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The impact of gross domestic product, exchange rates and ACFTA implementation on Indonesia's trade intensity index

Dyah Titis Kusuma Wardani^{1*}, Adinda Salshabilla Zhauza Huda¹, Susilo Nur Aji Cokro Darsono¹, and Jarita Duasa²**AFFILIATION:**

¹Department of Economics, Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta, Special Region of Yogyakarta, Indonesia

²Department of Economics, Kulliyah of Economics and Management Sciences, Internasional Islamic University Malaysia, Malaysia

***CORRESPONDENCE:**

dyah.wardani@umy.ac.id

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Abstract: The ASEAN-China Free Trade Area (ACFTA) represents a critical agreement between ASEAN member countries and China, aimed at fostering economic integration by eliminating or reducing trade barriers, enhancing service market access, refining investment regulations, and bolstering economic cooperation. This framework is designed to strengthen economic ties and enhance welfare across the involved nations. This study evaluates the impact of the ACFTA on trade dynamics by analyzing the Trade Intensity Index (TII), GDP, exchange rates, and a dummy variable representing the ACFTA's implementation. Utilizing annual data from 2001 to 2021, sourced from the UN-Comtrade Database and the World Bank, the research employs the Ordinary Least Squares (OLS) method to provide insights into the trade relationships under the ACFTA framework. The findings indicate a divergent impact, while Indonesia experiences a negative and significant influence from GDP, exchange rates, and ACFTA implementation, the ASEAN-6 countries display a positive and significant effect. Moreover, the study reveals that Indonesia's Trade Intensity Index with other ACFTA members is comparatively lower than Malaysia's. This suggests a need for targeted trade policies in Indonesia aimed at amplifying export volumes in sectors where it holds a comparative advantage. Such strategies could significantly enhance Indonesia's trade intensity within the ACFTA, fostering greater economic integration and benefits under this expansive regional trade agreement.

Keywords: Trade Intensity Index; GDP; Exchange Rate; ACFTA**JEL Classification:** F02; F10; F15

Introduction

International trade plays a crucial role in the economy of every country, contributing significantly to global welfare. As all nations participate in international business, they aim to achieve a surplus in their trade balance to bolster their economies (Smith, 1776). A trade surplus increases the inflow of foreign currency, which can generate revenue for the public treasury and subsequently fund national development (Johnson, 1953). This study examines the simultaneous and partial effects of net exports, imports, exchange rates, and economic growth on Indonesia's economic development (Todaro & Smith, 2015). Engaging in international trade is essential for every country to ensure the prosperity of its citizens, as no nation can meet all its needs independently (Ricardo, 1817). International trade is vital because it allows countries to leverage their unique

advantages, producing more goods and services per unit of resource than others (Heckscher & Ohlin, 1933). A country's ability to export its products can be an absolute advantage in certain situations (Anwar, 2018).

International trade has a significant impact on a nation's economic development. Without international trade, there is no capital transfer from developed to underdeveloped countries (Machmud, 2016). International trade is advantageous for a nation since it can improve employment opportunities, foreign exchange reserves, capital transfer flows, and state income for national growth (Krugman, 1979; Samuelson, 1948). However, import quotas and regulations, high import taxes, and currency exchange rates between nations could impose barriers to commerce (Bhagwati, 1988; Dornbusch, 1976). ASEAN countries are now actively engaging in international trade activities to address their domestic development needs (Hew, 2007; Menon, 1998). The trade balance is one of the factors impacted by global commerce. In economics, a nation's trade balance plays a significant role in establishing policy benchmarks (Salvatore, 2013). The difference between exports and imports is the trade balance (Krugman & Obstfeld, 2009).

A surplus is declared when the value of exports is higher; a deficit is declared when the value of imports is higher (Krugman & Obstfeld, 2009). This circumstance has a significant impact on a nation's GDP (Yuni, 2016; Salvatore, 2013). After conducting trade among its members, ASEAN has occasionally expanded its reach to include nations outside the group, such as China, Europe, the European Union, and Japan, where it has established free trade agreements (Severino, 2006; Menon, 2007). Trade with China, which has implemented a free trade area, is the main focus of these nations (Hew, 2007). On November 4, 2002, the ASEAN nations created a Framework Agreement on Comprehensive Economic Cooperation. This was later renamed the ASEAN-China Free Trade Area (ACFTA) (Tongzon, 2005). The ASEAN-China Free Trade Area (ACFTA) was officially established on January 1, 2010, following further negotiations between ASEAN and China (ASEAN Secretariat, 2004).

