Utomo, Selamet Joko; Mayvani, Titov Chuk's; Imron, Mochamad Ali

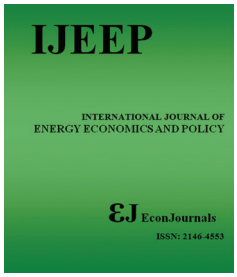
Article

Coal energy and macroeconomic conditions

International Journal of Energy Economics and Policy

Provided in Cooperation with:
International Journal of Energy Economics and Policy (IJEEP)

Reference: Utomo, Selamet Joko/Mayvani, Titov Chuk's et. al. (2021). Coal energy and macroeconomic conditions. In: International Journal of Energy Economics and Policy 11 (4), S. 426 - 432.
https://www.econjournals.com/index.php/ijeep/article/download/11214/5939.
doi:10.32479/ijeep.11214.



International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2021, 11(4), 426-432.

Coal Energy and Macroeconomic Conditions

Selamet Joko Utomo[1]*, Titov Chuk's Mayvani[1], Mochamad Ali Imron[2]

[1]Department of Economics, Faculty of Economics and Business, University of Trunojoyo Madura, Indonesia, [2]Department of Economics, Faculty of Business and Economics, Universitas Islam Indonesia, Indonesia. *Email. sjutomo@trunojoyo.ac.id

Received: 07 February 2021 **Accepted:** 28 April 2021 **DOI:** https://doi.org/10.32479/ijeep.11214

ABSTRACT

This paper assesses the effect of coal energy production volume, exchange rate, inflation and gross domestic product on the volume of Indonesia's coal energy exports in 1998-2019. Based on an Autoregressive Distributed Lag (ARDL) approach, in the short run, we find that the coal energy production volume, exchange rate, and gross domestic product has a negative relationship to Indonesia's coal energy exports. However, on the other hand, inflation has a positive relationship to Indonesia's coal energy exports. In the long run, we also find that the coal energy production volume, inflation, and gross domestic product has a positive relationship to Indonesia's coal energy exports. Besides, the exchange rate has a negative relationship to Indonesia's coal energy exports.

Keywords: Coal Energy, Exchange Rate, Inflation, Gross Domestic Product, Autoregressive Distributed Lag
JEL Classifications: E2, E6, Q4, Q2

1. BACKGROUND

Indonesia is one of the largest coal energy producing countries in the world. It makes Indonesia the largest exporter of coal energy world in 2012, of the total production of coal energy Indonesia, approximately 25% is used for the benefit of the country, while 75% are exported to foreign countries (World Coal Institute, 2013) (International Energy Agency, 2020).

Coal energy deposits in Indonesia are scattered on various islands from Sumatra to Papua. These deposits are very much found in large basins such as in Aceh, South Sumatra, East Kalimantan and South Kalimantan. According to (MEMR, 2019), the Geological Agency stated that Indonesia's coal energy resources reached 124.6 billion tons and coal energy reserves reached 26.2 billion tons. Indonesia's coal energy reserves are only 0.6% of the world's total coal energy reserves.

Based on Graph 1, in 2019, Indonesia's coal energy production reached 610 million tons and increased rapidly in the last 24 years. This coal energy production grows an average of 14-15% per year. The highest production was achieved in 2019 (MEMR, 2019).

Hadi (2021) states that most of Indonesia's coal energy is suitable for electricity generation. For domestic use, Indonesian coal energy is utilized by the State Electricity Company (PLN) as fuel for power plants. Indonesian coal energy has its own market in the world. In the world market, some of Indonesia's coal energy is exported to China, India and Japan, and partly to Africa, Europe to America. To set prices, the domestic coal energy market uses the reference coal Energy Price or the Indonesia Coal Index, while the Indonesian foreign market uses a system that applies internationally.

The largest coal consumption is Asia, which is around 65.6% of world coal consumption. This makes Asia the largest coal market in the world. The high consumption of coal has led to increased demand for coal by countries in Asia such as Japan, India, Taiwan, South Korea, China, Thailand and Malaysia. The high demand for coal in Asia provides an attractive prospect for coal exporters. The

construction of power plants in several Asian regions makes coal very much needed (Hadi, 2021).

