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An Analysis of Competitiveness and Determinants of Indonesia Coal's Export to Main Destination Country in 2012-2022 Period

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Abstract: This study aims to analyze the competitiveness and factors affecting Indonesia's coal export value. The study uses a quantitative research approach and secondary data types. The analytical technique used to determine competitiveness is the Revealed Comparative Advantage (RCA) index, and to identify the factors influencing Indonesia's coal export value, panel data regression with the Gravity Model is used. The results show that Indonesia's coal commodities have competitiveness in the global market, and the factors such as the Gross Domestic Product (GDP), exchange rate, and carbon dioxide emissions have a significant positive impact, while economic distance has a negative impact on Indonesia's coal export value. The implications of the findings in this study suggest that Indonesia needs to consider the challenges and threats to coal demand from destination countries and diversify products beyond coal to maintain foreign exchange revenue.

Keywords: RCA, GDP, Exchange Rate, Economic Distance, Carbon Dioxide Emissions, Coal Export, Panel Data Regression



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INTRODUCTION

International trade plays an important role in the global economy, including Indonesia. The involvement of a country in import and export activities, the country can optimize the potential of its resources (Pramana & Meydianawathi, 2013). A country that is export-oriented will benefit the country's goods or services, especially foreign exchange. Based on data from *Badan Pusat Statistik* (2023), coal as one of Indonesia's export commodities that has a contribution to foreign exchange, recorded in 2022 contributed 34% to Indonesia's foreign exchange. Indonesia's coal commodity is one of the leading commodities with a contribution of 19.03% to Indonesia's total exports in 2022 and over the past 5 years has generated a value of US\$ 152,011.04 (Kementerian Perdagangan, 2023). Coal has a very important role for a country because it is used as energy for power generation and as the main fuel for the cement, paper, steel and other industries (Admi et al., 2022). Based on data from British Protleum (2021), Indonesian coal has enormous potential with ownership reserves of 38,869 million tons with a contribution of 3.25% of all world coal reserves of 1,074 billion tons and this figure makes Indonesia the country with the seventh largest coal reserve ownership in the world in 2020 and Indonesia's coal reserve ratio is projected for the next 62 years. In addition to Indonesia's abundant coal reserves, coal is the dominant energy used as a source of energy in a country for electricity generation, more than 39% of all electricity in the world is generated by energy sources derived from coal (Indonesia Investments Report, 2024). Based on data from International Energy Agency (2021), Indonesia was the world's first largest coal exporter in 2020 with a total coal export volume of 405 million tons to the global market followed by Australia, Russia, the United States, South Africa, Canada, Colombia and Mongolia. These conditions have made Indonesia's coal commodities the flagship for Indonesia's total export value in recent years.

Based on data from UN Comtrade (2023), the development of the volume and value of Indonesia's coal exports for the period 2012-2022 shows a fluctuating trend caused by coal demand and prices. Based on the table shown in Figure 1, the highest value of Indonesian coal exports in 2022 amounted to 46.74 billion US\$ and it was recorded that after the Covid-19 pandemic, the value of Indonesian coal exports increased significantly by 82.65% in 2021 and 221.5% in 2022 compared to 2020. This condition is due to the high demand for Indonesian coal commodities from its main destination countries and makes Indonesia the largest coal exporter in 2022 (International Energy Agency, 2022).

Table 1. Development of Indonesia's Coal Export Volume and Value

Year	Coal Export Volume (Million Tons)	Coal Export Value (US\$ billion)
2012	347.58	24.29
2013	381.52	22.77
2014	356.30	18.70
2015	328.39	14.72
2016	310.66	12.90
2017	319.10	17.88
2018	343.12	20.64
2019	374.94	18.96
2020	341.55	14.53
2021	345.45	26.54
2022	360.29	46.74

Source: (*Badan Pusat Statistik*, 2023)

Although Indonesia's coal commodity plays a major role in the country's foreign exchange contribution and is a leader in the global market, there are challenges and threats to the impact of carbon dioxide emissions generated from coal commodities (Susanto & Admi, 2021). The use of fossil fuels such as coal, oil and natural gas has the largest contribution to carbon dioxide emissions in a country that consumes them (Nain et al., 2017). Another challenge is the shrinking global coal market, which has made competition among global coal exporting countries such as Australia, Colombia, South Africa and Russia more competitive (Admi et al., 2022). Therefore, there is a need for a strategic role from the government so that Indonesian coal commodities continue to have high competitiveness and demand in the global market by paying attention to environmental impacts.

