Article Type: Research Paper

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 Huda[1], and Jarita Duasa[2]

AFFILIATION:
[1]Department of Economics, Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta, Special Region of Yogyakarta, Indonesia

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

***CORRESPONDENCE:**
dyah.wardani@umy.ac.id

THIS ARTICLE IS AVALILABLE IN:
http://journal.umy.ac.id/index.php/esp

DOI: 10.18196/jesp.v25i1.22191

CITATION:
Wardani, D. T. K., Huda, A. S. Z., & Duasa, J. (2024). The impact of gross domestic product, exchange rates and ACFTA implementation on Indonesia's trade intensity index. *Jurnal Ekonomi & Studi Pembangunan, 25*(1), 62-77.

ARTICLE HISTORY
Received:
28 Nov 2023
Revised:
25 Feb 2024
04 Mar 2024
Accepted:
20 Apr 2024

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 Indonesia's Trade Intensity Index (TII). The dependent variable is trade dynamics which is analyzed using TII. Independent variables are GDP, exchange rates, and a dummy variable representing the ACFTA's implementation. Utilizing annual data from 2001 to 2021 that denotes before and after ACFTA implementation, data are obtained 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 lower than Malaysia. 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 Gross Domestic Product, exchange rates, and ASEAN-China Free Trade Agreement (ACFTA) implementation on Indonesia's total exports to

countries' member of ACFTA with respect to Indonesia's total exports (to the world), is measured by Trade Intensity Index. 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 advantage, producing more goods and services per unit of resource than others (Heckscher & Ohlin, 1991). 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; Rahajeng, 2016). International trade is advantageous for a nation, since it can improve employment opportunities, foreign exchange reserves, capital transfer flows, and also national income for national growth (Krugman, 1979; Samuelson, 1948). However, import quotas and regulations, high import taxes, and currency exchange rates between countries could impose barriers on trade (Dornbusch, 1976; Bhagwati, 1988; Sitorus, 2020). ASEAN countries are now actively engaging in international trade activities to address their domestic development needs (Davidson 2002; Menon, 1998; Shepherd & Wilson, 2008). The trade balance is one of the factors that is affected 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 so-called 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; Umuhoza & Wang, 2021). Trade with China, which has implemented a free trade area, is the main focus of these nations (Devadason, 2010). 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 (Davidson, 2002). 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; Raswatie, 2014).

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. 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 (SBM, 2011; Yudilla, 2020).

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. 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 such as Cambodia, Laos, Myanmar, and Vietnam (ASEAN Secretariat, 2004).

Implementing ACFTA is a milestone for ASEAN and China, enabling more intensive trade relations on a massive scale (Menon, 2007; Cheng, 2010). Over the last few years, ASEAN has been importing many goods from China (Lubis & Nuryanti, 2011), which currently has the highest level of economic activity in the world (Severino, 2006; Pramitasari, 2016). 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 (Park, 2007; Ridho'ah, 2018) to improve the economy and welfare of the countries participating in ACFTA (Mulyati, 2012; Amaliawiati & Murni, 2014; Andriana & Septiana, 2020).

This study evaluates the impact of the ACFTA on trade dynamics using a detailed analysis of the Trade Intensity Index (TII) as dependent variable. Meanwhile, the model is using GDP, exchange rates, and a dummy variable representing the ACFTA's implementation as independent variables. 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 (from 2001 to 2021) that denotes before and after ACFTA implementation, 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 & Faqih, 2020) . Each country has different natural resources, industrial capacities (Cahyani, 2014), technology, human resources, and capital. Consequently, trade agreements are established to address the development needs of each country (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 et al., 2016). International trade can drive economic growth (Salomo, 2007; Pridayanti 2016; Ayullah Kusuma, 2019; Wulandari & Zuhri, 2019; Putri & Siladjaja, 2021; Zatira, et al., 2021) 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, 2013).

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 (Bowo, 2012; Rahajeng, 2016). ACFTA was signed on November 12, 2017, and implemented on August 1, 2019 (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 & Satriani, 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, et al., 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:

$SX_t = Q_t - C_t + S_{t-1}$

Where:
SX_t = Total commodity export time period t
Q_t = Total domestic production time period t
C_t = Total domestic consumption period t
S_{t-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 inproduction (Ricardo, 1817).

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.