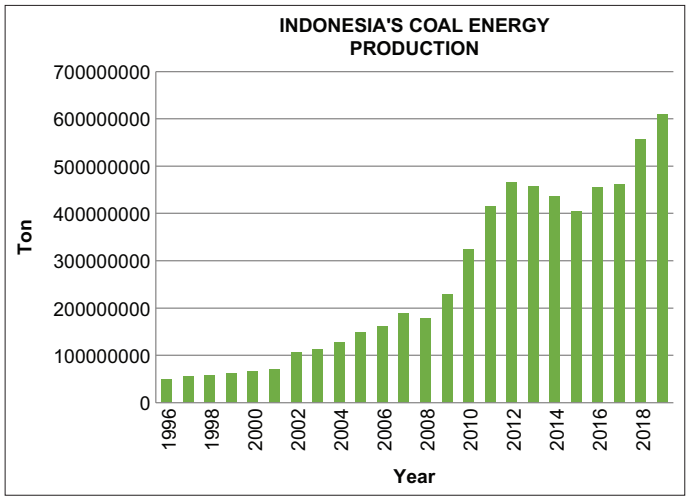
Based on Graph 2, world coal consumption from 1996 to 2019 has increased as a whole. The big role of coal in the process of life makes the world's demand for coal increase along with the development of the times. The increase in demand for coal has encouraged coal exporting countries such as China, the United States, India, Australia, Russia, South Africa including Indonesia to increase their production. Energy consumption, including coal, can continue to increase in line with economic growth, population, energy prices and government policies of a country.

In Table 1 above, in 2017-2019 the largest coal energy exporter was Indonesia. Although the largest producer of coal energy in the world is neither Indonesia nor Australia, but China. Indonesia is ranked 4th as a major producer of coal energy while Australia is in 5th place (IEA, 2020). However, Indonesia is the world's largest exporter of coal energy with a total coal energy exported of 394 metric tons in 2017. The number of exports has always increased in the last 3 years of data, reaching 455 metric tons in 2019. This shows that the not all coal energy producing countries, they do export it, but coal energy production is to meet the domestic needs of each of these countries.

From Table 1, data shows that Indonesia has an export share of 31.7% of all total exports in the world in 2019, while Australia has a share of 27.4% in the same year. This shows that the contribution of Indonesia and Australia in coal energy exports is not much different. Compared to other countries such as Russia, the United States, South Africa and others have a smaller share, so the contribution made is different from Indonesia. This is an opportunity that is owned by Indonesia in coal energy export to have a bigger market share (Udalov, 2021).

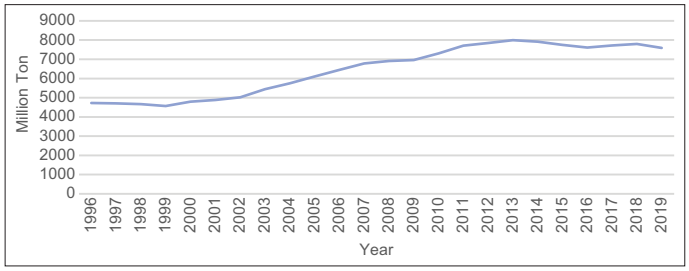
This study is to analyze the effect of simultaneous and partial on the inflation, the exchange rate, the volume of production and the gross domestic product (GDP) on the export of coal energy in Indonesia in 1996-2019.

Graph 1: Coal Energy Production in Indonesia



Source: International Energy Agency, 2019

Graph 2: World Coal Consumption (in million tonnes)



Source: Enerdata, Global Energy Statistical Yearbook, 2020

2. LITERATURE REVIEW

2.1. International Trade

International trade is an activity that occurs when a country has a comparative advantage or has an absolute advantage. Comparative advantage is the advantages of a state where it is able to produce goods and services with more quantity at a lower cost and efficient than any other country (Cheema, 2019). Absolute advantage is an advantage possessed by a country that produces goods or services that cannot be produced by other countries (Seon and Choib, 2019). Whereas in another sense, international trade is a form of cooperation between two or more countries in the economic field that directly benefits between countries, namely by meeting the needs of each country, which cannot be fulfilled solely by relying on domestic production. So these international trade activities have the aim of increasing the standard of living in that country (Schumacher, 2013).