ASEAN countries are actively engaging in trade activities with other nations to meet their internal development needs. The trade balance, a key indicator of economic performance, is significantly impacted by global commerce. It plays a crucial role in defining policy benchmarks within the economy (Krugman & Obstfeld, 2009; Salvatore, 2013). The trade balance is the difference between exports and imports: a surplus is recorded when export value exceeds import value, while a deficit occurs when import value surpasses export value (Yuni, 2016).

ASEAN has periodically expanded its trade activities beyond intra-regional commerce to include free trade agreements with countries outside the region, such as China, Europe, the European Union, and Japan (Severino, 2006; Menon, 2007). Trade with China, which has implemented a free trade area, is a primary focus for ASEAN nations (Hew, 2007). On November 4, 2002, ASEAN countries created the Framework Agreement on Comprehensive Economic Cooperation, which later evolved into the ASEAN-China Free Trade Area (ACFTA) (Tongzon, 2005). The ACFTA was officially established on January 1,

2010, following extensive negotiations between ASEAN and China (ASEAN Secretariat, 2004). This agreement marked the first Free Trade Area with an external party to be signed by ASEAN. In August 2014, ASEAN and China agreed to upgrade the ACFTA to enhance its effectiveness and benefits.

The ASEAN-China Free Trade Area (ACFTA) was the first Free Trade Area that ASEAN signed with third parties (Tongzon, 2005). In August 2014, China and ASEAN agreed to expand ACFTA (ASEAN Secretariat, 2014). The Trade in Goods Agreement was ratified twice, in 2006 and 2010, after its initial signing in November 2004 (ASEAN Secretariat, 2004). The methods for reducing and eliminating tariffs are divided into "Normal Track" and "Sensitive Track" categories. The ASEAN-6 (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, and Thailand) eliminated all tariffs for the Normal Track, followed by the participation of the CLMV countries (Cambodia, Laos, Myanmar, and Vietnam) (Hew, 2007).

Implementing ACFTA is a milestone for ASEAN and China, enabling more intensive trade relations on a massive scale (Menon, 2007). Over the last few years, ASEAN has been importing many goods from China, which currently has the highest level of economic activity in the world (Severino, 2006). ASEAN also engages in export activities with other countries, involving both intra-ASEAN and partner nations (Krugman & Obstfeld, 2009). The Free Trade Area agreement does not bind all nations collaborating with ASEAN to conduct international trade (Salvatore, 2013). The ACFTA agreement aims to create a free trade area by reducing and eliminating trade barriers, tariffs, and non-tariff barriers to 0%. Additionally, it seeks to open access to market services and investment to improve the economy and welfare of the countries participating in ACFTA (Fitra, 2020).

This study evaluates the impact of the ACFTA on trade dynamics using a detailed analysis of the Trade Intensity Index (TII), GDP, exchange rates, and a dummy variable representing the ACFTA's implementation. This multifaceted approach provides a nuanced understanding of how different economic factors influence trade under the ACFTA framework. By utilizing annual data spanning two decades (2001 to 2021), the research offers a longitudinal perspective on the effects of the ACFTA, allowing for the observation of long-term trends and changes in trade patterns. The research distinguishes between the effects on Indonesia and the ASEAN-6 countries, highlighting a divergent impact. This comparative approach underscores the varying outcomes of the ACFTA implementation across different member countries, providing specific insights into regional economic integration.

International trade involves the exchange of goods and services between countries to meet their respective needs (Ngatikoh, 2020). Each country has different natural resources, industrial capacities, technology, human resources, and capital. Consequently, trade agreements are established to address the development needs of each nation (Kariyono, 2020). International trade allows countries to capitalize on their production advantages, benefiting from price differences between domestic and international markets. However, it can also lead to reduced domestic production in countries that suffer losses due to increased competition. In international trade, export

and import activities determine the trade balance. A surplus occurs when a country exports more than it imports, while a deficit occurs when imports exceed exports, indicating a lack of domestic production (Atmaja, 2016). International trade can drive economic growth by contributing significantly to the Gross Domestic Product (GDP) and playing a vital role in a nation's economic, social, and political development. In the age of globalization, the expansion of industry, transportation, and multinational corporations has substantially increased international trade (Salvatore, 2007).