Previous research Admi et al. (2022), analyzed the competitiveness and factors affecting the level of competitiveness of Indonesian coal exports with the results of the RCA index > 1 and the factors of Indonesia's GDP, Indonesia's benchmark coal price, and the population of destination countries with negative results and exchange rates have no influence on Indonesian coal exports while research Tika Carolina & Aminata (2019) using the GDP factor of the destination country found the results of the influence and economic distance with the Gravity Model has a negative influence on Indonesian coal exports. Based on research Susanto & Admi (2021) which analyzed Indonesia's coal demand to six destination countries found that the foreign exchange factor and the population of the destination country had a positive effect while the exchange rate factor and the total coal production of the destination country had no effect on Indonesia's coal exports. The use of the Gravity Model method as a mathematical calculation of economic distance to determine the inhibiting factors on the value of Indonesian coal exports because economic distance is a cost that must be incurred by a country in international trade (Kadek et al., 2020). Based on research Leng et al. (2020) and Sadeghi et al. (2019) found that the economic distance factor has a negative influence on exports in China and Iran. Then the carbon dioxide emission factor of the destination country is used to see the environmental impact that coal energy has on the destination country. Previous research Batsuuri & Erickson (2015) and Richter & Schiersch (2017) found that the destination country carbon dioxide emission factor increased coal exports in Mongolia and Germany. Based on the background that has been described, this study aims to analyze the competitiveness of Indonesian coal commodities and the factors that influence coal demand from the eight main destination countries for the period 2012-2022. This study also including international trade theory to comprehensively determine the factors that affect the value of Indonesian coal exports to eight main destination countries.

LITERATURE REVIEW

International Trade Theory

International trade can realize a country in specializing in producing a good or service with good quality and produce production efficiency on a large scale (Admi et al., 2022). In the early 19th century, David Ricardo put forward the theory of comparative advantage where a country can have a comparative advantage when the country produces goods and services at a relatively lower cost than other countries (Krugman et al., 2017). International trade is influenced by several factors, especially demand factors (Susanto & Admi, 2021). According to Salvatore (1997), factors that affect the import of goods and services from destination countries include foreign exchange, exchange rates, cooperation agreements, and so on. In addition, a country that plays a role in international trade activities will get the benefits generated through imports or exports (Pratama et al., 2023).

Mankiw (2006) states that exports are the activity of selling goods or services to other countries that are traded on the international market. Exports can stimulate demand for domestic industries. The role of exports in the economy of a developing country is very important, especially Indonesia. The impact of conducting export activities can increase the country's productivity, increase the quantity of output of a domestic production, and economic growth (Susanto & Admi, 2021). In addition, the condition of a country's exports being greater than imports will have an impact on the trade surplus, realize specialization, and increase foreign exchange which can

reduce dependence on assistance from other countries and can realize an increase in a country's economic resilience (Elshehawy et al., 2014; Hasyim, 2016).

Competitiveness is defined as the ability of a commodity to enter and sustain in the global market. In research Boansi & David (2013) International trade theory states that the competitiveness of a country's commodity is based on the concept of comparative advantage. According to Porter (1990), stated that competitiveness through the level of productivity which is the level of output produced from each unit of input in the production process of goods or services. The increase in the quantity of productivity is related to the increase in the quantity of inputs, namely labor, capital, and technology. One approach that is often used to see the level of competitiveness of commodities is comparative and competitive advantage (Pradipta & Firdaus, 2014). In measuring the level of competitiveness of a country's export commodities, several methods have been developed. This research focuses on analyzing the competitiveness of Indonesian coal commodities in the global market using the Revealed Comparative Advantage (RCA) index. According to Balassa (1965), the RCA index is used to see the competitiveness of a country's commodity by comparing the export share of a country with the export share of the same commodity from the country or the world. The RCA index is often used in several literature studies in international trade and is used to analyze the competitiveness of a country's commodities in the global market (Liu & Gao, 2022). If the RCA index value of a country's export commodity > 1 indicates that the country's commodity is comparatively competitive in the global market (Admi et al., 2022; Jalata, 2021; Liew et al., 2021).