***H_1**: Dummy Variable of ACFTA implementation, the value is 1 when ACTA is implemented; and 0 otherwise.*

***H_2**: GDP Partners have a positive and significant effect on TII after implementation of Free Trade Agreement of ASEAN-China.*

***H_3**: GDP Reporter has a positive and significant effect on TII after the implementation of Free Trade Agreement of ASEAN-China.*

***H_4**: Exchange Rates Partners have positive and significant effect on TII after the implementation of Free Trade Agreement of ASEAN-China.*

***H_5**: Exchange Rates Reporter has a positive and significant effect on TII after the implementation of Free Trade Agreement of ASEAN-China.*

Research Method

The observation of this research is annual data on export, import, Gross Domestic Product and exchange rate in contries that join the ASEAN-China Free Trade Agreement. 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 trade efficiency after the ACFTA entry into force 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 the World Bank, 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

Table 2 Operational Definition of Variables

Variables Name	Variables Descripion	Data Source
Dependent Variables		
Trade Intensity Index	Determine whether the value of trade between two countries is greater or smaller than would be expected onthe 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 currencyagainst 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

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 authors use analyzing the Trade Intensity Index (TII) (Lestari, 2011). TII

calculations determined the trade intensity between ASEAN-6 (Indonesia, Malaysia, Thailand, Philippines, Singapore, and Brunei Darussalam) from 2001-2021.

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:

$$TII = \frac{\frac{X_{indo\_acfta}}{(X_{indo})}}{\frac{X_{indo\_world}}{(X_{wolrd})}}$$

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 (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	Indonesiato 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

Source: UN-COMTRADE, Author Estimation

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

Year	Indonesia to Malaysia	Indonesia to Thailand	Indonesia to Philippines	Indonesia to Singapore	Indonesia to Brunei	Indonesia to China
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, it can be seen 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 are above the average, of other countries which are 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 whine 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. The study by Menon (2007) on ASEAN economic integration provide the insights into regional trade patterns, emphasizing how shifts in trade policies and external economic factors, such as China's trade growth is impact on 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 Andriana and Septiana (2020) on the effects of ACFTA on ASEAN countries' trade patterns provides further evidence of how these agreements have impact on bilateral trade intensity, particularly Indonesia's TII.

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

From Table 4. 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 Thaniland	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 trade intensity of Malaysia-Singapore is very high. The trade intensity was steadily for 10 years, and in 2003 Singapore was still in first place with TII value is 3.05. The second place was China with TII value is 1.26 or (TII> 1). This indicated that, the intensity of trade between Malaysia-Singapore and Malayasia-China is better, compared to other ASEAN member countries.

Furthermore, among the highest TII value for 10 consecutive years, Singapore was in the first rank in 2009 with TII value is 3.01. Then in the same year, China was in the second place with TII value is 2.62, and in the third place was Thailand with TII value is 1.17. Thus, between 2011 and 2014, Singapore keep leads with an average TII value is 0.98. This shows, the intensity was below the average level of other ASEAN member countries. Moreover, China is in second place with TII value is 9.5. In addition, the results show that, Trade Intensity Index (TII) between Malaysia and ASEAN-5 countries, as well as Malaysia and China, reveal varying levels of trade over the years. Brunei Darussalam consistently recorded the lowest average TII score (TII < 1), with a total average of 0.00, indicating minimal trade activity between Malaysia and Brunei. In contrast, Singapore ranked first for ten consecutive years, reaching a peak TII value of 3.01 in 2009, signifying a high level of trade intensity. Severino (2006) attributes Singapore's strong

trade performance to its strategic position as a major trading hub in Southeast Asia, supported by advanced infrastructure, favorable trade policies, and a strategic geographic location. Meanwhile, Thailand ranked third in 2009 with a TII value of 1.17, reflecting a moderate level of trade with Malaysia.

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 TII between Malaysia and Brunei Darussalam is 0.00, reflects minimal trade activity between the two countries. Research by Wangke (2013) and Sheng, et al. (2014) explores the reasons behind low trade intensity, such as limited economic complementarities and trade barriers.

Trade Intensity Index Analysis

Table 3 shows the Trade Intensity Index between Indonesia and ACFTA member countries. It can be calculated the total average of TII Indonesia and its partners in ACFTA for each country member as follow, Indonesia-Malaysia with a total average of TII is 0.36, TII Indonesia-Thailand with a total average of TII is 0.25, TII Indonesia-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. By calculated the average of all Indonesia's TII to ACFTA countries, it produces an average of TII by 0.40. This indicates that the trade intensity index of Indonesia to all ACFTA member countries is less than 1 (TII< 1).

