

The Effect of Raw Material Imports, Exchange Rate, and Inflation on Non-Oil and Gas Industrial Exports in Indonesia, 2021-2023

Elang Rabbaanii Deandy Putra, Aprillia Nilasari*

Universitas Negeri Surabaya, Indonesia

Email: rabbaaniielang@gmail.com, aprillianilasari@unesa.ac.id*

Keywords:

Exchange Rate; Inflation; Non-Oil and Gas Exports; Raw Material Imports; Vector Error Correction Model

Abstract

Indonesia's non-oil and gas industrial exports play an important role in supporting economic growth and generating foreign exchange; however, their performance is closely associated with imported production inputs, exchange-rate movements, and inflation. This study examined the effects of raw material imports, the rupiah–U.S. dollar exchange rate, and inflation on Indonesia's non-oil and gas industrial exports during 2021–2023. The study employed a quantitative approach using 36 monthly observations obtained from Statistics Indonesia, Bank Indonesia, and the Ministry of Trade. The data were analyzed using a Vector Error Correction Model (VECM) in Stata 17, following tests of stationarity, optimal lag length, Johansen cointegration, model stability, and relevant diagnostic assumptions. The findings indicated the presence of two cointegrating relationships, confirming a long-run equilibrium among the variables. Raw material imports moved jointly with exports within the same long-run system, reflecting the dependence of export-oriented industries on imported production inputs. The exchange rate had a positive but statistically insignificant effect on exports (coefficient = 0.4711; $p = 0.751$), whereas inflation had a positive and statistically significant effect (coefficient = 4,446.265; $p < 0.001$). These findings imply that export policy should prioritize greater efficiency in raw material supply chains, prudent management of exchange-rate volatility, and measures to mitigate imported inflation rather than relying primarily on currency depreciation to enhance export competitiveness.



This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

Copyright © 2026 by Author. Published by
Publikasi Indonesia

INTRODUCTION

International trade plays a strategic role in supporting economic growth, industrial development, foreign exchange earnings, and the integration of national economies into global production networks. However, global trade conditions during the post-pandemic period were characterized by considerable uncertainty arising from geopolitical tensions, disruptions in international supply chains, tighter monetary policies, commodity price volatility, and persistent inflationary pressures. According to the World Trade Organization (WTO), global merchandise trade volume declined by approximately 1.2% in 2023, while the value of world merchandise trade also decreased compared with the previous year. These conditions demonstrate that export performance is increasingly influenced not only by international

demand but also by production costs, exchange-rate movements, inflation, and access to imported intermediate inputs.

Indonesia faced similar challenges as an emerging economy that relies on international trade to support domestic production and economic growth. Non-oil and gas exports constitute an important component of Indonesia's trade structure because they represent manufacturing, agricultural, mining, and other productive sectors outside the oil and gas industry (Sadiah & Ginting, 2024). According to Statistics Indonesia (BPS), Indonesia's total exports reached approximately US\$258.82 billion in 2023, representing a decline of 11.33% compared with 2022. The research data further indicate that Indonesia's monthly non-oil and gas industrial exports during 2021–2023 fluctuated between US\$11,963.95 million and US\$19,726.47 million, with an average value of US\$15,827.16 million. These fluctuations indicate that Indonesia's export performance remained vulnerable to domestic and international economic developments during the post-pandemic recovery period.

One important structural characteristic of Indonesia's industrial sector is its dependence on imported raw and auxiliary materials. These imports constitute essential intermediate inputs used by domestic industries to sustain production activities, including export-oriented manufacturing. BPS data show that raw and auxiliary materials represented the largest component of Indonesia's imports in 2023, accounting for more than 70% of total imports. This condition indicates that imports should not always be interpreted as a weakness in the domestic economy because a substantial proportion directly supports productive activities (Nababan et al., 2021). Within the Global Value Chain framework, production processes are increasingly fragmented across countries, resulting in firms importing intermediate inputs before processing, assembling, and subsequently exporting final products (Gereffi & Fernandez-Stark, 2011; Mahmood & Zahoor, 2021). Therefore, the relationship between raw material imports and exports should be examined as part of an interconnected production system.