The ASEAN-China Free Trade Area (ACFTA) is an agreement between ASEAN member countries and China to create a free trade area by eliminating or reducing trade barriers, both tariffs and non-tariff measures. This agreement aims to enhance market access for services, investment regulations, and economic cooperation, thereby improving the welfare of the people in ASEAN and China. ACFTA was signed on November 12, 2002, and implemented on August 1, 2004 (Upgrading Protocol ACFTA).

The Agreement on Trade in Goods under the Framework Agreement on Comprehensive Economic Cooperation between the Association of Southeast Asian Nations and the People's Republic of China includes programs for reducing or eliminating tariffs on goods. These programs are divided into the Early Harvest Program, Normal Track, and Sensitive Track (Wahyuningsih, 2019). The Early Harvest Program took effect on January 1, 2005, while the schedule for reducing and eliminating tariffs for the Normal Track of ASEAN-6 countries and China is outlined below. ASEAN-6 includes Indonesia, Malaysia, Thailand, the Philippines, Brunei Darussalam, and Singapore. For new ASEAN countries, such as Cambodia, Laos, Myanmar, and Vietnam, have their own schedule, and it is hoped that these four countries will be able to apply zero percent tariffs in 2015. Meanwhile, the Sensitive Track stage will begin reducing/eliminating import duty rates of up to 0% - 20% in 2012-2017. While for commodities included in the Highly Sensitive Track, import duty rates will be reduced/eliminated by 0% - 50% starting in 2015 (Based on PMK Number 235/PMK.011/2008).

Export involves selling products made in one nation to another. A country may export goods it produces to other nations that are unable to produce these goods themselves. Export plays a significant role in international trade by driving the national economy. Exports generate foreign currency, which can then be used to pay for imports and expand various industries within the country (Marks, 2015). Additionally, export can be defined as any activity involving the production of goods and services in one country intended for consumption in another (Wangke, 2013). Exports are often considered an excess of domestic production, with the surplus being sold abroad (Sheng, 2014).

The supply of a commodity refers to the quantity that producers make available to consumers in a market at a particular price and time. Several factors affect supply, including the price of the good, the cost of production inputs, the level of technology, and the impact of taxes and subsidies (Lipsey et al., 1995). When a commodity is exported, its supply is intended to meet international demand in addition to domestic needs. The export supply of a country's commodity is determined by the gap between

domestic supply and demand. The export supply theory seeks to identify the elements that influence a country's export supply.

Systematically can be formulated as follows:

$$SXt = Qt - Ct + St - 1$$

Where:

SXt = Total commodity export time period t

Qt = Total domestic production time period t

Ct = Total domestic consumption period t

$St - 1$ = Stock of previous time period (t-1)

An advantage that arises because it produces a good or service with a lower opportunity cost. The concept is important for explaining international trade as well as specialization in production. (David Ricardo).

Free trade area, which is a form of economic integration, all quantitative limitations and tariff barriers between members are eliminated, however each nation still levies its own tariffs on non-member nations.

1. Dummy Variable

H₁: Dummy Variable or ACFTA has a positive and significant effect against the TII after the Free Trade Agreement of ASEAN-China.

2. Gross Domestic Product of Partner Country

H₂: GDP Partner have a positive and significant effect against the TII after FTA of ASEAN-China.

3. Gross Domestic Product of Reporter Country

H₃: GDP Reporter have positive and significant effect against the TII after FTA of ASEAN-China.

4. Exchange Rate of Partner Country

H₄: Exchange Rates Partner has a positive effect against the TII after FTA of ASEAN-China.

5. Exchange Rate of Reporter Country

H₅: Exchange Rates Reporter has a positive effect against the TII after FTA of ASEAN-China.

Research Method

The observation of this research is annual data on export, import, Gross Domestic Product and exchange rate in the ASEAN-China Free Trade Area. The data was taken in the same period from 2001 to 2021. This study only covers the six ASEAN countries. Indonesia, Thailand, Malaysia, Singapore, Brunei Darussalam, Philippines and China. To see the effect and efficiency after the entry into force of the AFTA agreement by China and ASEAN-6 in 2004 after the elimination of tariffs.

This study uses secondary data in the form of time series and cross sections in the form of annual data for the period 2001 to 2021. The data in this study were obtained from

trusted sources such as Worldbank, United Nations International Trade Statistics Database (www.comtrade.un.org) with three digits Standard International Trade Classification (SITC) code Rev.3 as several other sources that support this research.