2.2. Export

According Mankiw (2019) exports means an activity which involves the production of goods and services produced by a country, but it is consumed by consumers outside the state boundaries are. According to the Customs Law no. 10 of 1995 explains that export is an activity of removing goods from the customs area (Indonesian territory which includes land, land and air space above it), as well as certain places in the EEZ (economy exclusive zone) and continental bases in which it applies. Customs law.

Based on Graph 3, it is explained that the value of Indonesia's coal exports to destination countries, Indonesia's market share is still dominated by India, China, Japan, South Korea, Taiwan,

Table 1: The world major of coal energy exporters (in metric tons)

Country	2017	2018	2019
Indonesia	394	434	455
Australia	379	382	393
Russia	190	210	217
United State of America	88	105	84
South Africa	71	70	81
Colombia	103	84	72
Canada	31	34	36
Mongol	29	32	28
Kazakhstan	29	27	25
Philippines	6	4	14
Others	46	35	31

Source: International Energy Agency, 2020

Malaysia and the Philippines which have an export value of more than 1000 million USD in 2019, other countries. Above has an export value of not more than 1000 million USD until 2019. It can be seen from the annual trend in each country, Indonesia's coal exports are quite volatile. In 2015-2016, Indonesia's average coal exports decreased. However, entering 2017-2019, Indonesia's coal exports experienced an increase, although there were several countries that experienced a decline in 2019.

The value of Indonesia's coal exports does not always experience a decline, India has become the main destination country with the highest export value of all destination countries every year in the last 5 years. The highest export value was in 2018, reaching 5,370 million USD. Meanwhile, according to the Central Statistics, China had reached the highest export value in 2011, namely up to USD 7,568.9 million. After that, starting from 2012 the value of China's exports continued to experience a significant decline. According to (Carolina and Aminata, 2019) explaining that the decline in the value of exports was caused in mid-2012 there was a world economic slowdown which also had an impact on the Chinese economy, where China was one of the largest export markets for Indonesian coal at that time. The world economic slowdown has also caused the demand for coal to decline.

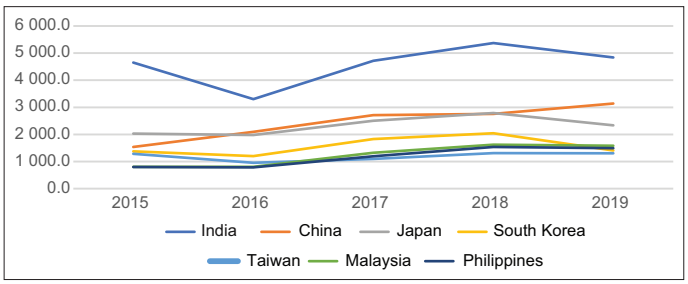
2.3. Energy Production

Production is making, producing and creating. A production can be done if there are materials that can be used for the production process. To be able to carry out the production process there are elements called the production factor, such as capital in all its forms, natural resources, labor and others. Factors of production can also be referred to as elements that help value creation efforts or efforts to increase the value or price of an item. Another definition of production is execution which utilizes several inputs from several economic activities. Production activities can be defined as activities to produce output by using certain production techniques to process inputs in such a way (Morozko, 2021).

2.4. Gross Domestic Product

Gross domestic product (GDP) is used to measure the performance of a country's economy, from GDP it can be concluded whether a country is experiencing progress or decline. GDP is an economic indicator to measure the total value of the final goods and services that are expressed as national production in an economy and national production is also the national income of the country concerned (Mankiw, 2019).

Graph 3: Value of Indonesian coal energy exports to importer countries (in million USD)



Source: Central Statistics, 2019

GDP shows the size of the economy in a country's ability, in which the larger the GDP generated in a region of the country will increasingly also the ability of these countries to conduct trade. GDP is defined as the money value of goods and services. In measuring the value of money, benchmarks are used to measure market prices for different goods and services. However, the prices of goods keep changing all the time, because inflation usually pushes the prices of goods and services up from year to year (Samuelson and Nordhaus, 2019).

