Indonesian Coal Exports: Dynamic Panel Analysis Approach

Ambya Ambya*, Lies Maria Hamzah

Department of Economics Development, Faculty of Economic and Business, Universitas Lampung, Lampung, Indonesia.
*Email: ambya.1959@feb.unila.ac.id

ABSTRACT

Coal is a mineral fuel commodity considered important as a source of energy and is traded among countries. Indonesia is one of the largest coal producing countries in the world. This study aimed to analyse the relationship between the net export volume, GDP per capita of destination countries, real exchange rate, and Indonesian coal export prices. The existence of a causal relationship between exports and economic growth shows that there is a relationship between net exports and future economic growth. Economic growth is an increase in people's per capita income without paying attention to changes in the economic structure. The study uses panel data of 5 biggest coal trading partner countries of Indonesia during the period 2015-2019, by using the dynamic panel analysis method, where a dependent variable is not only determined by the value of independent variables at the research period, but is also determined by the value of previous period. The dynamic panel method is characterized by the lag of the dependent variable which is correlated with the residual among the independent variables. The dynamic panel data regression method can be used to determine the short-term effect, and the long-term effect as well. Based on the estimation results of the Generalized Method of Moment (GMM) Arellano Bond, in the study period the exchange rate and export prices had a significant negative effect on the volume of Indonesian coal exports. GDP per capita has no significant effect on the volume of Indonesia's coal exports. Furthermore, the short-term elasticity approach for the exchange rate is –0.029159 and for the long term is 0.3616521. These results indicate that the calculation of the short-term and long-term elasticity of the exchange rate (ER) is inelastic and negative with different magnitudes. In addition, it explains that in the short term an increase in the exchange rate of 1 percent will reduce net exports in the short term by 2.9 percent.

Keywords: Net Exports, Prices, GMM, Per Capita Income, Exchange Rate
JEL Classifications: C4, C53, F17

1. INTRODUCTION

Economic growth in the context of a country's economy is a measure of the country's economic achievements. Salvatore stated that international trade activities (export-import) can be a driving force for economic growth. Exports show trade productivity and are the source of foreign exchange earnings for a country (Lee and Sulochani, 2015). Alleyne and Lorde (2014) conducted a study using the variables such as GDP per capita, the percentage of trade to GDP, the exchange rate. The results showed that GDP per capita had a positive effect on international trade, while the exchange rate had a negative effect

on international trade. Export and foreign trade activities will benefit and increase national income, which in turn will increase the amount of output and the rate of economic growth (Fernández and Fernandez, 2018; Sunde, 2017; Gries and Redlin, 2000). The relationship of export upgrading has a positive and significant effect on economic growth and causality analysis shows that there is the causality of the feedback effect between exports and economic growth (Chrid et al., 2020; Awokuse, 2007). Coal is one of the commodities that are needed globally as electrical energy and industrial machinery. According to Baig and Yousaf (2017) coal is one of the most important sources of energy in the world which produces 40% of electricity worldwide. According to the World Coal Institute (2018), world coal trade is dominated

by several producing countries, where Indonesia is one of the largest coal producing countries in the world (ranked 2nd) with coal exports of 28.21 percent of all world coal trade.

Indonesian coalproduction is affected by both the domestic and global demand. In 2018, Indonesian coal exports were 75% of its total coal production. As one of the exporters of coal in international energy trading, Indonesia has a high export value of around 565 million tonnes per year (CBS, 2020). Coal mining is one commodity that has a very promising prospect in the international market and contributes significantly to the economy of Indonesia which amounted to 85% of the total earnings of the state from the mining sector (Statistics Indonesia, 2015).

When international coal prices drop significantly, domestic production levels also decline. In 2015, many Indonesian mining companies stopped their activities and lowered their production when coal export prices reached USD 50/ton. In the other hand, the growth of Indonesian coal export volume in 2010-2014 experienced an significant increase and then experienced adecline in 2015 until 2019. The increase in coal export prices has affected production as coal mining companies increase their production to earn profits. At the same time, the government is looking for solutions to balance the trade deficit. Foreign exchange is a medium of exchange in the international market, therefore foreign exchange reserves are an important factor in international import demand (Sagawa and Kolzumi, 2008). The influence of the exchange rate, especially the rupiah against the US dollar is aproblemin international trade.