Table 1 Dependent and Independent Variables

No.	Variable	Unit	Source
1	Trade Intensity Index	TII	Comtrade UN
2	Exchange Rate	USD	World Bank
3	Gross Domestic Growth	Billion USD	World Bank
4	Export	Billion USD	UN Comtrade
5	ACFTA	Billion USD	UN Comtrade

The data collection technique in this study was by recording or downloading directly in the form of time series and cross-section data from 2001 to 2021, which were obtained from official websites such as word bank and UN Comtrade. The writers use statistical tools to process the secondary data collected, such as Microsoft Excel and E-Views 12 programs. Microsoft Excel is used for data processing regarding table creation and analysis. Meanwhile, E-Views 12 is used for processing panel data regression data. The second method writers use analyzing the Trade Intensity Index (TII). TII calculations determined the trade intensity between ASEAN-6 (Indonesia, Malaysia, Thailand, Philippines, Singapore, and Brunei Darussalam) from 2001-2021.

Table 2 Operational Definition of Variables

Variables Name	Variables Description	Data Source
Dependent Variables		
Trade Intensity Index	Determine whether the value of trade between two countries is greater or smaller than would be expected on the basis of their importance in world trade, (TII>1): above the world average level, (TII<1): below the world average level	UN Comtrade
Independent Variables		
Gross Domestic Product	Gross Domestic Product (GDP) is a calculation used by a country as the main measure for its national economic activity	World Bank
Exchange Rate	Exchange rate is the price of the domestic currency against foreign currencies country.	World Bank
ACFTA	The ACFTA implementation variable is a dummy variable used to explain the conditions for the implementation of the ACFTA. Prior to the implementation of ACFTA, it was given a value of 0 and the period after the implementation of ACFTA was given a value of 1.	UN Comtrade

Trade Intensity Index Estimation

The value of TII from country j to country or region k if it has a value more than 1 (TII>1) then indicates the intensity of trade conducted by country j to country or region k above the world average level and indicates the intensity of the country's important trade

partner in the trade of a country or region k. But if the value of TII from country j to country or region k has a value of less than 1 (TII).

The TII model to be used in this research is as follows:

$$TII = \frac{\left(\frac{X_{indo_acfta}}{X_{indo}}\right)}{\left(\frac{X_{indo_world}}{X_{world}}\right)} \dots\dots\dots (2)$$

where: Xindo-acfta indicates Indonesia’s exports to each member of ACFTA; Xindo indicates Indonesia’s total exports (to ACFTA); Xindo_world indicates Indonesia’s total exports (to the world); and Xworld indicates total world export.

Result and Discussion

Trade Intensity Index Analysis

Trade Intensity Index (TII) ASEAN-5 and China to Indonesia in 2001-2021

Table 3 Trade Intensity Index (TII) ASEAN-5 and China to Indonesia 2001-2021

Year	Indonesia to Malaysia	Indonesia to Thailand	Indonesia to Philippines	Indonesia to Singapore	Indonesia to Brunei	Indonesia to China
2001	0,34	0,23	0,18	1,16	0,00	0,48
2002	0,36	0,25	0,16	1,07	0,01	0,58
2003	0,68	0,44	0,30	1,71	0,01	1,21
2004	0,43	0,28	0,17	0,85	0,00	0,65
2005	0,00	0,02	0,02	0,09	0,00	0,07
2006	0,36	0,24	0,12	0,78	0,00	0,73
2007	0,39	0,23	0,14	0,79	0,00	0,73
2008	0,38	0,23	0,13	0,80	0,00	0,71
2009	0,91	0,60	0,45	1,90	0,01	2,16
2010	0,27	0,22	0,15	0,65	0,00	0,75
2011	0,25	0,22	0,14	0,67	0,00	0,84
2012	0,34	0,25	0,14	0,65	0,00	0,82
2013	0,41	0,23	0,15	0,06	0,00	0,87
2014	0,26	0,16	0,11	0,46	0,00	0,48
2015	0,32	0,24	0,23	0,55	0,00	0,65
2016	0,32	0,26	0,25	0,53	0,00	0,80
2017	0,32	0,27	0,27	0,52	0,00	0,95
2018	0,30	0,26	0,26	0,50	0,00	1,04
2019	0,31	0,25	0,28	0,53	0,00	1,15
2020	0,26	0,19	0,22	0,40	0,00	1,19
2021	0,24	0,18	0,22	0,30	0,01	1,38

Source: UN-COMTRADE, Author Estimation

From Table 3 we can see that the value of Trade Intensity Index (TII) of ASEAN-5 and China to Indonesia 2001-2021 almost all have value less than one ($TII < 1$) which shows the intensity of exports by ASEAN-5 and China to Indonesia under the average level of other countries to export to Indonesia, but Singapore and China which has a TII score of more than one ($TII > 1$) indicating that the export intensity above the average of other countries exporting to Indonesia.

