

A Comparative Analysis of Indonesia's Copper Export Competitiveness to China

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Abstract

Copper is a commodity widely used in various industries; therefore, the copper export value and the demand for copper have continued to increase in the past few decades. Indonesia is the 10th country with the highest copper reserves globally, but its export value is still lower than many countries. The study aims to analyze the comparative competitiveness between copper exports from Indonesia, Malaysia, Thailand, and the Philippines to China during 2018 - 2022. The methods used include the Trade Specialization Index (TSI), Revealed Comparative Advantage (RCA), and Export Competitiveness Index (ECI). The results showed that on average in 2018 - 2022, Indonesia is an exporting country with no comparative advantage but has an increasing trend of competitiveness in China. Meanwhile, Malaysia and the Philippines are exporting countries with a comparative advantage and an increasing trend of competitiveness in China. Thailand is an importing country with no comparative advantage but has an increasing trend of competitiveness in China.

Keywords: *Copper Export, Trade Specialization Index (TSI), Revealed Comparative Advantage (RCA), Export Competitiveness Index (ECI), ASEAN*

INTRODUCTION

International trade is an essential part of a country's economy. International trade is one of the economic driving forces and plays an important strategic in the growth of countries, including Indonesia (Darmawan et al., 2022). Basically, international trade is defined as exchanging services and goods between countries (Ambya & Hamzah, 2022).

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IJEBIR, Volume 03 Issue 05, 2024



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Countries in the world need to engage international trade, i.e., import and export, because each country has different resources. Therefore, countries import to meet their domestic demand. International trade, i.e., export and import, brings many benefits to the country, one of which is that countries can specialize in producing goods (Setiawan & Setiawina, 2019).

Indonesia is a country rich in natural resources, so Indonesia does numerous exports to the other country. Indonesia export many of the products of its natural resources, including copper. Indonesia is the 10th country with the highest copper reserves globally.

Copper is one of the most widely traded resources in the world. According to the data from the Observatory of Economic Complexity, copper ranks 19th out of 96 commodities as the most traded commodity in the world in 2022. Copper can be used in various industries, and differences in the availability of copper resources between countries encourage copper trade between countries and increased copper demand in recent decades.

The growing demand for copper in the world is in line with the increasing need for goods that use copper. Rising income levels in China, India, and other countries in Asia-Pacific have change the source of global demand (Magno & Guzman, 2021). China, which is the largest copper producer and consumer country in the world, accounts for more than 1/3 of the world copper consumption (Liu et al., 2021). The industrialization that has occurred in China has led to an increase in the level of demand for copper. This makes China the country with the highest level of copper import in the world.

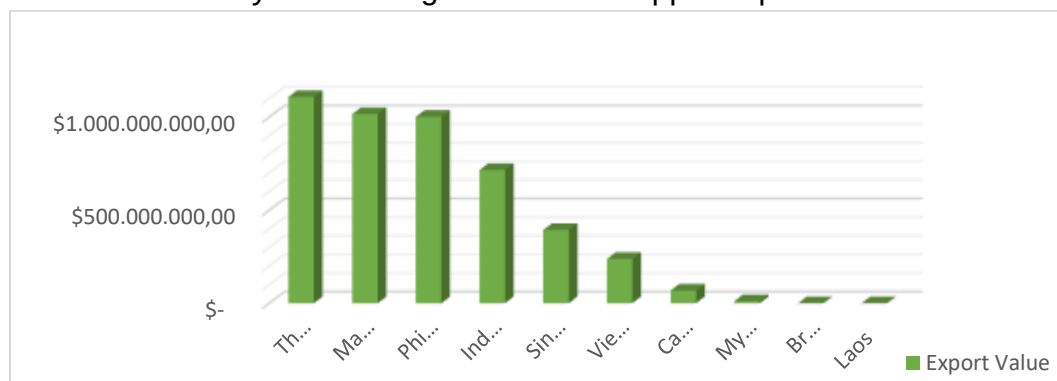


Figure 1: ASEAN Copper Export to China in 2022

Figure 1 shows the value of copper commodity exports in HS74 from ASEAN countries to China in 2022. As seen in figure 1, Thailand has the highest copper exports to China in ASEAN. Thailand's copper export value amounted to \$1.107.945.714. Malaysia occupies the second position with a copper export value to China is \$1.015.420.769 and Singapore is in the third position with a copper export value to China is \$1.001.618.063. Indonesia itself is in the fourth place as the country with the highest export level in ASEAN. The value of Indonesia's copper exports to China in 2022 is \$715.656.212.

