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Do Long-Term, Short-Term Leverage AND Firm Size Give Impact On Energy Firm Performance During THE Covid-19 Pandemic? A Comparison Study BETWEEN THE Idx Energy Index AND Nyse Energy Index

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ABSTRACT

With governments around the world committed to create better climate, the energy sector is changing from using fossil energy to renewable energy. This study was conducted to examine the effect of long-term leverage, short-term leverage and firm size on the performance of energy companies listed on the Indonesia Stock Exchange (IDX) and the New York Stock Exchange (NYSE) during the Covid-19 pandemic. The data were collected through non-probability purposive sampling method started at the first quarter of 2020 up to the fourth quarter 2021 with a total of 80 data for IDX Energy and 239 data for NYSE Energy. All data were analyzed using the multiple linear regression method. This study finds that both long-term and short-term leverage have a significant positive effect on firm performance at IDX Energy and NYSE Energy. Meanwhile, the firm size has a significant negative effect on company performance at IDX Energy and NYSE Energy.

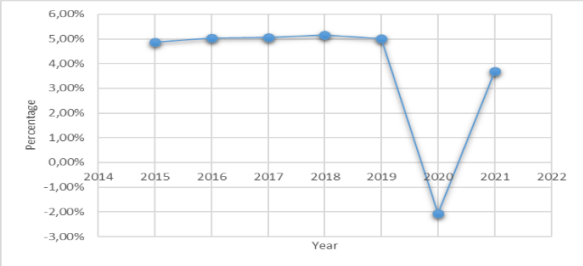
Keywords: Leverage, Firm Size, Firm Performance, IDX Energy, NYSE Energy

1. INTRODUCTION

The retail trading boom started as early as 2020 when the Covid-19 pandemic just started, as unprecedented market volatility and lockdowns created a unique opportunity for regular investors to play the stock market's surprising comeback. Indonesia's stock market has increased significantly over the years in which, during the pandemic, the number of investors grew tremendously at 92.99%, achieving 7.5 million investors at the end of 2021 (KSEI, 2021). Meanwhile, a study by Charles Schwab Corporation (2021) recorded new 16 million new individual investors entering the US stock market, dominated by the younger age generation.

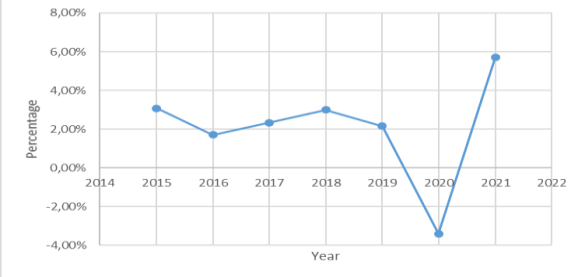
Investors are expected to gain return for their stock investment. The pandemic brought economic policy uncertainty and affected the stock market volatility (Deloitte, 2021; Su et al., 2019). Many important macro-economic indicators will influence the firm performance, such as inflation, exchange rate, economic growth and energy price. Therefore, the ongoing pandemic has been challenging to maintain the firm's well-being since it's related to the value of expected stock return (Aeni, 2022). Covid-19 slowed down the global economic growth because of the restrictions and lockdowns implemented. Figure 1 and 2 show that GDP Indonesia decreased to -2.07% and the US GDP growth suffered up to -3.41% in 2020. In this

moment of crisis, debt becomes a burden and increases the risk of bankruptcy (Danson et al., 2020).



Source: Badan Pusat Statistik (2022)

Figure 1. Indonesia GDP Growth



Source: World Bank Report (2022)

Figure 2. United States GDP Growth

Although the rise of energy demand from 1990 to 2019 showed an upward trend with a Compound Annual Growth Rate (CAGR) of 3.02% in Indonesia and 0.58% in the United States, Covid-19 slowed down the energy consumption in 2020, decreasing by 7.32% in Indonesia and 7.46% in the US (Enerdata, 2022). Indonesia is highly dependent on fossil fuel energy as, in the third quarter of 2021, Indonesia's energy consumption consisted of 37.6% coal, 31.6% oil, 19.7% gas, and 11.2% renewable energy (Ministry of Energy and Mineral Resource Republic of Indonesia, 2021). Meanwhile, United States energy consumption consists of 36.08% oil, 32.24% natural gas, 12.51% renewable energy, 10.82% coal, and 8.36% nuclear electric power (U.S. Energy Information Administrator, 2022).

Indonesia's electricity sources have shifted from natural gas to coal since coal is the least expensive fossil energy. Indonesia's coal production has been increasing tremendously as the energy demand continues to grow to meet the domestic and international market in which 73.78% of coal production is exported (IEA, 2021). According to Global Energy Monitor (2020), 75% of planned coal power as the primary resource for electricity generators in South-East Asia is owned by Indonesia. The industry still expects to grow until the year 2030 before shifting to renewable energy and implementing capture and sequestration (CCS) technology to coal (IESR, 2021). In addition, to fulfill the needs of Liquefied Natural Gas (LNG), the government has started to substitute the coal with Dimethyl Ether (DME) which is more ozone and environmental friendly (Ministry of Energy and Resources, 2022).

Although domestic production for oil and gas continues to decline, the domestic demand has risen over the years along with the growth of motor vehicles that reached more than half of Indonesia's population (Herawati, 2021). The Indonesian government has targeted to raise the lifting of oil to 1 million barrels per day, and gas production is expected to rise to 12 BSCFD (SKKMigas, 2020). The government also started a project of b100 or biodiesel as a more environment-friendly substitute considering Indonesia as the biggest producer of the world's palm oil (ASIAN AGRI, 2022). Some coal companies responded to the Indonesian government plan to be net zero-carbon by 2060 by diversifying their revenue into renewable energy sources, such as solar power plants and the electric vehicle industries (IESR, 2021).

The US government launched some programs related to clean energy to face the climate crisis by targeting: 100% carbon pollution free-electricity (CFE) by 2030; 100% zero-emission vehicle (ZEV) acquisition by 2035; 100% zero-emission light-duty vehicle acquisition by 2027; net-zero emission by 2050; net-zero emission building portfolio by 2045;

50% emission reduction by 2032; and net-zero emission from federal operations by 2050.