Singapore in 2001 was ranked first among ASEAN-5 countries and China with a TII score of 1.16 and continued for three consecutive years. In 2002, TII of Singapore to Indonesia score was 1.07 and in 2003 it was 1.71 while ASEAN-5 and China score is less than 1 ($TII < 1$). China was ranked second with TII value of 1.21 in the same year of 2003. In 2018 until 2021 China have the high value of TII sequentially, start from 2018 with total value 1,04, 2019 total value 1,15, 2020 total value 1,19 and last years of this years which is 2021 show the TII value of China to Indonesia is 1,38.

Trade Intensity Index (TII) of Malaysia, Thailand, Philippines and Thailand to Indonesia always declined from 2001 to 2021 when in 2001-2003, 2009 and 2018-2021 Singapore and China came into effect. To see a clear analysis of each country's export distribution to Indonesia, it will be explained as follows. The value of Trade Intensity Index (TII) from Indonesia to ASEAN-5 and China is dominantly under the average level. It show that the bilateral trade between countries that joined the ACFTA-China agreement and Indonesia as a reporter does not show a value of fast, high and evenly distributed intensity. Research by Lipsey et al. (1995) discusses the importance of trade intensity in evaluating bilateral trade relationships. Their framework can be applied to understand why the TII from these ASEAN countries to Indonesia declined over specific periods. Studies by Menon (2007) and Hew (2007) on ASEAN economic integration provide insights into regional trade patterns, emphasizing how shifts in trade policies and external economic factors, such as China's growing influence, can impact TII. The establishment of the ASEAN-China Free Trade Area (ACFTA) and its subsequent agreements, as discussed by Tongzon (2005) and Severino (2006), highlight how the inclusion of China reshaped trade flows within the region. This can explain the observed decline in TII from certain ASEAN countries to Indonesia as trade dynamics shifted towards China and Singapore. The work by Fitra (2020) on the effects of ACFTA on ASEAN countries' trade patterns provides further evidence of how these agreements have impacted bilateral trade intensity, particularly with Indonesia.

Trade Intensity Index (TII) ASEAN-5 and China to Malaysia in 2001-2021

From Table 3. we can see that the value of Trade Intensity Index (TII) of ASEAN-5 and China to Malaysia 2001-2021 almost all have value less than one ($TII < 1$) which shows the intensity of exports by ASEAN-5 and China to Malaysia under the average level of other countries to export to Indonesia, but Singapore, Thailand and China which has a TII score of more than one ($TII > 1$) indicating that the export intensity below the average of other countries exporting to Malaysia.

Table 4 Trade Intensity Index (TII) ASEAN-5 and China to Malaysia 2001-2021

Year	Malaysia to Indonesia	Malaysia to Thailand	Malaysia to Philippines	Malaysia to Singapore	Malaysia to Brunei	Malaysia to China
2001	0,22	0,47	0,18	2,07	0,04	0,53
2002	0,22	0,49	0,16	1,96	0,03	0,65
2003	0,39	0,85	0,27	3,05	0,06	1,26
2004	0,24	0,48	0,15	1,51	0,03	0,68
2005	0,02	0,51	0,13	1,47	0,02	0,62
2006	0,22	0,47	0,12	1,36	0,02	0,64
2007	0,25	0,42	0,12	1,25	0,02	0,75
2008	0,27	0,40	0,12	1,24	0,02	0,81
2009	0,67	1,17	0,27	3,01	0,06	2,62
2010	0,21	0,40	0,12	1,01	0,02	0,95
2011	0,22	0,38	0,12	0,94	0,02	0,98
2012	0,28	0,39	0,11	0,98	0,02	0,91
2013	0,32	0,39	0,09	0,98	0,03	0,95
2014	0,20	0,25	0,08	0,68	0,02	0,58
2015	0,24	0,37	0,11	0,91	0,02	0,85
2016	0,24	0,38	0,12	1,00	0,02	0,86
2017	0,25	0,37	0,12	0,99	0,02	0,93
2018	0,22	0,39	0,12	0,96	0,02	0,96
2019	0,22	0,39	0,13	0,95	0,02	0,97
2020	0,18	0,28	0,11	0,89	0,02	0,99
2021	0,19	0,25	0,11	0,83	0,03	0,92