Although Indonesia has the largest total copper reserves in Southeast Asia, the results of copper export to China in 2022 show total exports that are still below those of the three countries. The three countries have a copper export value of more than 1 billion to China.

The low export of commodity or goods compared to several other countries can be caused by low competitiveness. According to research conducted by V. Wardani & Sunyigono (2021), competitiveness has a positive and significant effect on exports. Therefore, it is necessary to calculate the export competitiveness of a commodity to find out the level of competitiveness of Indonesian export commodities in a market. Based on the background above, this research will discuss the competitiveness of Indonesian copper exports compared to the competitiveness of copper commodity exports from other countries, namely Malaysia, Thailand, and the Philippines.

LITERATURE REVIEW

Export and Import

Mankiw (2014) states that the definition of export is goods produced domestically and sold abroad, while imports are goods produced abroad and sold domestically. Export is the flow of a number of goods and services out of a country to the international market (Ambya & Hamzah, 2022). Another definition of export is expressed by Parnadi & Loisa (2018), export is a trading system that releases goods from within the country to foreign countries by fulfilling applicable regulations. If goods are needed by other countries and those countries cannot produce them or their production cannot meet their domestic demand, a country can export its production to other countries (Nur Annisa et al., 2022). The important function of the export component of international trade is that the country



makes a profit so that national income (foreign exchange) will increase so that later it can increase the amount of output and the rate of economic growth (Parnadi & Loisa, 2018).

Absolute Advantage

Adam Smith introduced this theory in his book entitled *The Wealth of Nations*. Adam Smith revealed in this theory that a country will trade with other countries if it has an absolute advantage. This absolute advantage is obtained if the country is more efficient in producing a commodity than other countries. This theory also explains that a country should specialize in commodities that have an absolute advantage (Anggraini et al., 2021). Countries can specialize in commodities with absolute advantages and import commodities with absolute disadvantages. With this process, resources will be used more efficiently, and the yield of both commodities will increase (Salvatore, 2018).

Comparative Advantage

The theory of comparative advantage is a theory introduced by David Ricardo in 1871 through his writing entitled *The Principles of Political Economy and Taxation*. David Ricardo argued that international trade between countries does not depend on absolute superiority in production but on differences in production cost. In this theory, comparative advantage is introduced, which is the advantage possessed by a country if the country can produce a commodity at a lower cost than other countries. The principle of comparative advantage states that every good to be produced must have a smaller opportunity cost (Mankiw, 2014). The law of comparative advantage states that even though a country has an absolute disadvantage against other countries in producing a product, there is still a basis for mutually beneficial trade (Salvatore, 2018). Countries with an absolute disadvantage can still specialize in products that have a smaller absolute disadvantage and import commodities that have a larger absolute disadvantage (Salvatore, 2018). According to this principle, all countries can benefit from trading with each other because trade allows each country to specialize in doing what they do best (Mankiw, 2014).

RESEARCH METHOD

This study is descriptive-quantitative research conducted with the aim of seeing the competitiveness of copper commodity exports. The countries that will be the subject

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IJEBIR, Volume 03 Issue 05, 2024



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of this research are Indonesia, Malaysia, Thailand, and the Philippines to the world's highest copper-importing country, China. The data used in this study is secondary data. comes from the United Nations Commodity Trade (UN Comtrade). The data used in this research is time series data for 5 years, from 2018 to 2022.

The methods used in this research include :

Trade Specialization Index (TSI)

Trade Specialization Index (TSI) is a method for measuring a country's tendency, whether a country tends to be an exporter or importer country. This method can be used to analyze the position or stage of commodity development (Parnadi & Loisa, 2018). The premise of this index is the same as the product cycle, where a product stays in the market for several years (Anggraini et al., 2021).

