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Indonesia's opportunity in driving an optimistic involvement in the multipolar world: trade evidence from ASEAN and BRICS+

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Abstract. Indonesia has played a significant role in the global shift towards multipolarity. After joining ASEAN in 1967, Indonesia officially joined BRICS+ in early 2025. Indonesia's involvement in these blocs is undoubtedly intended to increase economic growth through international trade. This study examines Indonesia's involvement in establishing bilateral trade cooperation and explores opportunities for future Indonesian trade cooperation with these two blocs. Researchers employed four approaches, including trend visualization, the trade complementarity index (TCI), the trade intensity index (TII), and the autoregressive distributed lag approach. Trend visualization shows that Indonesia had significant trade cooperation with Singapore, Malaysia, the Philippines, China, and India from 2012 to 2023. The TCI calculation reveals that Indonesia has a reasonably high trade compatibility with other ASEAN and BRICS+ countries, with an average TCI value of 0.8. Thus, the TII discloses that several countries have the potential to become new markets for Indonesian trade. The Russian Federation and the Lao PDR are the countries with the most potential for Indonesian trade collaboration. The ARDL model analysis indicates that the values of Indonesia's imports to ASEAN, its exports to BRICS+, and the exchange rate have a significant impact on Indonesia's GDP. This study offers a comprehensive examination of the impact of Indonesia's participation in multipolar organizations on its economic growth, particularly in relation to its membership in the BRICS+ group. Indonesia's economic growth forecast indicates an upward trend, with an average growth rate of 3.4% projected over the next decade. This suggests that Indonesia's involvement in ASEAN and BRICS is expected to have a substantial impact on its economic development. In conclusion, Indonesia's decision to join the BRICS+ is a strategic move aimed at diversifying international trade and reducing its dependence on conventional markets. This study recommends that policymakers develop regulations for bilateral trade cooperation between Indonesia and ASEAN, as well as BRICS+ countries.



Keywords: bilateral trade, intra-trade, geopolitical issues, international organization, unipolar world

Authors' contribution. Rizki S.W. — research concept and design, data collection, data analysis, wrote the paper; Didenko N.I. — research concept, supervision, result correction. All authors approved the initial version of the manuscript.

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Возможности Индонезии в продвижении позитивного участия в многополярном мире: примеры торговли в странах АСЕАН и БРИКС+

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Аннотация. Индонезия сыграла значительную роль в глобальном переходе к многополярности. После вступления в АСЕАН в 1967 г. страна официально присоединилась к БРИКС+ в начале 2025 г. с целью ускорения собственного экономического роста посредством международной торговли. Рассмотрено участие Индонезии в установлении двустороннего торгового сотрудничества и изучены возможности будущего торгового взаимодействия страны с двумя блоками. Используются четыре исследовательских подхода, включая визуализацию тренда, индекс торговой взаимодополняемости, индекс интенсивности торговли и метод авторегрессионного распределенного лага. Визуализация тренда показала, что Индонезия имела значительное торговое сотрудничество с Сингапуром, Малайзией, Филиппинами, Китаем и Индией в период с 2012 по 2023 г. Согласно проведенным расчетам, Индонезия имеет достаточно высокую торговую совместимость (ИТС) с другими странами АСЕАН и БРИКС+ со средним значением 0,8. Таким образом, несколько стран могут стать новыми рынками для индонезийской торговли. Российская Федерация и Лаосская Народно-Демократическая Республика — страны с наибольшим потенциалом для торгового сотрудничества с Индонезией. На основе модели ARDL выявлено, что стоимость импорта Индонезии в страны АСЕАН, экспорта в страны БРИКС+ и обменный курс значительно отражаются на ВВП Индонезии. Предложен комплексный анализ влияния на ее экономический рост Индонезии ее членства в многополярных организациях, особенно в группе БРИКС+. Прогноз экономического роста Индонезии указывает на тенденцию к увеличению, при этом средний темп роста в течение следующих десяти лет составит 3,4 %.

Участие Индонезии в АСЕАН и БРИКС, как ожидается, приведет к ускорению ее экономического развития. Отмечено, что решение присоединиться к БРИКС+ является стратегическим шагом, направленным на диверсификацию международной торговли и снижение зависимости Индонезии от традиционных рынков. Подчеркнута необходимость разработки правил двустороннего торгового сотрудничества между Индонезией и странами АСЕАН, а также БРИКС+.

Ключевые слова: двусторонняя торговля, внутренняя торговля, геополитические вопросы, международная организация, однополярный мир

Вклад авторов. Ризки С.В. — концепция и дизайн исследования, сбор данных, анализ данных, написание статьи; Диденко Н.И. — концепция исследования, руководство и корректировка результатов. Все авторы одобрили окончательную версию рукописи.

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Introduction

The emergence of regional powers is a primary cause of the development of multipolar structures. The increasing trend of multipolarity is driven by several factors, including the rise of new powers such as China and Russia, as well as a shift in the dynamic of the power structure from unipolarity to multipolarity (Muzaffar, Yaseen, Rahim, 2017). The Association of Southeast Asian Nations (ASEAN) and Brazil, Russia, India, China, and South Africa (BRICS) bloc, as well as the newcomer BRICS Plus, are international organizations that contribute significantly to the multipolar world, promoting global economic integration. The global landscape of international trade and economic cooperation has undergone a significant transformation, marked by the emergence of new economies and the growth of regional and international organizations over the past few decades. Economic integration with regional entities, such as ASEAN, and global initiatives, like BRICS, has played a significant role in shaping the region's economic landscape. However, ASEAN and BRICS member countries have significant economic disparities, high population dynamics, and challenging investment challenges (Porca-Konjikusic, Hudson Jr., Jain Harshi, 2024).

Indonesia is the country with the largest population and economy in Southeast Asia. Indonesia has committed to continuing its development of international cooperation to diversify strategic partners for export markets. In 1967, Indonesia was one of the founding members of the ASEAN establishment in Bangkok, Thailand. The ASEAN member countries are Indonesia, Malaysia, Singapore, Thailand, the Philippines, Myanmar, Cambodia, Lao PDR, Vietnam,

and Brunei Darussalam. The ASEAN Free Trade Area agreement was a significant commitment by ASEAN to enhancing intra-ASEAN trade. The agreements that eliminated tariff and non-tariff barriers have had a significant impact on intra-ASEAN trade, resulting in a net trade effect from export-import activities (Wong, Liew, Arip, 2017).

The establishment of the ASEAN Economic Community in 2015 was considered a response to the growing phenomenon of global economic integration. The AEC is a forum for ASEAN to carry out regional economic integration before participating at a higher level in global economic integration. Thus, Indonesia has not maximized its potential to become a major player in ASEAN regional economic integration, still lagging behind Singapore and several other ASEAN countries. Indonesia must further maximize its potential in the AEC 2025, which is predicted to be a more dynamic continuation of the AEC 2015. Furthermore, Indonesia is believed to be able to strengthen its position in the AEC 2025 and enhance its economy by developing a more structured and reconstructed identity (Permatasari, 2020).