Many factors can determine the quantity demanded in coal export destination countries, including the amount of energy demand, characteristics of energy use, industrialization, and the amount of domesticcoal production (Copeland and Taylor, 2004). Variables that affect trade internationally among others is thesize of the economy, means of payment, the price of commodities and the cost of transportation (Krugman et al., 2015). In previous studies, it was stated that coal producing countries were able to influence economic growth.

World coal consumption during the 2015-2019 period has risen 993.554 million kg in 2015 to 1.19652 million kg in 2019 (International Energy Agency, 2020). Seeing the potential of the market, there are still many coals demand, Indonesia as to the world's secondmajor coalexporter has an important role as a supplier of the world's coal. The demand of Indonesian coal is very dependent on the dynamics of the global market. Indonesia coal export since the early 2000s, experienced an increase as a result of an increase in the needs of the power plant in Southeast Asia.

Asia's coal consumption is estimated to be around 65% of the world's coal consumption. The five largest export destinations for Indonesia are; China, Japan, South Korea, India and Malaysia (BPS, 2020). Indonesia's coal exports are influenced by demand determinants from export destination countries. The factors that affect a coal importing country may differ from country to country. The amount of energy needed and characteristics of the industry helped contribute determine the quantity of exports that prompted (Copeland and Taylor, 2004).

Research is going to variables; GDP per capita as the size of the economy of a country, the value of the exchange, the price of commodities and GDP per capita of previous year. As the variables that affect the coal export volume of Indonesia, these show the existence of a causal relationship between exports and economic growth and net exports as a tool for growth. This shows that there is a relationship between net exports and future economic growth, considering that positive net exports are additional foreign exchange that can be used as investment for the coming period. Conversely, if net exports are negative, economic growth will be inevitably reduced.

The existence of a lag of the dependent variable as one of the regressors in the study, made this study used dynamic panel data regression. Dynamic panel data regression is a panel data regression method where the independent variable is the lag of the dependent variable. The dynamic panel data regression model in this study was estimated using the Arellano Bond first difference GMM method to obtain a consistent and efficient estimate. The dynamic panel data regression method is not only used to determine the short-term effect, but also the long-term effect (Fernández and Fernandez, 2018; Chrid et al., 2020).

2. LITERATURE REVIEW

International trade is basically defined as the exchange of goods and services between countries. Halwani (2002) states that differences in the level of production capacity in terms of quality and quantity will result in transactions between countries.

Export is the flow of a number of goods and services out of a country to the international market. Exports have an important role in the economy, especially for developing countries, including Indonesia (Ansari and Kumar, 2016). Exports can increase productivity and economic growth.

Adam Smith argues that countries will not focus on products that have absolute losses. So, the country will import goods that have absolute losses.

David Ricardo, focusing on comparative advantage (comparative advantage) and a comparative disadvantage (comparative disadvantage), made a theory to answer the question of how when a country does not have an absolute advantage over the goods when compared with other countries, and whether those countries are not eligible to conduct export activity. The theory of comparative advantage comparing labour productivity among countries to produce two types of goods (Krugman et al., 2015). Country with relatively large production factors can reduce production costs by specializing in producing export goods, this country can produce export commodities efficiently. In the other hand, countries would import certain goods when domestic production factorsare relatively scarce and expensive (Salvatore, 1997).

International trade is based on various factors, one of which is the demand factor. Salvatore (1997) argues that export destination countries have various factors that affect demand such as the number of goods or services needed as indicated by the population,

production of goods to be imported, foreign exchange reserves, exchange rates, cooperation agreements, and so on. Factors affecting the demand for imported coal may differ among countries.