2.5. Exchange Rate

The exchange rate between two countries is the price level agreed upon by the residents of the two countries to trade with each other (Mankiw, 2019). The exchange rate can be divided into two, namely the nominal exchange rate and the real exchange rate. Each of these means the nominal exchange rate is the relative price of the currencies of the two countries, while the real exchange rate is the relative price of goods between the two countries. The real exchange rate states the rate at which a person can trade goods from one country for goods from another country, so the real exchange rate is often called the terms of trade (Wildan et al., 2021.

2.6. Inflation

Inflation is a price increase simultaneously and continuously with views of two hundred types of goods. Inflation will cause the prices of goods in general to increase and in the end make the prices of domestic goods more expensive which in turn will lead to a tendency to import (Sukirno, 2019). Almost all countries in the world have experienced or are currently experiencing inflation. The prices of general goods that usually go up are basic goods or essential goods which are the consumption needs of a country.

2.7. Hypothesis

H_1: It is assumed that the variable production volume (PROD), gross domestic product (GDP), exchange rate (ER) and inflation (INF) simultaneously have an effect on the volume of Indonesia's coal energy exports in 1996-2019.

H_2: It is assumed that the variable volume of production (PROD) partially has a positive effect on Indonesia's coal energy exports in 1996-2019.

H_3: It is assumed that the exchange rate variable (ER) partially has a positive effect on Indonesia's coal energy exports in 1996-2019.

H_4: It is assumed that the inflation variable (INF) partially has a negative effect on Indonesia's coal energy exports in 1996-2019.

H_5: It is assumed that the Gross Domestic Product (GDP) variable partially has a positive effect on the volume of Indonesia's coal energy exports in 1996-2019.

3. RESEARCH METHOD

In this study, the data used are secondary data, where secondary data is data that can be obtained through official institutions. This study uses data time series and using autoregressive distributed lag (ARDL). This study is intended to determine whether the independent variables, namely coal energy production volume (PROD), inflation (INF), exchange rate (ER) and gross domestic product (GDP) affect

the dependent variable, namely coal energy export volume (EXP).. This study uses data with a time period of 1996 to 2019.

The form of the equation in this study is:

$$\Delta EXP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta EXP_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta PROD_{t-i} +$$

$$\sum_{i=1}^{n} \alpha_{3i} \Delta ER_{t-i} + \sum_{i=1}^{n} \alpha_{4i} \Delta INF_{t-i} + \sum_{i=1}^{n} \alpha_{5i} \Delta PDB_{t-i} +$$

$$\vartheta ECT_{t-1} + u_t$$

Where EXPt-i is the volume of exports in tonnes, PRODt-i is the amount of coal energy production in tonnes, ERt-i is the Rupiah exchange rate against USD in Rupiah, INFt-i is the inflation rate in percent and GDP is the Product gross domestic product in Rupiah.

4. RESULTS AND ANALYSIS

4.1. Model Testing

To find out how much the optimum lag is used, it can be seen using the Akaike Information Criterion (AIC) approach. The results of the Akaike Information Criterion (AIC) are as follows:

Based on Graph 4, there are 20 top Akaike Information Criteria models. However, the suitable model for the ARDL method in this study is ARDL (2,3,2,2,3) because it has a smaller error than the other models.

4.2. Autocorrelation Test

To find out the relationship between variables from 1 time to another, a test using the autocorrelation test was carried out. To detect autocorrelation, the Breusch-Godfret Serial Corelation LM Test method can be used. The hypothesis is as follows:

H_0: Data there is no autocorrelation

H_a: The data has Autocorrelation

According to the Table 2 has been tested Breusch-Godfrey and probability values obtained Chi-Square of 0.0007 <α = 5 % is to reject H_0 or data contained autocorrelation. Because there is autocorrelation, correction is needed in this regression test, the method used is HAC (Newey-West). Using the HAC method will show the standard error rate that has changed so that the results obtained will be better because the HAC has been corrected (Wildan et al., 2021).

4.3. Cointegration Test

The cointegration test is useful for knowing the long-term equilibrium relationship for each variable. Cointegration testing can be done by doing the bound test cointegration with the following hypotheses:

H_0: Data there is no cointegration.

H_a: Data has cointegration.