To expand and strengthen Indonesia's involvement and role in the multipolar economy, the BRICS forum is a potential and significant preference for strategic moves in diversifying trade and investment. This decision also provides broader market opportunities and reduces dependence on conventional markets, including the United States. The BRICS has emerged as a new power balancing the other three economic and political powers: the United States, the European Union, and Japan. The BRICS economies have become more integrated with international trade over time (de Castro, 2013). At the BRICS summit in 2017, the Chinese government announced the promotion of the "BRICS Plus" cooperation approach to establish closer and stronger partnerships with emerging market and developing countries, aiming to enhance potential cooperation in finance, trade, and investment (Arapova, 2019). In the modern world, establishing regional economic relations is considered a key factor in reducing conflicts between countries within the same region. The BRICS fosters strong economic relations among its member countries to reduce the likelihood of conflicts and promote a diplomatic global atmosphere (Shameem, Jayaprasad, 2020). The economic growth of the BRICS is heading in an optimistic direction, serving as a stepping stone for member countries towards achieving positive economic growth.

Indonesia has committed to improving bilateral relations in international trade. To fulfill this commitment, Indonesia officially became a full member of BRICS+ on 1 January 2025. This decision is part of the expansion drive at the BRICS summit 2023 in Johannesburg. Indonesia's official participation in the BRICS international organization is expected to increase strategic opportunities that can strengthen national interests in the economy, politics, and diplomacy. Furthermore, Indonesia's involvement in BRICS has the potential to develop intercontinental market access, reduce dependence on previous trading nations, and enhance infrastructure development through stronger competitive financing support from BRICS (Myajaya, 2025).

Indonesia's BRICS membership is an opportunity to expand economic partnerships, utilize alternative financial mechanisms, and increase its influence in global governance. Indonesia's decision on BRICS affiliation is expected to reflect a potential strategy that aligns with national interests, economic pragmatism, and geopolitical considerations in a rapidly evolving global context (Setiawan, 2025). The BRICS+ members include Brazil, China, Egypt, Ethiopia, India, Indonesia, Iran, the Russian Federation, South Africa, and the United Arab Emirates.

This study aims to enhance and build upon previous research on Indonesia's membership in BRICS. The authors examine Indonesia's opportunities for membership in international organizations from a trade perspective. To examine the opportunities Indonesia has in international trade involvement with ASEAN and BRICS countries, researchers employ several approaches. The approaches display Indonesian trade trends, trade complementarity index, trade intensity index, and the Autoregressive Distributed Lag (ARDL) model. The trend display is to determine how far Indonesia's trade growth is associated with ASEAN and BRICS countries. The trade complementarity index measures the level of similarity in export products between two countries across 10 product sectors. The trade intensity index is calculated to determine which country is the most suitable destination for Indonesian trade cooperation.

The research question of this study is how far Indonesia's involvement is in establishing bilateral trade cooperation in the context of a multipolar world.

The research purpose of this study is to examine opportunities for Indonesian trade cooperation with these two blocs in the future.

This study employs four approaches: trend visualization, the trade complementarity index, the trade intensity index, and the ARDL model, which are expected to provide deeper confidence and understanding. It is considered to be a moderate difference in the discussion of studies on Indonesia's involvement in the multipolar economy. Data visualization is used to provide a clear understanding of the growth of Indonesian trade through the export and import sectors with ASEAN and BRICS member countries. Data visualization can be applied in all fields of research. For example, data visualization is crucial in the business sector and can be used as a key consideration in making decisions closely related to the primary income of industrial companies (Qin et al., 2020).

The trade complementarity index and trade intensity index are employed to measure market compatibility and identify market opportunities between Indonesia and ASEAN, as well as BRICS+ member countries. There are several previous studies on the trade complementarity index, such as the study on the trade complementarity index was used to investigate the complementarity of agricultural trade of the Association of Southeast Asian Nations countries in the global agricultural market over 19 years, providing results implying that ASEAN countries have either weak complementarity or intense competition in agricultural trade in the world market (Hoang, 2018). Furthermore, the study examining the trade intensity index analysis of trade intensity among BRICS member countries indicated that the results of the trade intensity analysis recommend the need for closer cooperation to promote more intra-BRICS trade. Thus, important policies

related to structural transformation are necessary to promote trade relations and strengthen ties between BRICS countries, with a focus on free trade agreements (Maryam, Banday, Mittal, 2018).

Research on international trade cooperation involving the ASEAN and BRICS blocs has been widely conducted. For instance, a study applying gravity models to intra-BRICS trade movements and the potential for building economic cooperation confirmed that intra-BRICS trade relations have a substantial positive impact on economic performance in these countries (Rahman, Fatima, Rahman, 2020). Next, the study examines the structure and characteristics of ASEAN+3 intra-regional trade through the analysis of intra-regional trade shares, the intra-regional trade intensity index, and the introversion index provides indications that, for the sustainability of intra-regional trade development, more comprehensive and higher intra-regional economic integration is needed (Ra, 2015). Moreover, a study evaluating the impact of the ASEAN-China Free Trade Area on Indonesia's trade intensity index shows that Indonesia's trade intensity index with other ACFTA members is lower than that of Malaysia. This indicates the need for a targeted trade policy in Indonesia that aims to increase export volumes in sectors where it has comparative advantages (Wardani et al., 2024). Lastly, the study of trade expansion liberalization between Indonesia and its regional partner countries, which utilized the trade balance index (TBI) to analyze goods based on specialization advantage patterns, revealed that Indonesia profited from primary raw material trade, while losing ground in specific low-cost manufacturing sectors (Purwono et al., 2022).

Mathematical models and statistical methods are prevalent approaches utilized in econometric studies, especially to investigate the relationship between economic growth and trade in a country. Some of them are regression analysis, panel data, and ARDL models. Research examining the factors affecting international trade relations in Indonesia, using cointegration analysis, provided results indicating that export value, import value, exchange rate, and GDP have a significant effect on the balance of trade, accounting for 55.08 percent of the long-term trend over the next 35 years (Laksono, Mohd Saudi, 2020). Furthermore, an autoregressive distributed lag model is employed to examine the short-run and long-run effects of exchange rate volatility on Somalia's trade balance, revealing that GDP and the real effective exchange rate have a positive impact on the trade balance (Nur, Ali, 2025). To complement and examine in more depth previous studies on international trade involving ASEAN and BRICS countries, researchers examined Indonesia's opportunities in international trade involving the two blocs. The ARDL regression model is employed to identify the factors integrated into international trade that influence economic growth. Economic growth in this study is measured by GDP.

The research hypothesis of this study can be represented as follows,

H1: Export, import, and exchange rates have an impact on economic growth.

The alpha value has been chosen to assess the probability of error in determining a decision to reject or support the hypothesis. The hypothesis will be accepted if the p-value is less than the alpha value.

