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THE ANALYSIS OF COAL COMPETITIVENESS AND THE FACTORS AFFECTING INDONESIA'S COAL EXPORTS TO MAIN DESTINATION COUNTRIES (A CASE OF 8 DESTINATION COUNTRIES)

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ABSTRACT

Indonesia is one of the largest coal producers globally, with coal as the main export commodity compared to other commodities in the mining sector. The more competitive the world coal market is, the Indonesian coal market share faces threats from other coal exporting countries. The increasing commitment of countries to reduce air pollution by cutting the use of coal for power plants at PLTU. This study analyzes the competitiveness and various factors that influence the competitiveness of Indonesian coal in 8 export destination countries. This study seeks to determine how the development of Indonesia's coal competitiveness to the eight central destination countries and what factors affect Indonesia's coal exports for the 2009-2020 period to the eight central destination countries using RCA analysis and panel data regression. Based on the analysis, results show that the competitiveness of Indonesia's coal exports to 8 destination countries is excellent. It can be seen from the RCA value obtained by each country from 2009-to 2020, which is greater than 1. Meanwhile, based on the results of panel data, regression estimates with random models show that GDP per capita, population, and coal prices have a negative and significant impact on coal competitiveness in 8 Indonesian coal importing countries. The study results did not find the effect of exchange rates and CPO prices on coal competitiveness in 8 Indonesian coal importing countries.

Keywords: *Exports, Coal, Competitiveness, Exchange Rate, CPO Prices*
JEL: C1; F1; Q31

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Introduction

Coal is a commodity in the mining sector with the most significant contribution to Indonesia's GDP and is the commodity with the highest export value compared to commodities in other mining sectors. Based on the data below, in 2018, coal had an export value of US$ 20.634 million. The significant export value of coal mining products cannot be separated from the significant need for coal by the top importing country of Indonesian coal. The high value of coal exports makes coal a strategic export commodity and a major priority. According to Arinaldo & Adiatama (2019), Indonesian coal commodities play a crucial role in supporting

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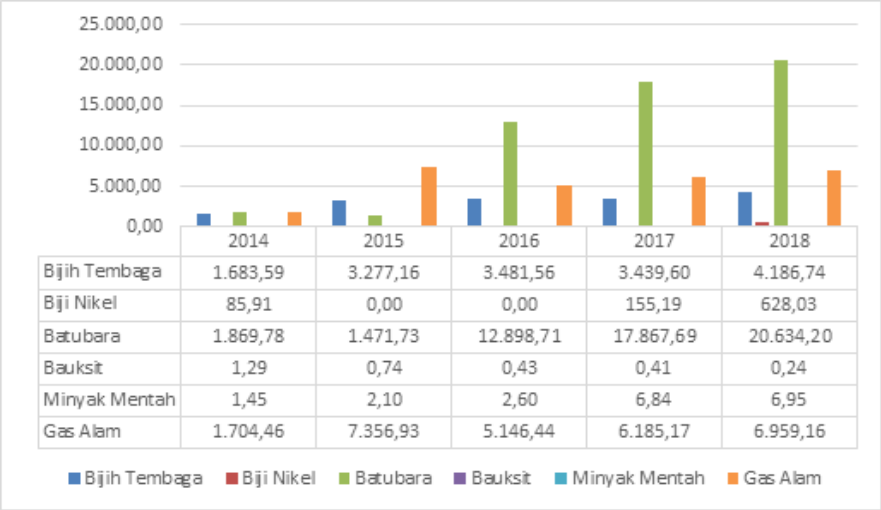
energy security and, at the same time, supporting the country's economy, especially foreign exchange earnings from exports. Several countries still rely on Indonesian coal as a source of electricity. Based on this, it is necessary to optimize export performance by increasing the competitiveness of coal.



	2014	2015	2016	2017	2018
Bijih Tembaga	1.683,59	3.277,16	3.481,56	3.439,60	4.186,74
Biji Nikel	85,91	0,00	0,00	155,19	628,03
Batubara	1.869,78	1.471,73	12.898,71	17.867,69	20.634,20
Bauksit	1,29	0,74	0,43	0,41	0,24
Minyak Mentah	1,45	2,10	2,60	6,84	6,95
Gas Alam	1.704,46	7.356,93	5.146,44	6.185,17	6.959,16

Source: UnComtrade

Figure 1: Mining Export Value 2014-2018 (Million US$)

