

**INDONESIA'S G20 ROLE AND EXPORT PERFORMANCE WITH THE US, CHINA, AND JAPAN**

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**Abstract:**

This study examines the relationship between Indonesia's G20 membership and its bilateral exports to China, the United States, and Japan over the period 1995–2023. The objective is to analyze how trade integration with these three major partners influences Indonesia's economic growth. Using the Vector Error Correction Model (VECM), with data obtained from the World Bank, UN Comtrade, and the Central Statistics Agency (BPS), the research investigates the short- and long-term dynamics between exports, gross domestic product (GDP), gross fixed capital formation (GFCF), and exchange rates. The empirical findings confirm the presence of cointegration among the variables, indicating long-term equilibrium. Exports to China show the strongest and most significant positive impact on GDP, with an error correction mechanism revealing a 24% annual adjustment speed. Exports to the United States also contribute positively, but with lower elasticity, reflecting limited macroeconomic spillovers despite persistent trade surpluses. By contrast, exports to Japan display the weakest impact on GDP, with slower adjustment dynamics (18% per year) and high dependence on primary commodities. The results imply that while Indonesia's G20 integration has enhanced trade opportunities, the country remains structurally vulnerable due to its reliance on resource-based exports. Policy recommendations include diversifying export markets, strengthening value-added manufacturing, reducing non-tariff barriers, and optimizing the role of regional trade agreements such as ACFTA and IJEPA.

**Keywords:** Indonesia, G20, Exports, VECM, Economic Growth

**INTRODUCTION**

The Forum Group of Twenty (G20) was formed in 1999 in response to the financial crisis of the late 1990s, with the aim of uniting developed and developing countries in finding solutions to global economic problems. The G20 is now a strategic arena representing more than 60% of the world's population, 75% of global trade, and 80% of global GDP. Indonesia, as one of the largest developing economies, has been a member of the G20 since the forum was established in 1999 (Prasetyo, 2023). Based on an article by Imannulloh & Rijal (2022), factors such as the significant size of Indonesia's economy (emerging economy) and its population, which is the fourth largest in the world, were also considerations for Indonesia's entry into the G20. It confirms Indonesia's important role in the international economic order and the expectation that participation in the G20 will have a positive impact on the national economy. In addition, Arvin et al. (2021) argue that one of the main focuses of the G20 is to promote sustainable global economic growth, including through the strengthening of international trade.

Based on data cited from the World Bank, during the period 1990–1998, Indonesia's average GDP growth was recorded at 4.3% per year, even experiencing a contraction of up to -13.1% during the 1998 Asian financial crisis. However, after entering the 2000–2023 era (post-G20 membership),

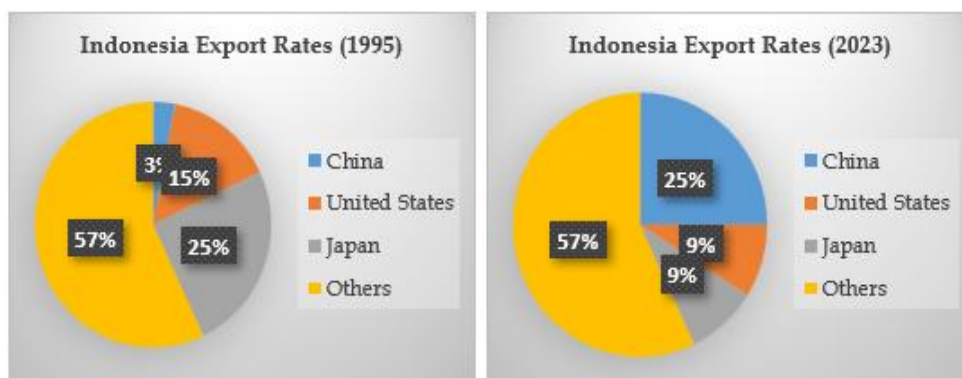
average GDP growth increased to around 5.4% per year with a more stable trend. In line with this, Indonesia's export value also showed consistent growth, with the share of non-oil and gas exports to G20 countries increasing significantly, particularly to China, which, after 2000, gradually became the largest export market for Indonesia (Veronica et al., 2023).



Source. World Bank

**Figure 1.** Economics Growth of Indonesia 1995-2023

These findings are in line with recent international research confirming a positive relationship between trade openness, exports, and Indonesia's economic growth. A study by Almalik et al. (2024) shows that exports have a significant impact on long-term economic growth in G20 countries, including Indonesia. Similarly, research using the ARDL approach on Indonesian data for the period 1995–2020 found that exports are one of the main determinants of economic growth compared to other macro variables such as exchange rates and FDI flows (Nasution & Rani, 2021). Thus, Indonesia's membership in the G20 forum is not only symbolic but can also be empirically linked to an increase in the rate of economic growth through the mechanisms of export expansion and strengthening of international trade integration.