TSI can be written as follows :

$$TSI = \frac{(Xia - Mia)}{(Xia + Mia)}$$

Note :

TSI = Trade Specialization Index

Xia = Export value or Volume of copper from country a to China

Mia = Import value or Volume of copper from country a to China

a = Indonesia, Malaysia, Thailand, and Philippines

If the results of the TSI are positive, which is between 0 and 1, it can be concluded that the country is classified as an exporter and has a strong competitiveness. On the other hand, if the TSI results are negative, between 0 and -1, it can be concluded that the country is classified as an importer with low competitiveness (Ariesha et al., 2019).

TSI can be used to identify the stage of development of a commodity in trade, which is divided into five stages, which are as follows (Claudia & Soenhadji, 2021).

1. Introduction stage : The result of the TSI calculation is between -1,00 and -0,50
2. Import substitution stage : The result of the TSI calculation is between -0,51 and 0,00
3. Growth stage : The result of the TSI calculation is between 0,01 and 0,80
4. Maturity stage : The result of the TSI calculation is between 0,81 and 1,00
5. Re-import stage : The result of the TSI calculation is between 1,00 and 0,00



Revealed Comparative Advantage (RCA)

Revealed Comparative Advantage (RCA) was introduced by Bela Balassa through his publication in 1965 entitled Trade Liberalisation and Revealed Comparative Advantage and his 1989 publication entitled Revealed Comparative Advantage in Japan and the United States. This RCA Index is commonly referred to as the Balassa RCA Index or the Balassa Index.

RCA is a method that can be used to analyze comparative advantage and is dynamic (Ariesha et al., 2019). RCA can measure the comparative competitiveness of a country's export share of commodities relative to the world (Veno et al., 2020).

RCA can be written as follows :

$$RCA = \frac{X_{ij}/X_{it}}{W_j/W_t}$$

Note :

RCA = Revealed Comparative Advantage

X_{ij} = export value or volume of copper from country i to China

X_{it} = Total export value or volume from country i to China

W_j = World export value or volume of copper to China

W_t = Total world export value or volume to China

i = Indonesia, Malaysia, Thailand, and Philippines

If the RCA result is < 1 and close to 0, it can be concluded that the commodity has no comparative advantage. On the other hand, if the RCA is > 1 , it can be concluded that the commodity has a comparative advantage. The higher the RCA value, the higher the competitiveness.

Export Competitiveness Index (ECI)

Export Competitiveness Index (ECI) is one of the measurement method that can be used to identify trends in a commodity's competitiveness (Anggraini et al., 2021). This method can show the comparison between a country's export of a particular commodity in a period (t) compared to the country's export of a particular commodity in a previous period (Ariesha et al., 2019).

ECI can be written as follows :

$$ECI = \frac{(X_{ki}/X_w)_t}{(X_{ki}/X_w)_{t-1}}$$



Note :

ECI = Export Competitiveness Index

X_{ki} = Export value of copper of country a to China in year t

X_w = World export value of copper to China

a = Indonesia, Malaysia, Thailand, and Philippines

t = current period

t-1 = previous period

If the result of ECI is > 1 , it can be concluded that the trend in the competitiveness of the commodity is increasing, while if the value is < 1 , the trend in the competitiveness of the commodity is on the decline.

RESULT

**Table 1 : TSI Indonesia-Malaysia-Thailand-Philippines
Trade Specialization Index (TSI)**

Country	Year	TSI	Note
Indonesia	2018	0,18	Eksporter / Growth Stage
	2019	0,24	Eksporter / Growth Stage
	2020	0,51	Eksporter / Growth Stage
	2021	0,37	Eksporter / Growth Stage
	2022	0,38	Eksporter / Growth Stage
Malaysia	2018	0,35	Eksporter / Growth Stage
	2019	0,49	Eksporter / Growth Stage
	2020	0,57	Eksporter / Growth Stage
	2021	0,52	Eksporter / Growth Stage
	2022	0,35	Eksporter / Growth Stage
Thailand	2018	-0,55	Importer / Introduction Stage
	2019	-0,4	Importer / Import Substitution Stage
	2020	-0,04	Importer / Import Substitution Stage
	2021	-0,14	Importer / Import Substitution Stage
	2022	0,04	Eksporter / Growth Stage
Philippines	2018	0,75	Eksporter / Growth Stage
	2019	0,78	Eksporter / Growth Stage
	2020	0,84	Eksporter / Maturity Stage