Methodology

Trend visualization in econometrics is commonly used, primarily employing line plots to illustrate how economic variables, such as GDP, change over time. Trends aim to help identify patterns, cycles, and volatility. Trend visualization can also be used as a visual basis for selecting appropriate econometric models and understanding the temporal behavior of time series. Trend visualization is a crucial and widely used tool in economic research (Song, Zhang, Dong, 2016; Wright, 2015). The trade complementarity index (TCI) assesses the extent to which a country’s export profile is correlated with the import profile of another country. The TCI can provide valuable insights into mutual trade prospects, as it illustrates how well a country’s import and export structures align with each other. The index can also be used as a basis for considering the formation of regional trade agreements. An index value of zero indicates that no products or services are exported by the determined country or imported by the partner country. A value of 1 indicates that the shares of both countries’ exports and imports are equal.

$$TCI_{ij} = \left[1 - \frac{\sum_k |m_k^i - x_k^j|}{2} \right],$$

(1)

where m_k^i — product k 's share in the total import of other ASEAN or BRICS countries in the world; x_k^j — product k 's share in Indonesia’s total exports to the world.

The composition of commodity trade is crucial for analyzing international trade. It represents the share of each sector or product category traded between trading partners. This study examined the 10 commodity sectors traded between Indonesia, ASEAN, and BRICS member countries, covering both total exports and imports for the period from 2017 to 2023 (Table 1).

Table 1

List of product shares

Code of Products	Label of products	Code of products	Label of the products
9	Coffee, tea, maté, and spices	30	Pharmaceutical products
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds, and fruit; industrial or medicinal	40	Rubber and articles thereof
13	Lac, gums, resins, and other vegetable saps and extracts	64	Footwear, gaiters, and the like, parts of such articles
15	Animal, vegetable, or microbial fats and oils and their cleavage products; prepared edible fats	73	Articles of iron or steel
18	Cocoa and cocoa preparations	84	Nuclear reactors, boilers, machinery, and mechanical appliances; parts thereof

Source: compiled by S.W. Rizki, N.I. Didenko.

The TII is a measure used to assess the cost of trade between two countries. Whether the value is greater or less than projected based on its expected position in world trade, this index represents the ratio of a country's exports to its partner to the world's exports to its partner. An index greater than or less than 1 indicates that bilateral trade flows are greater or less than expected. It provides an interpretation of the significance of the partner country in the global trade landscape.

$$TII_{ij} = \frac{X_{ij}}{Y_{jw}} = \frac{E_{ij}/E_{iw}}{E_{wj}/E_{ww}}, \quad (2)$$

where X_{ij} — a partner country j 's share of the determined country i 's total export; Y_{jw} — its share of the world export; E_{ij} — the total bilateral export between the determined country i and partner country j ; E_{iw} — export between the determined country i and the world; E_{wj} — export between countries j and the world; E_{ww} — total world export.

The ARDL model of order q and r , $ARDL(q, r)$ where e_t is a scalar zero-mean error term and X_t is N — dimensional column vector process¹. The coefficients σ_i are scalars while α_i are row vectors. Applying a lag operator L employed by each component represents a vector, $L^n X_t = X_{t-n}$ represent the lag polynomial $\sigma(L)$ and the vector polynomial $\alpha(L)$. A scalar variable Y_t is denoted as an equation

$$Y_t = \sum_{i=1}^q \sigma_i Y_{t-i} + \sum_{i=0}^r \alpha_i X_{t-i} + e_t. \quad (3)$$

An econometric model in which the endogenous variable Y can be presented as a function of its past values, counting the current and lagged values of other exogenous variables X . It is entitled 'a dynamic model'. If we regress Y on its m -lagged values and the current and m -lagged values of the exogenous variable X . Then the dynamic model is expressed as an equation as below²:

$$Y_t = \mu + \sigma_1 Y_{t-1} + \dots + \sigma_m Y_{t-m} + \alpha_0 X_t + \alpha_1 X_{t-1} + \dots + \alpha_m X_{t-m} + e_t. \quad (4)$$

The ARDL model involves several steps, including stationarity tests, correlation and multicollinearity tests, Akaike Information Criterion (AIC) checks, cointegration and autocorrelation tests, stability checks, and residual tests.

¹ Hassler, U., & Wolters, J. (2005). *Autoregressive Distributed Lag Models and Cointegration*.

² Hossain, S. (2024). *Econometric Analysis: An Applied Approach to Business and Economics* (1st edition). Cambridge Scholars Publishing.

Trend of Indonesia's bilateral trade with ASEAN and BRICS countries

A trend visualization represents the movement of international trade between Indonesia and ASEAN and BRICS+ member countries, in terms of export and import volumes. The graphs give readers information on intra-trade between Indonesia and the ASEAN and BRICS+ blocks. The intensity and volume of trade between Indonesia and ASEAN-BRICS member countries from 2012 to 2023 are illustrated in the trend graphs 1–4.

Singapore is Indonesia's largest export destination in the ASEAN region, followed by Malaysia, Thailand, the Philippines, and Vietnam, as shown in Figure 1. The remaining four countries import goods from Indonesia but have not gained a significant amount. In 2022, Indonesia earned an export value of more than \$ 10 billion from Singapore, Malaysia, and the Philippines. Since 2012, Indonesia has had the lowest export value among Brunei Darussalam, Cambodia, Lao PDR, and Myanmar.

Within the ASEAN bloc, Indonesia has made the most significant imports from Singapore since 2012, with a total import value exceeding \$ 20 billion, as shown in Figure 2. Indonesia's imports from other ASEAN countries are less than or around \$ 10 billion. From both Figures 1 and 2, it can be concluded that Indonesia has the most trade cooperation with Singapore.

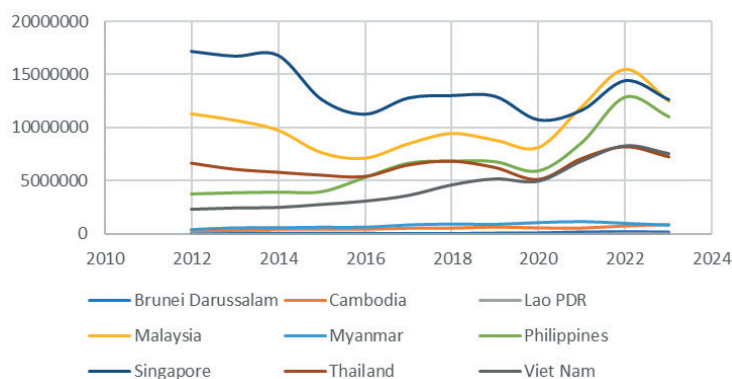


Figure 1. Indonesia's exports to ASEAN countries from 2012 to 2023

Source: compiled by S.W. Rizki, N.I. Didenko.

