

Analysis Of The Effect Of Coal Prices And Macroeconomic Factors On The Energy Sector Index In Indonesia

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Abstract

Abstract - This study aims to analyze the impact of external company factors, in the form of macroeconomic conditions on the energy sector index for the 2021-2023 period. The macro conditions studied are coal prices, the rupiah exchange rate against the US dollar, and inflation. The research was conducted with descriptive statistical analysis and multiple linear regression analysis with data processing using Eviews 12 data analysis. The results of this study indicate that coal prices partially have a positive significant effect on the energy sector index. while the rupiah exchange rate against the US dollar has a negative significant effect on the energy sector index. In contrast, inflation partially has no significant effect on the energy sector index during the research period.

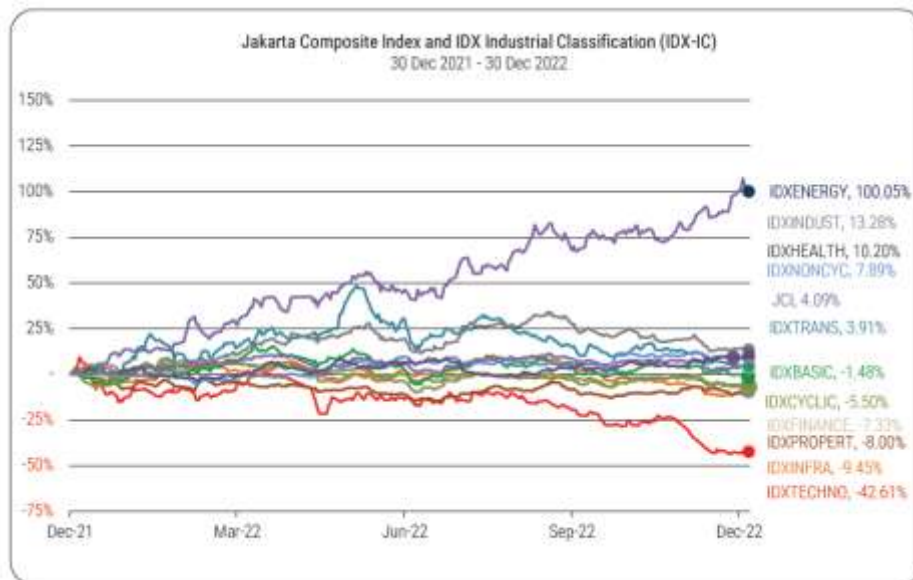
Keywords: external factors, energy sector index, inflation, coal prices, rupiah exchange rate

I. INTRODUCTION

Indonesia's economy has been growing, marked by the growth of the Jakarta Composite Index (JCI) which has increased by about 49.64 percent in the last decade (Investing.com, 2024). The movement of the JCI is supported by various companies in various industrial sectors that are influenced by both internal and external factors. Internal factors cause stock price fluctuations that are influenced by each company's condition, such as the company's financial performance, changes in the board of commissioners, and legal issues between managers or employees. External factors cause stock prices to fluctuate beyond the company's control, such as systemic risk, changes in interest rates on savings accounts, government policies, and macroeconomic conditions. (Effendi & Harahap, 2020; Sari & Riwayati, 2024).