Dependence on imported production inputs also creates a complex relationship between exchange-rate movements and industrial exports. Conventional international trade theory suggests that depreciation of the domestic currency can improve export competitiveness because domestically produced goods become relatively cheaper for foreign buyers (Guo, 2020; Ramana, 2022). However, such benefits may be reduced when domestic industries rely heavily on imported raw materials and components. Depreciation of the rupiah simultaneously increases the domestic-currency cost of imported inputs, which may raise production costs and weaken the price advantage gained in international markets. During the 2021–2023 observation period, the rupiah–U.S. dollar exchange rate averaged approximately Rp14,798.29 per U.S. dollar and reached Rp15,741.23 per U.S. dollar at its weakest level. This condition highlights the importance of examining whether exchange-rate depreciation actually strengthens Indonesia's industrial export performance.

Inflation also constitutes an important macroeconomic factor influencing export competitiveness and nominal export values. Indonesia experienced changing inflationary conditions during the study period, particularly as the domestic and global economies recovered from the pandemic and faced rising food, energy, transportation, and logistics costs. Bank Indonesia recorded annual inflation of approximately 1.87% in 2021, increasing to 5.51% in

2022 before declining to approximately 2.61% in 2023. Higher inflation may increase production costs through rising prices of raw materials, energy, transportation, wages, and other industrial inputs. For export-oriented industries, these increases may subsequently be reflected in export prices. Therefore, an increase in nominal export value should not automatically be interpreted as an improvement in production efficiency because it may partly reflect higher prices rather than increased export volume.

Previous empirical studies have demonstrated that the effects of exchange-rate movements on exports are not uniform across industries, commodities, and destination markets. Research examining Indonesia's major export commodities found that exchange-rate volatility may negatively affect several export products, although the magnitude and direction of the effects differ across destination countries and commodities (Sugiharti et al., 2020). Other studies focusing on bilateral trade also indicate that currency depreciation does not necessarily produce an immediate improvement in export performance or the trade balance (Ramana, 2022). These findings suggest that the predictions of conventional trade theory may be less straightforward when export-oriented industries depend heavily on imported inputs, global production networks, and external economic conditions. Consequently, exchange-rate movements should be analyzed alongside other factors that influence the structure and cost of industrial production.

Research on imports, inflation, and macroeconomic conditions has similarly produced diverse findings. Several studies indicate that imports of raw and auxiliary materials may support economic activity by providing essential inputs for domestic production, whereas imports of consumption goods may have different economic implications (Kinski et al., 2023; Nababan et al., 2021). Other studies show that inflation and exchange-rate movements can affect exports directly or indirectly through changes in prices, production costs, investment, and external competitiveness (Hidayat et al., 2024; Rezandy & Yasin, 2021). Research on Indonesia's manufacturing sector also emphasizes that export performance depends on multiple structural factors, including production capacity, infrastructure, access to intermediate goods, and firms' ability to participate in global markets (Duli et al., 2022). These empirical findings confirm that industrial export performance results from interactions among several macroeconomic and structural variables rather than from a single determinant.

Despite the growing literature on international trade, an important research gap remains regarding the simultaneous relationships among raw material imports, exchange rates, inflation, and Indonesia's non-oil and gas industrial exports. Previous studies have predominantly examined exchange rates and exports, inflation and trade performance, imports and economic growth, or individual export commodities separately (Arifudin et al., 2024; Kinski et al., 2023; Rezandy & Yasin, 2021). Limited research has incorporated raw material imports, exchange rates, and inflation simultaneously into a dynamic econometric framework specifically focused on non-oil and gas industrial exports during the 2021–2023 post-pandemic recovery period. Furthermore, conventional static regression approaches may be insufficient to identify dynamic interactions and long-run equilibrium relationships among macroeconomic variables. Therefore, a model capable of capturing both short-run adjustments and long-run relationships is required.

The urgency of this research relates to Indonesia's challenge of increasing industrial exports while maintaining macroeconomic stability and ensuring the availability of productive imported inputs. Export policies that rely excessively on currency depreciation may be ineffective when industries depend heavily on imported materials because depreciation simultaneously raises production costs. Likewise, import restrictions that fail to distinguish productive raw materials from final consumption goods may disrupt industrial production and reduce export capacity. Inflation further complicates this relationship because rising domestic prices may increase nominal export values without necessarily indicating higher output or productivity. Therefore, understanding the interactions among raw material imports, exchange rates, inflation, and industrial exports is essential for developing more effective and sustainable trade and industrial policies.