Gross Domestic Product

One of the benchmark indicators in measuring a country's economic performance is Gross Domestic Product (GDP). Gross Domestic Product (GDP) measures total income through international trade activities, namely exports and imports traded on international markets. A country with a high Gross Domestic Product (GDP) indicates the country's economic capacity and income. High domestic demand in a country makes the country import from other countries to fulfill its domestic needs (Azizah A' & Soelistyo, 2022). Mankiw (2006) stated that a country that has a high Gross Domestic Product (GDP) will have an impact on the country's purchasing power along with its domestic needs, so that imports in the country have increased. In research Admi et al. (2022) found the result that the Gross Domestic Product (GDP) of the destination country that increases will increase the value of Indonesian coal exports, similar to the results of research conducted by (Andriantoni et al., 2020) and Elshehawy et al. (2014) that the Gross Domestic Product (GDP) of the destination country has an impact on the high value of rubber exports in Indonesia and the value of exports in Egypt. Thus, the high Gross Domestic Product (GDP) in the importing country has an impact on the amount of demand for the value of Indonesian coal exports.

Exchange Rate

The exchange rate is the price of a country's currency against a foreign currency and is usually used as a transaction tool in international trade. In simple terms, the exchange rate is the amount of one unit of a country's currency required to buy one unit of another country's currency. For example, the exchange rate of a dollar against a destination country's currency is the amount of the destination country's currency required to buy one unit of US\$ (Admi et al., 2022). Exchange rate conditions in a country have an impact on the quantity of demand for a good or service from that country. Mankiw (2006) stated that the condition of a country's exchange rate that appreciates will increase the demand for goods or services to the exporting country because the price of goods or services from abroad tends to be cheaper. Vice versa, if the exchange rate of a country depreciates, it will reduce the demand for goods or services to exporting countries because the price of goods or services from other countries tends to be more expensive. Research conducted by Kurtovic et al. (2017) found that an appreciated destination country exchange rate can increase the value of exports in Serbia, similar to the results found in the study of Andriantoni et al. (2017).

Andriantoni et al. (2020) and Fitriani et al. (2019) that an increasing exchange rate in the destination country can increase the export demand for coal and frozen shrimp in Indonesia. Thus, the relationship between the exchange rate and the value of Indonesian coal exports has an impact on the value of Indonesian coal exports.

Economic Distance

Economic distance is the distance measured between two countries based on geographical distance by considering the Gross Domestic Product (GDP) of the destination country. Economic distance determines the transportation costs that must be paid in international trade. According to Salvatore (1997), transportation costs incurred by a country include ship costs, loading and unloading costs at the port, insurance costs, and various other costs. The higher the economic distance between the two countries results in a decrease in trade flows between the two countries (Carolina & Aminata, 2019). Krugman et al. (2017) stated that the greater the distance between the two countries, the more it will suppress the quantity of trade flows of goods or services between the two countries. The amount of distance is closely related to the costs that must be incurred by a country in international trade, including transportation costs, the cost of damage to goods during delivery, and the cost of lost delivery time (Kadek et al., 2020). Previous research by Leng et al. (2020) and Sadeghi et al. (2019) which found the result that economic distance will reduce export demand from the destination country because the costs that must be incurred are more expensive. Thus, there is a closely related relationship between economic distance and the value of Indonesian coal exports.

Carbon Dioxide Emissions

A country's economic development activities that use fossil energy, especially coal, have a damaging impact on the environment due to increased carbon dioxide emissions in the country (Nain et al., 2017). The use of fossil fuels, especially coal as energy for power generation and industry in a country contributes greatly to the increase in carbon dioxide emissions (Ohlan, 2015). The Environmental Kuznet Curve theory suggests that the level of environmental damage will increase along with economic development and at a certain point of achievement of economic development will be followed by a decreasing level of damage. Based on Mahmood et al. (2019), the increase in carbon dioxide emissions in Tunisia is due to massive economic growth due to high production in the manufacturing sector. The high demand for coal exports in the destination country is caused by high carbon dioxide emissions in the destination country because the country still has a dependence on coal energy as its domestic energy source (Batsuuri & Erickson, 2015; Richter & Schiersch, 2017). Thus, there is a relationship between the carbon dioxide emissions of destination countries that have an influence on the value of Indonesian coal exports.