Source. UN Comtrade

**Figure 2.** Comparison of Indonesia Export Rates (1995 dan 2023)

Indonesia's three main trading partners, namely China, the United States, and Japan, are members of the G20 and global economic powers. Data from the Central Statistics Agency shows



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that in 2023, the value of Indonesia's exports to China reached around US\$64.93 billion, equivalent to 25% of total national exports, making China Indonesia's largest trading partner. In contrast, the contribution of exports to the United States and Japan has declined in proportion, each accounting for around 9-10% of total exports. Data from the Central Statistics Agency (BPS) shows that at the beginning of 2023, these three countries absorbed more than 40% of Indonesia's non-oil and gas export value, with China accounting for approximately 24.93%, the United States 9.46%, and Japan 8.60% of total exports. The dominance of these three markets is a phenomenon that has developed, especially after the 2000s. In the mid-1990s (before Indonesia joined the G20), Japan and the United States were Indonesia's main export destinations. However, entering the 2000s, China's role increased rapidly in line with its economic growth. In 2018, China became Indonesia's largest export destination, accounting for around 14% of total national exports (Keiko Hubbansyah & Wurdaningsih, 2019).

This trend continues today, with China accounting for around a quarter of Indonesia's total exports. This change in the structure of trading partners has strategic implications for the Indonesian economy. Based on the findings of (Alfian Widiyanto et al., 2024), China's increasing dominance, on the one hand, opens up opportunities for broader market access, drives trade volume, and supports the growth of Indonesia's leading commodity sectors, such as coal, palm oil, and rubber. However, on the other hand, excessive dependence on one partner country can also pose external risks, for example, in the event of an economic slowdown in China or restrictive trade policy changes. Conversely, the decline in Indonesia's export share to the United States and Japan indicates a shift in competitiveness and changes in demand patterns. This decline could have implications for the reduction of Indonesia's export market diversification, which in the long term could reduce economic resilience if not offset by penetration into alternative markets (Qoni'ah, 2024).

Furthermore, from Muzwardi & Mahadiansar (2024), Indonesia's participation in the G20 has brought significant changes to its trade structure, particularly with its three main partners from China, the United States, and Japan. However, despite the increasing volume of exports, there remains limited empirical evidence on whether this integration has effectively contributed to Indonesia's long-term economic growth (Ummaya et al., 2023). Previous studies have focused on the general effects of trade openness or exports on growth, but have not specifically compared Indonesia's bilateral export dynamics before and after joining the G20. This research seeks to address that gap by investigating the following research problems:

1. How has Indonesia's bilateral export performance to China evolved before and after G20 membership?
2. How has Indonesia's bilateral export performance to the United States evolved before and after G20 membership?
3. How has Indonesia's bilateral export performance to Japan evolved before and after G20 membership?

Therefore, a clear gap exists in the literature, as no prior study has systematically compared Indonesia's bilateral export performance across the pre- and post-G20 periods, nor examined its implications for national economic growth. The urgency of this research lies in providing empirical insights into how Indonesia's participation in the G20 has influenced its export relations with major partners from China, the United States, and Japan over the long term since 1995–2023, and how these developments have contributed to Indonesia's broader economic trajectory.



To explain this context more comprehensively, it is important to anchor the analysis within established economic theories that describe how trade interacts with growth. Understanding Indonesia's export dynamics and their connection to economic performance requires revisiting the foundations of international trade and economic growth theories. These theoretical perspectives provide the basis for analyzing how openness, specialization, and capital accumulation shape a country's long-term development path, particularly in the context of Indonesia's growing integration into the global economy.

**Classical Theory of International Trade.** Classical theories of international trade emphasize that trade openness can increase a country's welfare through specialization and efficiency. Adam Smith (1776) proposed the concept of absolute advantage, while David Ricardo (1817) developed the theory of comparative advantage, which forms the basis of efficiency in trade. Heckscher-Ohlin added the dimension of production factors, arguing that countries tend to export goods that utilize relatively abundant production factors.

In the modern context, free trade is seen as an engine of growth through market expansion, technology diffusion, and foreign capital inflows (Grossman & Helpman, 1991). The export-led growth hypothesis asserts that export growth will have a direct impact on national GDP growth (Almalik et al., 2024; Desmintary et al., 2023). However, heterodox thinking, such as Thirlwall's, suggests that trade openness does not automatically lead to growth if the export structure is still based on low-value commodities. Therefore, structural transformation is a determining factor in optimizing the benefits of trade.

**Modern Trade and Global Integration Theory.** Building upon the foundations of classical trade theory, modern perspectives provide a more nuanced understanding of how international trade operates in an increasingly interconnected global economy. The New Trade Theory (NTT), introduced by Krugman (1990), challenges the traditional notion that comparative advantage alone determines trade flows. Instead, it argues that economies of scale and product differentiation play equally significant roles. Under conditions of imperfect competition, countries can gain advantages by specializing in particular industries where increasing returns to scale allow for lower production costs and global competitiveness. This framework helps explain why developed and developing countries alike often engage in intra-industry trade, exchanging similar goods such as automobiles, electronics, or machinery, driven by diversity in product quality and innovation rather than cost advantage alone (Picard & Tampieri, 2024).