Based on Table 3, there are results from the F-Statistic with a value of 80.05650 > I (1) with a significant level of 1%, 2.5%, 5% and 10%. So that means rejecting H_0 or there is cointegration. With the results obtained, it can be concluded that there is a cointegration between the variables of Indonesian Coal Energy Production Volume, Exchange Rate, Inflation and Gross Domestic Product in the long run.

4.4. Conditional ECM

Conditional ECM is used to estimate both short and long term models. This test is derived from the approach autoregressive distributed lag (ARDL). The hypothesis used is as follows:

H_0: There is no influence

H_a: There is an influence

The following is an estimation result from a short-term.

Table 4 shows the results of the short-term model test which can be explained as follows:

The coefficient DLOG (EXPORT (−1)) at the first past value is statistically significant and affects the volume of coal energy exports in the short term.

The DLOG (PROD) coefficient at that time value is statistically significant and affects the volume of coal energy exports in the short term.

Graph 4: Determination of the optimum lag

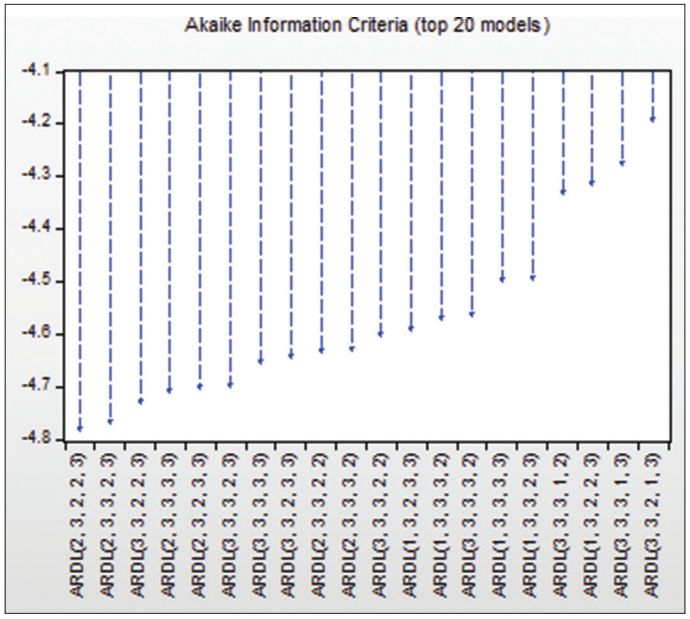


Table 2: Autocorrelation test results

Breusch-godfrey serial correlation LM test			
F-statistic	2.249540	Prob. F (2,2)	0.3077
Obs*R-squared	14.53755	Prob. Cshi-Square (2)	0.0007

Table 3: Test results cointegration bound testing

F-bounds test		Null hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I (0)	I (1)
			Asymptotic: n=1000	
F-statistic	80.05650	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

The DLOG coefficient (PROD (−1)) at the first past value is statistically significant and affects the volume of coal energy exports in the short term.

The DLOG coefficient (PROD (−2)) at the second past value is statistically significant and affects the volume of coal energy exports in the short term.

The DLOG coefficient (ER) at that time value is statistically significant and affects the volume of coal energy exports in the short term.

The DLOG coefficient (ER (−1)) at the first past value is statistically significant and affects the volume of coal energy exports in the short term.

The DLOG (INF) coefficient at that time value is statistically significant and affects the volume of coal energy exports in the short term.

The DLOG coefficient (INF (−1)) at the first past value is statistically significant and affects the volume of coal energy exports in the short run.

The DLOG coefficient (GDP) at that time value is statistically insignificant and has no effect on the volume of coal energy exports in the short run.

The DLOG coefficient (GDP (−1)) at the first past value is statistically significant and affects the volume of coal energy exports in the short run.

The DLOG coefficient (GDP (−2)) at the second past value is statistically significant and affects the volume of coal energy exports in the short run.

From Table 5 the long-term test (long run coefficients) has been carried out and the results can be explained as follows:

The variable volume of coal energy production (LOG (PROD)) has a statistically significant value and affects the volume of Indonesia's coal energy exports in the long run.

The Exchange Rate variable (LOG (ER)) statistically has a significant value and affects the volume of Indonesia's coal energy exports in the long run.