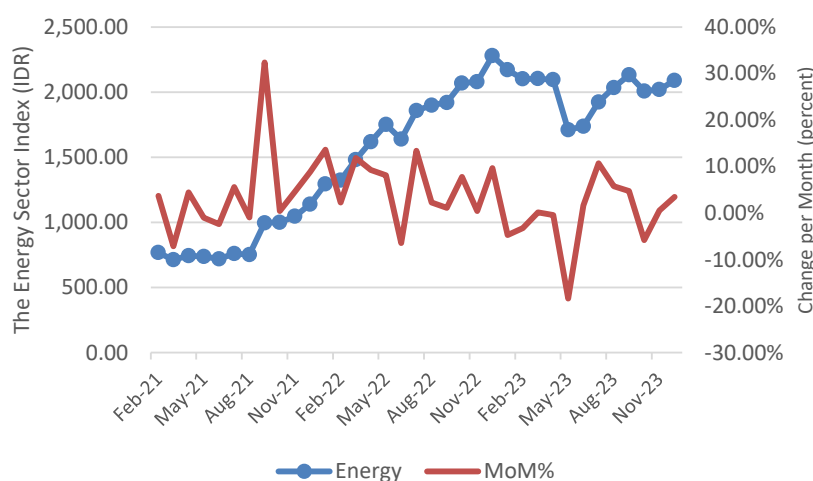
This research focuses on external factors in the form of macroeconomic conditions as an independent variable. The external factors that will be used in the study are coal prices, rupiah exchange rates, and inflation. Coal prices were chosen as one of the external factors because according to (IDX, 2024) 49.54 percent of the top 10 companies in the energy sector are companies engaged in and related to coal production. Other external factors chosen are inflation which describes the country's economic situation, as well as the rupiah exchange rate against the US dollar which is used by companies to export mining products. The energy sector index was chosen as the dependent variable in this study because it is one of the driving sectors on the Indonesia Stock Exchange. During 2022, the the energy sector index experienced relatively higher movements compared to other sectors. From December 2021 to December 2022, the energy sector index managed to record a growth of 100.05 percent, followed by the industrial sector which grew by 13.28 percent, and the health sector which managed to grow by 10.2 percent.

Chart 1 Comparison of Composite Stock Price Growth by Sector



Source: IDX, 2022

If drawn longer, the energy sector index has increased since August 2021, and peaked in December 2022 with a closing price of IDR 2,279.55. However, after this peak, the energy sector index decreased from January 2023 to May 2023, then rebounded and increased until December 2023. These fluctuations are influenced by macroeconomic uncertainties that occur both globally and in Indonesia. Therefore, economic variables that have the potential to influence stock price movements need to be a concern.

Chart 2 The Energy Sector Index in 2021 - 2023

Source: Investing.com, data processed

Previous research has been conducted to determine the influence between macroeconomic variables on stock prices, including coal prices. Research (Artiani et al., 2019), (Setyowaty, 2021) and (Purnama, 2020) stated that coal prices have a significant influence on stock prices. On the other hand, (Saputra & Ridhawati, 2023) stated that coal prices have no effect on stock prices.

In addition, other macroeconomic variables in the form of the rupiah exchange rate have been studied by (Efriyenty, 2020) which shows that the rupiah exchange rate has a significant positive effect on stock prices. Research Results Riwayati & Diena (2021) stated that the exchange rate has a negative and significant effect on stock prices. Meanwhile, Saputra & Ridhawati (2023); Satrya et al (2023); Setyowaty (2021); and (Artiani et al., 2019) found that the rupiah exchange rate has no effect on stock prices.

Other macroeconomic variables such as inflation have also been researched by (Artiani et al., 2019) and found that inflation has a significant negative effect on stock prices, but (Saranga, 2020) states that inflation has a significant positive effect on stock prices. On the contrary, Efriyenty (2020); Sari & Riwayati (2024) found that inflation has no effect on stock prices.

Based on the results of previous research, there are still different research results (research gap) regarding the factors that influence the stock price index. So there is still a need for research that analyzes several factors that influence the stock price index. To analyze the factors that influence the stock price index, this study uses macroeconomic indicators including coal prices, rupiah exchange rates, and inflation.

The importance of this research lies in its contribution to a better understanding of the complexity of the economic factors that influence the energy sector stock price index. The results of this study are expected to provide a more holistic view for stakeholders, including investors, financial analysts, and policy makers, to make more rational and strategic decisions in the face of equity market dynamics in the energy sector.