Another significant contribution to modern trade theory comes from the Gravity Model of Trade, initially formulated by Tinbergen (1962). The model posits that the volume of trade between two countries is positively correlated with their economic size (measured by GDP) and negatively correlated with the geographical distance between them. Over time, this model has been expanded to include variables such as institutional quality, trade agreements, and exchange rate stability. In the context of Indonesia, the Gravity Model provides an empirical foundation to explain the strong trade relationships with large economies such as China, the United States, and Japan, which not only possess significant market size but also share deep trade interdependencies through investment and production networks (Karno, 2017).

**Theory of Economic Growth.** The Solow-Swan model (1956) states that the accumulation of capital, labor, and technological progress determines long-term growth. Endogenous growth theory then adds the role of innovation, knowledge, and human capital (Romer, 1986; Lucas, 1988). In this perspective, trade and global economic integration become important channels for technology transfer and total factor productivity improvement. Solow's classical growth theory also predicts



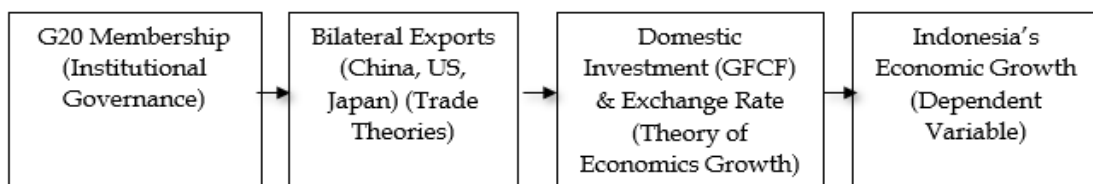
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conditional convergence, whereby poor countries with low capital levels tend to grow faster than rich countries until they approach the same per capita income, *ceteris paribus*. However, this convergence is highly dependent on fundamental similarities (savings, population, technology) in practice, with many developing countries lagging due to differences in these factors.

Recent research shows that trade openness and foreign investment play a crucial role in driving long-term growth in developing countries, including Indonesia (Pasaribu & Nasution, 2024; Wiguna & Panennungi, 2019). As a result, in the long run, the economy will approach a steady state with a rate of output growth determined solely by the rate of technological growth (exogenous assumption). From this, additional investment and labor drive short-term growth, but the engine of long-term growth is technological progress.

**Institutional and Global Governance Theory.** Institutional theory provides another critical lens through which to understand Indonesia's economic integration and its participation in the G20. According to North (1990), from Arwani & Priyadi (2024), institutions, defined as the formal and informal rules that structure human interaction, play a pivotal role in shaping economic performance. They establish the "rules of the game" that govern market transactions, influence incentives, and reduce uncertainty in economic behavior. In the international context, institutions such as the G20, the World Trade Organization (WTO), and regional trade agreements create predictable frameworks for cooperation, lowering transaction costs and encouraging investment flows. For Indonesia, alignment with global institutional frameworks enhances macroeconomic credibility and signals commitment to open-market principles.

The Institutional Theory of Economic Integration emphasizes that stable governance structures are necessary for sustaining long-term trade and investment relationships. When nations participate in multilateral organizations, they benefit not only from market access but also from shared standards of transparency, dispute resolution mechanisms, and coordinated policy frameworks (Gupta & Kaushik, 2024). These mechanisms assure investors and trading partners that policies are consistent and predictable, thus mitigating risks associated with political and economic volatility. In Indonesia's case, G20 membership represents such institutional commitments serving as both a platform for dialogue and a mechanism for reinforcing domestic reforms in fiscal discipline, monetary policy coordination, and sustainable trade practices (Putri, 2020).



**Figure 3.** Conceptual Framework

Based on the research from (Salawu et al., 2023), the conceptual framework of this research is constructed to illustrate the theoretical and logical relationships among the main variables, such as Indonesia's economic growth from Gross Domestic Product, bilateral exports, investment (GFCF), exchange rate, and G20 membership. This framework integrates the perspectives of Classical and Modern Trade Theories, Economic Growth Theory, and Institutional and Global Governance Theory to explain how international trade, macroeconomic factors, and institutional participation interact to influence national economic performance.



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From the standpoint of trade theory, the framework posits that bilateral exports to Indonesia's main trading partners, China, the United States, and Japan, serve as a key driver of growth. According to Smith (1776) and Ricardo (1817), trade allows specialization and comparative advantage, which increase efficiency and national welfare. Krugman's (1990) New Trade Theory further explains that product differentiation and economies of scale expand export potential, while the Gravity Model of Trade (Tinbergen, 1962) supports the idea that trade volume is influenced by economic size, distance, and institutional cooperation. Hence, greater export performance is expected to stimulate production, foreign exchange earnings, and overall GDP growth.