Source: UN-COMTRADE, Author Estimation

As can be seen at Table 4, in 2001-2010 Singapore had a value of (TII>1), which means that the intensity of trade and distribution of Malaysia-Singapore exports went well. Steadily for 10 years, in 2003 Singapore was still in first place with a TII score of 3.05 and second place was China with a TII value of 1.26 or (TII > 1) this indicated that the intensity of trade between Malaysia-Singapore and Malaysia-China is doing well compared to ASEAN member countries. Evidenced by a lower intensity value (TII <1).

The highest intensity value for 10 consecutive years, Singapore was ranked first in 2009 with a TII value of 3.01. Then in the same year China followed in second place with a TII of 2.62 and in third place was Thailand with a score of 1.17. Then in 2011-2014 Singapore still leads with an average TII value of 0.98, meaning it shows the intensity below the average level of other countries to export. And China is in second place with an average TII of 0.95. The number of years of research tested from the results of TII Malaysia to ASEAN-5 and China shows that the average score (TII<1) is occupied by Brunei Darussalam with an average total TII of 0.00 this shows that the low level of trade between Malaysia and Brunei Darussalam. Singapore ranked first for ten consecutive years, reaching its peak TII value of 3.01 in 2009. This indicates a high level of trade intensity compared to other countries. Research by Hew (2007) and Severino (2006) discusses Singapore's strategic position as a major trading hub in Southeast Asia, leveraging its advanced infrastructure, favorable trade policies, and strategic location. Thailand secured the third position in 2009 with a TII value of 1.17. Research by

Menon (2007) provides insights into Thailand's integration into regional trade networks and its role within ASEAN, contributing to its trade intensity. The data shows that Malaysia's average TII with Brunei Darussalam is 0.00, reflecting minimal trade activity between the two countries. Research by Wangke (2013) and Sheng (2014) explores the reasons behind low trade intensity, such as limited economic complementarities and trade barriers.

Regression Estimation Results

In understanding the descriptive of each variable in this study used descriptive analysis. The summary of the results of the statistical descriptive analysis that has been carried out is as follows:

Table 5 Summary of Statistics

Variabel	N	Minimum	Maximum	Mean
TII	126	0.000433	2.156779	0.397492
ACFTA	126	0.000000	1.000000	0.809524
GDP_Partner	126	0.000140	0.000976	0.000313
GDP_Reporter	126	0.000160	0.000119	0.000694
Exchange Rate_Partner	126	1.249567	56.03992	16.23341
Exchange Rate_Reporter	126	8.577000	14.58200	11.05276

Source: UN Comtrade, Author Estimation

According to Table 5 it can be seen that the TII dependent variable obtained a minimum value of 0.000433, a maximum value of 2.156779 and an average value (mean) of 0.397492. for the value of the independent variable dummy of ACFTA with a minimum value of 0.000000, a maximum of 1.000000 and a mean of 0.809524. then, the independent variable GDP_Partner with a minimum value of 0.000140, a maximum of 0.000976 and a mean of 0.000313. The next independent variable is GDP_Reporter with a maximum value of 0.000160, a maximum of 0.000190 and a mean of 0.000694. Exchange Rate_Partner with a minimum value of 1.249567, a maximum of 56.03992 and a mean value is 16.23341. Then the last independent variable is Exchange Rate_Reporter with a minimum value of 8.577000, a maximum of 14.58200 and a mean of 11.05276.

This method was selected using the best analytical analysis of the common effect, fixed effect, and random effect techniques. By comparing these three methods, we can determine which method or model is most effective for estimating panel data. The most effective and suitable method or model for this study's panel data analysis must be determined using the Chow test and Hausman test. The following table will illustrate the panel data analysis:

Table 6 Regression Result

Independent Variables:	Model		
	Common Effect	Fixed Effect	Random Effect
Constant	0.252411	0.127555	0.252411**
Standard error	(0.174567)	(0.127352)	(0.122472)
ACFTA	0.324800***	0.245351***	0.324800***
Standard Error	(0.087205)	(0.068733)	(0.061181)
GDP Partner	0.00065***	0.000236***	0.000605***
Standard error	(0.00125)	(0.000951)	(0.000880)
GDP Reporter	-0.000137	-0.000106	-0.000316
Standard error	(0.000137)	(0.000972)	(0.000961)
Exchange Rate_Partner	-0.005918***	0.013680***	-0.005918***
Standard error	(0.001642)	(0.003222)	(0.001152)
Exchange Rate_Reporter	-0.012347	-0.010501	-0.012347
Standard error	(0.019074)	(0.013600)	(0.013382)
Dependent Variables (TII)	Common Effect	Fixed Effect	Random Effect
R ²	0.330730	0.684306	0.330730
F-Statistics	32.62004	24.92763	11.85996
Prob(F-statistic)	11.85996	0.000000	0.000000
Durbin-Watson Stat	0.971501	1.544225	0.971501

Source: Author Estimation

Table 7 Regression Result: Fixed Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.127555	0.127352	1.001593	0.3186
ACFTA	0.245351	0.068733	3.569621	0.0005
GDP_Partner	2.360816	9.512117	2.482178	0.0145
GDP_Reporter	-1.060446	9.728914	-	0.2777
			1.090751	
Exchange Rate_Partner	0.013680	0.003222	4.246398	0.0000
Exchange Rate_Reporter	-0.010501	0.013600	-	0.4416
			0.772164	
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.684306	Mean dependent var		0.397492
Adjusted R-squared	0.656854	S.D. dependent var		0.399220
S.E. of regression	0.233858	Akaike info criterion		0.015049
Sum squared resid	6.289303	Schwarz criterion		0.262661
Log likelihood	10.05193	Hannan-Quinn criter.		0.115646
F-statistic	24.92763	Durbin-Watson stat		1.544225
Prob(F-statistic)	0.000000			

Trade Intensity Index Analysis:

Based on Table 3 explains about the total Trade Intensity Index among Indonesia to ACFTA countries can be concluded with the average total for each country. Indonesia-Malaysia with a total average of TII is 0.36, Indonesia to Thailand with a total average of TII is 0.25, Indonesia to Philippines with a total average of TII is 0.19, Indonesia-

Singapore with a total average of TII is 0.73, Indonesia-Brunei Darussalam with a total average of TII is 0.00 and Indonesia-China with a total average of TII is 0.84. With the calculation of sum from all TII ACFTA countries, it produces a total of TII of 2.38. This indicates that the intensity of the trade Indonesia to ACFTA countries is equal more than 1 ($TII > 1$) or can be distributed above the average.

Table 4 explains about the total Trade Intensity Index among Malaysia to ACFTA countries. It can be concluded that the calculation of TII by calculating the average amount of total TII Malaysia to ACFTA countries is as follows, Malaysia-Indonesia with a total average of TII is 0.264, Malaysia to Thailand with a total average of TII is 0.47, Malaysia Philippines with a total average of TII is 0.14, Malaysia-Singapore with a total average of TII is 1.40, Malaysia-Brunei Darussalam with a total average of TII is 0.02 and Malaysia-China with a total average of TII is 0.97. With an average total TII of all countries, a total of 20 years can be calculated by the number of TII Malaysia to ACFTA Countries is 3.28. This shows that the trade intensity among Malaysia to ACFTA Countries is equal more than 1 ($TII > 1$) or can be distributed above the average.

Based on the results of calculating the total average TII from Indonesia as a reporter with a total average TII of 2.38 and the distribution of exports between bilateral two countries from Indonesia as a reporter with the highest total value of TII is Singapore, which is 0,73. And the last rank is occupied by Brunei Darussalam with a total average TII of 0.00. While Malaysia as a reporter with a total average TII of 3.28. and the distribution of bilateral exports between the 2 countries from Malaysia as a reporter with the largest total average TII score is Singapore, which is 1.40. and the last rank is occupied by Brunei Darussalam with a total average TII of 0.02. it can be concluded that the number of Trade Intensity Index reporting countries that are superior with a total average of 3.28 is occupied by Malaysia. This shows that the intensity of trade between reporting countries and ACFTA countries can be well distributed by Malaysia compared to Indonesia.