Signaling theory states that company management has better information about the company and can share this information with potential investors to increase the company's share price (Kurniawati et al., 2020). So that the information released and announced will provide a signal for investors to make investment decisions. If the announcement is positive, it is expected that the market will react when it receives the announcement. After the information is released and received by the market, they will interpret the information as a good signal (good news) or a bad signal (bad news). If the information announcement is used as a good signal that attracts investors to trade stocks, then the volume of stock trading will change. (Suwardjono, 2018)

Financial reports that reflect good performance are a sign that the company is doing well. The market reaction is highly dependent on the signals issued by the company, so the market also responds to good signals. Investors will increase their capital when they believe that their investment will grow if invested in good performing companies. For this reason, investors' attention has focused on the company's capabilities as

reflected in the financial statements issued by the company. If investors are satisfied with management's performance and interpret the company's signals as positive, then the favorable correlation will continue to increase.

The Indonesia Stock Exchange (IDX) has 11 IDX-IC Sectoral Index, one of which is the energy sector. The energy sector is one of the main sectors of the Indonesia Stock Exchange because this sector is one of the options in investing, both direct and indirect investment. The Energy Sector includes companies that sell products and services related to the extraction of energy which includes non-renewable energy (fossil fuels) so that their revenues are directly influenced by world energy commodity prices, such as Petroleum, Natural Gas, Coal Mining companies, and companies that provide services that support these industries. This sector also includes companies that sell alternative energy products and services.

According to (Widoatmodjo, 2017), there are several types of prices, one of which is the closing price of shares, which is the price agreed upon by the seller and buyer at the end of the day on the stock exchange. The stock price that will be used by researchers is the closing monthly energy sector stock price index. Stock prices fluctuate influenced by internal and external factors of the company. Internal company factors are factors that come from conditions within the company, including the company's financial performance, changes in the board of commissioners, and legal issues between managers or employees. Meanwhile, external factors are factors outside the company's control, such as systemic risk, changes in interest rates, government policies, and macroeconomic conditions. (Effendi & Harahap, 2020).

The reference coal price (HBA) is the price or reference value for coal sales in the commodity market. The increase and decrease in the value of coal prices is seen from the demand and supply of coal itself. The reference coal price value is set by the Ministry of Energy and Mineral Resources with reference to 4 coal price indices commonly used in international coal trading, namely the Indonesia Coal Index, Platts Index, New Castle Export Index, and New Castle Global Coal Index. According to (IDX, 2024) 49.54 percent of the top 10 companies in the energy sector are companies engaged and related to coal production, so changes in coal prices will affect the average selling price which ultimately affects the company's profit/loss. Research Artiani et al. (2019); Setyowaty (2021); and (Purnama, 2020) stated that coal prices have a significant effect on stock prices. On the other hand, Saputra & Ridhawati (2023) state that coal prices have no effect on stock prices.

According to (Mankiw, 2021), the nominal exchange rate is the rate at which one can trade one country's currency for another country's currency. The exchange rate in this study is the Rupiah exchange rate against the US Dollar. According to Tandelilin (2017), strengthening the rupiah exchange rate against foreign currencies will reduce the cost of importing raw materials for production and will reduce the prevailing interest rate so as to increase investment. Conversely, when the rupiah exchange rate weakens, investors (especially foreign investors) tend to invest in other countries or invest in stronger currencies due to the weak purchasing power of the rupiah in the international market. Research (Efriyenty, 2020) shows that the rupiah exchange rate has a significant positive effect on stock prices, on the other hand (Riwayati & Jayantara, 2020)(Riwayati & Diena, 2021) found that the rupiah exchange rate has a significant negative effect. While (Saputra & Ridhawati, 2023); (Satrya et al., 2023); (Setyowaty, 2021); and (Artiani et al., 2019) found that the rupiah exchange rate has no effect on stock prices.

Inflation is defined as a general and continuous increase in prices within a certain period of time (Bank Indonesia, 2018). Meanwhile, according to the Central Bureau of Statistics (BPS), inflation is the tendency of rising prices of goods and services in general that take place continuously. An increase in inflation will make the price of raw materials increase, thereby reducing company profits (Tandelilin, 2017). Research by (Artiani et al., 2019) found that inflation has a significant negative effect on stock prices, but (Saranga, 2020). (Saranga, 2020) states that inflation has a significant positive effect on stock prices. On the contrary, (Efriyenty, 2020) and Riwayati & Jayantara (2020); Sari & Riwayati (2024) found inflation has no effect on stock prices. Riwayati (2024) found that inflation has no effect on stock prices.