Gross domestic product (GDP) is used as a measure of a country's economy. GDP is the final result of goods and services obtained by a country in a period of 1 year. GDP can show the production capacity of a country in exporting.

The benefits of international trade through export activities is to earn foreign exchange. Earnings foreign exchange is one source of income for the country. In addition to foreign exchange earnings, the state will also receive export taxes. High export tax revenue for the state will benefit the government. Export tax has a positive effect on international trade.

According to Festić et al. (2010), exports will generate foreign exchange rates that will finance import activities and stimulate the development of the domestic economic sector.

Coal is the largest export comodity. There was a trend of increased production during the years 2005 to 2015 and was predicted to continue rising. Therefore, expectations of coal as an export commodity will also continue to be a driving factor to the increase in the foreign exchange reserves (Ministry of Energy and Mineral Resources of the Republic of Indonesia, 2017). Unfortunately, Indonesia's coal export volume is influenced by demand determinants from destination countries. The determinants of demand are closely related to consumer behaviour in coal export destination countries. Sen (2012) suggests that the role of demand in trade theory.

Susanto and Randy (2021) the country's exchange rate will be one of the main import considerations. The weakening of the exchange rate becomes a limiting factor for importing countries because the prices of goods in the international market become expensive.

Foreign exchange reserves are international payment in the form of gold, foreign banknotes, and other bills in foreign currency to a foreign party Pugel and Lindert (1995).

The position of a country's foreign exchange reserves is usually declared safe if it meets the import needs of at least 3 months (Makhmutova and Mustafin, 2017).

Foreign exchange reserves can cause economic difficulties, one of which is in importing necessities. Depleting foreign exchange reserves reduce a country's imports because foreign exchange reserves are the main medium of exchange for international trade.

In addition, Azar and Aboukhodor (2017) argued that the depletion of foreign exchange reserves in a country can cause an economic crisis for the country having the problem. The effect of foreign exchange reserves is large enough for imports, debt payments, and protecting the country's economy from economic shocks. In the coal trade, the increase in the volume of coal imports is also thought to have occurred due to the decline in brick production in export destination countries. Coal shortages were resolved through an import mechanism.

3. RESEARCH METHOD

3.1. Data Types and Sources

The types of data that will be used in this study: export volume, GDP per capita of destination countries, real exchange rates and coal export prices using secondary quantitative data. The secondary data used is panel data or time series datacross (cross-sectional and time series). This study uses time series data for 5 years from 2015 to 2019 period and the number of cross-sections is the 5 largest Indonesian coal importing countries (India, China, South Korea, Japan and Malaysia). The data sources come from the Central Statistics Agency (BPS), the World Bank and the International Monetary Fund (IMF) in 2015-2019.

The operational definitions of the variables used in this study are as follows:

1. Export volume, is the volume of Indonesian coal exports to destination countries (India, China, South Korea, Japan and Malaysia) for the 2015-2019 periodexpressed in kilograms
2. GDP per capita, is a measure of the average income of the population of Indonesia's export destination countries expressed in US$
3. The real exchange rateis the exchange rate of the rupiah against the dollar at the buying rate
4. Coal export price, is the export price of destination countries (India, China, South Korea, Japan and Malaysia) from Indonesia expressed in US$.

3.2. Analysis Method

3.2.1. Dynamic panel data regression

The estimation method that will be used in this research is dynamic panel data regression, which is a panel data regression method where the independent variable is the lag of the dependent variable. With the background of the best method election from panel model such as fixed effect and random effect by using residual covariance structure variance. If there is a lag of the dependent variable as an independent variable, then there is a correlation between the dependent variable and the residue. The method proposed by Arellano da Bond is assumed to have a correlation between the dependent variable and the residue, (Wooldridge, 2002, Green, 2012). The dynamic panel method is characterized by the lag of the dependent variable which is correlated with the residuals among the independent variables. This causes the OLS estimator to be biased and inconsistent.

In the dynamic regression model, the lag of the dependent variable is included as one of the regressors. The dynamic panel data regression model in this study was estimated using the Arellano Bond first difference GMM method to obtain a consistent and efficient estimate.