Research Framework

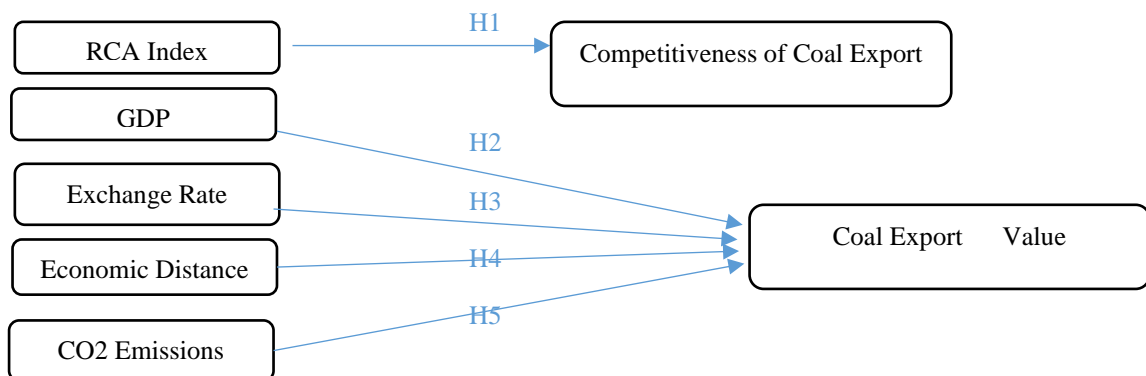


Figure 1. Research Framework

Source: Author (2024)

Hypothesis Development

In the calculation of the RCA index, an RCA index value greater than 1 indicates that the product in that country has a comparative advantage. Conversely, if the RCA index value is less than 1, it suggests that the product does not have a comparative advantage in that country. According Admi et al. (2022), using the RCA index to assess the competitiveness of Indonesia's coal commodities in the global market to main destination countries.

H1: RCA Index on Competitiveness of Coal Export

One indicator for measuring economic performance is Gross Domestic Product (GDP), which reflects the average output of goods or services in a country. According Andriantoni et al. (2020) present similar findings regarding the impact of GDP on the increase in commodity exports to importing countries. According to the study, a rise in GDP in an importing country enhances its income and capacity to purchase goods or services from abroad, thereby influencing the demand for coal exports from Indonesia.

H2: Gross Domestic Product on Coal Export Value

In international trade, exchange rates can impact the demand and supply of export commodities within a country. When the exchange rate appreciates, a commodity becomes cheaper in the international market, while its domestic price also tends to be lower. As stated by Mankiw (2006), an appreciation in a country's exchange rate generally makes foreign goods cheaper and vice versa. This relationship aligns with the study by Kurtovic et al. (2017), which found that the exchange rate had a negative impact on exports in Serbia. Similarly, research by Kadek et al. (2020) demonstrated a significant effect of the real exchange rate on the demand for Indonesia's natural rubber exports.

H3: Exchange Rate on Coal Export Value

In international trade, economic distance reflects transportation costs, which often hinder trade activities. The greater the distance between countries, the higher the transportation costs. Increased transportation costs impact exports and imports as they drive up the prices of goods. According Pradipta & Firdaus (2014), have found that economic distance negatively affects Indonesia's fruit exports. This finding aligns with Krugman et al. (2017), who state that the greater the distance between two countries engaged in international trade, the more it reduces the flow of goods or services between them.

H4: Economic Distance on Coal Export Value

The increase in greenhouse gas emissions has become a major environmental issue worldwide, with carbon dioxide (CO₂) being a significant contributor to the greenhouse effect in various countries. Most CO₂ emissions result from the consumption of fossil fuels, such as coal, oil, and gas (Hossain, 2011). As international trade activities, particularly exports and imports, continue to grow, fossil fuel usage increases, affecting the environmental ecosystem. Research by Mahmood et al. (2019), found that rising CO₂ emissions in China and Tunisia were driven by increased production for manufactured goods exports.