Based on the Badan Pusat Statistik (2020) data, the central destination countries for Indonesia's coal exports in the last 9 (nine) years are India, China, Japan, South Korea, Taiwan, Malaysia, the Philippines, Thailand, and Hong Kong. The critical role of coal as Indonesia's export commodity has many challenges and threats, one of which is the commitment of the G7 countries to boycott coal as a fuel. It is intended to reduce carbon emissions. Another challenge is the narrowing market for coal globally, causing competition among coal exporting countries (such as Australia, Colombia, South Africa, and Russia) to be higher. Although several developed countries have launched a clean energy campaign by reducing and stopping coal consumption, coal demand in the Asia Pacific region is expected to increase until 2035 (Yanwardhana, 2020). One of them is based on data compiled by APBI (Indonesian Coal Mining Association). There will be additional coal-fired power plants of up to 83 gigawatts (GW) in the period 2021-2030 in various world countries. It happened, in particular, in the Asia Pacific region, namely India, Indonesia, Vietnam, Japan, the Philippines, South Korea, Bangladesh, Pakistan, and Turkey. In addition to these countries, China is aggressively developing renewable energy and building massive coal-fired power plants (Meilanova, 2021).

Based on these data, it can say that for the next 1 to 2 decades, Indonesia has prospects for the coal market in Asia Pacific countries, especially China. It can be seen with China entering into a long contract to import Indonesian coal until 2030. China has also committed to purchasing Indonesian coal with USD 1.47 billion in 2021 (about 10% of Indonesia's total coal exports). Several factors influence this. First, China is experiencing an energy crisis caused by a decline in domestic production. In addition, the dispute with Australia has hampered the Chinese government's imports of coal from Australia (Indonesia Exim Bank, 2021). This study analyzes the competitiveness of Indonesian coal to export destination countries with the factors that influence the competitiveness. In this study, competitiveness was measured using the RCA (revealed comparative advantage) analysis found by Balassa.

Literature Review

International trade makes countries specialize in producing goods in a faster time or with better quality. It can obtain efficiency in large-scale production. According to Boediono (2011), comparative advantage is fundamental in determining international trade. This theory emphasizes that international trade can be mutually beneficial if one country has a comparative advantage in a commodity, where the price of a commodity in a country is relatively different compared to other countries. The advantage of this theory is that it can explain some exchange rates. Some advantages due to exchange, both of which are explained in terms of absolute advantage.

The H-O theory introduces a second factor of production, namely capital. A country will export intensively used commodities abundant in these resources and import goods with scarce resources (Krugman & Obstfeld, 2004). According to the H-O theory, international trade occurs because of differences in the opportunity cost of a product from one country to another. Exchanges can occur because of differences in the proportion of production factors owned by each country (factor endowment). Countries that have relatively many factors of production or are cheap in producing them can specialize in production and export their goods. On the other hand, countries with relatively scarce/expensive factors of production will import certain goods.

Competitiveness is a natural advantage developed, which becomes a differentiator to strengthen its position in the global market (Tambunan, 2014). Several methods are developed to measure the competitiveness of a country's commodity exports. This study uses Revealed Comparative Advantage (RCA), measuring a country's export performance to evaluate the role of that commodity's exports in world trade. The RCA technique has a weakness. Namely, the RCA index only explains current and ongoing trading patterns and does not predict patterns of comparative advantage in the future. According to Porter (1990), competitiveness is productivity defined as the output produced by labor. Generally, my competitiveness is the ability of companies, regions, or between regions and countries to increase income through the productive and sustainable use of labor and other resources.

Gross Domestic Product (GDP) per capita is one indicator of a country's economic size or economic performance. GDP per capita is the average measure of individual welfare within a country's territorial boundaries. The higher the GDP per capita of the export destination country, the higher the demand for exports, thereby increasing the competitiveness of domestic exports. Similar to Linder's (1961) theory of country resemblance, similar income levels and tastes play a significant role in trade. Research conducted by Pambudi et al. (2019) states that the higher the GDP per capita of the seven export destination countries for Indonesian biodiesel, the higher the competitiveness of Indonesia's biodiesel exports for the seven export destination countries. Research by Balogh & Fertő (2015) and Couillard & Turkina (2015) found that GDP per capita positively affects export competitiveness.

According to Nopirin (2014), the exchange rate is an exchange between two different currencies to obtain a value/price comparison between the two currencies. A simple understanding of the exchange rate is the amount of one currency buying one unit of another currency. For example, the dollar's exchange rate against the rupiah equals the amount of rupiah needed to buy one United States dollar. Research by Pambudi et al. (2019) states that if the exchange rate increases, the competitiveness of Indonesian biodiesel exports to the seven export destination countries will also increase. Research conducted by Couillard & Turkina (2015) and Isventina (2015) found that the exchange rate positively affected export competitiveness.