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	2021	0,84	Eksporter / Maturity Stage
	2022	0,76	Eksporter / Growth Stage

Based on the result using the TSI method, Indonesia obtained $TSI > 0$ and Positive for 5 years, from 2018 until 2022. This means that from 2018 to 2022, Indonesia is categorized as an exporting country in China. Indonesia's TSI results also show that it is in the range of 0 to 0,80, so Indonesia is in the growth stage.

Malaysia's TSI Result are the same as Indonesia's, which has an $TSI > 0$ for 5 years. This means that for 5 years, from 2018 to 2022, Malaysia was categorized as an exporting country to China. Malaysia's TSI results also show that it is in the range of 0,00 to 0,80, so Malaysia is also in the growth stage.

Based on Thailand's TSI results, Thailand is classified as an importing country from 2018 to 2021. The result in 2022 shows a positive result, so it is concluded that Thailand has become an exporting country to China in 2022. The results also show that Thailand continues to experience growth in its product development stages. Thailand was in introduction stage in 2018 and moved to the import substitution stage in 2019 to 2022, and in 2022 it moved again to the growth stage.

The result of Philippines' TSI from 2018 to 2022 show positive results. Based on these results, the Philippines is an exporting country to China. The Philippines was also in the growth stage in 2018, 2019, and 2022. In 2020 and 2021, the Philippines managed to be in the maturity stage.

Revealed Comparative Advantage (RCA)