H5: Carbon Dioxide Emissions on Coal Export Value

METHOD

This research uses a quantitative approach with secondary data obtained from the *Badan Pusat Statistik, Kementerian Energi dan Sumber Daya Mineral, Kementerian Perdagangan, World Bank, UN Comtrade, Statistical Review of Energy, and Center d'Etudes Prospectives et d'Informations Internationales (CEPII)*. According to Sugiyono (2013), secondary data is data that is not directly obtained from data collectors through trusted sources, including an institution or institution that provides such data and quantitative research has the aim of testing hypotheses that have been formulated in a study. The scope of the research consists of 8 main destination countries, namely China, India, Japan, South Korea, Malaysia, Thailand, the Philippines, and Hong Kong and the research period used is 2012-2022. All of these countries were chosen because they contributed 89% to the value of Indonesia's coal exports for the period 2012-2022 (*Badan Pusat Statistik, 2023*). This study, using RCA index method was developed by Balassa (1965) is used to measure the competitiveness of a country's commodities in the global market comparatively.

Mathematically, the Revealed Comparative Advantage (RCA) index is formulated as follows (Admi et al., 2022):

$$RCA_{ij} = \frac{X_i/X_t}{W_i/W_t}$$

Description, X_i is the value of Indonesia's coal exports to destination countries, X_t is the total value of Indonesia's exports to major destination countries, W_i is the value of world coal exports to major destination countries, and W_t is the total value of world exports to major destination countries. If the RCA value > 1 , it means that the commodity in that country has a comparative advantage in the global market (Liew et al., 2021).

The Gravity Model method is used to analyze economic distance that impacts international trade. This method can determine the inverse relationship to international trade barriers. Mathematically, it is formulated as follows (Li et al., 2008):

$$JE_{Indonesia.i} = \frac{J_i \times PDB_i}{\sum_{i=1}^8 PDB_i}$$

Where J_i for the geographical distance between Indonesia and the destination country, PDB_i for Gross Domestic Product (GDP) of the destination country, and $\sum_{i=1}^8 PDB_i$ for the total Gross Domestic Product (GDP) of eight major destination countries.

To find out the factors that affect the value of Indonesian coal exports using panel data regression with the Gravity Model using Stata16 software. The following is the regression model used in the study:

$$LnCEV_{it} = \beta_0 + \beta_1 LnGDP_{it} + \beta_2 LnER_{it} + \beta_3 LnED_{it} + \beta_4 LnCO2_{it} + e_{it}$$

The regression model in this study was transformed in the form of natural logarithms (ln) with the aim of minimizing the problem of classical assumptions and avoiding the model from bias (Gujarati & Porter, 2009). Where $LnCEV$ for the value of Indonesian coal exports to eight destination countries, $LnGDP$ for the Gross Domestic Product (GDP) of eight destination countries, $LnER$ for the exchange rate of eight destination countries, $LnED$ for Indonesia's economic distance to eight destination countries, and $LnCO2$ for carbon dioxide emissions of eight destination countries.

RESULTS AND DISCUSSION

Table 2. RCA Index Results

Tahun	CHN	IND	JPN	KOR	MAS	PHI	THA	HKG
2012	18,63	12,52	3,59	5,52	10,49	21,90	24,83	172,54
2013	17,55	13,06	4,22	7,19	13,91	21,10	25,73	197,96
2014	15,88	12,82	4,61	7,74	11,15	21,07	23,04	170,31
2015	16,93	10,98	4,32	7,95	14,13	21,38	22,48	198,82
2016	17,19	9,17	4,90	7,54	13,34	12,52	19,45	180,76
2017	11,66	7,40	4,13	7,09	12,13	11,50	19,30	167,75
2018	10,96	8,08	4,21	6,94	11,78	14,03	21,52	176,50
2019	12,34	10,48	4,53	6,94	12,65	12,63	21,41	152,25
2020	10,53	7,56	5,08	7,88	13,34	12,52	20,18	163,09
2021	16,79	6,81	4,36	6,70	11,67	11,74	18,14	236,68
2022	10,61	6,77	4,37	5,77	9,27	9,38	21,04	140,31

Source: UN Comtrade, Data Processed (2024)

The results of the calculation of the Revealed Comparative Advantage (RCA) index on Indonesian coal commodities to their main destination countries obtained an RCA value > 1. This value means that Indonesian coal commodities have a comparative advantage in the global market.