Salvatore (2014) states that the increasing population of a country affects the export of a commodity through the demand side and supply side, on the demand side, resulting in great domestic demand. On the supply side is an increase in labor to carry out the creation of export commodities. A decrease in population or the number of consumers will cause the opposite, namely a decrease in demand. Residents have a confident role in terms of supply and demand. In terms of supply, the population acts as a consumer.

In contrast, the population acts as a producer in terms of demand. According to Irawan & Suparmoko (2002), the population has a role in increasing imports and exports. Research conducted by Wardani & Mulatsih (2018) found that the increase in the destination country's population will increase exports of Indonesian tires to Latin America. Research by Rosyadi et al. (2021) states that the increasing number of people in food-importing countries will reduce the competitiveness of Indonesian CPO.

Price is the amount of money needed to obtain certain goods and services. The size of the value or price is not only influenced by physical factors but also psychological factors and other factors. According to Krugman & Obstfeld (2004), the price level is the total price of goods and services expressed in currency units. The relationship between the quantity demanded, and the law of demand can explain the price of an item. When the price of an item increases, the demand for that goodwill decreases, and vice versa. When the price decreases, the demand for the item will increase. High prices illustrate the scarcity of goods. Until the highest price level, consumers choose to replace the product with other closely related products and relatively inexpensive. The law of supply applies to the following: the lower the price of a good, the lower the supply.

Conversely, the higher the price of goods, the higher the supply. Export supply is determined by the export price level (Sukirno, 2004). Research conducted by Jalata (2021) states that increasing coffee prices will reduce the competitiveness of Ethiopian coffee exports. In comparison, Liew et al. (2021) found that price harmed export competitiveness. The research conducted by Pradipta & Firdaus (2015) found the same result, namely that increasing export prices will reduce Indonesian mangosteen, mango, and banana exports to Indonesia.

Data and Research Method

Data

This study collects and analyzes five variables: the value of Indonesia's exports to 8 Asian countries, GDP per capita, exchange rate, population, CPO prices, and coal prices. All data used in this study are secondary data obtained from several sources. The panel data in this study comes from data from 8 countries (China, Hong Kong, India, Japan, South Korea, Malaysia, the Philippines, and Thailand), and the year period used is 2009-2020. The data sources are detailed in the following table:

Table 1: Research Data Source

No	Data	Source	Unit
1	Indonesia's coal export data to 8 destination countries, world export data to 8 destination countries	International Trade Statistic	Thousand US$
2	GDP per capita	World Bank	US$/Capita
3	Exchange Rate (Destination Country – US Dollar)	World Bank	Destination Country Currency/Dollar
4	Total Population of 8 Coal Export Destinations	World Bank	

No	Data	Source	Unit
5	Price of Indonesian CPO in 8 destination countries	International Trade Statistic	US$/ton
6	Indonesian Coal Prices in 8 destination countries	International Trade Statistic	US$/ton

Research Method

The analysis used to determine the competitiveness of Indonesia's coal exports is by using RCA. RCA compares the share of a country's exports to the share of exports of the same commodity from the country or the world (Balassa, 1965). According to Saleh & Widodo (2010), RCA Balassa is the most intensively implemented (e.g. Aquino, 1982; Crafts & Thomas, 1986; Peterson, 1988; Crafts, 1989; Porter, 1990; Van Hulst, Mulder, & Soete, 1991; Amiti, 1999; Dowling & Cheang, 2000; Isogai, Morishita, & Rüffer, 2002; Ng and Yeats, 2003). However, some researchers, such as Vollrath, 1991; Dalum, Laursen, & Villumsen, 1998; Laursen, 1998; and Wörz, 2005, have noted some shortcomings of the RCA index, mainly when applied in econometric models to analyze dynamic communication of countries. Therefore, Dalum, Laursen, and Villumsen, 1998; Laursen, 1998; and Wörz, 2005 in Saleh and Widodo (2010) recommend the revealed symmetric comparative advantage (RSCA) index, which is a simple transformation of the RCA index. According to Saleh and Widodo (2010), both econometric models may not be suitable for forecasting purposes if the estimated value may violate the 0≤RCA≤ and -1≤RSCA≤1 criterion. The problem is theoretically more severe when we use RSCA than RCA because RSCA applies a lower bound index and an upper bound index, whereas RCA is just a bottom-up index. This study uses RCA to measure the competitiveness of 8 coal exports of destination countries.

