. In contrast, the AANZFTA has a negative and significant impact on the exports of palm oil, rubber, and coconut.

The variable of FTA1 had a positive and significant impact on rubber exports, however, it had a negative and significant impact on agriculture, palm oil, and coconut exports. The differences in the impact of FTAs on various products can be attributed to several factors, including the differing immediate effects of tariff reductions on specific products [71]. This may explain why, in this study, FTA1 had a positive impact on rubber commodities but not on other products.

The positive impact of the FTA1 as representing the potential impact of the RCEP agreement on rubber exports may indicate that the RCEP facilitates trade creation for the export of Indonesian rubber commodities to RCEP member countries [72]. Trade creation is defined as the process whereby the agreement leads to the substitution of goods previously imported from non-member countries, or produced domestically at higher costs, with products produced within the FTA member states [30]. The effect of trade creation attributed to Free Trade Agreements stems from reductions in preferential tariffs among members and tends to occur for products where there is a significant difference between the tariffs under the FTA and those applied to the Most Favored Nation (MFN) [73].

Indonesia is the second largest rubber exporter globally, exporting 1.988 million tons of rubber in 2022, valued at USD 3.45 billion [74]. Among the ten largest importers of Indonesian rubber products, seven countries, namely China, Japan, South Korea, Vietnam, Malaysia, Australia, and the Philippines, are members of the RCEP. This membership has proven beneficial for Indonesian rubber products following the ratification of the RCEP agreement, which resulted in reduced tariffs for member countries [75]. More specifically, the positive impact of FTA1 on rubber exports is in line with the previous study that shows that trade creation exists on rubber commodities prior to the memberships of RCEP [38]. In addition, the findings of this study are consistent with earlier research highlighting the positive effects of trade agreements with RCEP countries, particularly China under the ACFTA framework, on Indonesian rubber exports [14]. As one of Indonesia's key rubber export markets, China's large economy (GDP) plays a significant role in absorbing rubber products from Indonesia. Economic growth in destination countries, such as China, raises income levels, thereby boosting the demand for final products [76].

Conversely, FTA1 had a negative and significant impact on aggregate agriculture, palm oil, and coconut exports. The negative impact of RCEP may emphasize the low level of Inter-Industrial Trade (IIT) between Indonesia and other RCEP countries, particularly the more developed partner countries, which may lead to a decrease in Indonesian agricultural trade [19]. A previous study also suggests that while trade is expected to increase among RCEP countries, it is likely to be disproportionately concentrated among the developed member countries such as China, Japan, South Korea, and Australia. This concentration could result in more trade diversion than trade creation [77]. Trade diversion occurs as a result of tariff reductions and mechanisms within free trade agreements, leading to a shift in exports from less efficient countries to more efficient ones [78]. This process may help explain why certain agricultural products encounter difficulties under FTAs, as it can negatively impact their export performance. To maximize the benefits of participating in trade agreements, it is essential to strike a balance between trade creation and trade diversion.

5. Conclusions

This study concluded that the participation in the ASEAN+5 trade agreement, later incorporated into the Regional Comprehensive Economic Partnership (RCEP), had a positive and significant effect on sustaining Indonesian rubber exports but a negative and significant impact on the exports of aggregate agriculture, palm oil, and coconuts. This suggests that RCEP potentially encourages trade creation for Indonesian rubber exports to member countries, driven by lowered preferential tariffs for products with significant tariff disparities under the FTA compared to Most Favored Nation (MFN) rates.

However, the adverse effects of RCEP highlight a minimal level of Inter-Industrial Trade (IIT) between Indonesia and other RCEP members, particularly with the more developed countries like China, Japan, South Korea, and Australia. The study implies that although RCEP is expected to boost trade among member countries, the benefits might disproportionately favor developed nations, leading to a potential increase in trade diversion over trade creation. This imbalance underscores the complex dynamics of participating in RCEP agreements for countries like Indonesia.

Hence, the policy implication for developing nations such as Indonesia, in their participation in the RCEP agreement, is the necessity to discern which com-

modities are likely to yield benefits and which may prove to be disadvantageous, thereby enabling the formulation of suitable trade policies. This study has demonstrated that commodities such as rubber and coconut are poised to derive advantages from this trade agreement.

In addition, several limitations of this research should be noted. First, this study uses the ASEAN+5 FTA as a proxy for RCEP in the analysis, as RCEP was not implemented until 2022, which is beyond the timeframe of the data examined (2000–2021). Therefore, the findings primarily reflect trade dynamics under the ASEAN+5 FTA and may not fully capture the potential impacts of the more recent and broader RCEP agreement. Second, as this study relies heavily on quantitative data, it might not fully address qualitative aspects such as trade quality, the sustainability of trade practices, or socio-economic impacts on local industries and communities. Third, the study indicates minimal levels of Inter-Industrial Trade (IIT) between Indonesia and other RCEP members, a limitation potentially resulting from a lack of detailed sector-by-sector analysis that could provide deeper insights into how different sectors are specifically affected.