Therefore, the coal production has declined by 4.90% and the coal electricity generator fell to 20.51% in 2021 as the United States government reduced coal-fired generator use. Meanwhile, natural gas production has increased since 2010 with a 4.69% CAGR due to the usage growth of electric power (37%) and the industrial sectors (34%) in 2021 (U.S. Energy Information Administrator, 2022). With the government plan to shift more renewable and clean energy, natural gas is expected to slow down with a slight increase of production by 0.61% CAGR from 2022 to the year 2050.

Oil production in the United States has expanded since 2010 to 2021 with 5.95% CAGR, despite the pandemic has impacted the oil production, which declined by 8.05% in 2020 from the previous year. The government plan to shift toward electric vehicles potentially would reduce more oil demand and at the same time reduce production of new fossil fuel vehicles. Even so, United States Energy Information (2022) still expects a slight increase of oil production with 0.38% CAGR from 2022 until 2050.

The coal consumption is expected to decrease until 9.68% in 2050 since government has reduced the usage of coal-fired generator. The usage of nuclear and natural gas energy is also expected to decrease under the government plan to use more clean energy to achieve the net zero emission target in 2050. Solar panel and wind energy is expected to be the main driver of the increase in renewable energy as almost half of the new electric generating capacity is solar panels in 2022 (U.S. Energy Information Administration, 2022).

The energy sector is one of the crucial sectors affected during the pandemic since it provides an enabling function for other sectors (CISA, 2022). In the United States, energy supply, health, and welfare are included in crucial sectors, meanwhile the crucial sector in Indonesia includes the energy sector, health, security, logistics and transportation, food and drink industry, petrochemical, cement, vital national object, disaster management, national strategic project, construction, basic utility, and other industry that fulfills the basic need of the public (Hakim, 2021).

Tobin's Q is an indicator to measure the firm's market performance and is measured by dividing the firm's market value by the firm's book value (Danson et al., 2020). As shown in Table 1 and 2, the energy sector experienced the highest decline in the NYSE for the first semester of 2020 with 26.25% decline. It means that firm performance in the energy sector was the most impacted sector when the pandemic started in early 2020. Meanwhile, the mining sector in IDX experienced the fourth highest decline among other sectors with 27.43% decline.

Table 1. NYSE Sector Tobin's Q

SECTOR	Dec-19	Jun-20	Dec-20
Communications	3.44	3.50	4.03
Consumer Discretionary	8.00	9.74	10.94
Consumer Staples	5.75	5.49	6.16
Energy	1.60	1.18	1.28
Financials	1.51	1.12	1.40
Health Care	4.61	4.73	4.78
Industrials	4.96	4.57	5.42
Information Technology	7.53	9.09	10.73
Materials	2.54	2.70	2.48
Real Estate	3.77	3.25	3.46
Utilities	2.32	2.00	2.19

Source: Siblis Research (2022)

Table 2. IDX Sector Tobin's Q

SECTOR	Dec-19	Jun-20	Dec-20

Agriculture	1.19	1.51	1.31
Mining	2.26	1.64	2.01
Basic Industry & Chemicals	1.54	1.09	1.63
Miscellaneous Industry	2.80	1.43	1.62
Consumer Goods Industry	4.17	3.10	3.83
Property, Real Estate, and Building Construction	2.22	1.47	1.58
Infrastructure, Utilities, and Transportation	2.34	1.91	1.91
Finance	2.42	2.19	2.45
Trade, Services & Investment	2.56	2.09	2.12

Source: IDX Statistic (2020)

There are two forms of financing to cover the cost of business activities or working capital and investment: equity financing and debt financing. Equity financing is a trade-off between the firm ownership to acquire the funds, while debt financing borrows funds with the obligation to pay it with interest (Hayes, 2021). According to Corporate Finance Institute (2022), the cost of equity is higher than the cost of debt because the investors expect a higher return of investment as capital gain is not guaranteed. Thus, the firm needs to maintain a balance of equity financing and debt financing to reduce the weighted cost of capital (WACC). Too much equity would increase the opportunity cost, but too much debt could increase default risk (Fernando, 2021).

Bontempi et al. (2020) divide debt based on its maturity. Short-term debt refers to a debt to be paid within a year, while long-term debt refers to the debt with a maturity date over one year. According to Cathcard et al. (2020), excessive short-term borrowing could lead to higher default rates, affecting firm performance.

The Debt to Total Assets (DAR) ratio determines how the firm finances its assets (Hayes, 2021). The higher the ratio means the firm assets are financed with more debt. An otherwise lower ratio means the firms are financed with more equity (Carlson, 2020).

According to Dang et al (2018), firm size can be measured with three indicators: total assets, total sales, and market value of equity. As firm size defines the firm's growth opportunity and investment value, it is needed to measure the firm performance (Danson et al., 2020). According to the trade-off theory, larger firms have more access to debt because they have more assets to be used as collateral. Thus, the firms having higher firm size could have access to more debt options that could be capitalized to an increase of profit consequently increasing the firm performance (Le & Bich, 2017). On the other hand, a firm with a lower firm size would have a limited access to debt because it has less collateral. In addition, larger firm size companies have the ability to diversify the firm investment, which results in a lower default risk and has a lower financial cost compared to lower firm size companies, which results in a higher profit for the company (Zeitun & Saleh, 2015).

This study is expected to find the energy firm's sector performance in managing debt and whether the firm size affects the firm performance in the moment of crisis by comparing the IDX Energy and NYSE Energy to discover which energy firm in each country handles the crisis well and identify a future model for managing debt. NYSE was chosen as a benchmark since United States had the second biggest total energy supply and consumption in the world in 2020 (IEA, 2021). Furthermore, NYSE is the biggest stock market globally, with 27.7 trillion dollars in December 2021 (Statista, 2022). In addition, there are lack of new studies on the factors affecting the firm performance in NYSE.