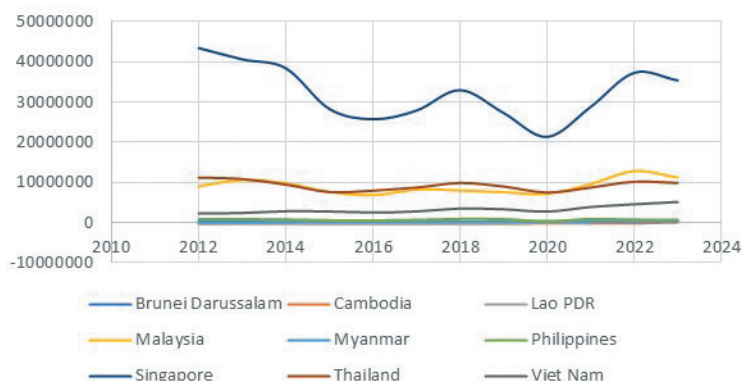


Figure 2. Indonesia's imports from ASEAN countries from 2012 to 2023

Source: compiled by S.W. Rizki, N.I. Didenko.

Indonesia's membership of BRICS+ officially took effect in early 2025; however, it had already initiated trade cooperation with BRICS+ member countries prior to this. The display of export and import cooperation is shown in Figures 3 and 4. Since 2012, China has been Indonesia's largest export destination, and this trend has continued to increase since then. This export trend increased sharply from 2020 to 2022, with the highest total export value of approximately \$ 70 billion in 2022. In 12 years, India has become Indonesia's second-largest export destination, although the total export value has remained relatively stable at around \$10–\$20 billion US dollars. Indonesia's export value to other BRICS+ countries remains insignificant, with a value of under \$ 3 billion.

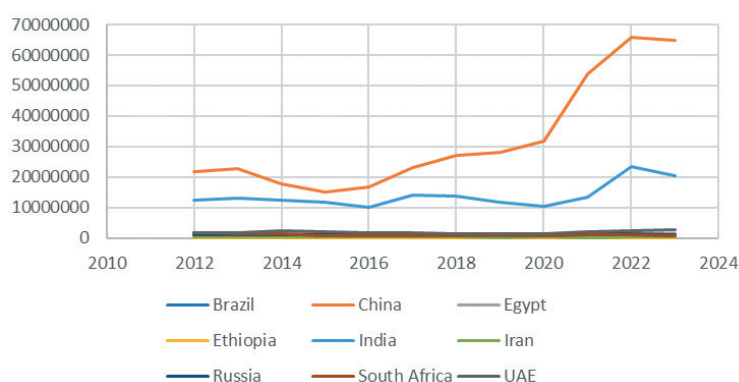


Figure 3. Indonesia's exports to BRICS+ countries from 2012 to 2023

Source: compiled by S.W. Rizki, N.I. Didenko.

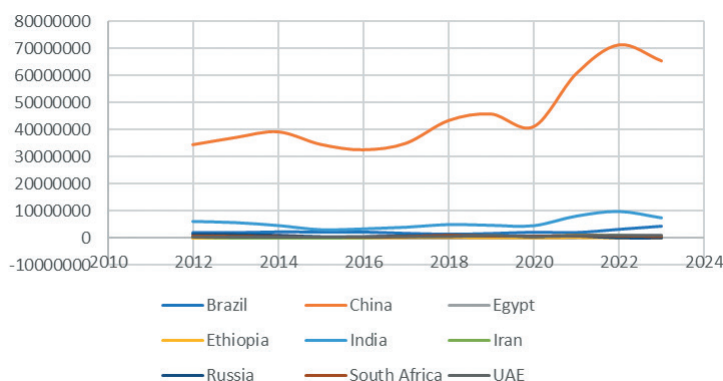


Figure 4. Indonesia's imports from BRICS+ countries from 2012 to 2023

Source: compiled by S.W. Rizki, N.I. Didenko.

In the BRICS+ group, China contributes the greatest number of Indonesia's imports. Between 2012 and 2023, Indonesian imports experienced an upward trend, particularly from 2020 to 2022, with a sharp increase. Other BRICS+ member countries have contributed a small amount to Indonesia's imports.

Based on the graphs, it can be concluded that only several ASEAN and BRICS+ member countries have significant trade cooperation with Indonesia. These are Singapore, Malaysia, the Philippines, China, and India. To strengthen this study

of Indonesia’s trade cooperation, additional approaches were taken to determine the level of optimism regarding opportunities for Indonesia’s trade cooperation with ASEAN and BRICS+ member countries. The next approach is identifying bilateral trade opportunities between Indonesia and those countries using the TCI and TII approaches.

TCI and TII values of Indonesia with ASEAN and BRICS countries

In the trend visualization approach, only five countries have cooperated significantly in trade with Indonesia. The TCI and TII calculations will provide an overview of Indonesia’s bilateral trade opportunities with ASEAN and BRICS+ member countries. Table 2 revealed bilateral trade suitability between Indonesia and ASEAN and BRICS+ countries.

Table 2

TCI and TII values of Indonesia and ASEAN-BRICS countries

ASEAN countries		TII	TCI	BRICS+ countries		TII	TCI
Indonesia	Brunei Darussalam	1.5954	0.8210	Brazil		0.4613	0.8406
	Cambodia	3.5768	0.8226	China		1.4327	0.6185
	Lao PDR	0.1448	0.8209	Egypt		3.3575	0.8323
	Malaysia	3.8587	0.8594	Ethiopia		1.5003	0.8263
	Myanmar	5.6862	0.8249	India		4.2113	0.8886
	Philippines	11.7292	0.8353	Iran		0.2821	0.8351
	Singapore	2.8847	0.8319	Russian Federation		0.2517	0.8518
	Thailand	2.5816	0.8279	South Africa		0.7396	0.8360
	Viet Nam	1.9480	0.8361	Uni Arabic Emirates		0.4443	0.8406

Source: calculated by S.W. Rizki, N.I. Didenko.

TCI values represent the strength of the bilateral connection between Indonesia and countries affiliated with ASEAN and BRICS+. The values indicate a correlation between a country’s exports to the world and imports from partner countries. The more significant the index score, the stronger the opportunity to provide beneficial bilateral trade and further development. We concluded that the order of TCI values from the largest to the smallest in ASEAN is as follows: Indonesia-Malaysia, Indonesia-Vietnam, Indonesia-Philippines, Indonesia-Singapore,

Indonesia-Thailand, Indonesia-Myanmar, Indonesia-Cambodia, Indonesia-Brunei Darussalam, and Indonesia-Lao PDR. In BRICS+, we have Indonesia-India, Indonesia-Russian Federation, Indonesia-Brazil, Indonesia-UAE, Indonesia-South Africa, Indonesia-Iran, Indonesia-Egypt, Indonesia-Ethiopia, and Indonesia-China. The TCI values are around 0.80, excluding Indonesia-China, and are around 0.6. It reveals that almost all ASEAN and BRICS+ countries have a significant level of bilateral trade compatibility with Indonesia. Bilateral trade with these countries will provide significant benefits for both countries involved.