Meanwhile, Table 4 that shows the Trade Intensity Index between Malaysia and ACFTA member countries. It can be calculated the total average of TII Malaysia and its partners in ACFTA for each country member as follows, Malaysia-Indonesia with a total average of TII is 0.26, Malaysia-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. By calculated the average of all Malaysia's TII to ACFTA countries, it produces an average of TII by 0.54. This indicates that, the trade intensity index of Malaysia to all ACFTA member countries is less than 1 (TII< 1), but the total average of TII of Malaysia to ACFTA member countries is higher than Indonesia.

In conclusion, based on the results of calculating the total average TII from Indonesia as a reporter with the total average of TII is 0.40, the highest of TII is occupied by Singapore and the lowest TII is occupied by Brunei Darussalam. The result is similar to Malaysia as a reporter with the total average of TII is 0.54, the highest of TII is occupied by Singapore and the lowest of TII is occupied by Brunei Darussalam. However, the TII of Malaysia is higher than Indonesia. This shows that, the trade intensity of Malaysia to ACFTA countries is higher and well distributed, compared to Indonesia.

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.

Panel regression estimation using the best analytical model of the Common Effect, Fixed Effect, and Random Effect. By comparing these three models, we can determine which model that is the most effective for estimating panel data. The most effective and suitable model for this panel data analysis were determined using the Chow test and Hausman test. The following table will illustrate the regression estimation result of 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	-000.316
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

Table 6 Regression Result

Independent Variables:	Model		
	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

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	- 1.090751	0.2777
Exchange Rate_Partner	0.013680	0.003222	4.246398	0.0000
Exchange Rate_Reporter	-0.010501	0.013600	- 0.772164	0.4416
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			

Panel Regression Analysis

Based on regression estimation results, this show that, the GDP of Country Partners have positive and significant effect on Indonesia's Trade Intensity Index. Then research hypothesis is accepted. The GDP coefficient has a value of 2.3608 with the probability value of 0.0145 < 0.05. This means that, if GDP Country Partners increase by 1 unit, this will increase Trade Intensity by 2.3608 poin. This result in line with research conducted by Wardani (2017) which states that the GDP of Partners have positive effect on exports flow, and TII contains export flow. Nevertheless, GDP of Reporter Country (Indonesia) has an insignificant effect on Trade Intensity Index. This is not in line with the research hypothesis.

Moreover, Country Partners' exchange rate have positive and significant effect on Trade Intensity Index. Then research hypothesis is accepted. The coeficient of Country Partners' exchange rate is 0.01368, with the probability value of 0.0000 < 0.05. This indicates that, if exchange rate Country Partners increase by 1 unit, this will increase Trade Intensity Index by 0.0137. Even though, Indonesia's exchange rate has insignificant effect on Trade Intensity Index. The coefficient value of exchange rate of Reporter Country (Indonesia) has a value of -0.0105 but with a probability value of 0.4416 > 0.05. This finding is supported by research that is conducted by 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.

Furthermore, the ACFTA implementation has significant effect on Trade Intensity Index. The research hypothesis is accepted. ACFTA has a probability value of 0.0005 < 0.05, this result shows that, after ACFTA is implemented, it has a significant effect on Trade Intensity Index. When ACFTA is implemented, it will increase the Trade Intensity index by 0.25 poin.

Conclusion

In conclusion, by employing the Trade Intensity Index (TII) analysis and panel regression analysis using the fixed effect model, this study aims to measure the impact of Gross Domestic Product, exchange rate, and ACFTA implementation on Trade Intensity Index, case study of Indonesia from 2001 to 2021. In the TII Analysis, the findings indicate that, Indonesia as a reporter country, has a lower Trade Intensity Index compared to Malaysia, this show that, Malaysia has more intensive trade than Indonesia toward ACFTA member countries. In the panel regression analysis, to sum up with, the study finds that, GDP, exchange rate, and the dummy variable of FTA of Indonesia's Partners have positive and significant effect on TII. It is demonstrating that, the post-implementation period of ACFTA has a more positive impact on TII, compared to the pre-implementation period. In details, the GDP of Indonesia's Partners, including: Malaysia, Thailand, Philippines, Singapore, Brunei Darussalam, and China, have positive effect on TII, indicating that an increase in the GDP of Indonesia's Partners enhances TII. However, the GDP of Indonesia, has an insignificant effect on TII. The exchange rate of Partners have positive and significant effect on the TII, implying that an increasing of the exchange rate has impact on the TII between Indonesia and its Partners, as the exchange rate is a critical variable affecting exports. Nevertheless, the exchange rate of Indonesia, has an insignificant effect on the TII.