2. LITERATURE REVIEW

Agency Theory

In the agency theory, the principal is the owner of the capital, and agents are the persons hired to carry out the task on the principal's behalf. The agency theory focuses on the relationship between the principal and agents (Moloi & Marwala, 2020). As the agents have more superior information, that might tempt the agents to work against the principal's best interest, in which the agents pursue high rewards with as minimal effort as possible, which maximizes the owner's return (Elsayeh & Elbardan, 2018). Therefore, the principal needs to monitor the agent's resulting agency cost by giving appropriate compensation to the agents to encourage them to act in the principal's best interest (Pepper, 2019).

Leverage

Based on the basic accounting equation, assets are financed by leverage and equity. Leverage can be acquired from third parties that provide capital with additional interest to be paid or use equity financing by selling part of the ownership to the public or directly. According to Hayes (2021), there are four advantages of leverage financing: (1) the lending company has no control of the company decisions; (2) the relations between the lender and the company end once the leverage is paid; (3) interest paid is considered business expenses and tax deductible; (4) the monthly payment or the payment breakdown having a clear leverage can reduce the agency cost by restraining the agents, causing the risk of liquidation. Thus, this encourages agents to act in the principal's best interest by regulating the investment choice. Consequently, as the agency cost decreases, it will positively affect the firm's performance (Dawar, 2014). The debt to asset ratio is a tool to show how much of the assets are funded by debt (Mulyono & Saraswati, 2020). The higher the ratio means more of the assets are funded through debt; the lower the ratio means the assets are funded through less debt.

Trade-Off Theory

The trade-off theory argues that the firm must take advantage of the tax shield as much as possible with as little bankruptcy cost as possible to reach the optimal capital structure (Le & Bich, 2017). Using leverage, the firm has the potential to invest in more assets and deductible interest paid on debt tax which will increase firm profitability and consequently its performances (Dalci, 2018).

Pecking Order Theory

Pecking order theory argues that profitable firms rely more on internal financing and only use external financing if the retained earnings are insufficient (Zeitun & Saleh, 2015). Thus, the firm would resort to leverage and then equity as its last resort (Mishra & Dasgupta, 2019).

Firm Size

Firm size is a fundamental factor that can be measured using sales, assets, and market capitalization (Dang et al, 2018). The firm size becomes an important part of measuring the firm's performance since a larger size firm can produce goods at a lower cost, having a better outlook, being more stable in their performance (Meiryani et al., 2020) and having more access to external funding because of having more assets as collateral (Le & Bich, 2017).

Firm Performance

The firm performance is a crucial indicator for higher efficiency and effectiveness (Taouab & Issor, 2019). The profitability ratio and market value ratio are the common measurements for the firm performance, as profitability is used to measure the company's ability to generate profit, and market value ratio is used to measure the company's value in the market (Meiryani et al., 2020). The higher the ratio measures, the higher the company's capacity to generate profit. According to Mulyono and Saraswati (2020), there are four profitability ratios that can be used,

including: Profit Margin (to show company's net profit compared to sales); Return on Assets (referring to the company's capabilities to utilize its assets); Return on Equity (to measure the utilization of equity to generate more revenue) and Earnings Per Share (as an indicator of the earning of investors in their share investment).

Tobin's Q is an indicator to measure the firm's market performance by dividing the firm market value with the firm's book value (Danson et al., 2020). Tobin's Q ratio of between 0-1 means that it costs more to replace the firm's asset than it's worth. If the value of Tobin's Q is greater than one it means that the firm is worth more than the cost of its assets (Hutabarat & Senjaya, 2016).

3. RESEARCH MODEL & HYPOTHESES DEVELOPMENT

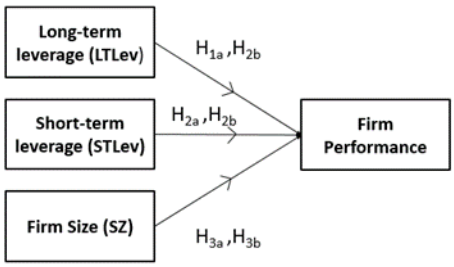


Figure 3. Research Framework

Long-term Leverage Impact on Firm Performance

Long-term leverage is debt that has a maturity date of over one year (Bontempi et al., 2020) and has a longer period to pay off the principles and lessens the company's financial burden even it carries higher interest (Tuovila, 2020). Trade-off theory argues that, to reach the optimal capital structure, the companies must take advantage of leverage as much as possible (Le & Bich, 2017). Weighted Average Cost of Capital (WACC) is a tool to measure the cost of capital or the required return rate from the financing cost. The higher the WACC means the higher the required return rate. Because WACC is used as a discount rate in financial forecasting methods like Discounted Cash Flow (DCF), a higher WACC would result in a lower expected company cash flow, which degrades the company's value (Hargrave, 2022). To keep the optimum capital structure, the companies must mix the leverage and the equity. If the firm used leverage, it would lower the WACC, increasing the expected cash flow and be expected to raise the firm performance. Egbunike and Okerekeoti (2018) and Bhattarai (2020) found a significant positive effect on long-term leverage on firm performances from research conducted in Nigeria, Nepal, and Pakistan. Meanwhile, Bawazir et al. (2019) and Angkasajaya et al. (2020) , who did research on firm on the Indonesia Stock Exchange, also found that long-term leverage has a significant positive impact on the firm performance. Thus, the research hypotheses are as follows:

H_{1a}: Long-term leverage has a significant positive impact on IDX Energy firm performance

H_{1b}: Long-term leverage has a significant positive impact on NYSE Energy firm performance

Short-term Leverage Impact on Firm Performance

Short-term leverage is debt that has a maturity date of under a year as a trade-off between the sales brought by the working capital and its costs (Bawazir et al., 2019). The trade-off theory also supports the maximum use of leverage, which would result in higher sales for the companies, consequently increasing the firm performance. Ibhagui and Olokoyo (2018) found that short-term leverage has a significantly positive effect on firm performance in Nigeria, Nepal, and Pakistan. This finding aligned with the previous study of Haslinda et al. (2020), who found that short-term leverage has an influence on IDX firm performances. Therefore, the research hypotheses are as follows:

H_{2a}: Short-term leverage has a significant positive impact on IDX Energy firm performance

H_{2b}: Short-term leverage has a significant positive impact on NYSE Energy firm performance.