Based on the results of previous studies, there is still a research gap related to factors that affect the stock price index, so it is still necessary to conduct research on the analysis of several factors that affect the

stock price index using macroeconomic indicators in the form of coal prices, the rupiah exchange rate against the dollar, and inflation. Therefore, a hypothesis was formulated to answer these problems as follows:

H₁ : coal prices have a significant positive effect on the energy sector stock price index

H₂ : the exchange rate of the rupiah against the US dollar has a significant positive effect on the energy sector stock price index.

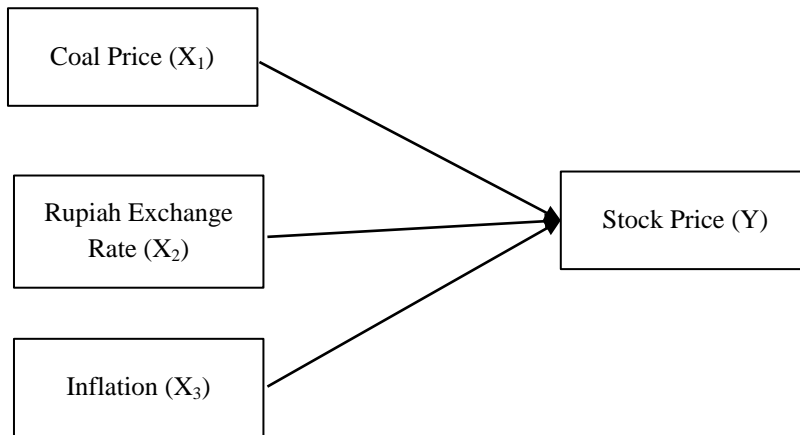
H₃ : inflation has a significant negative effect on the energy sector stock price index

II. METHODS

This research method applies a quantitative approach, which relies on the use of data in the form of numbers, starting from data collection, data interpretation, to the presentation of results. Quantitative data is organized chronologically based on a predetermined time according to certain variables. The time span of data collection for this study covers the period 2021 to 2023. This research, based on the level of explanation, is associative in nature with the aim of identifying the relationship between variables, as explained by (Sugiyono, 2022).

This research can be categorized as explanatory research. The explanatory nature applied in this research is causal explanations, which indicate research efforts to clarify the causal relationship between variables, where the affected variable (dependent variable) is explained in the context of variables that act as triggers (independent variables). The Dependent Variable used in this study is Stock Price, while the Independent Variables used are Coal Price, Rupiah Exchange Rate, and Inflation with the following illustration of the framework:

Figure 1 Research Framework



Source: Researcher (2024)

The research was conducted by the author by looking at the effect of independent variables, namely coal prices (X₁), rupiah exchange rates (X₂), and inflation (X₃) on the dependent variable in the form of stock prices (Y) with variable operationalization as follows:

Table 1 Variable Operationalization

Variables	Operational Definition	Indicator	Scale
Coal Price	The Reference Coal Price (HBA) is formulated with reference to 4 coal price indices commonly used in international coal trading, namely the Indonesia Coal Index, Platts Index, New Castle Export	HBA = 25% ICI + 25% Platts + 25% NEX + 25% GC	Ratio

Table 1 Variable Operationalization

Variables	Operational Definition	Indicator	Scale
	Index, and New Castle Global Coal Index (www.esdm.go.id).		
Rupiah Exchange Rate	According to Yusgiantoro (Anisa and Darmawan, 2018) "The exchange rate is the price of (domestic) currency against foreign currencies", namely the Rupiah against the Dollar.	$ER = \frac{\text{Midmarket Rate}_t - \text{Midmarket Rate}_{t-1}}{\text{Midmarket Rate}_{t-1} \times 100\%}$	Ratio
Inflation	Inflation is defined as a general and continuous increase in prices over a period of time (Bank Indonesia, 2018).	$CPI = \frac{\text{Current Price}}{\text{Base Year Price}} \times 100\%$	Ratio