Tabel 4: Estimation result in a short-term

Variable	Prob.	Information
DLOG (EXPORT(−1))	0.0147	Sig
DLOG (PROD)	0.0761	Sig
DLOG (PROD(−1))	0.0000	Sig
DLOG (PROD(−2))	0.0001	Sig
DLOG (ER)	0.0001	Sig
DLOG (ER(−1))	0.0000	Sig
DLOG (INF)	0.0023	Sig
DLOG (INF(−1))	0.0012	Sig
DLOG (GDP)	0.3193	No Sig
DLOG (GDP(−1))	0.0001	Sig
DLOG (GDP(−2))	0.0004	Sig

The Inflation variable (LOG (INF)) statistically has a significant value and affects the volume of Indonesia's coal energy exports in the long run.

The gross domestic product (LOG (PDB)) variable is statistically insignificant and has no effect on Indonesia's coal energy export volume in the long run.

4.5. Simultaneous Test (F-tes)

F test or simultaneous test is a test that is useful to determine the effect of the independent variable as a whole on the dependent variable. The hypothesis for the Simultaneous Test (F-test) is as follows:

H_0: There is no effect (not significant).

H_a: There is influence (significant).

From the Table 6 have been performed testing Simultaneous Test and has obtained the results of calculation of probability value of 0.000001 $<\alpha = 5$ %, then reject H_0, so it can be concluded that the independent variable with the same effect simultaneously against dependent variable.

4.6. Partial test (t-test)

Partial test is a test that is useful for testing between independent variables individually against the dependent variable. The partial test is basically used to determine or understand the significant level of the regression coefficient, here is the hypothesis for the partial test (t-test):

H_0: There is no influence.

H_a: There is an influence.

The explanation of the above hypothesis is that if the probability value results are obtained $>\alpha = 5$ %, it means receiving H_0, it can be concluded that the independent variable does not partially affect the dependent variable. If the results obtained the probability value $<\alpha = 5$ %, it means rejecting H_0, it can be concluded that the independent variable has a partial effect on the dependent variable. The results of the Partial Test (t-test) are as follows:

On the Table 7, it has been tested using the partial test (t-test), the results are obtained with the following explanation:

The LOG variable (EXPORT (−2)) is a variable of Indonesian coal energy export volume with a lag of 2 having a prob value of 0.3345 $>\alpha = 5$ %, which means that the Indonesian coal Energy Export Volume variable in the previous 2 years has no partial effect.

Table 5: Long-term test

Variable	Prob.	Information
LOG (PROD)	0.0020	Sig
LOG (ER)	0.0042	Sig
LOG (INF)	0.0051	Sig
LOG (PDB)	0.9567	Non Sig

Table 6: Simultaneous test results (F-test)

Prob (F-Statistic)	Critical value α=5%	Info
0.000001	0.1	Sig

and it is not significant to the variable volume of Indonesian coal Energy Exports in that year.

The LOG variable (PROD (−3)) is a variable volume of Indonesian coal energy production with lag 3 has a probability value of 0.0017 <α = 5 %, which means that the variable volume of Indonesian coal energy production in the previous 3 years has a partial and significant effect on Indonesian Coal Energy Export Volume variable in that year.

The LOG variable (ER (−2)) is an exchange rate variable with lag 2 having a probability value of 0.0001 <α = 5 %, which means that the exchange rate in the previous 2 years has a partial and significant effect on the variable volume of coal energy exports.

The LOG variable (INF (−2)) is an inflation variable with a lag of 2, has a probability value of 0.0404 <α = 5 %, which means that the inflation value in the previous 2 years has a partial and significant effect on the Indonesian coal energy export volume variable in the.

The variable LOG (PDB (-3)) is a variable of Gross Domestic Product with a lag of 3, has a probability value of 0.0010 <α = 5 %, which means that the gross domestic product variable in the previous 3 years has a partial and significant effect on the Energy Export Volume variable. Indonesian coal in that year.

5. DISCUSSION

Analysis of the effect of coal energy production volume on the energy export volume of Indonesian coal.