The novelty of this study lies in integrating raw material imports, the rupiah–U.S. dollar exchange rate, and inflation into a single dynamic model to explain Indonesia's non-oil and gas industrial export performance during 2021–2023. The study employs a Vector Error Correction Model (VECM), which enables the identification of short-run adjustments and long-run equilibrium relationships among the variables. This model is appropriate because the variables are integrated of order one and cointegrated, allowing their dynamic relationships to be examined systematically. In addition, this research combines the Marshall–Lerner condition with the Global Value Chain framework to explain why currency depreciation may not necessarily increase exports when domestic production remains highly dependent on imported intermediate inputs.

Accordingly, this study aims to examine the effects and dynamic relationships of raw material imports, the rupiah–U.S. dollar exchange rate, and inflation on Indonesia's non-oil and gas industrial exports during 2021–2023. Specifically, the study seeks to identify the short-run adjustments and long-run equilibrium relationships among these variables using the VECM approach. Theoretically, the research contributes to the international trade literature by integrating conventional exchange-rate theory with the Global Value Chain perspective. Empirically, it provides evidence regarding the interconnected roles of imported production inputs, exchange-rate movements, and inflation in shaping industrial export performance. Practically, the findings are expected to benefit policymakers in designing export, import, exchange-rate, and inflation policies; assist industry stakeholders in managing production-input and currency risks; and provide a reference for future research on Indonesia's industrial competitiveness and participation in global value chains.

METHOD

This study employed a quantitative associative design to examine the relationships among non-oil and gas industrial exports, raw material imports, the exchange rate, and inflation (Sugiyono, 2019). The analysis used national-level monthly time-series data for Indonesia covering 36 observations from January 2021 to December 2023.

The dependent variable was non-oil and gas industrial exports (EINM), measured in millions of U.S. dollars. The independent variables were raw material imports (IBB), measured in millions of U.S. dollars; the rupiah–U.S. dollar exchange rate (NT), measured in rupiah per

U.S. dollar; and inflation (INF), measured as a percentage. The data were obtained from official publications of Statistics Indonesia (BPS), Bank Indonesia (BI), and the Ministry of Trade of the Republic of Indonesia through the Satu Data Perdagangan portal.

The data were analyzed using a Vector Error Correction Model (VECM) in Stata 17. Model selection was based on stationarity and cointegration properties. Stationarity was assessed using the Augmented Dickey–Fuller (ADF) test (Dickey & Fuller, 1979), while the optimal lag length was determined using the Akaike Information Criterion (AIC), Schwarz Bayesian Information Criterion (SBIC), Hannan–Quinn Information Criterion (HQIC), and Final Prediction Error (FPE) (Akaike, 1974; Schwarz, 1978). Long-run relationships were examined using the Johansen cointegration test (Johansen, 1991), followed by VECM estimation and assessment of the error-correction mechanism. Model adequacy was further evaluated through stability and diagnostic tests, including serial-correlation, normality, and heteroskedasticity assessments (Breusch & Pagan, 1979; Gujarati & Porter, 2009).

RESULTS AND DISCUSSIONS

The descriptive statistics for the four research variables over the period January 2021 - December 2023 are presented in Table 1.

Table 1. Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
EINM (Million USD)	15,827.16	15,815.65	19,726.47	11,963.95	1,740.347
IBB (Million USD)	13,627.59	13,840.63	17,014.85	9,871.89	1,795.987
NT (Rupiah)	14,798.29	14,749.72	15,741.23	14,042.10	510.7925
INF (%)	3.1505	2.75	5.95	1.33	1.5344

Source: Stata 17, data processed (2026)

The mean value of Non-Oil and Gas Industrial Exports (EINM) over the observation period was 15,827.16 million USD, with a relatively tight spread around the mean (standard deviation of 1,740.347). A similar pattern is seen in the three independent variables, whose standard deviations are each smaller than their means, indicating that the data were not extremely dispersed during the study period.

The prerequisite testing stage began with the Augmented Dickey-Fuller (ADF) unit root test at the first-difference level. The results show that all variables are significantly stationary at the 5% significance level (Dickey & Fuller, 1979), as presented in Table 2.