This analysis aims to calculate the competitiveness of Indonesia's coal exports to 8 destination countries. The variables used are the value of coal exports, total exports, export values, and world export values.

The RCA formula is as follows:

$$RCA_{ij} = \frac{X_{ij}/X_{it}}{W_j/X_t} \quad (1)$$

Description:

RCA = Index of coal commodity competitiveness level by Indonesia in export destination countries

X_{ij} = Value of Indonesian Coal Exports to Destination Countries

X_{it} = Total value of Indonesia's exports to destination countries

W_j = World Export Value of coal commodities to export destination countries

W_t = Total value of world exports to export destination countries

If the RCA value > 1 is obtained, the stronger the competitiveness.

Research on coal exports with competitiveness (cross-section data) in the 2009-2020 period (time series data), a combination of cross-section and time-series is panel data. The choice of the model refers to the research of Pambudi et al. (2019), Jalata (2021), Couillard & Turkina (2015), and Isventina (2015) and with variable adjustments.

The panel regression equation is as follows:

$$RCA_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 KURS_{it} + \beta_3 JP_{it} + \beta_4 PC_{it} + \beta_5 PCP_{it} + \varepsilon_{it} \quad (2)$$

It will transform the estimate into a linear log to avoid a biased model. Bias is caused by the considerable data distance between the variables, and the units between the different variables are extensive. So the model can be formulated as follows:

$$\ln RCA_{it} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln KURS_{it} + \beta_3 \ln JP_{it} + \beta_4 \ln PC_{it} + \beta_5 \ln PCP_{it} + \varepsilon_{it} \quad (3)$$

Description:

RCA_{it} = RCA coal year it
GDP_{it} = Gross Domestic Product per Capita Gross (US$)
$KURS_{it}$ = Exchange rate of the country it against US$
JP_{it} = Total population of the destination country
PC_{it} = Indonesian CPO price to destination country
PCP_{it} = Indonesian coal price to destination country
β1, β2, β3, β4, β5 = estimated parameters
ε_{it} = Error term

Panel data regression is called the panel data regression model. This study needs to use panel data because it not only observes the cross-section units simultaneously but also knows the cross-section units at various periods. According to Gujarati (2003), there are three models for regressing data: the common effect model, fixed-effect model, and random effect model. In selecting the model, it is necessary to test the model with the Chow test, Hausman test, and the Lagrange multiplier test aimed at testing the model's suitability.

Finding and Discussion

Result of Data Analysis

Analysis of the competitiveness of Indonesian coal exports to 8 destination countries can be seen from the value of the RCA calculation from year to year.

Table 2: Calculation Results of RCA Coal Exports to 8 Main Destination Countries

Tahun	China	Hong Kong	India	Japan	South Korea	Malaysia	Philippines	Thailand
2009	20.297	107.041	6.117	3.107	8.349	15.917	19.057	7.725
2010	24.186	127.089	5.708	3.469	7.239	14.258	25.011	8.431
2011	23.822	116.436	7.151	2.971	5.011	13.295	18.671	8.096
2012	20.993	153.659	7.416	3.239	5.824	12.161	17.423	8.915
2013	19.883	170.492	9.430	3.622	7.800	13.120	18.209	8.519
2014	18.985	148.603	8.861	3.919	8.443	12.508	19.233	7.943
2015	23.051	179.182	7.444	4.312	9.517	16.033	17.867	10.059
2016	22.992	170.551	6.706	5.199	9.195	15.001	8.205	10.199
2017	14.427	156.106	4.926	4.285	8.512	13.565	7.548	10.280
2018	12.960	160.118	5.138	4.162	7.856	13.367	8.233	11.287
2019	14.836	140.966	5.851	4.425	7.481	14.687	8.333	10.731
2020	13.199	158.624	5.681	4.978	8.646	16.297	8.954	10.571

Source: Autor Calculation

The results of the RCA calculation above show that Indonesia's coal exports have competitiveness in 8 central destination countries (RCA> 1). Of 8 Indonesian coal importing countries, the highest average RCA value is in Hong Kong, with the highest value in 2015 of 170,551. The importing country with the lowest RCA value for Indonesian coal exports is Japan, with the lowest value in 2011 of 2,971.

The growth of comparative advantage competitiveness (RCA) between 2018 and 2020 has fluctuated. The RCA value in China from 2018 increased in 2019 but decreased in 2020. The RCA value in Hong Kong and South Korea has a fluctuating RCA value from 2018-to 2020. In 2019 the RCA value decreased and increased in 2020. The RCA in India, Japan, Malaysia, and the Philippines has increased from 2018 to 2020. Meanwhile, the RCA value in Thailand has decreased every year from 2018 to 2020. However, the overall RCA value obtained is greater than 1, and it can conclude that Indonesia's coal exports have competitiveness in 8 countries of Indonesia's coal export destinations.