Future studies should pursue longitudinal analysis to assess the long-term impacts and socio-economic effects of RCEP. Additionally, given the limitations of this study, future studies should explore the causal relationship of the RCEP agreement in greater detail. Detailed sector-specific analysis is recommended to understand diverse industry responses. Comparative research across RCEP member countries can enhance generalizability, while investigations into policy changes within the RCEP framework will provide insights into regulatory impacts. Additionally, focusing on Inter-Industrial Trade (IIT) can help identify barriers and opportunities for enhancing industrial collaboration within the agreement. These approaches will offer a more comprehensive understanding of the RCEP's economic implications.

Author Contributions

Conceptualization, H.A.; methodology, H.A. and J.L.; software, H.A.; validation, H.A. and J.L.; formal analysis, H.A.; data curation, J.L.; writing—original draft preparation, H.A.; writing—review and editing, H.A. and J.L.; supervision, J.L.; All authors have read and agreed to the published version of the manuscript.

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Informed Consent Statement

Not applicable.

Data Availability Statement

All data used in the study are available from the corresponding author upon request.

Conflicts of Interest

All authors disclosed no conflict of interest.

Appendix A

Table A1. Countries included in the study.

No	Country Full Name	Country Code	Continent	FTA Member
1	Australia	AUS	Australia	AANZFTA, RCEP
2	Bangladesh	BGD	Asia	Non-FTA
3	Belgium	BEL	Europe	Non-FTA
4	Brazil	BRA	America	Non-FTA

Table A1. *Cont.*

No	Country Full Name	Country Code	Continent	FTA Member
5	Brunei Darussalam	BRN	Asia	ASEAN+6 FTA
6	Cambodia	KHM	Asia	ASEAN+6 FTA
7	China	CHN	Asia	ACFTA, RCEP
8	Egypt	EGY	Africa	Non-FTA
9	Germany	DEU	Europe	Non-FTA
10	Hong Kong SAR	HKG	Asia	AHFTA
11	India	IND	Asia	AIFTA
12	Iran	IRN	Asia	Non-FTA
13	Italy	ITA	Europe	Non-FTA
14	Japan	JPN	Asia	AJFTA, RCEP
15	Korea Rep. of	KOR	Asia	AKFTA, RCEP
16	Lao People's Dem. Rep.	LAO	Asia	ASEAN+6 FTA
17	Malaysia	MYS	Asia	ASEAN+6 FTA
18	Myanmar	MMR	Asia	ASEAN+6 FTA
19	Netherlands	NLD	Europe	Non-FTA
20	New Zealand	NZL	Australia	AANZFTA, RCEP
21	Pakistan	PAK	Asia	Non-FTA
22	Philippines	PHL	Asia	ASEAN+6 FTA
23	Russian Federation	RUS	Europe	Non-FTA
24	Saudi Arabia	SAU	Asia	Non-FTA
25	Singapore	SGP	Asia	ASEAN+6 FTA
26	South Africa	ZAF	Africa	Non-FTA
27	Spain	ESP	Europe	Non-FTA
28	Tanzania United Rep. of	TZA	Africa	Non-FTA
29	Thailand	THA	Asia	ASEAN+6 FTA
30	Türkiye	TUR	Europe	Non-FTA
31	Ukraine	UKR	Europe	Non-FTA
32	United Arab Emirates	ARE	Asia	Non-FTA
33	United Kingdom	GBR	Europe	Non-FTA
34	USA	USA	America	Non-FTA
35	Vietnam	VNM	Asia	ASEAN+6 FTA

Appendix B

Table A2. Estimation with fixed effects.

Dependent Variable	Agriculture		Palm Oil	
	Eq (1)	Eq (2)	Eq (1)	Eq (2)
GDP_i	0.000	0.000	0.000	0.000
	−1.5	−1.5	−0.54	−0.54
GDP_j	0.000***	0.000***	0.000**	0.000**
	−6.05	−6.05	−2.97	−2.97
Distance	0.000	0.000	0.000	0.000
	(omitted)	(omitted)	(omitted)	(omitted)
$Population_j$	−0.000*	−0.000*	−0.000***	−0.000***
	(−2.54)	(−2.54)	(−6.49)	(−6.49)
$Land_j$	0.000	0.000	0	0
	(−0.43)	(−0.43)	(−1.48)	(−1.48)
Exchange	0.001	0.001	0.001*	0.001*
$Rate_j$	−1.73	−1.73	−2.53	−2.53
$AFTA_{ijt}$	0.284*	0.284*	0.762*	0.762*
	−2.09	−2.09	−1.99	−1.99
$ACFTA_{ijt}$	0.340*	0.340*	−1.668***	−1.668***
	−1.98	−1.98	(−4.34)	(−4.34)