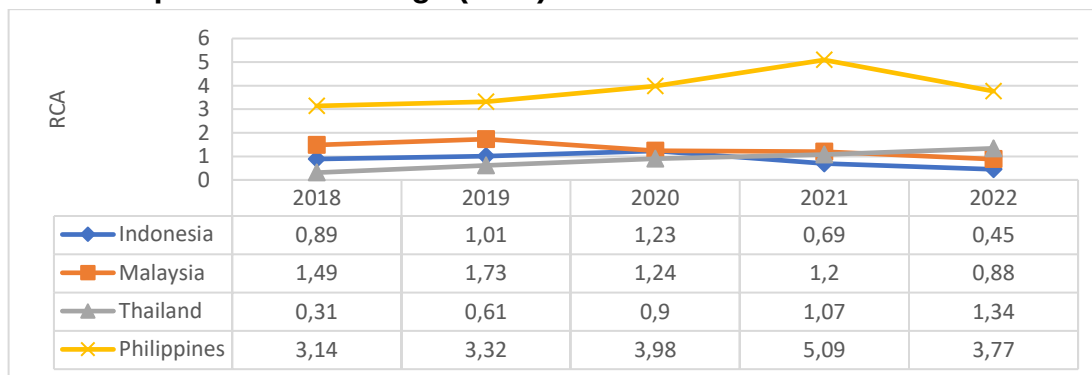


Figure 2: RCA Indonesia-Malaysia-Thailand-Philippines



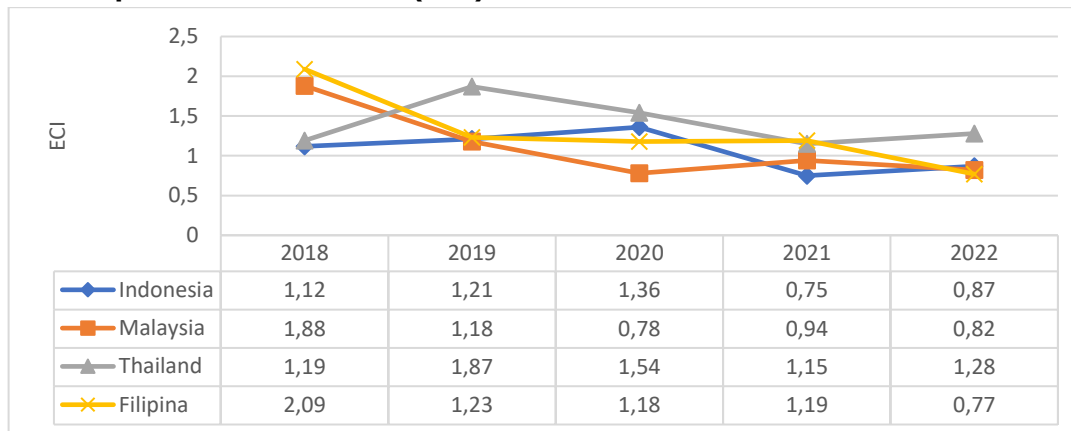
Indonesia's RCA results in 2018 showed a result of 0,89 and increased in 2019 and 2020 with RCAs of 1,01 and 1,23 respectively. The RCA result after that show that Indonesia's RCA continues to decline yearly. In 2021, Indonesia's RCA result was 0,69; in 2022, it was 0,45. The RCA results in 2022 showed a high decline and made the RCA results in that year the lowest RCA result from 2018 to 2022. This means that Indonesia's competitiveness shows a decrease in the competitiveness of copper exports. Based on these results, it is also concluded that Indonesia is classified as having a comparative advantage in China in 2019 and 2020, while 2018, 2021, and 2022 show that Indonesia does not have a comparative advantage in China.

The highest RCA result obtained by Malaysia was in 2019, with an RCA value of 1,73. Malaysia's RCA result in 2020 is 1,24, and 2021 is 1,2. Based on the RCA results from 2018 to 2021, Malaysia is classified as a country that has a comparative advantage in China. The RCA results in the following year, 2022, showed results that were less than 1, namely 0,88. These results mean that in 2022, Malaysia does not have a comparative advantage in copper export to China.

Thailand's RCA value in 2018 was 0,31, which is the lowest RCA result that Thailand has had from 2018 to 2022. Thailand's consecutive RCA results include 0,61 in 2019, 0,9 in 2020, and 1,07 in 2021. Thailand's highest RCA value is in 2022, with an RCA of 1,34. Based on these results, it is concluded that Thailand does not have a comparative advantage in China from 2018 to 2022. The results of Thailand's RCA in 2021 and 2022 are more than 1, so it can be concluded that Thailand has a comparative advantage in China.

Based on the results of the RCA, the Philippines is the country with the highest calculation results compared to Indonesia, Malaysia, and Thailand in 5 years, from 2018 to 2022. The Philippines is also the only country with an RCA result > 1 over the 5 years. The Philippines' lowest RCA result was 3,14 in 2018, and its highest result was 5,09 in 2021. These results also show that the Philippines has a comparative advantage in copper export to China, and this comparative advantage exceeded Indonesia, Malaysia, and Thailand.



Export Competitiveness Index (ECI)**Figure 2: ECI Indonesia-Malaysia-Thailand-Philippines**

Indonesia's ECI results in 2018, 2019, and 2020 were $ECI > 1$, which is 1,12 in 2018, 1,21 in 2019, and 1,36 in 2020. These results concluded that from 2018 to 2020, Indonesia copper exports experienced an increasing trend of competitiveness in China. Furthermore, for 2021 and 2022, the ECI results show results below 1, namely 0,75 in 2021 and 0,87 in 2022. In 2021 and 2022, the trend of competitiveness of Indonesia's copper export decreased in China.

The result of Malaysia's ECI in 2018 was 1,88, and in 2018 was 1,18. This means that in 2018 and 2019, Malaysia experienced an increasing trend of copper export competitiveness in China. In the following years, Malaysia experienced $ECI < 1$, which is 0,78 in 2020, 0,94 in 2021, and 0,82 in 2022. Malaysia's ECI value is below 1, so it is concluded that Malaysia experienced a decreasing copper export competitiveness from 2020 to 2022. Even though it had experienced a downward trend in competitiveness, on average, Malaysia's ECI value was still above 1. On average, Malaysia experienced an increasing trend in copper export competitiveness in China.