Model Selection Test

Models in research using panel data regression are selected the best model through the Chow Test, Hausman Test, and Langrange Multiplier Test (Gujarati & Porter, 2009).

Table 3. Model Selection Test

Model Selection Test	Prob	Hypothesis
Uji Chow	0.0000	Fixed Effect Model
Uji Hausman	0.1613	Random Effect Model
Uji Langrange Multiplier	0.0000	Random Effect Model

Source: Output Stata 16, Data Processed (2024)

Based on Table 3, the results show that the Chow test, with a significance level of 5% and a Prob F value of 0.000, leads to the acceptance of H1, indicating that the Fixed Effect Model is appropriate. Next, the Hausman test, with a 5% significance level and a Prob > Chi^2 value of 0.1613, results in the rejection of H1, suggesting that the Random Effect Model is more suitable. The Lagrange Multiplier test then shows a probability of 0.0000 < α, leading to the acceptance of H1, again favoring the Random Effect Model. Therefore, based on these model selection tests, the Random Effect Model is accepted for this study.

Table 4. Random Effect Model Estimation Results

LnCEV	Coef.	Std. Err.	z	P > z
LnGDP	0,6060055	0,3052927	2,00	0,046**
LnER	0,1634919	0,0757273	2,16	0,031**
LnED	-0,662108	0,2068245	-3,20	0,001***
LnCO2	0,6039987	0,1866766	3,24	0,001***
_cons	-10,36912	7,000205	-1,48	0,139

Note: Significant Level ***:1%, **:5%, *:10%

Sources: Output Stata 16, Data Processed (2024)

Based on Table 4, the estimation results are shown using the selected best model, namely the Random Effect Model. Thus, the estimation model for this study can be written as follows.:

$$LnCEV = -10,36912 + 0,6060055(LnGDP) + 0,1634919(LnER) - 0,662108(LnED) + 0,6039987(LnCO2) + e_{it}$$

Classical Assumption Test Results

Based on the results in table 5 below, shows that the regression model in this study is normally distributed, but there are symptoms of heteroscedasticity and autocorrelation. To cure symptoms of heteroscedasticity and autocorrelation in a research model, Feasible Generalized Least Square (FGLS) is used (Jacob et al., 2014)

Table 5. Classical Assumption Test Results

Uji	Prob
Normality	0,0000
Heteroscedasticity	0,1613
Autocorrelation	0,0000

Source: Output Stata 16, Data Processed (2024)

Statistical Test Results

Table 6. Determination Coefficient (R^2) Result

Determination Coefficient (R^2)
0,5903

Source: Output Stata 16, Data Processed (2024)

Based on the results in table 6 shows the results of the coefficient of determination (R^2) which obtained a value of 0.5903. This shows that the variable value of coal exports can be explained by the variable Gross Domestic Product (GDP) of the destination country, the exchange rate of the destination country, Indonesia's economic distance from the destination country, and carbon dioxide emissions of the destination country by 59.03%, while the remaining 40.97% is explained by other independent variables outside the model.

Table 7. F-Test Result

Uji	Prob
F-Test	0.0000

Source: Output Stata 16, Data Processed (2024)

Based on the results in table 7 shows the results of the F test with a value of 0.000. This means that the destination country's Gross Domestic Product (GDP) variable, the destination country's exchange rate, Indonesia's economic distance from the destination country, and the destination country's carbon dioxide emissions have a significant effect simultaneously on the value of Indonesian coal exports.

Table 8. T-Test Result

Uji	Prob
<i>LnGDP</i>	0,046
<i>LnER</i>	0,031
<i>LnED</i>	0,001
<i>LnCO2</i>	0,001

Source: Output Stata 16, Data Processed (2024)

Based on the results in table 10 which shows the results of the T test for each independent variable on the dependent variable, it means that the variables of Gross Domestic Product

(GDP), exchange rates, economic distance, and carbon dioxide emissions have an influence on the value of Indonesian coal exports partially.