Source: Researcher (2024)

Population is a generalization area consisting of objects or subjects that have certain qualities and characteristics to be studied and conclusions drawn. (Sugiyono, 2022). The population in this study is the entire Energy Sector Stock Price Index on the Indonesia Stock Exchange, Coal Prices, Rupiah Exchange Rate against the US Dollar, and Inflation.

The sample to be taken is data for each of these variables for the period February 2021 (the month energy sector index starts) to December 2023, so the total sample is 35 data. The sampling method in this study uses a non-probability sampling technique method. Non-probability sampling is a sampling technique that does not provide equal opportunities or opportunities for each element or member of the population to be selected as a sample. (Sugiyono, 2022). The non-probability sampling technique used in sampling in this study is purposive sampling technique.

The data presented by researchers is secondary data with documentation techniques from agencies / institutions or other relevant parties. Energy Sector Index data is taken from monthly closing stock prices from the investing.com website. Coal prices are taken from the monthly reference price published by the Ministry of Energy and Mineral Resources through its website esdm.go.id. While Inflation and the Rupiah Exchange Rate against the US Dollar are taken from the Bank Indonesia website, namely bi.go.id. The data that has been collected is then processed using Eviews 12.

III. RESULTS AND DISCUSSION

The data analysis conducted in this study is through time series multiple regression techniques to determine the effect of independent variables (Inflation, IDR/USD Exchange Rate, and Coal Price) on the dependent variable, namely the energy sector index. Prior to the multiple regression technique, researchers have tested the data with the classical assumption test.

Table 2 Descriptive Statistical Analysis Results

Statistics	Share Price	Coal Price	Exchange Rate	Inflation
Mean	1563.684	203.2737	6.74E-05	0.031963
Median	1737.970	191.2600	6.73E-05	0.028600
Maximum	2279.550	330.9700	7.04E-05	0.059500
Minimum	712.9800	84.47000	6.28E-05	0.013300
Std. Dev.	542.4410	83.51004	2.25E-06	0.015317
Observations	35	35	35	35

Source: Data processed with Eviews 12

The data sample taken is monthly data from February 2021 (the energy sector index was formed) to December 2023 with a total of 35 data. The average share price during the 35 months was IDR1,563.68 with the lowest value of IDR712.98 in March 2021 and the highest in December 2023 of IDR2,279.55 with a standard deviation of IDR542.44. For the Inflation variable, the highest data shows 5.95 percent in May 2022 and the lowest is 1.33 percent in August 2023. The average inflation stands at 3.2 percent with a standard deviation of 1.53 percent. The exchange rate of the Rupiah against the US Dollar showed an average of USD0.0000674 over the 35-month research period, with the highest exchange rate of USD0.0000704 in October 2021, and the lowest of USD0.0000628 in October 2023. The standard deviation of the Rupiah to US Dollar exchange rate variable is USD0.0000225. Meanwhile, the data on the coal price variable shows the lowest value of IDR84.47 in March 2021 and the highest in October 2022 of IDR330.97. The average coal price is IDR203.27 with a standard deviation of IDR83.51.