Based on the ECI calculation result, Thailand is the only one of four countries whose calculation results for five years get $ECI > 1$ from 2018 to 2022. Thailand's ECI calculation result in 2018 is 1,19, in 2019 is 1,87, in 2020 is 1,54, in 2021 is 1,15, and in 2022 is 1,28. From these results, it can be concluded that Thailand is the only country with an increasing copper export competitiveness trend from 2018 to 2022. Thailand does not experience a declining competitiveness trend in China.

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Based on the results of the Philippines ECI calculation, the ECI results from 2018 to 2021 show $ECI > 1$. The Philippines' ECI results in 2018 is 2,09, in 2019 is 1,23, in 2020 is 1,18, and in 2021 is 1,19. These results mean that the Philippines has an increasing trend of copper export competitiveness in China. The result in 2022 is 0,77, which means that the Philippines has a decrease in the trend of copper export competitiveness in China.

DISCUSSION

Based on the result of RCA, Indonesia does not have a comparative advantage in copper export to China. The export value of Indonesian copper in HS74 is still lower than Malaysia and Thailand's. Indonesia is the country with the highest copper production level in Southeast Asia. However, its production is still not maximally utilized. This is because the production tends to be exported as copper ore and concentrates. According to the data, the export of copper ore and concentrates is still much higher than the export of processed copper products. The production of copper ore is also more exported to other countries than processed domestically. According to data from Direktorat Jenderal Mineral dan Batubara (2021), in 2021, as much as 1.176.765 tons of copper concentrate were exported or around 53,45%, while the rest, 1,064,879 tons or around 46.55%, were processed domestically.

The value of copper exported to China as copper ore (HS2603) is also higher than the value of copper exported in (HS74). The export value of copper ore and concentrate to China in 2022 is \$1.773.986.000 and is 2 times higher than the export value of processed copper products in HS74. The higher number of products sold as raw materials than pre-processed products is also the cause of Indonesia's low exports, which impacts the specialization of processed copper products, which will be reflected in the RCA value.

Although Thailand and Malaysia are not countries with strong copper mining products like Indonesia, the export value of their processed copper products contained in HS74 has exceeded the export value of Indonesia. Malaysia's high copper exports compared to Indonesia can be attributed to Malaysia exporting finished goods products. Malaysia's most exported product in HS74 is copper wire. Copper wire is also in the 54th position as the most exported product by Malaysia worldwide.

Both countries have low copper production. Therefore, Malaysia and Thailand import from various other countries to fulfil their domestic needs. Malaysia also has a

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strong copper absorption capacity across the industrial chain. Thailand's TSI result also shows that the country is a net importer.

Both countries import semi-finished goods from various countries, including Indonesia, and then the products are reprocessed in their country. Exporters of copper wire in Malaysia and Thailand import refined copper rods from other ASEAN countries, namely Indonesia, the Philippines, and Vietnam, to produce copper wire (Banik, 2022). Malaysia and Thailand import copper cathodes/copper rods from Indonesia, convert them into copper wires and export them to various other countries. Copper wire is one of Thailand's most exported products worldwide, with a total export value of \$859.952.105, and Malaysia's total export value is \$967,684,100.

The calculation results using the three methods show that the Philippines is a strong country in terms of copper export competitiveness. The RCA of the Philippines shows that the country has a comparative advantage in copper exports to China. This is because copper is one of the many resources owned by the Philippines. In 2019, the Philippines also ranked 20th as the country with the highest level of copper smelter production in the world. Copper ranks 3rd as the most exported product by the Philippines to China. Thus, it is unsurprising that the Philippines has a comparative advantage and is competitive in copper exports to China.

CONCLUSION

The conclusions that can be drawn from the results of the analysis above using three methods, namely Trade Specialization Index, Revealed Comparative Advantage, and Export Competitiveness Index, include the following: Indonesia is an exporting country and does not have a comparative advantage but has an increasing competitiveness trend in China. Malaysia is an exporting country with a comparative advantage and has an increasing competitiveness trend in China. Thailand is an importing country with no comparative advantage but has an increasing competitiveness trend in China. The Philippines is an exporting country with a comparative advantage and has an increasing competitiveness trend in China.