The TII represents the intimacy of the trade relationship between two countries based on actual observations of bilateral trade flows. The lower the TII value, the better the export prospects. Exporters can use the results of the TII calculation as a reference for selecting markets, specifically with a low TII value. The low values indicate a greater potential opportunity for export. Table 2 discloses Indonesia's export opportunities to ASEAN and BRICS countries. The order of opportunities from the largest to the smallest of Indonesia's export destinations in ASEAN countries is Indonesia-Lao PDR, Indonesia-Brunei Darussalam, Indonesia-Vietnam, Indonesia-Thailand, Indonesia-Singapore, Indonesia-Cambodia, Indonesia-Malaysia, Indonesia-Myanmar, and Indonesia-Philippines. In BRICS, the opportunity order is as follows: Indonesia-Russia, Indonesia-Iran, Indonesia-United Arab Emirates, Indonesia-Brazil, Indonesia-South Africa, Indonesia-China, Indonesia-Ethiopia, Indonesia-Egypt, and Indonesia-India.

The ARDL Model (2,2,2,2)

The ARDL model employed GDP as an endogenous variable. Volume of Indonesia's export to ASEAN, volume of Indonesia's import to ASEAN, volume of Indonesia's export to BRICS, volume of Indonesia's import from BRICS, and the exchange rate were chosen as exogenous variables influencing and significantly impacting GDP. The research applied time series data in the period 2005–2023. The data struggled during the COVID-19 era from 2020 to 2022. It would be a unique and challenging expectation in the analysis process.

The endogenous variable in the ARDL model analysis is GDP (\$ million). Exogenous variables include *ExpA* represents Volume of Indonesia's exports to ASEAN (\$ million), *ImpA* represents Volume of Indonesia's imports from ASEAN (\$ million), *ExpB* represents Volume of Indonesia's exports to BRICS+ (\$ million), *ImpB* represents Volume of Indonesia's imports from BRICS+ (\$ million), and ER^3 represents the Exchange rate (IDR/USD). Several stages are required to run the ARDL model.

Stationarity checking. The ARDL model tolerates data stationarity at level I (0) and first differencing I (1). An augmented Dicky-Fuller test is required to check the stationarity status. In this study, all variables are stationary in first differences (I (1)) and exhibit different types, as shown in Table 3.

³ Foreign Exchanges Rates. Central Bank of Indonesia. Retrieved 4 April 2025, from <https://www.bi.go.id/en/statistik/informasi-kurs/transaksi-bi/default.aspx>

Table 3

Stationery test results using the augmented Dicky-Fuller Test

Var	Stationery at	Type (1): no drift, no trend	Type (2): with drift, no trend	Type (3): with drift, with trend
GDP	I (1)	Yes at lag 0, p-value=0.0233	Yes at lag 0, p-value=0.0243	No
ExpA	I (1)	Yes at lag 0, p-value =0.0100 at lag 1, p-value =0.0100	Yes at lag 0, p-value=0.0158 at lag 1, p-value =0.0100	Yes at lag 0, p-value=0.0747 at lag 1, p-value =0.0100
ImpA	I (1)	Yes at lag 0, p-value =0.0100 at lag 1, p-value =0.0100 at lag 2, p-value =0.0100	Yes at lag 0, p-value =0.0100 at lag 1, p-value =0.0174	Yes at lag 0, p-value =0.0199 at lag 1, p-value =0.0461
ExpB	I (1)	Yes at lag 0, p-value =0.0141 at lag 1, p-value =0.0100	Yes at lag 1, p-value =0.0100	Yes at lag 1, p-value =0.0217
ImpB	I (1)	Yes at lag 0, p-value =0.0100 at lag 1, p-value =0.0100	Yes at lag 0, p-value=0.0100 at lag 1, p-value =0.0100	Yes at lag 0, p-value=0.0398 at lag 1, p-value =0.0100
ER	I (1)	Yes at lag 0, p-value =0.0100 at lag 1, p-value =0.0240	Yes at lag 0, p-value =0.0269	No

Source: calculated by S.W. Rizki, N.I. Didenko.

Correlation and multicollinearity tests. The correlation coefficient indicates the degree to which a linear relationship exists between two variables, as shown in Table 4.

Table 4

Pearson's correlation coefficients

Coefficients	GDP	ExpA	ImpA	ExpB	ImpB	ER
GDP	1					
ExpA	0.9473	1				
ImpA	0.6777	0.7964	1			
ExpB	0.8950	0.9302	0.5676	1		
ImpB	0.9606	0.9515	0.6134	0.9659	1	
ER	0.8002	0.6450	0.2218	0.7125	0.8209	1

Source: calculated by S.W. Rizki, N.I. Didenko.

The correlation coefficient calculation revealed that most variables have a strong relationship, as indicated by a value greater than 0.75. A strong correlation causes multicollinearity significantly. This condition leads to uncertainties, such as unstable estimates and higher standard errors. Correlation values have been

determined as an initial step in recognizing multicollinearity. The Variance Inflation Factor (VIF) test is conducted to determine the independent variables used in the ARDL model in Table 5.

Table 5

The VIF values of variables in the expected model

	ExpA	ImpA	ExpB	ImpB	ER
GDP	71.67042	10.17597	42.66207	159.89425	16.38089
	46.135444	10.136164	19.714961	X	2.955736
	X	1.639301	3.165799	X	2.256720

Source: calculated by S.W. Rizki, N.I. Didenko.

Akaike information criterion (AIC) checking. The AIC is a measure used to assess model fit and determine the optimal number of lags. The Akaike information criterion value determines the optimal lag and the best model. The lowest value recommends the optimal lag for the best model. This study recommends the ARDL (2,2,2,2) model based on the smallest value of 368.0632, as seen in Table 6.

Table 6

The Akaike information criterion for optimal lag selection

No	GDP	ImpA	ExpB	ER	AIC
1	2	2	2	2	368.0632
2	1	2	2	2	368.4078
3	1	2	2	1	371.7326
4	1	2	1	1	372.8647
5	1	1	1	1	400.3230

Source: calculated by S.W. Rizki, N.I. Didenko.

Cointegration and autocorrelation checking. The ARDL model and bounds tests for cointegration, as recommended by Pesaran et al., were employed using the open-source programming language R and the ARDL package (Natsiopoulou, Tzeremes, 2022). This calculation uses case type 1, with no drift and no trend, based on the stationarity test results in Table 4. The results of the cointegration and autocorrelation tests are presented in Table 7.

Table 7

Pesaran-Shin and the autocorrelation test

Special test	Hypothesis	Test result	Decisions
<i>Bounds F-test</i>	H0: No cointegration exists. H1: Cointegration exists	F = 1.0846 p-value = 0.726	The p-value is greater than 0.05, thus H0 is accepted. It means no cointegration exists in an ARDL model
<i>Bounds t-test</i>	H0: No cointegration in the coefficients on the lagged variables H1: Cointegration exists in the coefficients on the lagged variables	t = -4.2228, Lower-bound I (0) = 2.8650, Upper-bound I (1) = -3.7713 p-value = 0.01627	The p-value is less than 0.05, thus H0 is rejected. It indicates the presence of cointegration in the coefficients on the lagged variables in an ARDL model
<i>Breusch-Godfrey test</i>	H0: No serial correlation in the residuals. H1: Serial correlation exists in the residuals	LM test = 1.0247 df = 1 p-value = 0.3114	The p-value is greater than 0.05, thus H0 is accepted. It means no serial correlation in the residuals in an ARDL model

Source: calculated by S.W. Rizki, N.I. Didenko.