Competitiveness of Indonesia's Coal Export

Indonesia's coal commodity exports have a Revealed Comparative Advantage (RCA) value > 1 to its main destination countries. This indicates that Indonesian coal commodities are comparatively competitive in the global market against their main destination countries. This finding accepts the hypothesis in this study and is supported by the research of Admi et al. (2022) who found the results of the Revealed Comparative Advantage (RCA) index value > 1 on Indonesian coal commodities to destination countries. The level of competitiveness owned by Indonesian coal commodities during the period 2012-2022 is due to demand factors from the eight main destination countries. In addition, the competitiveness of Indonesian coal commodities has a contribution provided by factors that affect the value of Indonesian coal exports. Increases in destination country GDP, destination country exchange rates, and destination country carbon dioxide emissions have an impact on increasing demand for Indonesian coal exports. Despite economic distance as an obstacle in international trade activities, Indonesian coal export commodities still have comparative competitiveness in the global market against their destination countries. Thus, the Advantage (RCA) Revealed index Comparative value of Indonesian coal export commodities has a comparative level of competitiveness as indicated by the Revealed Comparative Advantage (RCA) value > 1 . The results of this finding are also supported by the research of Jalata (2021) and Liew et al. (2021) who found the result that the Revealed Comparative Advantage (RCA) index > 1 on a commodity in the country has comparative competitiveness in the global market.

The Effect of Destination Countries GDP on the Indonesia's Coal Export Value

Based on statistical tests that have been carried out, the Gross Domestic Product ($LnGDP$) variable of the destination country obtains a coefficient value of 0.6060055 and a probability value of 0.046. These results indicate that if the State Domestic Product (GDP) of the destination country increases by 1% on a constant basis, then the value of Indonesian coal exports increases by 0.61%. This finding accepts the hypothesis of the Gross Domestic Product (GDP) variable in this study and is in line with research by (Andriantoni et al., 2020). The increase in Gross Domestic Product (GDP) in a country shows the purchasing power of the country to buy goods or services from other countries so that the amount of Gross Domestic Product (GDP) in a country has an influence on the amount of value in international trade. This is because the high domestic demand in the destination country cannot be met so that it imports to other countries. In the research Ardalia & Puspitawati (2022) and Pradipta & Firdaus (2014) support this finding which is in line with the results found in the study. support this finding that the Gross Domestic Product (GDP) of the destination country has a positive influence on coal and fruit exports in Indonesia. In addition, the research results of Elshehawy et al. (2014) also found similar results that the Gross Domestic Product (GDP) of the destination country has a positive influence on exports in Egypt. Thus, a high Gross Domestic Product (GDP) of the destination country indicates that the country has the ability to purchase goods or services from abroad that coincide with its domestic needs. If the country does not meet its domestic needs, it imports. An increase in the Gross Domestic Product (GDP) of the destination country will result in increased demand for its trading partners (Mankiw, 2006).

The Effect of Destination Countries Exchange Rate on the Indonesia's Coal Export Value

Based on statistical tests that have been conducted on the destination country exchange rate variable ($LnER$) with a coefficient value of 0.1634919 and a probability value of 0.046. This result shows that if the exchange rate of the destination country increases by 1% constantly, then the value of Indonesian coal exports increases by 0.16%. This finding accepts the hypothesis of the destination country exchange rate variable in this study and is supported by the following research (Kurtovic et al., 2017). The exchange rate is one of the crucial factors in international trade that reflects the rate at which a country can trade goods or services from one country to another.

Transactions in international trade that use the US\$ currency will have an impact on the amount of trade that will be carried out by a country (Ardelia Nisa & Puspitawati, 2022). When a country's exchange rate appreciates, the country's demand to buy goods or services from abroad will increase because the price of goods or services from abroad tends to be cheaper than domestic (Mankiw, 2006). This finding is also in line with research Fitriani et al. (2019) who found that the appreciation of the destination country's exchange rate will increase the demand for frozen shrimp in Indonesia. Thus, if the exchange rate of the destination country appreciates, it will increase the demand for Indonesian coal and when the exchange rate of the destination country depreciates, the demand for Indonesian coal will decrease.