Firm Size Impact on Firm Performance

As the firm size grows over time, the firm could be more ineffective in the operations, resulting in scale diseconomies when the firm experiences a higher cost in its production (Ross, 2019). The firm would face more agency problems; consequently, it costs more to monitor the agent's performance, which will result in reducing the firm performance (Mankiw, 2017). Dalci (2018), Mishra and Dasgupta (2019) and Danson et al. (2020) found that firm size has a significant negative correlation to firm performance in India, China, Germany, France, Japan, Argentina, and Sri Lanka. In addition, Bawazir et al. (2019 and Haslinda et al. (2020), researching the Indonesia Stock Exchange firms, also found the same result. Thus, the hypotheses for the research are as follows:

H3a: Firm size has a significant negative impact on IDX Energy firm performance

H3b: Firm size has a significant negative impact on NYSE Energy firm performance

4. RESEARCH METHODOLOGY

The research took data of IDX Energy and NYSE Energy companies from the first quarter of 2020 until the fourth third quarter of 2021 based on the period of the Covid-19 pandemic starting across the world. IDX Energy is an index that measures the performance of all energy sector stocks in Indonesia and is related to a company that sells products or services related to fossil fuel extraction, such as oil, gas, coal, and alternative energy (Indonesia Stock Exchange Classification Guideline, 2021). Meanwhile NYSE refers to an index that measures the performance of all energy stocks listed on the New York Stock Exchange (NYSE) as the largest stock market in the world (Statista, 2022). The energy sector is considered a cyclical industry because it's affected by the commodities price and macroeconomic factors. Because of the characteristics of this sector, this research compared the energy sector in Indonesia and the United States as the United States had the world's second-biggest total energy supply and consumption in 2020 (IEA, 2021). Thus, the condition of the firms on the NYSE will affect the supply and demand, consequently raising or reducing the commodities price. As a causal studies method, the purpose of this research is to find the correlation between overall leverage, long-term leverage, short-term leverage, and firm size on firm performance.

The research populations are all companies listed in IDX Energy and NYSE Energy; as of March 2022, there were 73 listed companies in IDX Energy and 255 listed companies in NYSE Energy. This study uses judgmental sampling with some criteria as follows: the company has been listed in IDX Energy or NYSE Energy at least in 2019 so that the firms have data from the first quarter of the year 2020; only uses the common stock equity-type between IDX Energy and NYSE Energy to make the exact comparison and only uses data from large-capitalization companies with the criteria of over $10 billion for NYSE Energy and Rp10 Trillions for IDX Energy (Fauzia, 2021) since the large cap represent a significant portion of the stock exchange and offers stable financial performance with lower risk (Chen, 2020). Based on the criteria used, the study was able to use 10 companies of IDX Energy as sample with a total of 80 data and 30 companies of NYSE Energy sample with a total of 239 data.

Descriptive analysis is an analysis used to provide an overview of the data tested by measuring the average value (mean), standard deviation, maximum, minimum, and range. This research used four classical assumptions, including: Normality test to ensure that the data are normally distributed and independent using Kolmogorov-Smirnov method with 95% confidence level; Multicollinearity test to ensure

that there will be no correlation between the independent variable in the regression model using tolerance value and variance inflation factor (VIF); Heteroscedasticity test to see whether an error or residual in the observed data does not have constant variance using a scatterplot with the predicted value of the dependent variable ZPRED and the residual SRESID; and Autocorrelation test to test whether, in the linear regression model, there is a correlation between the confounding error in the data from the first quarter of 2020 until the fourth quarter of 2021 using Durbin-Watson test.

Furthermore, the hypotheses testing was conducting using: Simultaneous test (F Test) to measure whether all independent variables tested simultaneously affect the dependent variable by comparing the result of the F test with the result of F Table; Determinant Coefficient Test (R square) to measure how far the research model can explain the dependent variable; and Partial Multiple Regression Analysis (t-test) to measure how far the independent variables' influence individually affects the dependent variable by comparing the results of the p-value with the significance level 0.05 (Ghozali, 2018).

5. RESULT AND DISCUSSION

Descriptive Statistics

The descriptive statistics show the summary of the variables tested, including long-term leverage, short-term leverage, firm size, and firm performance (Tobin's q). Table 3 and 4 show the descriptive statistics for both IDX Energy and NYSE Energy as follows:

Table 3. IDX Energy Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Long-term Leverage	80	.52	.03	.55	.2375	.14914
Short-term Leverage	80	.46	.05	.51	.2060	.09332
Firm Size	80	127.09	2.64	129.73	40.5735	36.36669
Firm Performance	80	32.31	.31	32.62	4.2111	7.21435
Valid N (listwise)	80					

Table 4. NYSE Energy Descriptive Statistics

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Long-term Leverage	239	.63	.25	.88	.4631	.12487
Short-term Leverage	239	.26	.03	.29	.1183	.05668
Firm Size	239	357.08	4.42	361.50	61.4344	71.10399
Firm Performance	239	6956.80	-6335.27	621.53	-23.8877	412.91246
Valid N (listwise)	239					

In the IDX Energy, the minimum value of long-term leverage is 0.03 (Harum Energy Tbk., Q3 2020) and the maximum value is 0.55 (Indika Energy, Tbk., Q1&Q4 2020) with the range between the maximum and minimum values being 0.52; the average weight of long-term leverage is 0.24 and a standard deviation of 0.15. The data show that the energy companies in IDX Energy are financed with 24% from long-term leverage.

The minimum value of short-term leverage in IDX energy is 0.05 (Harum Energy Tbk., Q1 2020 &2021), and the maximum value is 0.51 (Golden Energy Mines Tbk., Q4 2021). The range between the maximum and minimum values is 0.46. The average weight of short-term leverage is 0.21, with a standard deviation of 0.09. This means 21% of energy companies in IDX energy financing comes from short-term leverage. It also shows that for companies in IDX Energy, financing comes more from equity financing because the combination of average long-term and short-term leverage is 44% or less than 50%.