Stability model checking. The cumulative sum (CUSUM) test is a statistical method used to detect small, persistent shifts in a data series. This test involves calculating the cumulative sum of observations or residuals and comparing it to a predetermined threshold or control limit. The ordinary least squares cumulative sum (OLS-CUSUM) test is a statistical tool used to detect structural errors in regression models, indicating potential changes in parameter stability. This test involves accumulating OLS residuals over time and plotting their cumulative sum.

Figure 5 describes that the CUSUM line (actual line) remains within the blue line (confidence limits). It means the model is considered stable at the 95% confidence level. Figure 6 reveals that the OLS-CUSUM line does not cross the predetermined critical boundary (red line), indicating no structural break and leading to the rejection of the null hypothesis of parameter stability. This plot indicates that the ARDL (2,2,2,2) model has good parameter stability. Both figures above indicate that the model in this study exhibits no structural changes in the model or its parameters. Briefly, the ARDL (2,2,2,2) model is stable, indicating that the model remains consistent over the analyzed time period, making it reliable for forecasting

To conduct residual tests for an ARDL model in R, use the ARDL package and its function to extract the residuals test: normality test, heteroskedasticity checking, and autocorrelation checking as follows:

Normality test using Q-Q plots. The Q-Q plot is used to compare the actual residual distribution with the theoretical normal distribution. Figure 7 shows that the data points approach a straight line; thus, the normality assumption is fulfilled, and the ARDL (2,2,2,2) model is valid.

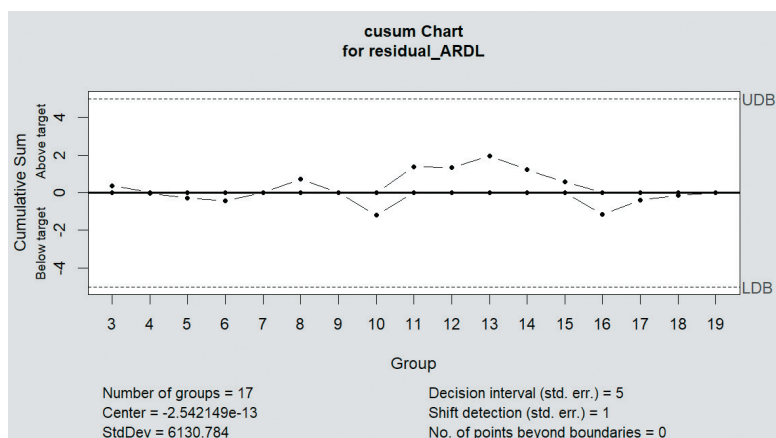


Figure 5. CUSUM plot

Source: compiled by S.W. Rizki, N.I. Didenko.

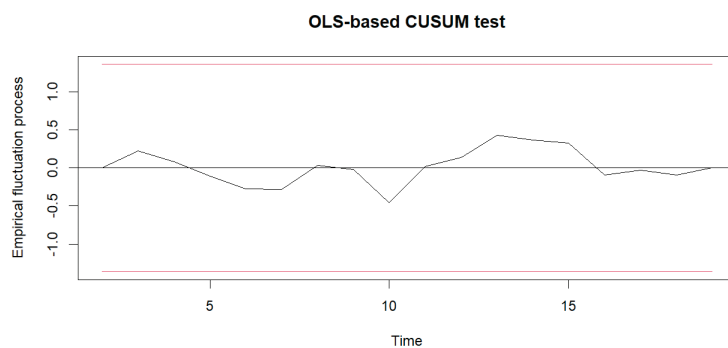


Figure 6. OLS-CUSUM plot

Source: compiled by S.W. Rizki, N.I. Didenko.

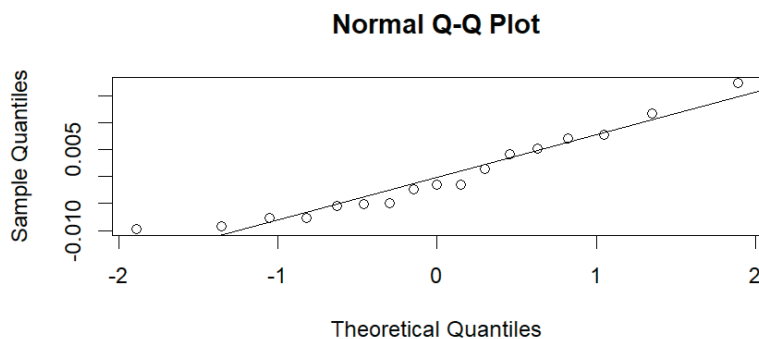


Figure 7. Q-Q plot

Source: compiled by S.W. Rizki, N.I. Didenko.

Heteroskedasticity checking using the Breusch-Pagan test. The test requires a hypothesis as follows

H0: No heteroskedasticity problem

H1: Heteroskedasticity problem exists

H_0 will be rejected if the p-value is less than alpha 0.05. From the analysis test using R Studio software, a p-value of 0.6699 is obtained. It concludes that H_0 is accepted, indicating that there is no heteroskedasticity problem.

Autocorrelation checking. In the Durbin-Watson test, which aims to measure the dependence between residuals sequentially, the DW value is 2.45, which is still considered close to 2. This means that this model can be said to have no autocorrelation. To conduct a deeper examination for autocorrelation testing, we employed Autocorrelation Function (ACF) plots and Partial Autocorrelation Function (PACF) plots (Fig. 8, 9). Both plots can be used to determine the presence of autocorrelation. Testing these two plots uses lag as a comparison. Lag is the difference in the order of a residual from the previous residual.

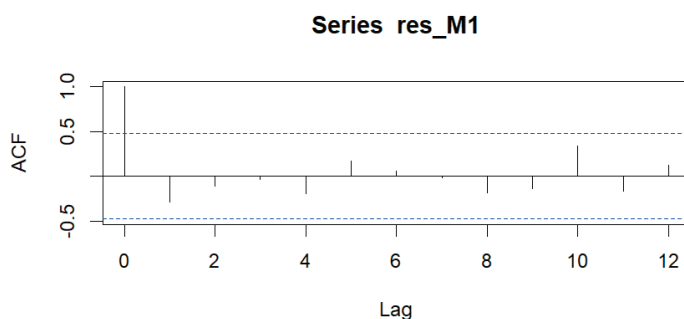


Figure 8. ACF plot

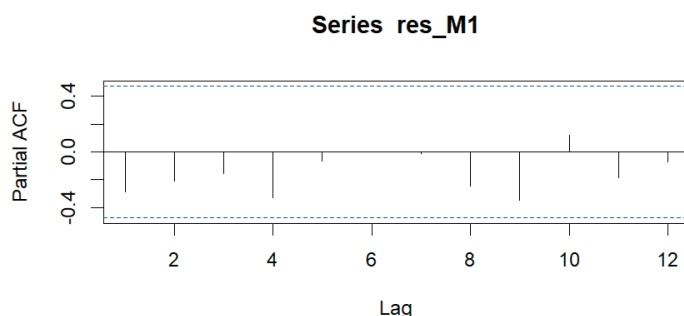


Figure 9. PACF plot

Source: compiled by S.W. Rizki, N.I. Didenko. Source: compiled by S.W. Rizki, N.I. Didenko.