Finally, this research 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 low. Therefore, it is essential for the government to strengthen trade cooperation between countries, especially after the implementation of the ACFTA, focusing on export-import activities. The study also reveals that the GDP of partner countries has a positive and significant effect on TII. This indicates that partner countries need to maintain the stability of consumption level 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.

Author Contributions

Conceptualisation, D.T.K.W and A.S.Z.H; Methodology, D.T.K.W; Investigation, A.S.Z.H and J.D.; Analysis, A.S.Z.H and D.T.K.W.; Original draft preparation, D.T.K.W and A.S.Z.H;

Review and editing, 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.

Acknowledgement

This research has been supported by Universitas Muhammadiyah Yogyakarta research grant for the period 2023/2024.

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.

References

Amaliawiati, L., & Murni, A. (2014). Pengaruh ASEAN-China Free Trade Area (ACFTA) pada Perdagangan Indonesia. JP FEB Unsped. 931-945.

Andriana, Y. F., & Septiana, U. (2020). Dampak Perdagangan Internasional Terhadap Perdagangan Batik Indonesia. *Singularity: Jurnal Desain dan Industri Kreatif, 1*(1), 26–32. https://doi.org/10.31326/jsing.v1i1.647

Anwar, D. M. (2018). *Perdagangan dan Investasi Bilateral Indonesia*. The Phinisi Press.

Atmaja, B. T., Suhadak S., & Hidayat, R. R. (2016). Analisis Pengaruh Balik Ekspor Impor Minyak dan Gas terhadap Pertumbuhan Ekonomi (Studi pada Bank Indonesia Periode 2006-2014). Jurnal Administrasi Bisnis. 31(1).

Ayullah Kusuma, A. (2019). Dampak ASEAN-China free trade agreement (ACFTA) terhadap pertumbuhan ekonomi Indonesia. *Jurnal Ekonomi Pembangunan, 15*(1), 1–14. https://doi.org/10.29259/jep.v15i1.8778

Bhagwati, J. N. (1988). *Protectionism*. MIT Press.

Bowo, H. (2012). Dampak Penerapan ASEAN-China Free Trade Area terhadap Nilai Perdagangan Indonesia atas China: Studi Beberapa Komoditas Terpilih. *Thesis*. Universitas Indonesia, Jakarta.

Cahyani, C. A. (2014). Analisis Daya Saing Industri Besi Baja dalam Rangka Menghadapi ACFTA. *Economics Development Analysis Journal, 3*(2), 337-344. https://journal.unnes.ac.id/sju/edaj/article/view/3841

Cheng, J. Y. (2004). The ASEAN-China Free Trade Area: genesis and implications. *Australian Journal of International Affairs, 58*(2), 257–277. https://doi.org/10.1080/1035771042000220114

Davidson, P. J. (2002). *ASEAN: The Evolving Legal Framework for Economic Cooperation, 205-211*. Marshall Cavendish Intl.

Devadason, E. S. (2010). ASEAN–China Trade Flows: moving forward with ACFTA. *Journal of Contemporary China, 19*(66), 653–674. https://doi.org/10.1080/10670564.2010.485403

Dornbusch, R. (1976). Expectations and Exchange Rate Dynamics. *Journal of Political Economy, 84*(6), 1161–1176. https://doi.org/10.1086/260506

Heckscher, E.F., Ohlin, B.G., Flam, H., & Flanders, M.J. (1991). *Heckscher-Ohlin Trade Theory*.

Johnson, H. G. (1953). Optimum Tariffs and Retaliation. *The Review of Economic Studies, 21*(2), 142. https://doi.org/10.2307/2296006

Kariyono, M. (2020). *Pengesahan Protokol Implementasi Sixth Package*.

Kartikasari, E. (2016). Respon Indonesia Terhadap Acfta: Pro Kontra Wacana Renegosiasi. *Cakrawala Jurnal Penelitian Sosial, 3*(1). Retrieved from https://ejournal.uksw.edu/cakrawala/article/view/71

Krugman, P. R. (1979). Increasing returns, monopolistic competition, and international trade. *Journal of International Economics, 9*(4), 469–479. https://doi.org/10.1016/0022-1996(79)90017-5

Krugman, P. R., & Obstfeld, M. (2009). International Economics: Theory and Policy (8th ed.). Pearson Education.