Furthermore, the data was tested for classical assumptions, but autocorrelation was found. Then, the researcher transformed the equation with the *Generalized Difference Equation* method, so that the following hypothesis test results were found:

Table 3 Goodness of Fit Test Results

R-squared	0.454145	Mean dependent var	643.8024
Adjusted R-squared	0.399559	S.D. dependent var	222.5804
S.E. of regression	172.4734	Akaike info criterion	13.24849
Sum squared resid	892411.7	Schwarz criterion	13.42807
Log likelihood	-221.2244	Hannan-Quinn criter.	13.30973
F-statistic	8.319883	Durbin-Watson stat	1.577081
Prob(F-statistic)	0.000356		

Source: Data processed with Eviews 12

The Prob (F-statistic) value of 0.000356 < 0.05 using an error degree α of 5 percent (0.05) indicates that the probability (F-statistic) is smaller than 0.05, so the price of coal, the exchange rate of the Rupiah against the US Dollar, and inflation are feasible to be used to explain the energy sector index on the Indonesia Stock Exchange for the period 2021 - 2023. The value of the coefficient of determination (Adjusted R Square) shows a figure of 0.3995 or 39.95 percent. These results mean that 39.95 percent of the variation in stock prices can be explained by these independent variables, and 60.05 percent by factors outside this research.

Table 4 Partial Hypothesis Test Results (t Test)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2309.426	746.7843	3.092495	0.0043
Coal Price	2.570208	0.803321	3.199477	0.0032
Exchange Rate	-67961385	29133000	-2.332797	0.0266
Inflation	-7577.231	5013.418	-1.511390	0.1412

Source: Data processed with Eviews 12

The partial hypothesis test results on the effect of coal prices on the energy sector index show a probability value of 0.0032, lower than 0.05, with positive coefficient. These results can be interpreted that coal prices have a positive significant influence on the energy sector index, so Hypothesis 1 (H_1) is accepted. On the other hand, the Rupiah exchange rate against the US Dollar has a negative significant influence on the energy sector index as indicated by a probability value of 0.0266, lower than 0.05, with negative coefficient. This means that Hypothesis 2 (H_2) is rejected. Another calculation shows the effect of inflation on the energy sector index shows a probability value of 0.1412 which is higher than 0.05. This can be interpreted that inflation has no influence on the energy sector stock price, so Hypothesis 3 (H_3) is rejected.

The higher the coal price, the higher the energy sector index. This happens in this study in line with the results of research from (Artiani et al., 2019); (Setyowaty, 2021); and (Purnama, 2020). However, it is different from the research results of (Saputra & Ridhawati, 2023). This is because most companies in the energy sector are engaged in coal production and its support. In coal producer companies, coal prices are one of the drivers of revenue in addition to coal selling volume. An increase in the average selling price of coal also increases the company's revenue, which gives a positive signal to investors.

This research also indicates that the stronger the US dollar, the lower the energy sector stock price index. This is because most of the coal production is exported abroad, considering that Indonesia is one of the largest coal producers in the world. The strengthening of the US dollar brings exchange rate losses for exporters, thus reducing the company's net profit. The results of this study are in line with research (Riwayati & Jayantara, 2020); Riwayati & Diena (2021), that the rupiah exchange rate against the US dollar has a significant negative effect on stock prices. This result is different from the results of the study (Efriyenty, 2020) that the rupiah exchange rate has a significant positive effect on stock prices. It is also different from the research results (Saputra & Ridhawati, 2023); (Satrya et al., 2023); (Setyowaty, 2021); (Artiani et al., 2019); found that the rupiah exchange rate has no effect on stock prices.

On the other hand, an increase in inflation does not affect the movement of the energy sector index. The results of this study are in line with Efriyenty (2020); Sari & Riwayati (2024) who found inflation has no effect on stock prices. However, in contrast to the results of research from (Artiani et al., 2019) who found that inflation has a significant negative effect on stock prices. Research results Saranga (2020) stated that inflation has a significant positive effect on stock prices.

IV. CONCLUSION

Coal prices partially have a positive significant effect on the energy sector index, while the rupiah exchange rate against the US dollar has a negative significant effect on the energy sector index. In contrast, inflation partially has no significant effect on the energy sector index during the research period. The results of this study are feasible and able to explain the effect of coal prices, the rupiah exchange rate against the USD dollar, and inflation on the energy sector index by 39.95 percent, while the remaining 60.05 percent is influenced by factors outside this study.