Table 2. ADF Unit Root Test Results at First Difference

Variable	Z(t) Statistic	Critical Value 5%	P-value	Remarks
EINM	-4.113	-3.682	0.0009	Stationary
IBB	-3.867	-3.682	0.0023	Stationary
NT	-5.034	-3.689	0.0000	Stationary
INF	-5.363	-3.689	0.0000	Stationary

Source: Stata 17, data processed (2026)

Because all variables are stationary at the first difference, $I(1)$, testing continued with the determination of the optimal lag length. The AIC, HQIC, SBIC, and FPE criteria consistently recommended lag 1 as the optimal lag for the model. Next, the Johansen cointegration test

produced the Trace Statistic and Maximum Eigenvalue Statistic values presented in Table 3.

Table 3. Johansen Cointegration Test Results

Maximum Rank	Trace Statistic	Critical Value 5%	Max-Eigen Statistic	Critical Value 5%
0	105.1348	62.99	46.8895	31.46
1	58.2453	42.44	27.7982	25.54
2	30.4471	25.32	17.6595	18.96
3	12.7876	12.25	12.7876	12.52

Source: Stata 17, data processed (2026)

The Trace Statistic values at rank 0 (105.1348) and rank 1 (58.2453) both exceed the 5% critical value, so H_0 is rejected and it is concluded that the cointegration rank is 2 ($r = 2$). Given this cointegrating relationship, the model used in this study is the Vector Error Correction Model, or VECM (Johansen, 1991).

Estimation of the VECM yields an Error Correction Term (ECT) of -0.8249 with a p-value of 0.004 in the first equation, and 0.4507 with a p-value of 0.041 in the second equation, both of which are statistically significant. The first ECT coefficient has a negative sign, consistent with the stability criterion, indicating that 82.49% of short-run deviations are corrected toward the long-run equilibrium within one month.

Because the Johansen test indicates a cointegration rank of 2, the VECM system forms two separate cointegrating equations. The Raw Material Imports (IBB) variable forms its own cointegrating equation endogenously, and therefore does not appear as a single coefficient in the main export equation. The long-run cointegrating equation for non-oil and gas industrial exports is formulated as follows:

$$\text{Ln(EINM)}_t = 16108.05 + 0.4711401 \text{ NT}_t + 4446.265 \text{ INF}_t + e_t \quad (1)$$

In this equation, the Exchange Rate (NT) variable has a positive actual coefficient of 0.4711401 but is not statistically significant (p-value = 0.751), while the Inflation (INF) variable has a positive coefficient of 4,446.265 and is statistically significant (p-value = 0.000). The model stability test shows that, of the eight characteristic roots produced, exactly two have a modulus of 1 -- consistent with the criterion $k - r = 4 - 2 = 2$ -- while the remaining six roots all lie below 1 (ranging from 0.3445 to 0.5969), so the model is judged stable. Furthermore, the classical assumption tests show that the model is free from autocorrelation (LM test, lag 1: Prob > $\chi^2 = 0.269$), is normally distributed (Jarque-Bera test: Prob > $\chi^2 = 0.916$), and contains no heteroskedasticity (Breusch-Pagan test: Prob > $\chi^2 = 0.491$), so all estimation results can be considered valid and reliable (Gujarati & Porter, 2009).

The Effect of Raw Material Imports on Non-Oil and Gas Industrial Exports

The Johansen cointegration test, which yields a rank of 2, means that the raw material imports variable does not produce a single elasticity coefficient directly on exports in the main cointegrating equation. This finding does not, however, mean there is no relationship; on the contrary, the VECM structure shows that raw material imports and non-oil and gas industrial exports move simultaneously within the same long-run equilibrium system, driven by identical macroeconomic factors, namely inflation and the productivity trend. This finding is consistent with the Global Value Chain (GVC) theory developed by Gereffi & Fernandez-Stark (2011):

in global supply chains, rising demand for manufactured exports draws in a higher volume of intermediate input imports to maintain production continuity. This phenomenon is a form of 'disintegration of production' as termed by Feenstra (1998), in which domestic industry outsources part of its production inputs to maintain the efficiency of the final product in global markets. The implication is that smooth access to imported raw material supplies is a fundamental prerequisite for non-oil and gas export production capacity, so export-promotion strategies should also pay attention to the efficiency of import procedures for auxiliary raw materials.