Regression Estimation Results:

Regression results in this study show that the ACFTA variable has a probability value of $0.0005 < 0.05$, this shows that ACFTA has a positive effect on TII, if ACFTA increases by 1 it will increase TII by 0.245351, so it can be concluded that the hypothesis is accepted. The Effect of GDP Partner country on Trade Intensity Index, result shows that, the partner country's GDP has positive and signifikan effect on Trade Intensity Index of Indonesia. This is in line with the research hypothesis. The GDP coefficient has a value of 2.371505 with a probability of $0.0145 < 0.05$, this indicates that the hypothesis is accepted. This is in line with research conducted by Mia Ayu Wardani (2017) which states that the GDP of the partner country has a positive effect on exports. This means this is linear with the calculation TII that contains Export. GDP of the Reporter Country has a insignificant effect on TII. This is not in accordance with the research hypothesis. Based on the results of the hypothesis testing of the Exchange Rate_Partner or variable, shows that the exchange rate has a positive and significant effect on exports in ACFTA countries in the 2001-2021 period. With a regression with the Exchange Rate_Partner

variable probability value is $0.0000 < 0.05$, this shows that the Exchange Rate_Partner has a positive effect on Trade Intensity Index, if the Exchange Rate_Partner increases by 1 it will affect an increase in TII by 0.013680, so it can be concluded that the hypothesis accepted. Finally, Exchange Rate_Reporter produces a probability value of $0.4416 > 0.05$. This indicates that Exchange Rate_Reporter has insignificant effect on TII, if Exchange Rate of Reporter country.

Conclusion

Based on the results of research and data analysis, including the Trade Intensity Index (TII) and multiple regression analysis using the fixed effect model data method, the study aimed to measure the impact of international trade on exchange rates, gross domestic product (GDP), and the trade intensity index within the context of the ASEAN-China Free Trade Area (ACFTA) agreement in Indonesia and Malaysia from 2001 to 2021. The findings indicate that Indonesia, as a reporter country, has a lower trade intensity index value between AFTA countries compared to Malaysia, suggesting that Malaysia has a more intensive Trade Intensity Index score than Indonesia. The study also found that the dummy variable representing ACFTA membership has a positive and significant effect on TII in Indonesia for countries that are members of ACFTA, demonstrating that the post-implementation period of ACFTA has had a more positive impact compared to the pre-implementation period.

Furthermore, the GDP of partners, including Malaysia, Thailand, the Philippines, Singapore, Brunei Darussalam, and China, has had a positive effect on the Trade Intensity Index (TII), indicating that an increase in the GDP of these partners enhances Indonesia's TII. In contrast, the GDP of the reporter country, Indonesia, has an insignificant effect on the Trade Intensity Index (TII). The exchange rate of partners has a positive and significant effect on the Trade Intensity Index (TII), implying that an increase in the exchange rate influences the growth of exports and enhances the TII between Indonesia and its partners, as the exchange rate is a critical variable affecting exports. However, the exchange rate of the reporter country, Indonesia, has an insignificant effect on the Trade Intensity Index (TII). This finding is supported by research conducted by Ari Mulianta (2013), which showed that the rupiah exchange rate was under significant pressure due to the large outflow of capital caused by the loss of foreign investor confidence in the prospects of the Indonesian economy. The research is limited to Malaysia and Indonesia in the TII analysis and only includes ASEAN-6 countries in the ASEAN region.

Based on the research findings, the researcher has several recommendations. The Trade Intensity Index (TII) of Indonesia and Malaysia as reporting countries shows that the average total TII in each country is still quite low. Therefore, it is essential for the government to strengthen trade cooperation between countries, especially after the implementation of the ACFTA agreement, focusing on export-import activities. The study also reveals that the GDP of partner countries has a positive and significant effect on Indonesia's TII. This indicates that partner countries need to maintain the stability of

their consumption levels to ensure that the value of Indonesia's imports remains stable, which will, in turn, stabilize the exports among ACFTA countries. Conversely, the GDP of the reporter country has an insignificant effect on TII. The exchange rates of partner countries have a positive and significant effect on the TII of ASEAN-China, suggesting that the governments of partner countries should ensure the stability of interest rates. However, the exchange rates of the reporter country have an insignificant effect on TII.

Author Contributions

Conceptualisation, D.T.K.W and A.S.Z.H; Methodology, D.T.K.W and S.N.A.C.D; Investigation, A.S.Z.H and J.D.; Analysis, S.N.A.C.D., A.S.Z.H and D.T.K.W.; Original draft preparation, D.T.K.W and A.S.Z.H; Review and editing, S.N.A.C.D., J.D. and D.T.K.W.; Visualization, A.S.Z.H. and J.D All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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