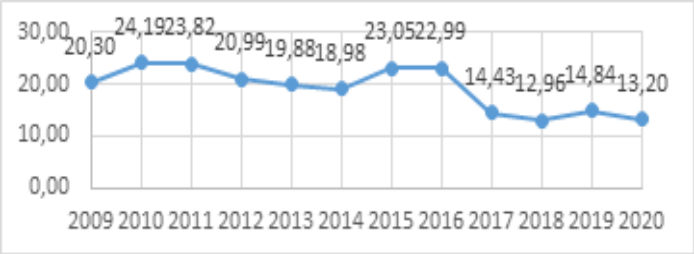


Figure 2: RCA Value Development in China 2009-2020

Based on figure 2, it can be seen that there is a dynamic movement in the RCA value. From 2010 to 2014, the RCA value of Indonesian coal exports in China tended to decline. It was due to an economic slowdown that impacted the Chinese economy. The slowdown in the world economy has caused the global demand for coal to decline. The competitiveness of Indonesian coal to China has increased in 2015 and 2016. From 2017 to 2018, it has decreased. Could not separate the decline from the slowdown in coal demand, one of which was caused by climate change factors that caused China to carry out policies to reduce coal imports. However, the RCA value in China is still at a number that indicates that Indonesia has a good position as a coal exporter for China. It is indicated by an RCA value greater than 1.

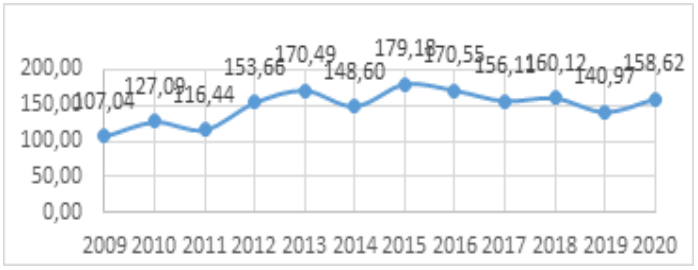


Figure 3: RCA Value Development in Hongkong 2009-2020

Based on figure 3, the development of RCA in Hong Kong from 2009 to 2020 experienced dynamic movements. From 2011 to 2013, the development of RCA has increased. This increase was due to the decline in Indonesian coal prices in Hong Kong, causing the demand for Indonesian coal to increase. From 2014 to 2019, the RCA movement in Hong Kong tends to decrease. It is due to the rising price of Indonesian coal in Hong Kong. Nevertheless, the RCA value in Hong Kong is still very high, with an average value of 149.07, so it can say that the competitiveness of coal exports in Hong Kong is excellent.

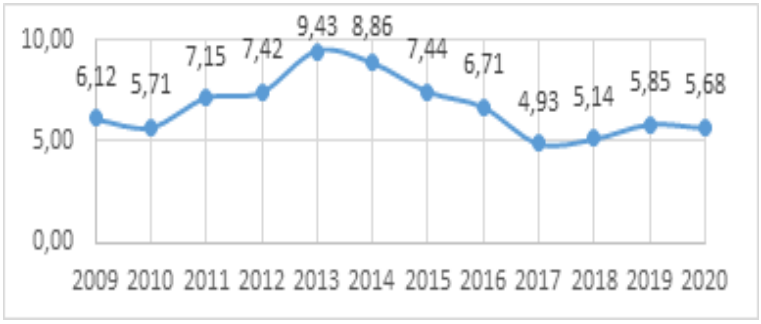


Figure 4: RCA Value Development in India 2009-2020

Based on Figure 4, RCA developments in India from 2009 to 2020 experienced an increase from 2010 to 2014. This increase was caused by the volume of Indonesian coal exports, which increased in that year because India became the leading destination for Indonesian coal exports after the economic slowdown in China. In that year, Indonesia became a supplier of 76% of coal for India (Leonard, 2016). From 2015 to 2020, the development of the RCA value tends to decrease. It is due to India's commitment to start developing renewable energy. However, the RCA value in India is still at a number that indicates that Indonesia has a good position as a coal exporter for India. It is indicated by an RCA value greater than 1.