The results of the ACF and PACF plots generated in the residuals of the ARDL (2,2,2,2) model analysis in this study disclose that in both the ACF and PACF plots, no vertical line at a particular lag exceeds the height of the horizontal blue line. According to these two plots, it indicates that there is no autocorrelation in the model. By fulfilling all these residual tests, the ARDL (2,2,2,2) model is considered good and reliable for further prediction or analysis.

Analysis of the ARDL (2,2,2,2) model in Table 8 helps researchers determine whether to reject or fail to reject the hypothesis. The hypothesis will be accepted if the p-value is less than the alpha level. Intercept is significant at alpha 5%, because the p-value is 0.015846. Indonesia's imports from ASEAN at the time t are significant

at the 1% alpha level, as indicated by a p-value of 0.001258. Indonesia's import from ASEAN at the time $t - 1$ are significant at alpha 5%, because the p-value is 0.025779. Indonesia's export to BRICS at the time t . This result is significant at $\alpha = 1\%$, because the p-value is 0.005831. The exchange rate at the time t is significant under alpha 0.1%, because the p-value is 0.000135. The exchange rate at the time $t - 1$. This result is significant at the 5% alpha level, as the p-value is 0.023455.

Table 8

Results of ARDL model analysis

Indicator	Estimate	Std. Error	t-value	Pr (> t)
Intercept	-4.129e+05	1.153e+05	-3.5820	0.015846 *
GDP_{t-1}	1.267e-01	3.368e-01	0.3760	0.722243
GDP_{t-2}	1.713e-01	1.992e-01	0.8600	0.429143
$ImpA_t$	5.102e-03	7.810e-04	6.5320	0.001258 **
$ImpA_{t-1}$	5.170e-03	1.649e-03	3.1360	0.025779 *
$ImpA_{t-2}$	1.642e-03	1.126e-03	1.4580	0.204659
$ExpB_t$	2.950e-03	6.411e-04	4.6020	0.005831 **
$ExpB_{t-1}$	4.958e-04	1.609e-03	0.3080	0.770384
$ExpB_{t-2}$	-1.533e-03	1.269e-03	-1.2080	0.280934
ER_t	-6.248e+01	5.945e+00	-10.509	0.000135 ***
ER_{t-1}	6.503e+01	2.019e+01	3.2200	0.023455 *
ER_{t-2}	4.413e+01	3.084e+01	1.4310	0.211812

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual standard error: 10440 on 5 degrees of freedom
Multiple R-squared: 0.9995, Adjusted R-squared: 0.9984
F-statistic: 915.9 on 11 and 5 DF, p-value: 1.585e-07

Source: calculated by S.W. Rizki, N.I. Didenko.

The adjusted R-squared value is 0.9984. It reveals that the volume of Indonesia's imports to ASEAN in the current and previous years, the volume of Indonesia's exports to BRICS in the current year, and the exchange rate in the current and previous years give an explanation and impact on the GDP in the current year, accounting for 99.84%. R-squared of 0.9995 indicates that the entire set of exogenous variables at any time has a 99.95% effect on the GDP. The ARDL (2,2,2,2) model is represented in the Equation

$$\begin{aligned}
 GDP_t = & -4.129E05 + 1.267E01GDP_{t-1} + 1.713E01GDP_{t-2} + \\
 & + 5.102E03ImpA_t + 5.170E03ImpA_{t-1} + 1.642E03ImpA_{t-2} + \\
 & + 2.950E03ExpB_t + 4.958E04ExpB_{t-1} - 1.533E03ExpB_{t-2} - \\
 & - 0.6248ER_t + 0.6503ER_{t-1} + 0.4413ER_{t-2} + e_t.
 \end{aligned} \tag{5}$$

The intercept of $-4.129E05$ indicates that the function value for the exogenous variable is 0. This means that the average GDP when GDP at lags, importing from ASEAN, exporting to BRICS+, and the exchange rate are equal to zero is minus \$41.29. A negative GDP indicates the Indonesian economy will experience a contraction or slowdown. This situation will indicate a decrease in the total value of goods and services produced, which can lead to increased unemployment, reduced purchasing power, and negative impacts on various economic sectors.

The coefficient of Indonesia's import volume from ASEAN in the current year of $5.102E03$ indicates that GDP will increase by \$ 5102 if the import from ASEAN is \$ 1 million — an analogous explanation for the coefficient of those variables at lags. Positive import values indicate economic growth through the provision of capital goods, raw materials, and technology, which increases domestic production capacity to meet consumer needs, encourages innovation through competition, and creates jobs through the processing of imported products. Furthermore, imports also help countries obtain products at more competitive prices, optimize profit margins, and increase economic diversification, reducing dependence on a single sector.

The coefficient of Indonesia's export volume to BRICS+ in the current year, $2.950E03$, indicates that GDP will increase by \$ 2950 if the export to BRICS+ is \$1 million. An analogous explanation for the coefficient at time $t - 1$ and $t - 2$. A positive export value has a significant impact on economic growth by increasing state revenue, creating jobs, encouraging increased domestic production, and improving the trade balance. Increased exports can also diversify a country's economy and reduce dependence on a single sector, ultimately building a more solid economic foundation. Indonesia's export volume to the BRICS bloc is expected to increase due to the high economic growth and large market size of BRICS+ members, which will provide greater demand for Indonesian products and new trade opportunities.

The coefficient of exchange rate for the current year, -0.6248 , indicates that GDP will decrease significantly when the exchange rate of IDR 1. However, the exchange rates at $t - 1$ and $t - 2$ also contribute to influencing GDP. If the three coefficients are added together, the result will be positive, indicating that GDP will continue to increase with a 1-unit change in the IDR exchange rate. A stable and competitive exchange rate stimulates economic growth by increasing exports, attracting foreign investment, and creating certainty for economic actors. A stable exchange rate minimizes volatility, which can disrupt trade and investment, and maintains the purchasing power and stability of imported goods prices, thereby creating a conducive economic environment.