3.2.2. Dynamic panel data model

$$y_{it} = \rho\, y_{it-1} + z_{it}\gamma + c_i + \mu_{it}$$

Arellano Bond first difference GMM method where μ_{it} is a residual with an average equal to zero and a certain variance z_{it} is a matrix of a collection of exogenous variables and y_{it} is predetermined (exogenous variables derived from endogenous variables. One of the dynamic models is the autoregressive dynamic model. To

illustrate this case, the following is an AR1 autoregressive panel data model without including exogenous variables.

3.2.3. AR models (1)

$$y_{it} = \rho_i y_{i,t-1} + z_{it}\gamma + \mu_{it}$$

AR(1) model, if we assume that the eksogen variables (y_{it} and z_{it}) are not correlated, we can use OLS (fixed effect) or GLS (random effect) (Wooldrige, 2002).

If the AR(1) model violates the assumptions so that the eksogen (y_{it} and $_{it}$) are correlated with μ_{it}, then the AR(1) model is transformed by first differencing. And can be solved with OLS and GLS estimators.

$$\Delta y_{it} = \rho_i \Delta y_{it} + \Delta z_{it}\gamma + \Delta\mu_{it}$$

3.2.4. Model Arellano bond

$$y_{it} = \alpha_1 y_{it-1} + \ldots + y_{it-\rho}\alpha_\rho + x_{it}\beta_1 + z_{it}\beta_2 + c_i + \mu_{it}$$
x_{it} = matrix for exogenous variable
z_{it} = matrix for predetermine variable
c_i = random effect
Arellano-Bond suggests Δy_{it-2} as an instrument of Δy_{it-2}. This procedure produces an efficient estimator.

Specification of dynamic panel model:
$$VE_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 ER_{it} + \beta_3 EP_{it} + \delta GDP_{it-1} + \mu_{it}$$
Explanation:
VE_{it} = Export net volume (kg)
GDP_{it} = Percapita Income of destination countries (USD)
VE_{it} = Exchange rate (USD)
PE_{it} = Export price (USD)
GDP_{it-1} = Lag Percapita Income of destination countries (USD)
B_0 = Constant
β_i, δ = Coefficient
μ_{it} = Residual.

The estimation is done in the form of natural log.

One of the advantages of the dynamic panel model is that apart from knowing the short-term effects, we can also find out the long-term effects. In this study, analysis of the long-term effect of GDP on VE. In the dynamic panel data regression model, the coefficient represents the short-termeffect of a change in X. The long-term effect on a change in VE can be obtained from

This study begins with the selection of the best panel data estimation regression model from the panel data regression model, namely; common effect model, fixed effect model and random effect model. The selection was carried out using the Chow test and Hausman test.

Regression estimation of the dynamics panel data of Arellano-Bond GMM, the independent residual is the second-order first difference estimation residual, there should be no autocorrelation. Furthermore, to determine whether there is a relationship in the model, a significance test is carried out. Classical assumption test must be met; in this study the independent variables must be

normally distributed. Estimation of dynamic panel data model using Eviews 10 software.

4. DISCUSSION

4.1. Estimated Results
The calculation process begins with the classical assumption test. Heteroscedasticity test results obtained Chi Square count (4.3144) <Chi-square table (7.814728) at df=3 for the independent variable and the 5% significance level. This means rejecting H_o and receive H_a then there was a heteroscedasticity problem in the equation.

The results of the autocorrelation test obtained Chi-square count (19.75862) > Chi-square table (5.99) at df of residual lag length = 2 and a significance level of 5%. This means that if you accept H_o then there was no autocorrelation problem in the equation.

Furthermore, an estimate is made using the Arellano-Bond GMM using

Eviews 10 with Dynamic panel model Specifications:

$$VE_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 ER_{it} + \beta_3 EP_{it} + \delta GDP_{it-1} + \mu_{it}$$
where:
VE_{it} = Export net volume (kg)
GDP_{it} = Percapita Income of destination countries (USD)
VE_{it} = Exchange rate (USD)
PE_{it} = Export price (USD)
GDP_{it-1} = Lag Percapita Income of destination countries (USD)
B_0 = Constanta
β_i, δ = Coefficient
μ_{it} = Residual.