Stock investors who will buy stocks in the energy sector can consider macro conditions, including coal prices, the rupiah exchange rate against the US dollar, and inflation before deciding to buy. Hopefully, in addition to these three variables, future researchers can develop other macroeconomic factors that can affect stock price fluctuations.

REFERENCES

- Artiani, L. E., Utami, C., & Sari, P. (2019). *Pengaruh Variabel Makro Dan Harga Komoditas Tambang Terhadap Harga Saham Sektor Pertambangan Di Indeks Saham Syariah Indonesia (Issi) The Effect Of Macro Variables And The Price Of Mine Commodities On The Stock Price Of The Mining Sector In Indonesiashariah Stock Index (Issi)*.
- Effendi, S., & Harahap, B. (2020). *Analisis Faktor Internal dan Eksternal Perusahaan Pada Harga Saham*.

- Efriyenty, D. (2020). Pengaruh Inflasi Dan Kurs Terhadap Harga Saham Di Industri Dasar Dan Kimia. In Going Concern, *Jurnal Riset Akuntansi* (Vol. 15, Issue 4).
- Kurniawati, D., Riwayati, H. E., & Firdaus, A. (2022). Effect of sustainability report on manufacturing sector firm value with profitability as a moderation variable. *Dinasti International Journal of Digital Business*, 3(5): 755 – 765.
- Mankiw, N. G. (2021). *Principles Of Economics* (Ninth Edition). Cengage Learning, Inc.
- Purnama, J. (2020). *Pengaruh Harga Emas Dunia, Harga Minyak Dunia, dan Harga Batubara Terhadap Index Harga Saham Gabungan Sektor Pertambangan.*
- Riwayati, H. E., & Jayantara, I. P. (2020). Analisis Faktor-Faktor Yang Memengaruhi Indeks Harga Saham Sektor Properti (Studi Pada Sektor Properti di Bursa Efek Indonesia). *Jurnal Wawasan Manajemen*, 8(2): 114 – 122.
- Riwayati, H. E., & Diena, M. A. (2021). Analysis Relates to The Impact from Macroeconomic Factors to Banking Stock Returns which Mediated by Profitability. *Dinasti Orang Journal of Education Management And Social Science*, 2(5), 742–755. <https://doi.org/10.31933/dijemss.v2i5.870>
- Sari, L. A., & Riwayati, H. E. (2024). Analisis Faktor Internal dan Eksternal Perusahaan Terhadap Harga Saham. *Jurnal Manajemen Dan Perbankan (JUMPA)*, 11(1), 37–49.
- Saputra, I., & Ridhawati, R. (2023). Pengaruh Earning Pershare, Harga Batu Bara Acuan Dan Nilai Tukar Terhadap Harga Saham. *Jurnal Komunikasi Bisnis Dan Manajemen*, 10(1).
- Saranga, M. (2020). *Pengaruh Inflasi Terhadap Indeks Harga Saham Gabungan Di Bursa Efek Indonesia.*
- Satrya, I., Permady, Y. T., & Supriadi, Y. N. (2023). Analisis Faktor-Faktor Yang Mempengaruhi Harga Saham Perusahaan Sektor Energi. *Jurnal Ilmiah Metansi (Manajemen Dan Akuntansi)*, 6(2): 183–191.
- Setyowaty, A. G. (2021). *Pengaruh Nilai Tukar Rupiah Dan Harga Batubara Terhadap Harga Saham Pada Perusahaan Sektor Energi Industri Batubara Yang Terdaftar Di Bursa Efek Indonesia Halaman Judul Program Studi Strata 1 Akuntansi Sekolah Tinggi Ilmu Ekonomi Indonesia Jakarta 2021.*
- Sugiyono. (2022). *Metodelogi Penelitian Kuantitatif dan Kualitatif Dan R&D.* Alfabeta.
- Suwardjono. (2018). *Teori Akuntansi* (3rd Edition). BPF.
- Widoatmodjo, S. (2017). *Pengetahuan Pasar Modal Untuk Konteks Indonesia.* Elexmedia Komputindo.