Next, Economic Growth Theory emphasizes the role of capital accumulation and investment as crucial channels linking trade and growth Theory (Solow, 1956; Romer, 1986; Lucas, 1988). The revenue generated from exports increases domestic investment, which enhances production capacity and technological progress. In this study, Gross Fixed Capital Formation (GFCF) represents domestic investment that contributes to long-term productivity. Together with a stable exchange rate, investment supports export competitiveness and macroeconomic stability, as key factors for maintaining sustainable growth in an open economy.

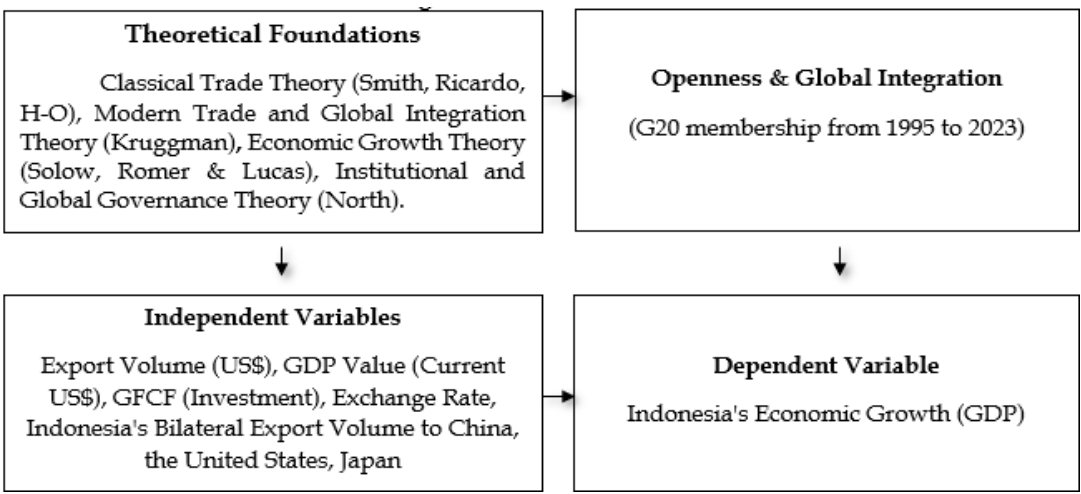


Figure 4. Research Framework

Furthermore, aside from the conceptual framework, the research framework was developed by referring to the main theories in international trade and economic growth, and supported by previous empirical research results. Smith's classical trade theory and Solow's economic growth theory form the conceptual basis for understanding the relationship between trade and growth. Furthermore, the export-led growth hypothesis asserts that exports act as a driver of economic growth (Kalaitzi & Cleeve, 2018). Research in Indonesia also shows that international trade, investment, and exchange rates play a significant role in influencing GDP growth (Putri Amanda et al., 2022). Based on this theoretical and empirical evidence, this research framework places bilateral exports, GDP current US\$, GFCF, and exchange rates as independent variables that influence Indonesia's economic growth (GDP) as a dependent variable.

Thus, conceptually, the relationship between variables can be explained through Independent Variables consisting of Export Volume (US\$), Gross Domestic Product Value (Current US\$), GFCF (Investment), and Exchange Rate affecting Indonesia's economic growth (GDP), as well as

Dependent Variables, namely Indonesia's Gross Domestic Product, both directly and indirectly. Based on the explanation from Adi et al. (2022), Export Volume (US\$) acts as the main driver of growth, GFCF (Investment) reflects domestic investment that strengthens production capacity, Exchange Rate determines export competitiveness and macroeconomic stability, while the Gross Domestic Product Value (Current US\$) represents a measure of economic scale that can expand market potential (Purba et al., 2021).

## METHODS

This study uses a quantitative approach with time series analysis for the period 1995–2023. The choice of quantitative method is based on the research objective to measure the causal relationship between bilateral exports, macroeconomic factors, and Indonesia's economic growth. The type of data used is secondary data with annual coverage (1995–2023). Below are the details of the data:

**Table 1.** Variable of the Data

Variable	Indicator / Measurement	Unit	Data Source	Description
Economic Growth	Annual percentage change in Indonesia's Gross Domestic Product (GDP)	Percent (%)	World Bank (World Development Indicators)	Represents Indonesia's overall economic performance and is used as the dependent variable.
Gross Domestic Product (Current US\$)	Value of Indonesia's GDP at current prices (US\$)	US Dollar (US\$)	World Bank (World Development Indicators)	Serves as a supporting measure for the national economic scale and as a component in the VECM lag variable.
Bilateral Export Volume	Total export value from Indonesia to China, the United States, and Japan	US Dollar (US\$)	UN Comtrade Database	Independent variable representing Indonesia's trade performance with its three major partners.
Domestic Investment (Gross Fixed Capital Formation)	Value of investment in fixed assets such as infrastructure, machinery, and buildings	US Dollar (US\$)	World Bank (World Development Indicators)	Indicates domestic capital accumulation and productive capacity contributing to growth.
Exchange Rate	Annual average exchange rate of the Indonesian Rupiah against the US Dollar	Rupiah per US Dollar	Bank Indonesia / World Bank	Reflects external competitiveness and macroeconomic stability.
G20 Membership (Dummy Variable)	1 = Post-2008 (after joining G20), 0 = Pre-2008	Binary (0–1)	Constructed by a researcher	Captures institutional participation and the global integration effect on trade and growth.