Estiomation was done in the form of log natural.

Estimation result was shown on Table 1.

VE=11.9770–0.1745*GDP–0.0291*ER–0.9973*EP+0.1937*GDP(–1)
Coefficient R^2 = 0.9491
Explanation:
VE = Export Volume
GDP = GDP/cap
ER = Exchange Rate
EP = Export Price.

Coefficient of determination R^2 = 0.9491, it means per capita GDP variable of the importing country, the exchange rate, the price of coal exports and GDP per capita in year t–1 in explaining

Table 1: Estimation result of export volume, PDB percapita, exchange rate and export price

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.97708	1.748301	6.850697	0.0000
GDP	–0.174579	0.511073	–0.341594	0.7374
ER	–0.029159	0.018603	–1.567458	0.1379
EP	–0.997388	0.141510	–7.048166	0.0000
GDP(–1)	0.193728	0.514746	0.376356	0.7119

the variation of the variable volume of coal exports amounted to 94.91% and the remaining 5.09% explained other factors did not exist in this study.

Based on the significance test of the exchange rate and export price variables, the probability values are 0.1379 and 0.000, at a significance level of 10% and df = 20. This indicates that the exchange rate and export price have a significant effect on export volume. The significance test of the variable GDP per capita and lag GDP per capita have no significant effect on export volume. Data estimation was done by using natural logs. The coefficient obtained can explain the magnitude of the level of elasticity. The coefficient was< 1, it means inelastic with a negative sign that the increase in the exchange rate and export prices was greater than the decrease in export volume.

4.2. Short-Term and Long-Term Effects
The advantage of the dynamic panel model was that it can determine the short-run effect and long-run effect. The elasticity results were obtained in Table 2.

Dynamic panel data model regression coefficient β is a short-term effect of changes X. Long-term effects on the change of VE can be obtained from the results of the calculation of short-term and long-term elasticity, exchange rates (ER) are inelastic and negative with different magnitudes. In the long term there is an increase.

This is in accordance with the Mundell-Fleming theory which states that the exchange rate with a negative effect, the higher the exchange rate, the lower the export volume. The short- term elasticity of the exchange rate is –0.029159, this explains that an increase in the exchange rate of 1 percent will reduce net exports in the short term by 2.9 percent.

4.3. Discussion
The estimation result of GDP per capita was negative and not significant. Lag GDP per capita was positive but not significant. GDP was the net value of final goods and services produced by a country's various economic activities. Increased activity and economic activity will increase the production of goods and services by the community.

Export companies as providers of goods and services will also experience an increase if economic growth increases. The increase in coal exports was mostly used as energy for power generation. On the other hand, Indonesia's coal importing countries are coal producers (China, India) so that part of their coal needs can be met by domestic production.

The estimation results indicate that the positive effect and significat of coal price against Indonesian coal exports. This means that the

higher the price of coal in the destination country, the larger the volume of Indonesian coal exports. According to Lipsey (1995), the higher the price, the more quantity supplied. The greater the difference between prices in the international market and domestic prices will cause the number of commodities to be exported to increase. The results of the study support the research of Tilova (2012) who found that the price of export destination countries had a positive and significant effect on Indonesia's coal demand.

Theoretically the exchange rate was determined by the demand and supply of the US dollar currency in a country's trade. The country exports, the country will receive revenue in the form of US dollars, so that there are enough US dollars available, US dollars will be used for requests for US dollars.

The results of this study indicate that the exchange rate has a negative and significant effect on the volume of coal exports. This means that the greater the exchange rate of the export destination country against the US dollar, the greater the volume of exports. The foreign trade of a country was determined by the demand of the trading partner country depending on the income of the trading partner country. The weakening of the rupiah against the dollar has a positive effect. The decline in the exchange rate of the rupiah against foreign currencies (US$) allows exporters to offer goods at lower prices, thereby increasing competitiveness abroad. The increase in competitiveness will encourage an increase in export income.