From the results of the research estimate, the coefficient of Indonesian Coal Energy Production Volume is 0.8497. These results can be interpreted that if the Volume of Indonesian Coal Energy Production increases by 1%, the Indonesian Coal Energy Export Volume will increase by 0.8497%, in which the exchange rate, inflation and Gross Domestic Product variables are considered constant.

The results of this study are the same as research (Levialdi and Marchegiani, 2020) where in the study, the results showed that the variable amount of production had a positive and significant effect on the volume of Indonesian coal energy exports in the 1992-2012 period. This is in accordance with the theory which states that an increase in the amount of production will also result in an increase in export volume (Wildan et al., 2021). This means that this research actually supports previous research. Another research conducted by (Shahad et al., 2020), in this study used coal energy production as an independent variable and the results showed that coal energy production had a significant effect on the volume of coal energy exports.

Table 7: Partial test results (t-test)

Variable	Prob.	Info
LOG (EXPORT(−2))	0,3345	Non Sig
LOG (PROD(−3))	0,0017	Sig
LOG (KURS(−2))	0,0001	Sig
LOG (INF(−2))	0,0404	Sig
LOG (PDB(−3))	0,0010	Sig

Analysis of the effect of exchange rates on the volume of indonesian coal energy exports.

From the estimation results in this study indicate that the coefficient of the exchange rate or the exchange rate of Rupiah against USD is 2.1962, from these results it can be interpreted that if the exchange rate or exchange rate increases by 1% then in that year the Indonesian Coal Energy Export Volume will increase by 2.1962%, where the variables of production volume, inflation and gross domestic product are considered fixed.

This is in accordance with the theory which states that an increase in the exchange rate will cause an increase in export volume (Sukirno, 2019). The weakening of the exchange rate (exchange rate) will increase the volume of exports and will also increase the competitiveness of export commodities. This can occur because the price of export commodities in the destination country seems to have decreased in price due to the strengthening of the exchange rate, while for countries that are exporting, the weakening of the exchange rate (exchange rate) seems to cause the price of export commodities to experience an increase in price.

This is in line with research conducted by (Hasanudin et al., 2020), in this study found that the real exchange rate has a positive and significant effect on Indonesia's coal energy exports.

Analysis of the effect of inflation on the volume of Indonesian coal energy exports.

From the results of the research estimate, the inflation coefficient is −0.1146. These results mean that if inflation increases by 1%, the Indonesian coal energy export volume will decrease by 0.1146% if the variable volume of coal energy production, exchange rate and Gross domestic product is considered constant.

These results are in accordance with the theory which states that an increase in the price of goods or inflation causes the goods in that country to be unable to compete in the international market so that it will cause exports to decline (Akhmad and Amir, 2018).

Analysis of the effect of gross domestic product on the volume of Indonesian coal energy exports.

Gross domestic product is the market value of all goods and services produced in the economy within a certain period of time. Gross domestic product is one indicator that economists use to measure the success of implementing the economy by a country.

From the estimation results, the coefficient of gross domestic product is −0.2252. These results can be interpreted that an increase in gross domestic product of 1% can reduce the Volume

of Indonesian coal energy exports by 0.2252%, if the variable volume of coal energy production, exchange rate, inflation is considered constant.

This is not in line with research conducted by (Khamis et al., 2018) which in their research stated that gross domestic product (GDP) has a positive influence on Indonesian exports. This discrepancy suggests that the use of domestic coal energy is presumably still very high, as we know that coal energy is the highest used for electricity generation, besides coal energy can also be used for railroad fuel. The increase in coal energy exports, causes a reduction in the consumption of coal energy in the country, especially for electricity generation, so that it will hamper some economic activities that use electricity and can result in a decrease in the Gross Domestic Product.

6. CONCLUSION

Based on the results of research that has been carried out by analyzing existing data, the following conclusions can be drawn:

The variable volume of coal energy production, exchange rate, inflation and gross domestic product simultaneously affect the volume of coal energy exports in Indonesia.

Export volume of coal energy is influenced by production volume of coal energy in a positive and significant. This means that if the coal energy production volume increases, the Indonesian coal energy export volume will also increase.

The volume of export of coal energy Indonesia affected by the exchange rate is positive and significant. This means that if the rupiah exchange rate against the USD has increased or weakened then export volume of coal energy Indonesia also increased.