The firm size variable in IDX energy was measured by the company's total assets in billions of rupiah with minimum value of 2.64 (Transcoal Pacific Tbk., Q1 2021) and the maximum value of 129.73 (Perusahaan Gas Negara Tbk., Q1 2020). The range among the maximum and minimum values is 127.09. The firm size average value is 40.57, with 36.37 standard deviation.

Firm performance measured by Tobin's Q shows a minimum value of 0.31 (Medco Energy International Tbk., Q1 2020) and the maximum value of 32.62 (Transcoal Pacific Tbk.,

Q2 2021). Thus, the range between the maximum and minimum values is 32.31. The average value of firm performance is 4.21 with the standard deviation of 7.21. The average value means that the company's value in IDX Energy is 4.21 greater than the cost of assets.

Meanwhile, the minimum value of the long-term leverage in NYSE Energy was 0.25 (Camero, Q1 2020) and the maximum value of 0.88 (Cheniere Energy, Q2-Q4 2020). The range between the maximum and minimum values is 0.63. The average weight of long-term leverage is 0.46, with 0.12 standard deviation. The average value means that the energy companies in NYSE Energy are 46.31% financed with long-term leverage. It also shows that NYSE Energy companies rely on long-term financing more than companies in IDX Energy.

The minimum short-term leverage value of NYSE energy company is 0.03 (Camero, Q1&Q2 2021) and the maximum value is 0.29 (Schlumberger, Q1 2020). Therefore, the range between the maximum and minimum values is 0.26. The average weight of short-term leverage is 0.12, with 0.06 standard deviations. The data mean that the companies in NYSE Energy are financed with 11.83% short-term leverage. Unlike IDX Energy companies with more finance in equity, the NYSE Energy companies are more financed in leverage with the combination of average long-term and short-term leverage of 58.14%.

Total assets measure the firm size variable in billions of United States dollars. The minimum value of firm size in NYSE energy is 4.42 (Cottera Energy, Q3 2020), and the maximum value is 361.5 (Exxon Mobil, Q2 2020). The range between the maximum and minimum values is 357.08. The average value of firm size is 61.43, with 71.10 standard deviation.

The financial performance of NYSE energy variable measured by Tobin's Q shows a minimum value of -6335.27 (Schlumberger, Q1 2021) and the maximum value of 621.53 (Schlumberger, Q2 2021). The minus minimum value of financial performance of energy companies in NYSE energy index is caused by the total asset being less than the combination of intangible assets and total debt, resulting in negative book value. The average value of financial performance is -23.89, with 412.91 standard deviation.

Normality Test

The result of the Kolmogorov-Smirnov test is as follows:

Table 5. IDX Energy Normality Test (before removing outlier)

			Unstandardized Residual
N			80
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		6.08563600
Most Extreme Differences	Absolute		.216
	Positive		.216
	Negative		-.124
Test Statistic			.216
Asymp. Sig. (2-tailed)			.000[c]
Monte Carlo Sig. (2-tailed)	Sig.		.001[d]
	99% Confidence Interval	Lower Bound	.000
		Upper Bound	.002

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Based on 10000 sampled tables with starting seed 2000000.

Since the result of the normality test in Table 5 shows that the data are not distributed normally because Monte Carlo significance is 0.001 and less than 0.05, the study used the outlier boxplot method to normalize the data with results as follows:

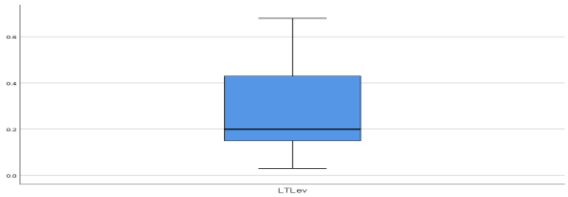


Figure 4. IDX Energy Long-Term Leverage Outlier Boxplot

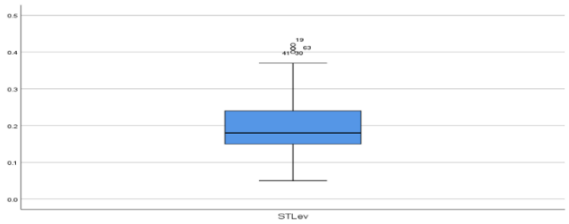
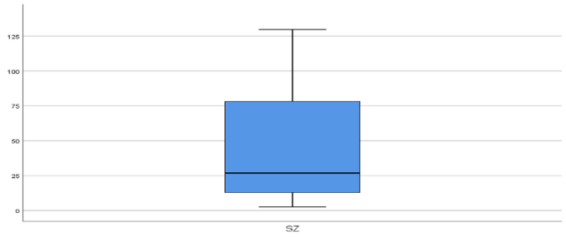


Figure 5. IDX Energy Short-Term Leverage Outlier Boxplot



After removing the outlier from the outlier boxplot, the normality test in Table 6 shows a Monte Carlo significance of 0.622. Thus, this test means the data are distributed normality as the significance is higher than 0.05.

Table 6. IDX Energy Normality Test (after removing outlier)

One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			71
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		1.05520916
Most Extreme Differences	Absolute		.087
	Positive		.087
	Negative		-.043
Test Statistic			.087
Asymp. Sig. (2-tailed)			.200[c,d]
Monte Carlo Sig. (2-tailed)	Sig.		.622[e]
	99% Confidence Interval	Lower Bound	.609
		Upper Bound	.634

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.
e. Based on 10000 sampled tables with starting seed 334431365.

Table 7. NYSE Energy Normality Test (before removing outlier)

Figure 6. IDX Energy Firm Size Outlier Boxplot

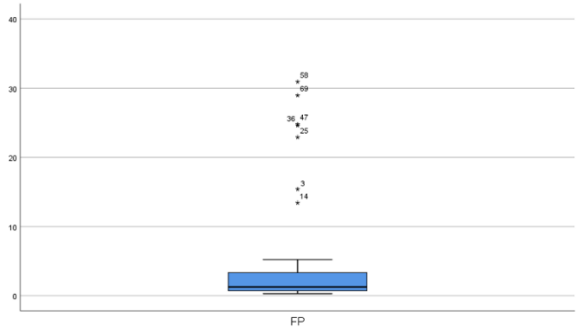


Figure 7. IDX Energy Firm Performance Outlier Boxplot

One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			239
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		409.7304422
Most Extreme Differences	Absolute		.440
	Positive		.331
	Negative		-.440
Test Statistic			.440
Asymp. Sig. (2-tailed)			.000[c]
Monte Carlo Sig. (2-tailed)	Sig.		.000[d]
	99% Confidence Interval	Lower Bound	.000
		Upper Bound	.000

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Based on 10000 sampled tables with starting seed 1502173562.