The Effect of Economic Distance on the Indonesia's Coal Export Value

Based on statistical tests that have been carried out on the variable economic distance between Indonesia and the destination country ($LnED$) with a coefficient value of -0.662108 and a probability value of 0.001 . This result shows that if Indonesia's economic distance to the destination country increases by 1% constantly, then the value of Indonesian coal exports will decrease by -0.66% . This condition supports the hypothesis of Indonesia's economic distance variable with the destination country in this study and is in line with the research of (Kadek et al., 2020). This condition aligns with the research by Leng et al. (2020), which found that the distance between two countries negatively impacts the export of wind energy products from China. This finding is further supported by Sadeghi et al. (2019), who found that distance negatively affects date exports from Iran. The decline in Indonesia's coal export value to destination countries, influenced by economic distance, is due to the fact that the farther apart the trading countries are, the higher the transportation costs that the importing country must bear.

The Effect of Destination Countries Carbon Dioxide Emissions on the Indonesia's Coal Export Value

Based on statistical tests that have been carried out on the destination country carbon dioxide emissions variable ($LnCO_2$) with a coefficient value of 0.6039987 and a probability value of 0.001 . This result shows that when the destination country's carbon dioxide emissions increase by 1% constantly, the value of Indonesian coal exports will increase by 0.60% . This finding accepts the hypothesis of the destination country's carbon dioxide emission variable in this study and is in line with the results of research by Batsuuri & Erickson (2015) that destination country carbon dioxide emissions have a positive influence on coal exports in Germany. The high carbon dioxide emissions of a destination country indicate that the country is experiencing rapid and massive economic growth and is still dependent on fossil energy, especially coal as a domestic energy source (Zeshan & Ahmed, 2013). China and India are among the largest importers of Indonesian coal and have the largest carbon dioxide emissions due to their high use of coal energy (Chen & Mu, 2023; Ohlan, 2015). The impact of coal energy consumption is the main source of increased carbon dioxide emissions (Chen & Mu, 2023; Ohlan, 2015). Thus, the increase in the value of Indonesia's coal exports is due to the increasing carbon dioxide emissions of destination countries due to the massive economic growth of destination countries and the high consumption of coal. The Environmental Kuznet Curve theory states that a country in stages 1 and 2 with high economic growth has an impact on environmental damage. This finding is also supported by the results of research Richter & Schiersch (2017) who found that high carbon dioxide emissions have an impact on the high demand for Mongolian coal to China.

CONCLUSION AND SUGGESTIONS

Conclusion

Based on the results of the study, Indonesian coal commodities have comparative competitiveness in the global market against their destination countries as indicated by the Revealed Comparative Advantage (RCA) index value > 1 . Overall, although there are several factors that affect the value of Indonesian coal exports, especially economic distance which is an obstacle to the value of Indonesian coal exports. The value of Indonesian coal exports still has a comparative

advantage in the global market. Factors affecting the value of Indonesian coal exports, namely the Gross Domestic Product (GDP) variable, the exchange rate of the destination country, the economic distance between Indonesia and the destination country, and the carbon dioxide emissions of the destination country have an influence on the value of Indonesian coal exports.

Suggestion

Based on the results of the study, it is expected that the Indonesian government needs to pay attention to the factors that affect the demand for Indonesian coal from destination countries and the Indonesian government can consider the market share of coal commodities with countries that have a high level of Gross Domestic Product (GDP). In addition, the government also needs to diversify export commodities other than coal to ensure a sustainable contribution to Indonesia's foreign exchange. For future research, it is recommended to expand the scope of research beyond the main destination countries and can use variables that focus on internal and external factors, such as Indonesia's Gross Domestic Product (GDP), the amount of Indonesian coal production, *Harga Batu Bara Acuan* (HBA), Indonesia's exchange rate against the US dollar, Indonesia's Foreign Direct Investment and Market Share of Indonesian coal in destination countries.

IMPLICATIONS

This research is expected to be a consideration for the government to pay attention to factors that can affect the demand for Indonesian coal commodities against importing countries and can diversify export commodities other than coal commodities that can increase Indonesia's foreign exchange in a sustainable and environmentally friendly manner.

LIMITATIONS

Research conducted by the author focuses only on the demand side or external factors so that it requires research improvements that focus on the supply side or internal factors that can be controlled by the Indonesian government. The research location is only limited to the main destination countries for Indonesian coal exports and further research can use the Market Share of the destination country as a refinement of the Gravity Model which only considers the economic distance between the two countries.

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