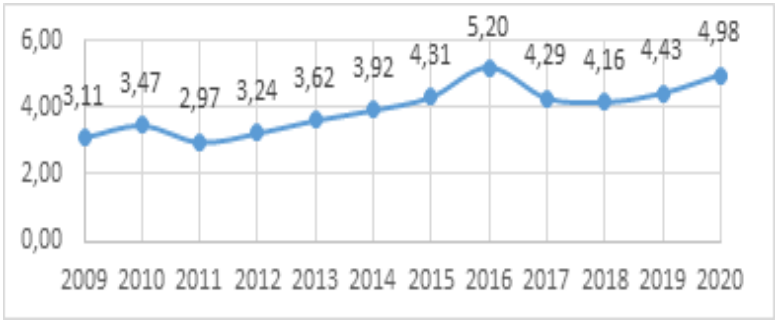


Figure 5: RCA Value Development in Japan 2009-2020

Based on figure 5, the development of RCA in Japan from 2009 to 2020 tends to increase 2009 in 2020. It is due to the agreement between Indonesia and Japan called (IJEPA) which makes Indonesia the primary choice for Japan to import coal.

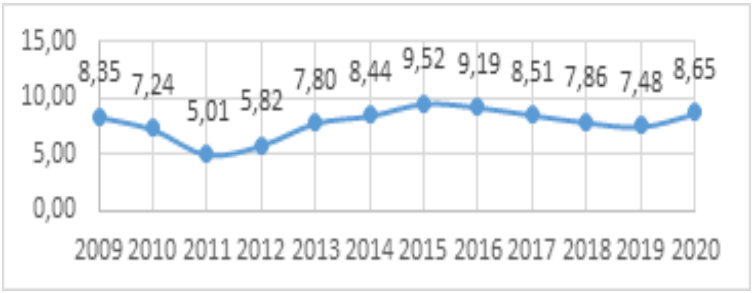


Figure 6: RCA Value Development in South Korea 2009-2020

Based on figure 6, the development of RCA in South Korea from 2009 to 2020 tends to increase from 2011 to 2015. The increasing value of RCA is due to the extreme winter in Korea, so the demand for coal is increasing. From 2015 to 2019, the RCA value decreased. This decline could not be separated from the slowdown in coal demand, one of which was caused by climate change factors that resulted in South Korea carrying out policies to reduce coal imports. In 2020 there was an increase in RCA. It was due to the energy crisis, which increased the demand for coal.

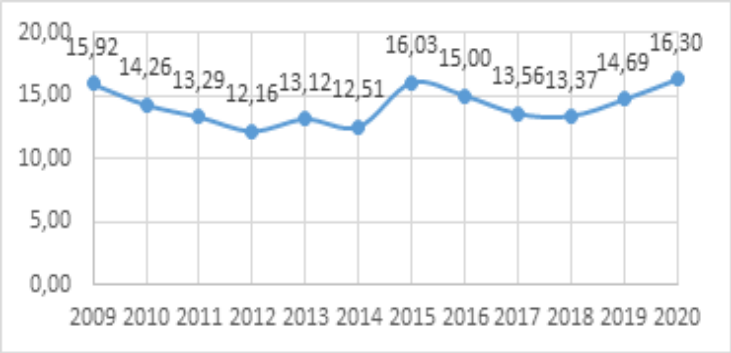


Figure 7: RCA Value Development in South Korea 2009-2020

Based on figure 7, the development of RCA in Malaysia from 2009 to 2020. From 2009 to 2012, Indonesia's RCA value for coal exports tended to decline. This decrease was due to coal prices which tend to increase every year. It can be seen in figure 8.

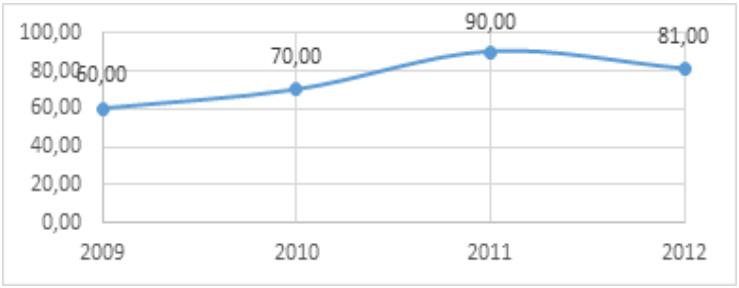


Figure 8: Development of Indonesian Coal Prices in Malaysia 2009-2012 (US$/Ton)

RCA experienced an increase from the previous year in 2018 to 2020. This increase was due to Malaysia showing progress in constructing steam power plants (PLTU), thereby increasing coal imports.