The Effect of the Exchange Rate on Non-Oil and Gas Industrial Exports

The exchange rate variable shows a positive actual coefficient of 0.4711401, meaning that each one-unit depreciation of the Rupiah could potentially increase non-oil and gas industrial exports by 0.4711401 million USD. However, this effect is not statistically significant (p -value = 0.751), which indicates that the Marshall-Lerner condition was not optimally satisfied in Indonesia's non-oil and gas industry in 2021-2023. Within the Global Value Chain framework, this insignificance is related to the phenomenon of vertical specialization (Hummels et al., 2001): when the Rupiah depreciates, export goods do become cheaper for foreign buyers, but the cost of imported raw materials needed by manufacturing industries also rises, eliminating that price advantage (Gereffi & Fernandez-Stark, 2011). This finding is consistent with Sugiharti et al. (2020), who also found that exchange-rate volatility does not always have a significant impact on Indonesia's leading exports because of the high import content of their production structure. The implication is that export-promotion strategies can no longer rely on currency depreciation policies, but instead require more measured management of exchange-rate volatility to maintain Indonesia's competitiveness in global value chains.

The Effect of Inflation on Non-Oil and Gas Industrial Exports

The inflation variable shows a positive actual coefficient of 4,446.265 and is statistically significant at the 5% level (p -value = 0.000), meaning that each 1% increase in inflation is predicted to raise the nominal value of non-oil and gas industrial exports by 4,446.265 million USD, assuming other variables are held constant. This finding indicates a price pass-through mechanism, in which higher domestic production costs -- including the cost of imported raw materials, energy, and logistics -- are passed on by producers into export selling prices. This phenomenon is clearly visible in the national automotive industry operating within GVC schemes, where most precision components such as engines and electronic systems are still imported from partner countries before being assembled and exported (Gereffi & Fernandez-Stark, 2011). Because export value in this study is measured in nominal terms, the positive effect of inflation reflects an increase in trade transaction value driven by prices, rather than by an increase in volume or real production efficiency. Thus, the growth in the value of non-oil and gas exports during the study period reflects the vulnerability of the national production cost structure to global input price shocks more than a strengthening of long-term structural competitiveness.

CONCLUSION

Based on the research findings and discussion, it can be concluded that raw material imports, the exchange rate, and inflation played interrelated roles in shaping the long-run equilibrium of Indonesia's non-oil and gas industrial exports during 2021–2023. Because the Johansen cointegration test identified two cointegrating relationships (rank = 2), the long-run relationship between raw material imports and exports could not be appropriately summarized by a single standalone elasticity coefficient. Nevertheless, raw material imports and exports moved jointly within the same long-run system, indicating the importance of imported production inputs in supporting export-oriented production within the Global Value Chain framework. The rupiah–U.S. dollar exchange rate had a positive but statistically insignificant relationship with exports (coefficient = 0.4711; $p = 0.751$), suggesting that exchange-rate depreciation alone did not significantly strengthen export performance during the study period. This finding may reflect the offsetting effect of Indonesia's dependence on imported raw materials, which raises production costs when the rupiah depreciates. However, the result should not be interpreted as direct evidence that the Marshall–Lerner condition was not satisfied, because testing that condition requires information on the relevant export and import demand elasticities. Meanwhile, inflation had a positive and statistically significant relationship with the nominal value of exports (coefficient = 4,446.265; $p < 0.001$), suggesting that changes in export values may partly have reflected price effects rather than improvements in export volume or structural efficiency. Taken together, these findings indicate that Indonesia's future non-oil and gas industrial export strategy should prioritize greater efficiency in domestic and imported raw material supply chains, prudent management of exchange-rate volatility, and measures to mitigate imported inflation rather than relying primarily on currency depreciation to stimulate exports.

FUNDING

The authors declare that no financial support was received for the conduct of this research and/or the publication of this article.

CONFLICT OF INTEREST

The authors declare that this research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AUTHOR CONTRIBUTION

Elang Rabbaanii Deandy Putra contributed to the conceptualization of the research, data collection and processing, application of the Vector Error Correction Model (VECM) method, interpretation of results, and preparation of the initial draft of the manuscript. Aprillia Nilasari, as the corresponding author, contributed to research supervision, validation of the methods and analysis results, and refinement, review, and finalization of the manuscript. Both authors have read and approved the final version of the manuscript for publication.

GENERATIVE ARTIFICIAL INTELLIGENCE USAGE STATEMENT

The authors state that generative artificial intelligence (AI) was used in the preparation of this manuscript. The authors acknowledge the use of generative AI to help improve the clarity of language and refine the grammatical structure of the manuscript. This use was carried out in compliance with applicable ethical guidelines on the use and disclosure of generative AI in scholarly research. Each author has made a substantial intellectual contribution to this work. The entire content of the manuscript has been carefully reviewed to ensure its accuracy, and the authors bear full responsibility for the integrity and final content of the manuscript.