REFERENCES

- Ambya, A., & Hamzah, L. M. (2022). Indonesian Coal Exports: Dynamic Panel Analysis Approach. *International Journal of Energy Economics and Policy*, 12(1), 390–395. <https://doi.org/10.32479/ijeep.11978>
- Anggraini, D., Syapsan, & Darmayuda. (2021). DAYA SAING EKSPOR LADA INDONESIA KE NEGARA AMERIKA SERIKAT. *CONVERGENCE: THE JOURNAL OF ECONOMIC DEVELOPMENT*, 3, 90–105.
- Ariesha, Y., Alamsyah, Z., & Malik, A. (2019). ANALISIS KOMPARASI DAYA SAING EKSPOR LADA INDONESIA TERHADAP VIETNAM DAN MALAYSIA DI PASAR ASEAN. *JISEB*, 22(1), 80–90. <https://doi.org/10.22437/jiseb.v22i1.8619>
- Banik, N. (2022, September 29). ASEAN CEPA review: Making trade fair for India's copper industry. *Financialexpress.Com*.
- Claudia, G., & Soenhadji, I. M. (2021). Market Overview of Indonesia Copper Export Commodity (Case of Indonesia, Thailand, and Japan Copper Exporting Countries in 2004-2018). *Journal Research of Social, Science, Economics, and Management*, 1(3), 246–254. <https://doi.org/10.36418/jrssem.v1i3.19>
- Darmawan, A., Husaini, M., Rakhmadi, R., & Atiqasani, G. (2022). Investigating the Impact of Indonesia-Turkey CEPA and Factors influencing Indonesian Export Performance. *Jurnal Ekonomi Pembangunan*, 20(1), 77–88.
- Direktorat Jenderal Mineral dan Batubara. (2021). *GRAND STRATEGY MINERAL DAN BATUBARA*.
- Liu, S., Liu, W., Tan, Q., Li, J., Qin, W., & Yang, C. (2021). The impact of China's import ban on global copper scrap flow network and the domestic copper sustainability . *Resources, Conservation and Recycling*, 169.
- Magno, C. D., & Guzman, R. R. S. (2021). Energy and the viability of downstream integration: Cross-country evidence from the copper industry . *The Extractive Industries and Society*, 8(3).
- Mankiw, N. G. (2014). *Principles of Economics* (Seventh Edition). Cengage Learning.
- Nur Annisa, Nairobi, & Taher, A. R. Y. (2022). The The Effect of Foreign Debt, Labor Force, and Net Exports on Indonesia's Economic Growth in Period of 1986 Q1 - 2020 Q4. *Jurnal Ekonomi & Bisnis JAGADITHA*, 9(1), 39–46. <https://doi.org/10.22225/jj.9.1.2022.39-46>



- Parnadi, F., & Loisa, R. (2018). ANALISIS DAYA SAING EKSPOR KOPI INDONESIA DI PASAR INTERNASIONAL. JURNAL MANAJEMEN BISNIS DAN KEWIRAUSAHAAN, 02, 52–61.
- Salvatore, D. (2018). Ekonomi internasional (M. Masykur & Y. Setyaningsih, Eds.; 9th ed., Vol. 1). Salemba Empat.
- Setiawan, I. K. D., & Setiawina, N. D. (2019). E-Jurnal EP Unud, 8 [4] : 877-906 ANALISIS DAYA SAING SERTA FAKTOR-FAKTOR YANG MEMPENGARUHI EKSPOR BIJIH NIKEL DI INDONESIA. E-Jurnal Ekonomi Pembangunan Universitas Udayana, 8(4), 877–906.
- Veno, A., Safitri, L. A., & Prijanto, T. (2020). Analisis Daya Saing Ekspor Minyak Mentah Indonesia Dibanding dengan Negara Anggota OPEC. Journal Of Management, Accounting, Economic and Business, 01, 16–29.
- Wardani, V., & Sunyigono, A. (2021). Daya Saing dan Faktor yang Mempengaruhi Ekspor Lada Indonesia ke India. Jurnal Ekonomi Pertanian Dan Agribisnis, 5(3), 655–666. <https://doi.org/10.21776/ub.jepa.2021.005.03.5>