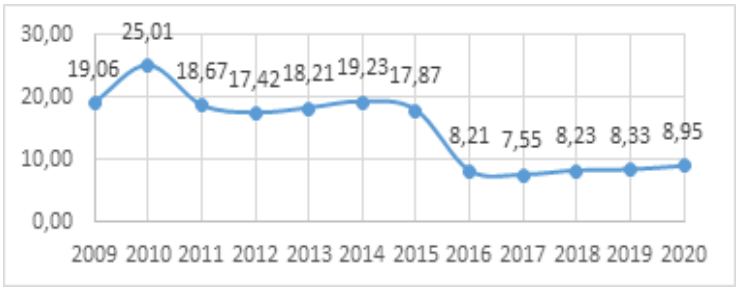


Figure 9: RCA Value Development in Philippines 2009-2020

Based on figure 9, the development of RCA in the Philippines from 2009 to 2020. From 2012 to 2014, the RCA value tends to increase. However, in 2016 Indonesia's RCA value fell from the previous 17.87 in 2015 to 8.21. From 2017 to 2020, the value of Indonesia's RCA tends to increase. It is due to the Philippines, which is very dependent on Indonesian coal. Overall, the RCA value of Indonesia in the Philippines is excellent. It is indicated by the RCA value of more than one. The average RCA value of Indonesia in 2009-2020 in the Philippines of 14.37.

Based on figure 10, the development of RCA in Thailand from 2009 to 2020 tends to be stable between 21 to 25. It shows that Indonesian coal has an excellent position in Thailand, with an average RCA value of 22.94.

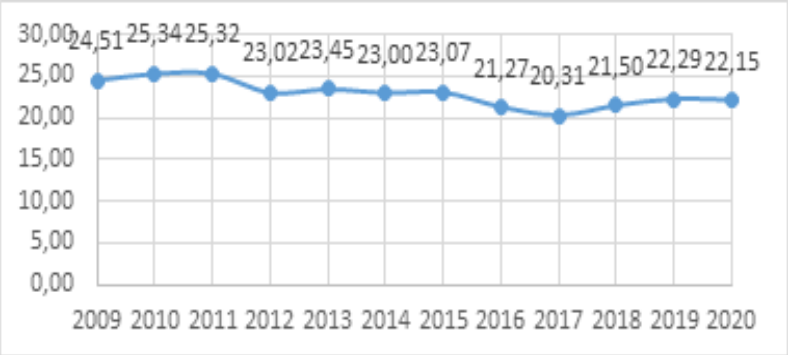


Figure 10: RCA Value Development in Thailand 2009-2020

In the first step of panel data analysis, choosing between a fixed-effect model, a common model, or a random model by performing the Chow, Hausman, and Lagrange multiplier tests is necessary.

Table 3: Summary of Panel Model Test Results

Test	P-Value	Results
Chow	0.0000	*Fixed effect*
Hausman	0,0952	*Random effect*
Lagrange Multiplier	0,0000	*Random effect*

Source: Autor Calculation

Based on the results of the panel model test, it was found that the random effect is the most appropriate model to describe the effect of real GDP per capita, exchange rate, population, CPO prices, and coal prices on the competitiveness of Indonesia's coal export commodities to 8 destination countries.

Table 4: Results of Regression Random effect Model

Variable	Coefficient	t-Statistik	Prob
GDP per capita	-0.434	-3.912	0.000
Kurs	-0.224	-1.488	0.140
Total population	-0.586	-3.076	0.002
CPO price	0.001	0.041	0.966
Coal Price	-0.258	-2.182	0.031
Adjusted R-Square			0.180
F-statistic			5.174
Prob (F-*Test*)			0.000

Source: Autor Calculation

Next is to find out the influence of each object. The following is the result of the intercept value of each object. From the random effect test, it is obtained the intercept value of each individual. It is the error value of each individual's data and the individual effect value.

Table 5: Intercept Value of Each Individual

Individual	Intercept value
China	1.196
Hongkong	1.002
India	-0.078

Individual	Intercept value
Japan	-0.294
South Korea	0.109
Malaysia	-1.261
Philippines	-0.582

The estimation results using random-effects show that the exchange rate variable has no significant effect on the competitiveness of coal exports. Variable GDP per capita, population and coal prices have a negative and significant impact on the competitiveness of coal exports. The exchange rate and CPO price variables have no significant effect on the competitiveness of coal exports. All independent variables affecting the competitiveness of coal exports can be seen from the probability F statistic, which has a value of less than 0.05. The goodness of fit seen from the adjusted R-square value of 0.180134 shows that the model can explain 18.01% of the variation in the competitiveness of coal exports.