Lestari, E. P. (2011). Intensitas Perdagangan dan Keselarasan Siklus Bisnis di ASEAN-4 dan Uni Eropa. *Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi Dan Pembangunan, 12*(2), 163. https://doi.org/10.23917/jep.v12i2.191

Lipsey, R. G., Courant, P. N., & Ragan, C. T. S. (1995). Economics (9th ed.). HarperCollins College Publishers.

Lubis, A. D., & Nuryanti, S. (2016). Analisis Dampak ACFTA dan Kebijakan Perdagangan Kakao di Pasar Domestik dan China. *Analisis Kebijakan Pertanian, 9*(2), 143. https://doi.org/10.21082/akp.v9n2.2011.143-156

Machmud, A. (2020). Dampak Depresiasi Rupiah Terhadap Perkembangan Impor Indonesia. *Quantitative Economics Journal, 5*(1). https://doi.org/10.24114/qej.v5i1.17480

Marks, S. V. (2015). The Asean–China Free Trade Agreement: Political Economy in Indonesia. *Bulletin of Indonesian Economic Studies, 51*(2), 287–306. https://doi.org/10.1080/00074918.2015.1061917

Menon, J. (2007). Bilateral Trade Agreements. *Asian-Pacific Economic Literature, 21*(2), 29–47. https://doi.org/10.1111/j.1467-8411.2007.00201.x

Mulianta, A. (2013). The Impact of ACFTA on Indonesia's Trade Balance. Journal of International Economic Studies, 10(3), 45-67.

Mulyati, L. U. (2012). Dampak Perjanjian Perdagangan Bebas ACFTA (ASEAN-China Free Trade Area) Indonesia Menurut Hukum Perdagangan Internaisonal. *Thesis*. Universitas Andalas Padang.

Ngatikoh, S., & Faqih, A. (2020). Kebijakan Ekspor Impor: Strategi Meningkatkan Pertumbuhan Ekonomi di Indonesia. *LABATILA : Jurnal Ilmu Ekonomi Islam, 4*(2), 167-190. https://ejournal.iainu-kebumen.ac.id/index.php/lab/article/view/269

Ohlin, B. (1933). *Inter-Regional and International Trade*. Cambridge, MA: Harvard University Press.

Park, D. (2007). The Prospects of the ASEAN–China Free Trade Area (ACFTA): A Qualitative Overview. *Journal of the Asia Pacific Economy, 12*(4), 485–503. https://doi.org/10.1080/13547860701594103

Pramitasari, R. (2016). Integrasi Perdagangan dan Sinkronisasi Siklus Bisnis antara Indonesia dan ASEAN+6. *Thesis*. Jurnal Repository IPB.

Pridayanti, A. (2014). Pengaruh Ekspor, Impor, dan Nilai Tukar Terhadap Pertumbuhan Ekonomi di Indonesia Periode 2002-2012. *Jurnal Pendidikan Ekonomi (JUPE), 2*(2). https://ejournal.unesa.ac.id/index.php/jupe/article/view/8103

Putri, R. D. S., & Siladjaja, M. (2021). Pengaruh Perdagangan Internasional (Ekspor - Impor) dan Investasi Terhadap Pertumbuhan Ekonomi di Indonesia. *Journal of Public Auditing and Financial Management, 1*(1), 13 - 26. https://ejournal.imperiuminstitute.org/index.php/JPAFM/article/view/361

Rahajeng, L. R. (2016). Analisis Faktor yang Mempengaruhi Masuknya Foreign Direct Investment (FDI) Negara Berkembang di Kawasan ASEAN (Indonesia, Malaysia, Thailand, Kamboja dan Vietnam) Periode 1995-2014. *Jurnal Ilmiah Mahasiswa FEB, 4*(2). https://jimfeb.ub.ac.id/index.php/jimfeb/article/view/3227

Raswatie, F. D. (2014). Hubungan Ekspor - Produk Domestik Bruto (PDB) di Sektor Pertanian Indonesia. *Journal of Agriculture, Resource and Environmental Economics, 1*(1), 28-42. https://doi.org/10.29244/jaree.v1i1.11288

Ricardo, D. (1817) On the Principles of Political Economy and Taxation (John Murray, London). In: Sraffa, P., Ed., *The Works and Correspondence of David Ricardo*, Vol. 1, Cambridge University Press, Cambridge, 1951.