The normality test of the NYSE Energy in Table 7 shows that data are not distributed normally as the Monte Carlo significance (0.00) is lower than the 0.05 significance level. Therefore, the outlier boxplot method was applied to normalize the data with results as follows:

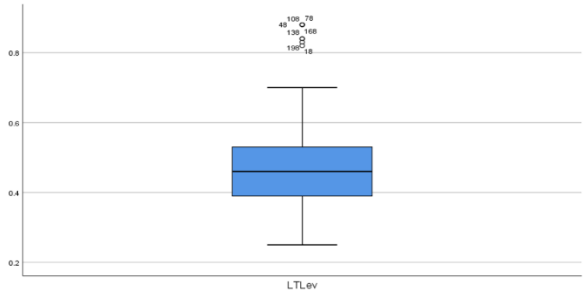


Figure 8. NYSE Energy Long-Term Leverage Outlier Boxplot

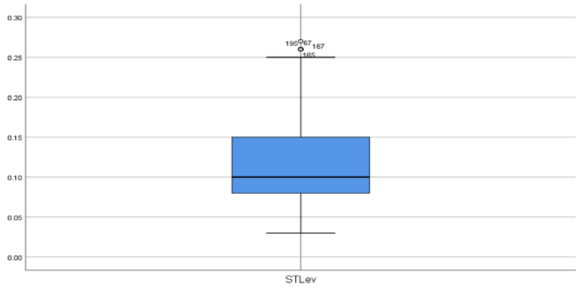


Figure 9. NYSE Energy Short-Term Leverage Outlier Boxplot

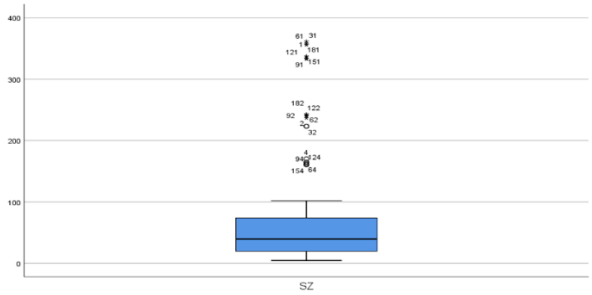


Figure 10. NYSE Energy Firm Size Outlier Boxplot

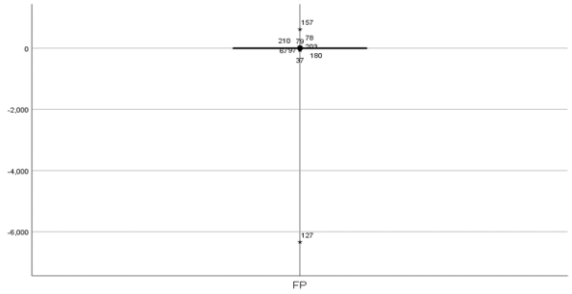


Figure 11. NYSE Energy Firm Performance Outlier Boxplot

After removing the outlier from the outlier boxplot, Table 8 shows the normality test with 0.135 Monte Carlo significance which means that all the data are distributed normally.

Table 8. NYSE Energy Normality Test

One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			217
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		1.04327598
Most Extreme Differences	Absolute		.079
	Positive		.079
	Negative		-.065
Test Statistic			.079
Asymp. Sig. (2-tailed)			.002[c]
Monte Carlo Sig. (2-tailed)	Sig.		.135[d]
	99% Confidence Interval	Lower Bound	.126
		Upper Bound	.144

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Based on 10000 sampled tables with starting seed 743671174.

Multicollinearity Test

The multicollinearity test for both the IDX and NYSE Energy showed good regression model since there is no multicollinearity between the independent variables as the tolerance is more than 0.10 and the VIF value of long-term leverage, short-term leverage, and firm size is less than 10.

Table 9. Multicollinearity Test for IDX and NYSE Energy

Variable	IDX ENERGY		NYSE ENERGY	
	Tolerance	VIF	Tolerance	VIF
Long-Term Leverage	0.645	1.550	0.946	1.057
Short-Term Leverage	0.925	1.081	0.939	1.065
Firm Size	0.608	1.645	0.913	1.095

Heteroscedasticity Test

The heteroscedasticity test for IDX Energy and NYSE Energy can be seen in Figure 10 and 11, respectively:

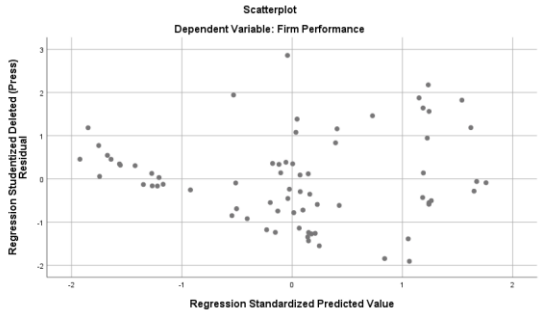


Figure 12. IDX Energy Heteroscedasticity Test

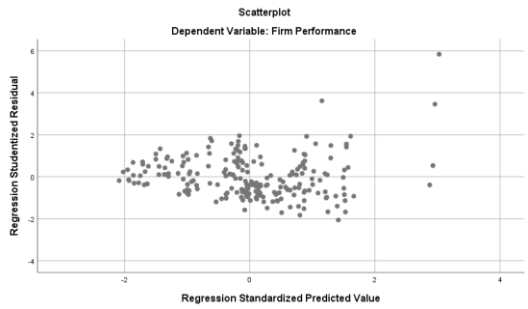


Figure 13. NYSE Energy Heteroscedasticity Test

As the heteroscedasticity test for IDX energy and NYSE energy result showed that the object is spread above and below the number 0 on the Y-axis and does not form a certain pattern, it can be concluded that there is no heteroscedasticity in the data.