If the exchange rate depreciates, the price of exported goods abroad will be cheaper and the price of imported goods will become more expensive. So that exports were smaller than imports and exports experience a decline. Vice versa, the appreciation of the exchange rate will cause Indonesia's foreign trade to increase. So it can be concluded that the exchange rate has a significant negative effect on export volume.

The elasticity approach to exchange rate determination model states that the exchange rate was determined by the balance between exports and imports. The exchange rate will depreciate when the value of exports was less than imports, and the exchange rate will appreciate if exports were greater than imports. This was in accordance with the Mundell-Fleming theory which states that the exchange rate has a negative effect, the higher the exchange rate, the lower the export volume. The weakening of the exchange rate has implications for purchasing power due to price spikes that cause a decline in economic growth.

4.4. Implication
Indonesia is a country that adheres to an open economic system by trading with other countries through exports and imports. Exports not only generate foreign exchange but also show trade productivity (Lee and Sulochani, 2015). The problem of international trade is the influence of the exchange rate (exchange rate), especially the rupiah against the US dollar. Net exports are the difference between exports and imports. On the other hand, international trade is influenced by the endowment factor of each country. Indonesia is a country that has a large enough.

Table 2: Short-term elasticity, long-term elasticity

Variable	Prob.	Short-term Elasticity	Long-term Elasticity
C	0.0000		
Ln GDP	0.7374	–0.174579	
Ln ER	0.1379	–0.029159	–0.3616521
Ln EP	0.0000	–0.997388	–1.23703663
Ln GDP$_{t-1}$	0.7119	–0.193728	

Coal is a resource that is quite widely available in Indonesia. Strategic trade and resource policy taking place in the energy resource market for decades. Strong price shocks and high price volatility have become a new phenomenon in the market which is characterized by long-term contracts, stable prices, and practically non-existent financial markets (IEA, 2011b, Ritschel, 2011). However, international trade has grown significantly in recent years, and is mostly growing in the Pacific part of the market. There is an increase in Southeast Asia's energy demand, due to rapid economic growth.

5. CONCLUSION

The estimation result of per capita income was negative and not significant, while GDP per capita was positive but not significant. The increase in coal exports was mostly used as energy for generating electricity. On the other hand, Indonesia's coal importing countries were coal producers (China, India) so that part of their coal needs can be fulfilled by domestic production. Coal price had a positive and significant impact on Indonesia's coal exports. The volume of Indonesian coal exports increased with the increase in coal prices in the destination country. The greater the difference between prices in the international market and domestic prices will cause the number of commodities to be exported to increase.

The exchange rate had a negative and significant effect on the volume of coal exports. This means that the greater the exchange rate of the export destination country against the US dollar, the greater the volume of exports.

The foreign trade of a country was determined by the demand of the trading partner country which depends on the income of the trading partner country. The decline in the exchange rate of the rupiah against foreign currencies (US$) allows exporters to offer goods at lower prices, there by increasing competitiveness abroad. The increase in competitiveness will encourage an increase in export income.

REFERENCES

Alleyne, A., Lorde, T. (2014), A gravity model approach to analysing the trade. Applied Econometrics and International Development, 14(2), 145-160.

Ansari, M.K., Kumar, S. (2016), International trade of coal in India: Trends, challenges and measures for achieving trade balance. International Journal of Research Granthaalayah, 4(1), 189-198.

Awokuse, T.O. (2007), Causality between exports, imports, and economic growth: Evidence from transition economies. Economics Letters, 94(3), 389-395.

Azar, S.A., Aboukhodor, W. (2017), Foreign exchange reserves and the macro-economy in the GCC countries. Accounting and Finance Research, 6(3), 72-80.

Baig, K.S., Yousaf, M. (2017), Coal fired power plants: Emission problems and controlling techniques. Journal of Earth Science and Climatic Change, 8(7), 1-10.