The variables outlined above are analyzed using the Vector Error Correction Model (VECM) approach. VECM is chosen because it effectively captures both short-term dynamics and long-term equilibrium relationships among non-stationary but cointegrated time series variables (Prasetyo & Susandika, 2021). This model allows the estimation of how quickly Indonesia's economy adjusts toward equilibrium when there are shocks in exports, investment, or exchange rate fluctuations:

$$\begin{aligned}
 \Delta GDP_t = & \beta_0 + \lambda ECT_{t-1} + \sum_{i=1}^p \beta 1 \Delta GDP_{us_{t-1}} + \sum_{i=1}^p \beta 2 \Delta Export_{t-1} \\
 & + \sum_{i=1}^p \beta 3 \Delta GFCF_{t-1} + \sum_{i=1}^p \beta 4 \Delta Exrate_{t-1} + \delta D_{g20} + \epsilon_t
 \end{aligned}$$

Where:

$\Delta GDP_t$ : Indonesia's Economic Growth (Gross Domestic Product, %)

$GDP_{us(t-1)}$ : Indonesia's Economic Growth (Current US\$)

$Export_{(t-1)}$ : Indonesia's Bilateral Export Volume to China, the United States, and Japan (US\$)

$GFCF_{(t-1)}$ : Domestic Investment

$Exrate_{(t-1)}$ : Rupiah Exchange Rate (US\$)

$\delta D_{g20}$ : G20 dummy variable (1 starting in 2008, 0 before 2008)

$\Delta$ : First-difference ensuring stationarity

$ECT_{(t-1)}$ : Error Correction Term, describing the speed of adjustment towards long-term equilibrium

$\lambda$ : Speed of adjustment coefficient

$\epsilon_t$ : Error term, following a white noise distribution

Since the data used in this study are macroeconomic time series that tend to be non-stationary, the analysis was conducted using the Vector Error Correction Model (VECM). VECM is an extension of the Vector Autoregression (VAR) model that incorporates both short-term dynamics and long-term equilibrium relationships among the variables (Halim et al., 2024). The model includes several key macroeconomic variables: economic growth (GDP), bilateral exports (Export Volume to China, the United States, and Japan), domestic investment (GFCF), exchange rate (Exchange rate), and the G20 membership dummy, which interact simultaneously to explain the behavior of the economy over time.

This method allows the separation of short-run effects, which capture immediate fluctuations, from long-run relationships, which reflect structural linkages between trade, investment, and growth. In addition, the Error Correction Term (ECT) measures the speed at which short-term imbalances are corrected toward the long-run equilibrium, ensuring that the model remains stable and theoretically consistent (Chen, 2022).

## RESULT AND DISCUSSION



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**Performance and implications of exports to the People's Republic of China.** Export performance shows that China has become the largest market for Indonesian exports. In 2023, based on Data from World Integrate Trade Solutions, the value of exports to China reached around US\$64 billion (around 25% of Indonesia's total exports). The main commodities include mineral fuels (coal), palm oil, and ferro-alloys. The Central Statistics Agency (BPS) reported that non-oil and gas exports to China during January-November 2023 amounted to US\$56.56 billion (25.49% of non-oil and gas exports) and were dominated by iron/steel, lignite, and coal. Despite the large export value, the trade balance still experienced a deficit in January 2024. BPS recorded a deficit of US\$1.38 billion with China due to high imports of machinery, electrical equipment, and plastics.

Furthermore, China has become Indonesia's largest export market. According 2023 to the World Bank and WITS Data, exports to China amounted to approximately US\$64.9 billion, representing about 25% of Indonesia's total exports. Moreover, based on the report BPS that Non-oil and gas exports during January–November 2023 reached US\$56.56 billion or 25.49% of non-oil and gas exports, dominated by iron/ steel, lignite, and coal. Despite the large volume of exports, the trade balance still recorded a deficit of US\$1.38 billion in January 2024, primarily due to imports of machinery, electrical equipment, and plastics from China. It indicates that although China provides the largest export demand for Indonesia, it simultaneously creates structural dependence on Chinese capital goods and intermediate inputs.