Autocorrelation Test

Based on Table 10, IDX Energy Durbin-Watson table with 80 samples (n) and three variables (k), it is found that the DW is 1.678, and the DU is 1.643. With DU<D<4-DU equations, the data are found to meet the criteria of 1.643 < 1.678 < 2.3026. Meanwhile, for the Durbin-Watson of NYSE with 239 samples (n) and three variables (k), the DW is 1.765, and DU is 1.7710. Using DU<D<4-DU equations, the data meet the criteria of 1.765 < 1.7710 < 2.229. Thus, it can be concluded that both IDX Energy and NYSE Energy showed no autocorrelation in the dependent variable.

Table 10. Autocorrelation Test

Object	Durbin-Watson
IDX Energy	1.678
NYSE Energy	1.765

Simultaneous Test (F test)

Table 11 and 12 explain that the IDX Energy simultaneous test showed the F value (17.045) is higher than F table (2.74). The same result was also found with the simultaneous test conducted in the NYSE Energy with the F value (25.639) > F table (2.67). It means that long-term leverage, short-term leverage, and firm size simultaneously significantly affect the energy firm performances in IDX Energy. This finding is aligned with the previous research done by Danson et al. (2020) that found long-term leverage, short-term leverage, and firm size affect the firm performance simultaneously.

Table 11. IDX Energy Simultaneous Test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	59.487	3	19.829	17.045	.000[b]
	Residual	77.943	67	1.163		
	Total	137.430	70			

a. Dependent Variable: Firm Performance

b. Predictors: (Constant), Firm Size, Short-term Leverage, Long-term Leverage

Table 12. NYSE Energy Simultaneous Test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	84.896	3	28.299	25.639	.000[b]
	Residual	235.100	213	1.104		
	Total	319.996	216			

a. Dependent Variable: Firm Performance

b. Predictors: (Constant), Firm Size, Long-term Leverage, Short-term Leverage

Determinant Coefficient Test (R square)

The adjusted R square as seen in Table 13 and 14 for IDX Energy was 0.407 and NYSE Energy was 0.255. It means that long-term leverage, short-term leverage, and firm size can explain 40.70% of factors affecting firm performance in IDX Energy, and 25.60% in the NYSE Energy. Meanwhile, 59.30% of other factors will influence the firm performance in IDX Energy with 74.50% other factors affecting firm performance in NYSE Energy. Some other factors might be macroeconomic factors since the energy industries' characteristics heavily rely on supply and demand fluctuation and government policies in regulating the commodities market.

Table 13. IDX Energy Determinant Coefficient Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.658[a]	.433	.407	1.07857

a. Predictors: (Constant), Firm Size, Short-term Leverage, Long-term Leverage

b. Dependent Variable: Firm Performance

Table 14. NYSE Energy Determinant Coefficient Test

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.515[a]	.265	.255	1.05060

a. Predictors: (Constant), Firm Size, Long-term Leverage, Short-term Leverage

b. Dependent Variable: Firm Performance

Partial Multiple Regression Analysis (t-test)

Partial multiple regression analysis or t-test measures how far the independent variables' influence individually affects the dependent variable (Ghozali, 2018). The result of the partial multiple regressions for both IDX and NYSE Energy with their equations are as follows:

Table 15. IDX Energy Partial Multiple Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.178	.410		2.876	.005
	Long-term Leverage	3.829	1.031	.426	3.714	.000
	Short-term Leverage	4.623	1.596	.277	2.896	.005
	Firm Size	-.025	.005	-.649	-5.497	.000

a. Dependent Variable: Firm Performance

FP = 3.829 LTLev + 4.623STLev – 0.025 SZ + 1.178

Table 16. NYSE Energy Partial Multiple Regression Analysis

FP = 4.847 LTLev + 4.303 STlev – 0.003 SZ - 0.712

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.712	.361		-1.970	.050
	Long-term Leverage	4.847	.635	.461	7.634	.000
	Short-term Leverage	4.303	1.472	.177	2.923	.004
	Firm Size	-.003	.001	-.160	-2.607	.010

a. Dependent Variable: Firm Performance

Long-term leverage impacts energy firms' performance in IDX and NYSE significantly since the t-value is 3.71 for IDX Energy and 7.63 for NYSE Energy with p-value less than 0.05. If the long-term leverage variable increases by 1%, the firm's performance in IDX Energy will increase by 0.04 and by 0.05 in NYSE Energy. The finding aligned with the previous research by Egbunike and Okerekeoti (2018) and Angkasajaya et al. (2020) who explained that long-term leverage has positive impact on the firm's performance.

The short-term leverage variable impacts the firm performance significantly in IDX Energy since it has a t-value of 2.90 and 2.92 for NYSE Energy with p-value less than 0.05. If the short-term leverage increases by 1%, the firm performance in IDX Energy will increase by 0.05 and by 0.04 in NYSE Energy. Although this finding supported the previous research done by Haslinda et al. (2020) who found short-term leverage has a significant impact on the firm performance, it opposed the past research of Danson et al. (2020) who mentioned that short-term leverage harms firm performance.

The firm size variable in IDX Energy has a t-value of -5.50,while, the firm size variable in NYSE Energy has a t-value of -2.61. Both have p-value less than 0.05. Therefore, it shows that the firm size impacted the firm performance

significantly. The negative coefficient shows that firm size has negative impact on firm performance. If the firm size in IDX Energy increases by Rp1 billion, the firm performance will be decreased by 0.04. In addition, if the firm size in NYSE increases by $1 billion, the firm performance will decrease by 0.00. This finding supported the research of Bawazir et al. (2019), Mishra and Dasgupta (2019), Danson et al. (2020), and Haslinda et al. (2020), who found that the firm size negatively impacts firm performance.