REFERENCES

- Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control*, 19(6), 716–723. <https://doi.org/10.1109/TAC.1974.1100705>
- Arifudin, Nurhidayah, S., Sintiya, S., Afifudin, A., & Nabih, A. N. (2024). Pengaruh ekspor dan impor terhadap neraca perdagangan di Indonesia. *Moneter: Jurnal Ekonomi dan Keuangan*, 2(3), 1–8. <https://doi.org/10.61132/moneter.v2i3.562>
- Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. *Econometrica*, 47(5), 1287–1294. <https://doi.org/10.2307/1911963>
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74(366a), 427–431. <https://doi.org/10.1080/01621459.1979.10482531>
- Duli, M. Y., Jaya, K. W., Saleh, S., & Pangaribowo, E. H. (2022). Why do some regions exhibit a greater degree of manufacturing export and entrepreneurship activities than others? Evidence from Indonesia. *Cogent Economics & Finance*, 10(1), Article 2037251. <https://doi.org/10.1080/23322039.2022.2037251>
- Feenstra, R. C. (1998). Integration of trade and disintegration of production in the global economy. *Journal of Economic Perspectives*, 12(4), 31–50. <https://doi.org/10.1257/jep.12.4.31>
- Gereffi, G., & Fernandez-Stark, K. (2011). *Global value chain analysis: A primer*. Center on Globalization, Governance & Competitiveness, Duke University.
- Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics* (5th ed.). McGraw-Hill Irwin.
- Guo, G. (2020). Estimating the Marshall-Lerner condition of China. *Journal of Economics and International Finance*, 12(2), 48–56. <https://doi.org/10.5897/JEIF2019.1008>
- Hidayat, A. M., Purwanda, E., Hadijah, H. S., & Sodik, G. (2024). Impact of exchange rates, inflation, foreign direct investment, government spending, and economic openness on exports, imports, and economic growth in Indonesia. *Journal of Infrastructure, Policy and Development*, 8(6), 1–12.
- Hummels, D., Ishii, J., & Yi, K.-M. (2001). The nature and growth of vertical specialization in world trade. *Journal of International Economics*, 54(1), 75–96. [https://doi.org/10.1016/S0022-1996\(00\)00093-3](https://doi.org/10.1016/S0022-1996(00)00093-3)
- Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica*, 59(6), 1551–1580. <https://doi.org/10.2307/2938278>
- Kinski, N., Tanjung, A. A., & Sukardi, S. (2023). Analisis pengaruh ekspor dan impor terhadap pertumbuhan ekonomi di Indonesia tahun 2018–2022. *Ganaya: Jurnal Ilmu Sosial dan Humaniora*, 6(3), 568–578.
- Mahmood, A., & Zahoor, M. A. (2021). *Role of global value chains and exchange rate: An empirical examination in case of Pakistan*.

- Nababan, M., Haryadi, & Nurjanah, R. (2021). Analisis pengaruh impor barang konsumsi, impor barang modal, dan impor bahan baku/penolong terhadap PDB Indonesia tahun 2000–2018. *10*(2).
- Ramana, F. (2022). Marshall-Lerner condition pada perdagangan Indonesia-Tiongkok. *Buletin Ilmiah Litbang Perdagangan*, *16*(1). <https://doi.org/10.30908/bilp.v16i1.684>
- Rezandy, A., & Yasin, A. (2021). Pengaruh nilai tukar, inflasi, dan pendapatan nasional terhadap ekspor nonmigas Indonesia. *Independent: Journal of Economics*. <https://ejournal.unesa.ac.id/index.php/independent>
- Sadiah, F. U., & Ginting, A. L. (2024). Pengaruh perdagangan internasional ekspor migas dan non migas terhadap perdagangan di Indonesia. *6*(1).
- Schwarz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics*, *6*(2), 461–464. <https://doi.org/10.1214/aos/1176344136>
- Sugiharti, L., Esquivias, M. A., & Setyorani, B. (2020). The impact of exchange rate volatility on Indonesia's top exports to the five main export markets. *Heliyon*, *6*(1), Article e03141. <https://doi.org/10.1016/j.heliyon.2019.e03141>
- Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.