Ridho'ah, H., Viphindrartin, S., & Riniati, R. (2018). Analisis Kausalitas Perdagangan Internasional dan Pertumbuhan Pasar Saham Terhadap Pertumbuhan Ekonomi di ASEAN 3 Periode Tahun 2000-2015. *Jurnal Ilmu Ekonomi dan Pembangunan, 18*(2), 101-110. http://dx.doi.org/10.20961/jiep.v18i2.17048

Salomo, R. (2007). *Peranan Perdagangan Internasional Sebagai Salah Satu Sumber Pertumbuhan Ekonomi Indonesia*. Eprints UMSIDA.

Salvatore, D. (2013) International Economics. 220-290. John Wiley & Sons.

Samuelson, P. A. (1948). International Trade and the Equalisation of Factor Prices. *The Economic Journal, 58*(230), 163. https://doi.org/10.2307/2225933

SBM, N. (2011). Pro-Kontra Perdagangan Bebas ASEAN-China (ACFTA). *Media Ekonomi dan Manajemen. 24*(2) 31-37.

Severino, R. C. (2006). Southeast Asia in Search of an ASEAN Community. https://doi.org/10.1355/9789812305671

Sheng, Y., Tang, H. C., & Xu, X. (2014). The impact of the ACFTA on ASEAN–PRC trade: estimates based on an extended gravity model for component trade. *Applied Economics, 46*(19), 2251–2263. https://doi.org/10.1080/00036846.2014.899676

Shepherd, B., & Wilson, J. S. (2009). Trade facilitation in ASEAN member countries: Measuring progress and assessing priorities. *Journal of Asian Economics, 20*(4), 367–383. https://doi.org/10.1016/j.asieco.2009.03.001

Sitorus, F. D. (2020). Pengaruh Perdagangan Internasional Terhadap Nilai Tukar Rupiah. *Quantitative Economics Journal, 7(*3). https://doi.org/10.24114/qej.v7i3.17559

Smith, A. (1776). *An inquiry into the nature and causes of the wealth of nations* (Vol. 2). The Glasgow edition of the works and correspondence of Adam Smith. https://doi.org/10.1093/oseo/instance.00043218

Tongzon, J. L. (2005). ASEAN-China Free Trade Area: A Bane or Boon for ASEAN Countries? *The World Economy, 28*(2), 191–210. https://doi.org/10.1111/j.1467-9701.2005.00643.x

Umuhoza, A. J., & Wang, J. (2021). Research on EAC-China Economic Relations in Trade and Its Influences: An Analysis Based on Trade Intensities. *Chinese Studies, 10*(2), 100–122. https://doi.org/10.4236/chnstd.2021.102008

Wahyuningsih, S., & Satriani, D. (2019). Pendekatan Ekonomi Kreatif Terhadap Pertumbuhan Ekonomi. *IQTISHADUNA: Jurnal Ilmiah Ekonomi Kita, 8*(2), 195–205. https://doi.org/10.46367/iqtishaduna.v8i2.172

Wangke, H. (2016). Perdagangan Lintas Batas Antar-Negara: Memacu Pembangunan Ekonomi Kabupaten Bengkayang Dan Kabupaten Belu. *Jurnal Politica Dinamika Masalah Politik Dalam Negeri dan Hubungan Internasional, 4*(1).

Wulandari, L., & Zuhri, S. (2019). Pengaruh Perdagangan Internasional Terhadap Pertumbuhan Ekonomi Indonesia Tahun 2007-2017. *Jurnal REP (Riset Ekonomi Pembangunan), 4*(2), 1–189. https://doi.org/10.31002/rep.v4i2.781

Yudilla, A. (2020). Kerjasama Indonesia Cina dalam Belt and Road Initiative Analisa Peluang dan Ancaman untuk Indonesia. *Journal of Diplomacy and International Studies. 4*(3), 18-23. https://journal.uir.ac.id/index.php/jdis/article/view/4427

Yuni, R. (2021). Dampak Perdagangan Internasional Terhadap Pertumbuhan Ekonomi Indonesia Pada Tahun 2009-2019. *NIAGAWAN, 10*(1), 62. https://doi.org/10.24114/niaga.v10i1.19193

Zatira, D., Sari, T. N., & Apriani, M. D. (2021). Perdagangan Internasional Terhadap Pertumbuhan Ekonomi Indonesia. *Jurnal Ekonomi-Qu, 11*(1), 88. https://doi.org/10.35448/jequ.v11i1.11277