DISCUSSION

This research found that long-term leverage has a significant positive impact on financial performance both in IDX Energy and NYSE Energy. Ibhagui and Olokoyo (2018) supported this result, finding a positive correlation between long-term leverage and financial performance. Companies with better long-term leverage management will have lower financial cost or obligation to pay higher interest to creditors if the government decided to reduce the interest rate. During the Covid-19 pandemic, Indonesia's government chose to lower the interest rate gradually from 5% in January 2020 to 4.75% in February 2020 then 4.5% in March of 2020, until the lowest point of 3.5% in February 2021. On the other hand, the Federal Reserve decided to cut the interest rate drastically from 1.75% in February 2020 to 0.25% in March 2020. According to agency theory, different interest and information asymmetries between the agents and the principal could result in the agency cost. Under the pecking order theory, the companies would use internal funding first; then, if it is not enough, the firm would use the external funding starting at the safest securities first as its last order. Long-term leverage is used for financing fixed assets that are expected to capitalize on the opportunity to increase the firm performance. This shows that the companies using the long-term leverage as the internal fund is not enough to finance the investment, which is not a problem as long as it still positively impacts the firm's performance. The trade-off theory suggests that the firm must maintain an optimal capital structure. The firm must use the tax shield as much as possible with as little bankruptcy cost as possible to reach the optimal capital structure (Le & Bich, 2017). As a result, it shows a positive correlation; IDX Energy companies should increase the long-term leverage as it aligns with the investment needed to shift from fossil fuel to renewable energy. The result shows that IDX Energy should increase the long-term leverage to increase the firm performance. Furthermore, even though the IDX Energy long-term leverage average value is 0.24 and the NYSE Energy's average long-term leverage of 0.46, there is a 0.22 difference. However, NYSE Energy's long-term leverage still positively impacts firm performance. Thus, the 0.46 long-term leverage level can be used as a benchmark for the IDX Energy companies to increase the long-term leverage to reach the optimum capital structure, which will be productive to improve the firm performance.

The short-term leverage also exposes the borrower to a higher risk in the moment of crisis and volatility (Bontempi et al., 2020). Danson et al. (2020) find short-term leverage harmed the firm performance during the 2007/2008 crisis. This research finds that short-term leverage positively correlates with firm performance with average value of IDX Energy of 0.21 and 0.12 for NYSE Energy. Referring to the trade-off theory that the firm must maintain optimal capital structure, it can be concluded that both IDX Energy and NYSE Energy had lower average value of short-term leverage, which significantly impacts the firm's performance. IDX Energy companies should bring the short-term leverage back to optimal by using NYSE Energy as a benchmark to mitigate the risk of bankruptcy in a moment of uncertainty. Following the agency theory, monitoring action is needed to encourage

the agents to work in the principal's best interest. This will result in an agency cost for the principal. In pecking order theory, the firm prefers to use internal financing by using the retained earnings from the operation activities. The pandemic has impacted the global economy; the pandemic's uncertainty has resulted in a fluctuation in the firm profitability, consequently affecting the firm cash flow. According to pecking order, as the fluctuation happens that results in less cash flow, thus the firm would draw down its cash and marketable securities such as deposits in the bank. However, if the fund is still not enough, the firm would first decide to use the external funding, starting with the safest securities of leverage before deciding to finance with equity. NYSE Energy and IDX Energy show that capitalizing the short-term leverage as a working capital positively impacts the firm's performance. Other than the working capital, short-term leverage is also included in the bank loans and leased payments under a year. The rise of demand as the economy recovers is one of the reasons short-term leverage has a positive impact on firm performance. Although the coal consumption decreased in 2020 by 4.4% because of the pandemic, it was expected to increase by 6% in 2021, with China, India, and the United States as the highest gainers (IEA 2021). The energy sector firms could use the short-term leverage for working capital as it has a lower cost than equity. However, the firm could sell the commodities at a higher price because of the limited supply and increased demand. As the economy recovered, the demand for electricity, fuel, and other energy increased, as shown with the rebound in commodities price. Based on the Newcastle Coal Future, the coal price started to rebound in September 2020 and achieved its peak at October 5th, 2021 at $269.50 per ton. This price is higher before the pandemic at the average price of $65.90 per ton. Based on the Crude Oil WTI Futures, the rebound oil price started in May 2020 with the highest peak at November 8th, 2021 at $80.44 per barrel higher than the average price at $48.24 per barrel before the Covid-19 pandemic. Natural Gas Futures showed that the natural gas prices started to reverse the declining trend in July 2020 with the highest price at $6312/MMBtu on October 5th, 2021 (Investing, 2022). The rise of the commodities price would increase the sales as the energy firm sells the commodities at a higher price.

This research found a significant negative impact of firm size on firm performance. This finding is supported by Mishra and Dasgupta (2019) and Danson et al. (2020)who found that firms with larger sizes work ineffectively. This statement is aligned with the agency theory; the agent's action is not always in line with the principal's best interest (Ali, 2020). Large-capitalization firms as the research object have an advantage of economies of scale, where the firm could produce goods in large numbers resulting in lower production costs. However, as the firm grows, the organization becomes more complex. Consequently, the firm becomes ineffective as the coordination between each department becomes harder (Mankiw, 2017). Thus, resulting in diseconomies of scale that increase the firm cost, consequently diminishing the firm performance.

CONCLUSION and SUGGESTED FURTHER RESEARCH

This research studies the impact of long-term leverage, short-term leverage, and firm size on firm performance, comparing IDX Energy and NYSE Energy. Based on the research, it can be concluded that long-term leverage and short-term have a significant positive impact on firm performance in IDX Energy and NYSE Energy. Meanwhile, firm size has a significant negative impact on firm performance in IDX Energy and NYSE Energy. For IDX Energy, companies should increase the long-term leverage, as it effectively increases the firm's performance, by

benchmarking with the NYSE Energy's average long-term leverage to reach optimum capital structure. As the firm size has harmed the firm's performance, the companies in IDX Energy and NYSE Energy. The principal should increase the monitoring and build a bond with the agents. Furthermore, the agents should be given appropriate compensation to encourage them to act in the principal's best interest. Future research could also study more variables related to firm performance in the energy sector and more studies about the energy industry from various points of view since there has not been much research regarding the variables affecting firm performance that focused on the energy sector.

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