**Table 2.** Indonesia's Main Exports to China (2023)

Commodity	Export Value (US\$ billion)	Share of Total Exports (%)
Coal and Lignite	25	10
Iron & Steel	7.5	3
Palm Oil	5.5	2.1
Ferro-alloys & basic metals	4.8	1.9
Checicals	3.5	1.4
Other commodities	18.6	6.6
Total exports to China	64.9	25

Source. World Bank, WITS, and BPS

**Dynamics of ACFTA.** Recent research from Alleyne et al. (2020), Darmanto et al. (2021), and Asyono & Samputra (2023) on the ASEAN–China Free Trade Area (ACFTA) found that its impact has been mixed. A number of Indonesian sectors, such as textiles, vegetable oil, and vehicles, have seen an increase in exports following the ACFTA, but other commodities (cocoa, corn, and metal ores) have experienced a decline. In aggregate, China has enjoyed a trade surplus and increased worker wages, while Indonesia has faced a decline in import volume and a worsening trade balance. The study suggests the need to strengthen collaboration and leverage comparative advantages within the ACFTA, emphasizing that GDP growth and rupiah appreciation are positively correlated with export volume.

Specific commodity performance. A study from Natalia et al. (2024) analyzed Indonesian pulp exports to China using the RCA method and the Almost Ideal Demand System model. The results show that Indonesian pulp has a comparative advantage ( $RCA > 1$ ), but this advantage is declining as China's pulp consumption increases. The LA/AIDS model found that Japanese pulp is



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complementary to Indonesian pulp, while Thai and Brazilian pulp are substitutes. It indicates fierce competition and encourages the need for product diversification.

**VECM Estimation Results.** The Vector Error Correction Model (VECM) was applied to assess the long-term and short-term relationship between Indonesia’s GDP, exports to China, Gross Fixed Capital Formation (GFCF), and the exchange rate during 1995–2023.

**Augmented Dickey-Fuller (ADF).** The Augmented Dickey-Fuller (ADF) test (Table 4.2) indicated that GDP and the exchange rate are stationary at the level, while exports to China and GFCF are only stationary at the first difference. Thus, VECM is the appropriate model.

**Table 3.** ADF Test Results (China model)

Variable	ADF Level	p-value	Decision	ADF First Diff.	p-value	Decision
ln(GDP)	-4.255	5E-04	Stationary	–	–	–
ln(Exports China)	-1.836	0.363	Non-stationary	-5.139	0	Stationary
ln(GFCF)	-0.807	0.817	Non-stationary	-4.156	0.0008	Stationary
ln(Exchange rate)	-3.682	0.004	Stationary (5%)	–	–	–

**Johansen Cointegration Test.** Johansen’s cointegration test with lag 4 (Table A3) confirms the presence of two cointegrating vectors, suggesting long-term equilibrium relationships among the variables.

**Table 4.** Johansen Cointegration Test (China model)

Hypothesis (r)	Trace Statistic	5% Critical Value	Decision
r = 0	83.49	47.21	Reject H0
r ≤ 1	45.25	29.68	Reject H0
r ≤ 2	15.07	15.41	Borderline
r ≤ 3	0.01	3.76	Accept H0

The VECM results show that exports to China significantly and positively affect GDP in the long term. A 1% increase in exports to China increases Indonesia’s GDP growth in the long run. The Error Correction Term (ECT) is negative and significant (-0.24), indicating that about 24% of disequilibrium is corrected annually, meaning the economy takes around four years to return to its long-term path.

**Table 5.** Summary of Significant VECM Coefficients (China model)

Equation	Variable	Coef.	p-value	Interpretation
$\Delta \ln(\text{GDP})$	ECT (L1)	-0.24	<0.05	Significant adjustment towards equilibrium
$\Delta \ln(\text{Exports})$	LD(Exports)	-1.03	0	Short-term negative correction
$\Delta \ln(\text{GFCF})$	LD(GFCF)	0.16	0.008	Investment supports exports short term
$\Delta \ln(\text{Exrate})$	L2D(Exrate)	0.07	0.003	Exchange rate depreciation boosts exports.

**Implications.** The macroeconomic implications are clear from expanding exports to China has stimulated domestic activity, investment, and employment (Tao et al., 2025). The BPS data shows



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that bilateral trade reached US\$82.1 billion in 2020 (Indonesia exported US\$35.7 billion, 43.5%), and by 2022, exports rose 25.4% to US\$124.34 billion. However, according to Arif & Chishti (2020), over-reliance on China poses risks. Export composition remains concentrated in primary commodities vulnerable to price volatility. The persistent trade deficit with China due to capital goods imports underscores structural dependence.

Policy-wise, Indonesia must prioritize market diversification, value-added exports, and downstream industrialization. Furthermore, Kim (2021) said that monitoring and negotiating non-tariff measures (NTMs) and strengthening domestic supply chains are essential to sustain competitiveness. For businesses, adaptation to China's market dynamics through product innovation and compliance with technical standards is critical to maintaining export growth amid global uncertainty.