BPS. (2020), Statistik Indonesia 2020 Statistical Yearbook of Indonesia 2020. Statistical yearbookof Indonesia.

Chrid, N., Saafi, S., Chakroun, M. (2020), Export upgrading and economic growth: Panel cointegration and causality analysis. The Journal of the Knowledge Economy, 12,811-841.

Copeland, B.R., Taylor, M.S. (2004), Trade, Growth, and the Environment. Journal of Economic Literature, 42(1), 7-71.

Energy Information Administration, US. (2019), International Energy Outlook 2019 with Projections 2050. Choice Reviews Online, No. 170.

Fernández, V.C., Fernández, J.T. (2011), The long run impact of foreign direct investment, exports, imports and GDP: Evidence for Spain from an ARDL approach. American Open Journal of Statistics, 1, 58-73.

Festić, M., Repina, S., Volčjak, R. (2010), Estimating coal price dynamics with the principal components method. Romanian Journal of Economic Forecasting, 13(2), 188-212.

Green, W.H. (2012), Econometric Analysis. 7th ed. Hoboken, New Jersey: New York University, Prentice Hall.

Gries, T., Redlin, M. (2000), Trade Openness and Economic Growth: A Panel Causality Analysis. Germany: University of Paderborn, Germany.

Halwani, R.H. (2002), Ekonomi Internasional dan Globalisasi Ekonomi. Jakarta: Erlangga.

IEA. (2010b), International Energy Outlook 2010. Washington DC: International Energy Agency.

Krugman, P.R., Obstfeld, M., Melitz, M.J. (2015), International Economics Theory and Policy. 10th ed. London, England: Pearson.

Lee, K., Sulochani, R.S. (2015), Does openness lead to sustained economic growth? Export growth versus other variables as determinants of economic growth. Journal of the Asia Pacific Economy, 10(10), 8-14.

Lipsey, R.G. (1995), Pengantar Mikro Ekonomi. Jakarta: Penerbit Binarupa Aksara.

Makhmutova, D.I., Mustafin, A.N. (2017), Impact of international trade on economic growth. International Journal of Scientific Study, 5(6), 140-144.

Ministry of Energy and Mineral Resources of the Republic of Indonesia. (2018), Handbook of Energy and Economic Statistics of Indonesia 2018. Handbook of Energy and Economic Statistics of Indonesia. Jakarta: Ministry of Energy and Mineral Resources of the Republic of Indonesia.

Pugel, T.A., Lindert, P.H. (1995), International Economics. New York: McGraw-Hill Higher Education.

Ritschel, W. (2005-2011), German Coal Importers' Association Annual Reports 2005-2011. Hamburg: German Coal Importers' Association.

Sagawa, A., Kolzumi, K. (2008), The trend of coal export and imports by China and its influence on Asian coal markets. International Economic Environment Journal, 1-19.

Salvatore, D. (1997), Ekonomi Internasional. Jakarta: Erlangga.

Sen, S. (2012), International Trade Theory and Policy: A Review of the Literature. Working Paper No. 635.

Sunde, T. (2017), Foreign direct investment, exports and economic growth: ARDL and causality analysis for South Africa. Research in International Business and Finance, 41, 434-444.

Susanto, D.A., Randy, A. (2021), The determinants of Indonesia's coal export demand to six Asian countries. Journal of Developing Economies, 6(1), 66-78.

Tilova, R. (2012), Analisis Faktor-faktor yang Mempengaruhi Permintaan batu Bara di Indonesia di Empat Negara Tujuan Ekspor Terbesar, Dalam Penelitian Departemen Ilmu Ekonomi. Fakultas Ekonomi dan Manajemen IPB.

Wooldridge, J. (2002), Econometric Analysis of Cross Section and Panel Data, MIT Press, Cambridge MA.

World Coal Institute. (2017), Coal Statictics. Available from: http://www.worldcoalinstitute.org [Last accessed on 2017 Nov 17].