Based on the estimation results of panel data regression with REM in table 4. The next step is to test the significance of t. it found that GDP per capita, total population, and coal price partially had a negative and significant effect on competitiveness. In comparison, the exchange rate and price of CPO do not affect competitiveness. Furthermore, the F test was carried out, and the results of the data analysis showed the probability value of F-count = 0.000, less than 5% alpha. Thus, it can conclude that the variables of GDP per capita of the destination country, exchange rate, population, CPO prices, and coal prices together have a statistical effect on Indonesian coal exports' competitiveness (RCA) to 8 central destination countries. Next is the R2 test. The adjusted R squared value of 0.180134 shows that the variables of GDP per capita of the destination country, exchange rate, population, CPO prices, and coal prices together can explain the effect of competitiveness (RCA) of Indonesian coal exports to 8 destination countries. The main factor is 18.01%, and other variables explain the remaining 82.89% outside of this study.

Discussion

GDP per capita of Indonesia's coal export destinations has a negative and significant impact on the competitiveness of Indonesia's coal exports. It also found the results of this in research conducted by Liew et al. (2021) and Balogh & Fertő (2015). GDP per capita has a negative effect, presumably because coal is the raw material needed for the eight export destinations of Indonesian coal for the needs of their industries and household consumption. When the GDP per capita of the destination country increases, public consumption and industry will shift to better commodities. The industry will also have more capital to produce products from higher-quality raw materials. For example, the destination country will replace steam power plants with natural gas fuel to replace the role of coal as fuel.

The exchange rate has no significant effect on the competitiveness of Indonesia's coal exports. It also found the results of this study. Depreciation of the destination country's currency affects the more expensive foreign commodities. But in reality, price is not the main problem for importers to trade with Indonesia because coal is a relatively easy and cheap electricity fuel compared to other energies. It is due to the needs of destination countries for Indonesian coal, which still uses coal-fired power plants, and Indonesia itself has a geoFigureical position for the giant market of developing countries, especially China and India, which are the largest importers of Indonesian coal (Indonesia Invesment, 2018).

The destination country's population has a significant adverse effect on the competitiveness of Indonesian coal. The results of this study were also found (Rosyadi et al., 2021). The number of people who have a negative effect on the competitiveness of Indonesian coal can be ambiguous because an increase in the population of a country is assumed to be in line with the increase in consumers in the market while causing an increase in demand.

The price of CPO or palm oil has no significant effect on the competitiveness of Indonesian coal. Based on Febijanto (2020), CPO is only mixed energy for primary energy use, namely coal, which is called coal downstream into DME or co-firing or mixing renewable energy such as biomass in PLTU power plants. It is suspected that the CPO price does not affect the eight export destinations of Indonesian coal that have not implemented the use of alternative energy in replacing coal as industrial raw material. In contrast to European countries, which have begun to maximize alternative energy to replace coal, one of which is palm oil. In addition, it can also say that CPO is still a complementary commodity to coal as a fuel for power plants.

Indonesian coal prices have a negative and significant impact on the competitiveness of Indonesian coal. The results of this study were also found by Liew et al. (2021) and Jalata (2021). High prices reflect a shortage of goods. Up to the highest price level, consumers tend to replace these goods with other goods that have a close relationship and are relatively cheaper. The result is suspected that when the price of an item increases, the demand for goods decreases, and vice versa. When the price tends to decrease, demand will increase.

Conclusion

Based on the results of the RCA measurement, it found that Indonesian coal commodities had high competitiveness from 2009 to 2020 in 8 Indonesian coal importing countries. The results of panel data regression estimates show that GDP per capita, population, and coal prices have a negative and significant impact on coal competitiveness in 8 coal importing countries of Indonesia. The study results did not find the effect of exchange rates and CPO prices on coal competitiveness in 8 Indonesian coal importing countries. Based on the results obtained, the RCA value is good for Indonesia's exports to 8 central destination countries. If Indonesia stops coal exports to 8 central destination countries to meet domestic needs, this will not affect Indonesia's coal demand and Indonesia's coal competitiveness. To 8 destination countries because Indonesian coal is still the primary choice for eight destination countries. The government is expected to develop innovation in coal, namely by developing the downstream coal industry, including coal gasification, coal liquefaction, and coal quality improvement. Thus, Indonesian coal mining will be more competitive than other coal-producing countries.

To overcome the limitations of the study is hoped that further research can include competitor variables to see the influence of international market dynamics on the competitiveness of Indonesian coal exports and add references related to coal competitiveness.

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