**Performance and implications of exports to the United States.** The United States (US) is Indonesia's second-largest export partner. According to the data from the Bureau of Industry and Security from the US, BPS from Indonesia in 2023, Indonesia's exports to the US were valued at approximately US\$23 billion, equivalent to 9% of Indonesia's total exports. The structure of Indonesian exports to the US is dominated by textiles and footwear (32.7%), followed by agricultural commodities such as rubber and coffee (19.4%), and chemical/plastic products (14.7%) (BIS, 2019). Conversely, US exports to Indonesia are dominated by agricultural products (31.3%) and chemicals/plastics (14.7%). According to BPS (2024), Indonesia recorded a trade surplus of US\$1.21 billion with the US in January 2024, highlighting the positive contribution of this bilateral trade to Indonesia's overall balance.

**Table 6.** Indonesia's Export Structure to the US (2023)

Commodity	Share of US Imports from Indonesia (%)	Source
Textiles & footwear	32.70%	BIS, 2019
Agricultural goods	19.40%	BIS, 2019
Chemicals & plastics	14.70%	BIS, 2019
Others	33.20%	BIS, 2019
<b>Total</b>	<b>100%</b>	BIS, 2019

**VECM Estimation Results.** The ADF test (Table 7) shows that GDP and exchange rate are stationary at the level, while exports to the US and GFCF are stationary only after first differencing. **Augmented Dickey-Fuller (ADF).**

**Table 7.** ADF Test Results (US model)

Variable	ADF Level	p-value	Decision	ADF First Diff.	p-value	Decision
ln(GDP)	-4.255	0.0005	Stationary	-	-	-
ln(Exports US)	-0.483	0.8953	Non-stationary	-5.676	0	Stationary
ln(GFCF)	-0.807	0.8171	Non-stationary	-4.156	0.0008	Stationary
ln(Exrate)	-3.682	0.0044	Stationary (5%)	-	-	-

**Johansen Cointegration Test.** Johansen's trace test (Table B3) identifies two cointegrating vectors, confirming long-term equilibrium among variables.



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**Table 8. Johansen Cointegration Test (US model)**

Hypothesis (r)	Trace Statistic	5% Critical Value	Decision
$r = 0$	101.52	47.21	Reject H0
$r \leq 1$	37.95	29.68	Reject H0
$r \leq 2$	11.97	15.41	Borderline
$r \leq 3$	0.57	3.76	Accept H0

The VECM results (Table B4) reveal that Error Correction Terms are significant in the GDP equation ( $-1.951$ ;  $p=0.001$  and  $-3.080$ ;  $p=0.040$ ), indicating effective long-term adjustment. Additionally, investment (GFCF) and exchange rate depreciation play significant roles in explaining GDP dynamics.

**Implications.** Macroeconomically, exports to the US contribute positively to GDP, but the relatively low elasticity compared to China highlights structural vulnerabilities. Policy implications include export diversification, improving product quality standards, and strengthening bilateral trade diplomacy to counteract protectionist measures. Practically, Indonesian industries must invest in innovation and global marketing strategies to respond to shifting US consumer demand (Yang et al., 2023).

According to Tian et al. (2022), from a structural perspective, dependence on labor-intensive exports such as textiles and footwear exposes Indonesia to the risk of trade diversion and value chain relocation. As global production networks shift toward countries with lower production costs (e.g., Vietnam or Bangladesh), Indonesia must accelerate industrial upgrading by moving into medium- and high-technology manufacturing sectors. Strengthening backward and forward linkages in industries like automotive parts, electronics, and processed foods can create more sustainable trade relations with the US.

In addition, the findings underline the importance of resilience against policy shocks. Protectionist tendencies in the US, such as tariff escalation and the introduction of stricter non-tariff measures, require Indonesia to actively participate in regional and plurilateral trade agreements, while at the same time improving domestic institutional capacity to comply with international standards. It includes ensuring compliance with labor, environmental, and sustainability requirements that are increasingly decisive for market access in advanced economies (Danendra et al., 2025).

**Performance and implications of exports to Japan.** Japan ranks as Indonesia's third-largest export partner, according to data from OEC, (2025) with exports valued at approximately US\$20 billion in 2023, or 8% of total exports, on top of that the main commodities are coal briquettes (US\$5.76 billion), liquefied natural gas (US\$2.18 billion), and copper ore (US\$1.78 billion). Indonesia's exports to Japan rank fourth out of 213 partners, while imports from Japan rank thirteenth, highlighting a commodity-heavy trade structure.

**Table 9. Indonesia's Main Exports to Japan (2023)**

Commodity	Export Value (US\$ billion)
Coal briquettes	5.76
Liquefied natural gas	2.18
Copper ore	1.78
Others	10.28



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<b>Total</b>	<b>20</b>
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**VECM Estimation Results, Augmented Dickey-Fuller (ADF).** The ADF tests for Japan (Table 5.1) indicate that GDP and the exchange rate are stationary at the level, while exports to Japan and GFCF are stationary after differencing.