Table A2. *Cont.*

Dependent Variable	Agriculture		Palm Oil	
	Eq (1)	**Eq (2)**	**Eq (1)**	**Eq (2)**
$AJFTA_{ijt}$	−0.279*	−0.279*	−0.015	−0.015
	(−2.02)	(−2.02)	(−0.07)	(−0.07)
$AKFTA_{ijt}$	0.165	0.165	1.214**	1.214**
	−1.56	−1.56	−2.59	−2.59
$AIFTA_{ijt}$	0.061	0.061	−1.271**	−1.271**
	−0.49	−0.49	(−2.59)	(−2.59)
$AANZFTA_{ijt}$	−0.211	−0.211	1.569***	1.569***
	(−1.74)	(−1.74)	−4.49	−4.49
$FTA1_{ijt}$	0.337*	0.337*	0.499***	0.499***
	−2.16	−2.16	−3.72	−3.72
$FTA2_{ijt}$	−0.000*	−0.000*	−0.000***	−0.000***
	(−2.54)	(−2.54)	(−6.49)	(−6.49)
Year1(2008)	-	0	-	0
		(omitted)		(omitted)
Year1(2020)	-	0	-	0
		(omitted)		(omitted)
Constant	21.209***	21.209***	26.509***	26.509***
	−30.78	−30.78	−10.51	−10.51
Country fixed	yes	yes	yes	yes
Pseudo R-squared	0.947	0.947	0.941	0.941
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Wald chi2(12)	75.841	75.841	168.217	168.217
No. Obs	735	735	735	735

Note: Robust standard errors are in parentheses; *** p < 0.01; ** p < 0.05; * p < 0.1. Eq1 denotes Equation (1) and Eq2 denotes Equation (2).

Table A3. Estimation with fixed effects.

Dependent Variable	Rubber		Coconut	
	Eq (1)	**Eq (2)**	**Eq (1)**	**Eq (2)**
GDP_i	0.000**	0.000**	0.000	0.000
	−3.27	−3.27	(−0.28)	(−0.28)
GDP_j	−0.000***	−0.000***	0.000***	0.000***
	(−6.54)	(−6.54)	−4.79	−4.79
Distance	0	0	0	0
	(omitted)	(omitted)	(omitted)	(omitted)
$Population_j$	0.000***	0.000***	0.000	0.000
	−6.23	−6.23	(−0.78)	(−0.78)
$Land_j$	0.000***	0.000***	0.000	0.000
	−4.95	−4.95	−0.53	−0.53
Exchange	0	0	0.000	0.000
$Rate_j$	−0.78	−0.78	−0.45	−0.45
$AFTA_{ijt}$	−0.375	−0.375	−1.726***	−1.726***
	(−0.77)	(−0.77)	(−3.31)	(−3.31)
$ACFTA_{ijt}$	0.342*	0.342*	−0.817*	−0.817*
	−2.39	−2.39	(−2.13)	(−2.13)
$AJFTA_{ijt}$	−0.208*	−0.208*	0.584**	0.584**
	(−2.30)	(−2.30)	−2.6	−2.6
$AKFTA_{ijt}$	0.068	0.068	−0.532	−0.532
	−0.63	−0.63	(−1.33)	(−1.33)
$AIFTA_{ijt}$	−1.127***	−1.127***	0.177	0.177
	(−5.91)	(−5.91)	−0.38	−0.38
$AANZFTA_{ijt}$	0.247**	0.247**	1.102**	1.102**
	−2.66	−2.66	−2.99	−2.99
$FTA1_{ijt}$	0.134	0.134	−0.141	−0.141
	−0.51	−0.51	(−0.41)	(−0.41)

Table A3. *Cont.*

Dependent Variable	Rubber		Coconut	
	Eq (1)	Eq (2)	Eq (1)	Eq (2)
$FTA2_{ijt}$	0.000***	0.000***	0.000	0.000
	−6.23	−6.23	(−0.78)	(−0.78)
Year1(2008)	-	0	-	0
		(omitted)		(omitted)
Year1(2020)	-	0	-	0
		(omitted)		(omitted)
Constant	10.604***	10.604***	17.587***	17.587***
	−9.05	−9.05	−4.62	−4.62
Country fixed	yes	yes	yes	yes
Pseudo R-squared	0.980	0.980	0.941	0.941
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Wald chi2(12)	261.382	261.382	108.358	108.358
No. Obs	693	693	714	714

Note: Robust standard errors are in parentheses; *** p < 0.01; ** p < 0.05; * p < 0.1. Eq1 denotes Equation (1) and Eq2 denotes Equation (2).

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