Indonesia's coal energy export volume is negatively and significantly affected by inflation. This means that if inflation increases, the Indonesian Coal Energy Export Volume will experience a decline.

The export volume of coal energy Indonesia affected by the gross domestic product is negative and significant. This means that if the Gross Domestic Product increases, the Indonesian Coal Energy Export Volume will experience a decline.

6.1. Suggestion

Based on the above conclusions that Indonesia's coal energy exports can increase gross domestic product by looking for alternatives to the use of coal energy for domestic electricity generation, because the highest use of coal energy in the country is used for steam power generation, so that domestic electricity needs are still met and the volume of Indonesia's coal energy exports can increase so that it can also increase the gross domestic product.

REFERENCES

Akhmad, A., Amir, A. (2018), Study of fuel oil supply and consumption in Indonesia. International Journal of Energy Economics and Policy, 8(4), 13.

Amir, M. (2004), Export Import Theory and Its Application. Jakarta: PPM.

Carolina, L.T., Aminata, J. (2019), Analysis of competitiveness and factors affecting coal exports. Diponegoro Journal of Economics, 1(1), 9-21.

Cheema, M.A., Scrimgeour, F. (2019), Oil prices and stock market anomalies. Energy Economics, 83, 578-587.

Enerdata. (2020), Global Energy Statistical Yearbook 2020. Available from: https://www.yearbook.enerdata.net. [Last accessed on 2021 Jan 07].

Hadi, M.F., Hidayat, M., Widiarsih, D., Murialti ,N. (2021), The role of electricity and energy consumption influences industrial development between regions In Indonesia. International Journal of Energy Economics and Policy, 11(3), 403-408.

Hasanudin, H., Nurwulandari, A., Adnyana, I.M., Loviana, N. (2020), The effect of ownership and financial performance on firm value of oil and gas mining companies in Indonesia. International Journal of Energy Economics and Policy, 10(5), 103-109.

International Energy Agency. (2020), Coal Information Overview. Paris: IEA Publications.

Khamis, R., Anasweh, M., Hamdan, A. (2018), Oil prices and stock market returns in oil exporting countries: Evidence from Saudi Arabia. International Journal of Energy Economics and Policy, 8(3), 301-306.

Levialdi, N., Marchegiani, L. (2020). The investments in energy distribution networks: Does company ownership matter? International Journal of Energy Economics and Policy, 10(5), 41-49.

Mankiw, N.G. (2019), Macroeconomics. 6th ed. Jakarta: Erlangga.

MEMR. (2019), Indonesia's Coal Energy Reserves are 26 Billion Tons. Indonesia: Ministry of Energy and Mineral Resources. Available from: https://www.esdm.go.id/id/media-center/arsip-berita/cervasi-coal-energy-indonesia-amounting-26-billion-ton. [Last accessed on 2021 Jan 10].

Morozko, N., Morozk, N., Didenko, V. (2021), Energy prices and households' incomes growth proportions in Russia's case context. International Journal of Energy Economics and Policy, 11(3), 243-250.

Samuelson, P.A., Nordhaus, W.D. (2019), Macro Economics. Jakarta: PT Media Education.

Schumacher, R. (2013), Deconsturcting the Theory of Comparative Advantage. World Economics Review, 2, 83-105.

Seon, T.K., Choib, B. (2019). Price risk management and capital structure of oil and gas project companies: Difference between upstream and downstream industries. Energy Economics, 83, 361-374.

Shahad, A., Gasim, A.A., Hunt, L.C. (2020). Modelling industrial energy demand in Saudi Arabia. Energy Economics, 85, 104554.

Sukirno, S. (2019). Microeconomics: An Introductory Theory. Jakarta: Raja Grafindo Persada.

Udalov, I. (2021), The transition to renewable energy sources as a threat to resource economies. International Journal of Energy Economics and Policy, 11(3), 460-467.

Wildan, M.A., Imron, I., Siswati, E., Rosyafah, S. (2021), Macroeconomic factors affecting natural gas export management. International Journal of Energy Economics and Policy, 11(1), 639-644.

World Coal Institute. (2013), The Coal Resource: A Comprehensive Overview of Coal. London: World Coal Institute.