**Table 10. Indonesia's Main Exports to Japan (2023)**

Variable	ADF Level	p-value	Decision	ADF First Diff.	p-value	Decision
ln(GDP)	-4.255	0.0005	Stationary	-	-	-
ln(Exports JP)	-1.836	0.363	Non-stationary	-5.139	0	Stationary
ln(GFCF)	-0.807	0.8171	Non-stationary	-4.156	0.0008	Stationary
ln(Exrate)	-3.682	0.0044	Stationary	-	-	-

**Johansen Cointegration Test (Japan model).** Johansen test results (Table C3) indicate two cointegrating relationships, confirming long-term linkages among variables.

**Table 11. Indonesia's Main Exports to Japan (2023)**

Hypothesis (r)	Trace Statistic	5% Critical Value	Decision
r = 0	83.49	47.21	Reject H0
r ≤ 1	45.25	29.68	Reject H0
r ≤ 2	15.07	15.41	Borderline
r ≤ 3	0.01	3.76	Accept H0

VECM estimation (Table 5.2) shows that exports to Japan have a positive coefficient, but its magnitude is smaller than for China and the US. The ECT coefficient is -0.18, meaning that deviations from equilibrium adjust at 18% per year, which is slower than for other partners.

**Table 12. Summary of VECM Results (Japan model)**

Equation	Variable	Coef.	p-value	Interpretation
$\Delta \ln(\text{GDP})$	ECT (L1)	-0.18	<0.05	Slow adjustment (18% per year)
$\Delta \ln(\text{Exports JP})$	LD(GFCF)	0.156	0.008	Investment supports export growth
$\Delta \ln(\text{Exports JP})$	L2D(Exrate)	0.074	0.003	Depreciation boosts exports

**Implications.** Indonesia's exports to Japan remain concentrated in primary commodities, exposing the country to risks from global commodity price fluctuations and the global energy transition. The relatively weak GDP elasticity suggests limited macroeconomic contribution. From the research by Yulianti et al. (2023), they mention that policy implications include the need to increase export diversification, develop mid- to high-value manufacturing, and enhance agricultural product quality. Reducing NTMs and optimizing trade agreements, such as IJEPA, are essential. From a



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business perspective, exporters must adapt by meeting technical standards, innovating, and moving up the value chain to remain competitive in the Japanese market.

In addition, the slow adjustment speed reflected in the VECM results (around 18% per year) implies that shocks in trade relations with Japan may persist longer than in Indonesia's trade with other partners. Align with Sukarniati et al. (2025) research to highlight the necessity of enhancing bilateral cooperation not only in commodity trade but also in services and technology transfer. Expanding cooperation in renewable energy, digital economy, and human capital development could help reduce Indonesia's vulnerability to commodity cycles and support long-term structural transformation (Heykal et al., 2024).

Furthermore, empirical evidence from recent literature by Purwono et al. (2022) and Yuliati et al. (2023) indicates that non-tariff measures (NTMs) and high logistics costs significantly hamper Indonesia's ability to expand exports to Japan. Addressing these barriers requires improvements in infrastructure, port efficiency, and supply chain management, which in turn would lower trade costs and improve competitiveness. Coupled with a stronger utilization of IJEPA, such reforms could provide Indonesia with greater bargaining power and ensure that its export performance to Japan contributes more effectively to sustainable economic growth.

## CONCLUSION

This study has examined the relationship between Indonesia's G20 membership and its bilateral exports to China, the United States, and Japan during the period 1995–2023. The empirical results derived from the Vector Error Correction Model (VECM) confirm the existence of long-term cointegration between exports, GDP, investment, and exchange rates, suggesting that external trade is a significant determinant of Indonesia's economic performance.

The findings show that exports to China provide the most substantial and statistically significant positive impact on long-term GDP growth, although at the expense of structural dependence on primary commodities such as coal and palm oil. By contrast, exports to the United States also contribute positively, but with relatively lower elasticity, indicating limited macroeconomic spillover despite the existence of a persistent trade surplus. Meanwhile, exports to Japan reveal the weakest contribution to economic growth, with slow adjustment dynamics and high vulnerability to global commodity price cycles.

From a policy perspective, the results underline the urgency for Indonesia to pursue structural transformation in its export composition. Diversification toward higher value-added manufacturing, strengthening agricultural product standards, and maximizing trade agreements such as ACFTA and IJEPA are critical strategies to reduce over-reliance on primary commodities and mitigate the risks of protectionist policies from major partners. Strengthening trade diplomacy, improving logistics and supply chain efficiency, and addressing non-tariff barriers will also be essential to sustain Indonesia's competitiveness in global markets.

Overall, Indonesia's integration into the G20 framework has coincided with greater trade openness and stronger bilateral relations with its three main partners. However, the benefits of this integration will only be fully realized if Indonesia is able to transform its export structure, enhance industrial upgrading, and reinforce resilience against external shocks.

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