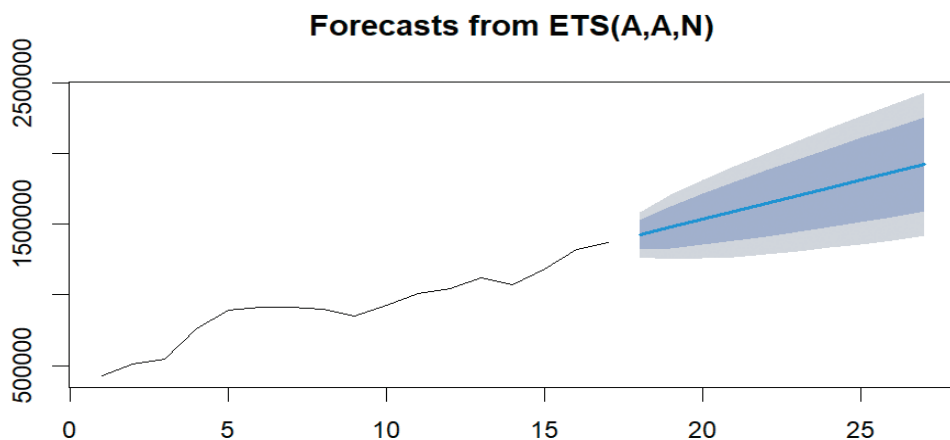
The results of Indonesia's economic growth forecast, which involves international trade with ASEAN and BRICS+ member countries, show an upward trend with an average growth rate of 3.4% until 2033 (Table 9). This confirms that bilateral trade with members of the two blocs has a significant impact amidst global challenges.

Table 9

Forecasting of Indonesia's GDP in the upcoming 10 years

Year	Forecasting, \$ million	Lo 80	Hi 80	Lo 95	Hi 95
2024	1424264	1319399	1529130	1263886	1584643
2025	1479635	1331332	1627937	1252826	1706444
2026	1535005	1353367	1716644	1257213	1812798
2027	1590376	1380629	1800123	1269596	1911156
2028	1645747	1411232	1880261	1287087	2004406
2029	1701117	1444207	1958027	1308207	2094027
2030	1756488	1478980	2033996	1332076	2180900
2031	1811858	1515176	2108541	1358121	2265596
2032	1867229	1552534	2181924	1385944	2348513
2033	1922599	1590866	2254333	1415256	2429943

Source: calculated by S.W. Rizki, N.I. Didenko.

**Figure 10.** Forecast of Indonesia's GDP

Source: compiled by S.W. Rizki, N.I. Didenko.

Based on the graphical illustration of the forecasted upward trend in Indonesia's economic growth in upcoming 10 years (Figure 10). Indonesia's involvement in ASEAN and BRICS+ is projected to have a significant impact on its economic development. Joining BRICS enables Indonesia to diversify its export markets, reduce its reliance on traditional Western markets, gain leverage in global trade, and access alternative financing through institutions.

Discussion

The analysis result of Indonesia's membership in ASEAN and BRICS+ leads to a discussion. This strengthens Indonesia's position in a multipolar world. Indonesia has taken the right step in joining BRICS+, a grouping that includes several key countries, such as China and Russia. A study examining the strategic policies of Russian and Chinese foreign relations in terms of post-hegemony or multipolarity in the global political economy revealed that multipolarity has endured for a long time under the policies and agreements approved by the involved countries to achieve mutual goals within the global political and economic structure (Silvius, 2019). Next, a study showed that BRICS consistently represents the image of multipolarity, showing the revival movement followed by several Southern countries. The BRICS have a distinct conception of world order and continue to compete and interact with one another. On the other hand, the West suffers from the re-nationalization of Europe and the polarization of US politics. This results in the management of global interdependence being realized through ad hoc meetings of various groups for different purposes (Cooper, Flandes, 2013). Furthermore, a study revealed that the rise of emerging economies, including China, India, Brazil, and South Africa, is counterbalancing the hegemony of traditional powers, catalysing a transition from a unipolar to a multipolar world order. The rise of emerging economies represents a strategic shift in redefining the nature of global governance, leading to a multipolar world where shared leadership and multilateralism must be achieved in response to current challenges (Ali, Rassias, 2024).

The analysis result of the trade intensity index discloses that Russia is the BRICS country with the greatest potential for Indonesian trade collaboration. To date, the Indonesian government has strengthened economic cooperation with Russia. Various news sources⁴ Throughout 2025, it was reported that Indonesia was strengthening its cooperation with Russia in various areas, including trade in agricultural and food products (such as Russian wheat to Indonesia and Indonesian agricultural products to Russia), as well as potential cooperation in investment, oil and gas, technology, and nuclear energy. Bilateral economic growth between Indonesia and Russia has shown a positive trend, with trade reaching US\$4.3 billion in 2024 and increasing by 40% between January and April 2025. Efforts to strengthen bilateral relations between Indonesia and Russia continue. In 2018, the two leaders agreed in Moscow to expedite the drafting of a new strategic partnership agreement aimed at intensifying bilateral interactions. The Kremlin views Jakarta as a regional power with the potential to become a dominant regional performer in Southeast Asia (Manurung, Bainus, 2022). Indonesia is considered a key partner of Russia in the Asia Pacific region.

⁴ Information portal about Indonesian economy. Kontan. Retrieved 4 August 2025, from https://www.kontan.co.id/search/?search=Rusia+Indonesia&Button_search=

Conclusion

In the graph visualization display from 2012 to 2023, Indonesia has bilateral trade cooperation with significant export and import volumes with several ASEAN and BRICS+ member countries, namely Singapore, Malaysia, the Philippines, China, and India. Other countries have bilateral trade cooperation with Indonesia, with relatively low trade volumes. The situation can be used as a reference to open up market opportunities for Indonesia in these countries. Further studies on bilateral trade cooperation are conducted through the TCI approach to gain a deeper understanding of market opportunities in the ASEAN and BRICS regions. The calculation of the TCI value between Indonesia and other member countries in ASEAN and BRICS+ provides information on the market compatibility for 10 international trade products. Based on the TCI value, the countries with the largest to smallest opportunities for market compatibility with Indonesia in ASEAN are Malaysia, Vietnam, the Philippines, Singapore, Thailand, Myanmar, Cambodia, Brunei Darussalam, and Laos. The order of the most significant TCI values between Indonesia and its bilateral partner countries in BRICS is as follows: India, the Russian Federation, Brazil, the UAE, South Africa, Iran, Egypt, Ethiopia, and China.

In addition, the order of opportunities based on TII calculations, from the largest to the smallest, of Indonesia's export destinations in ASEAN countries is as follows: Lao PDR, Brunei Darussalam, Vietnam, Thailand, Singapore, Cambodia, Malaysia, Myanmar, and the Philippines. In the BRICS+, the order of opportunities is as follows: Russian Federation, Iran, United Arab Emirates, Brazil, South Africa, China, Ethiopia, Egypt, and India. This study determined the ARDL (2,2,2,2) model as the best model. From the results of the calculation analysis using this model, it was found that the volume of Indonesian imports to ASEAN, the volume of Indonesian exports to BRICS+, and the exchange rate have a strong impact on Indonesian GDP, as indicated by the Adjusted R-squared value of 0.9984. This revealed that those exogenous variables provide an explanation and impact on GDP of 99.84% in the current year.

This study has assessed the impact of Indonesia's involvement in multipolar organizations on its economic growth, particularly its membership in the BRICS+ group. The study reveals that Indonesia has an optimistic opportunity to establish international trade relations with BRICS+ countries. Indonesia needs to strengthen bilateral relations with BRICS countries, especially Russia. Indonesia's decision to join BRICS+ is crucial to diversifying international trade and reducing reliance on traditional markets.

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