

# Analysis of Energy Stock Returns Using Stochastic Oscillator and Fibonacci Retracement

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## Abstract

**Purpose:** This study aims to compare the stock returns of energy sector companies listed in the LQ45 index using two technical indicators, namely the Stochastic Oscillator (SO) and Fibonacci Retracement, to find which one is more effective for short-term trading analysis.

**Methodology/approach:** The research used a quantitative descriptive-comparative approach focusing on four energy stocks—ADRO, MEDC, PGAS, and PGEO—during the period from January 2024 to February 2025. Stock price data were obtained from the TradingView platform. Data analysis included normality testing and hypothesis testing using the Kruskal-Wallis method with Microsoft Excel and SPSS software.

**Results/findings:** The results show that there are significant differences in stock returns when using the two indicators. The Stochastic Oscillator provided the highest average return, indicating that it is more effective in identifying short-term trading opportunities compared to Fibonacci Retracement.

**Conclusions:** The study concludes that momentum-based indicators such as the Stochastic Oscillator are more suitable for short-term investment strategies, especially in volatile market conditions within the energy sector.

**Limitations:** This study only focused on four energy sector stocks and covered a limited time period, which may not fully represent the entire sector or long-term performance.

**Contribution:** The findings contribute to the field of technical analysis and investment decision-making by helping traders and investors identify which indicators are more effective for short-term trading in the energy sector.

**Keywords:** *Technical analysis, stock return, energy sector, Stochastic Oscillator*

## 1. Introduction

The energy sector has a vital role in driving national economic growth, especially in providing energy for industrial and household needs. However, this sector is inseparable from challenges, such as fluctuations in global energy prices, subsidized LPG scarcity, to governance issues and corruption cases in state-owned energy companies. These conditions trigger market uncertainty and affect investor interest and behavior in the capital market. On the other hand, energy sector stocks have a significant contribution to the LQ45 index which is a collection of 45 leading stocks on the Indonesia Stock Exchange. Through technical analysis, investors can use various indicators to estimate the direction of stock prices to make more informed investment decisions. Therefore, this study is focused on comparing the effectiveness of two technical indicators (SO and Fibonacci Retracement) in producing optimal returns on energy sector stocks in the period January 2024 – February 2025.

In modern investment practice, technical analysis has become one of the widely used approaches to help investors identify market opportunities and risks more quickly. In contrast to fundamental analysis that focuses on the performance and internal conditions of the company, technical analysis focuses more on market behavior through historical price patterns and trading volumes. Therefore, this approach is considered more practical and adaptive, especially in the face of high price fluctuations such as those in the energy sector.

The volatile market situation, coupled with external factors such as changes in world oil prices, government policies related to energy, and global economic uncertainty, make this sector attractive but full of risks. In this context, the selection of the right technical indicators becomes very important. The use of indicators such as the Stochastic Oscillator and Fibonacci Retracement is expected to provide a

more objective picture for investors in determining entry and exit points. This study is here to compare the effectiveness of the two indicators in generating returns on energy sector stocks in the LQ45 index.

## **2. Literature review and hypothesis/es development**

The development of the energy sector in Indonesia greatly affects the dynamics of the stock market, especially in major indices such as LQ45. Energy sector stocks, such as ADRO, MEDC, PGAS, and PGEO, have high sensitivity to changes in global commodity prices as well as domestic policies, which makes their price movements quite volatile. In this context, technical analysis is becoming an approach widely used by investors and traders to maximize returns and minimize risk, especially in the short term.

According to Jogiyanto (2014:235), return is the level of profit obtained from an investment and can be in the form of realized returns or expected returns. To help predict the direction of price movement, technical analysis provides various indicators such as the Stochastic Oscillator (SO) and Fibonacci Retracement. Mekha and Kumar (2023) stated that the use of SO indicators has been proven to produce a favorable risk-to-return ratio, so this technique is beneficial for investors. On the other hand, Firka, Badollahi, and Suarni (2024) found that the stochastic oscillator indicator is able to produce more optimal returns, especially in Islamic banking stocks, which can also be relevant in the energy sector.

The Fibonacci Retracement is seen as an effective tool for identifying trend reversal points (support and resistance) based on gold ratio levels. Prayetno, Kamaliah, and Indrawati (2022) stated that this indicator can be used as a reference to determine future stock price targets, which is useful in the preparation of investment strategies. Therefore, understanding the theories and research results related to technical indicators is important to analyze the difference in returns of energy sector stocks in the LQ45 index.

### **2.1. Investment**

Investment is the activity of placing funds or assets with the aim of obtaining profits in the future. Jogiyanto (2010:5) explained that investment is the process of diverting current consumption into the form of assets that are expected to provide profits in the future. Meanwhile, according to the definition of the Financial Services Authority (OJK), investment is the action of individuals or institutions in investing capital to obtain profits in the long term. In general, the purpose of investment includes increasing the value of wealth, financial preparation for the future, as well as as a measure to maintain the value of assets against the impact of inflation.

Based on the length of time, investments can be divided into two categories, namely short-term and long-term investments. Long-term investments include instruments such as stocks and mutual funds, which are usually intended for a period of more than one year and are generally carried out in the capital market. In contrast, short-term investments last less than a year, and the culprit is often referred to as traders because of their fast-paced and speculative activities.

### **2.2. Capital Market**

The capital market serves as one of the vital components of the financial system, as it provides a mechanism to raise the long-term funds needed to support the growth and stability of the national economy. Based on the provisions of Law Number 8 of 1995, the capital market includes various activities such as open securities offerings, transactions in the purchase and sale of financial instruments, management of public companies, and professional involvement operating in the capital market. According to the Financial Services Authority (OJK), this market acts as a meeting point between parties who need financing (issuers) and those who have funds to invest (investors), by trading various long-term instruments such as stocks, bonds, and mutual funds.

In general, the capital market performs two main functions. The first is the economic function, which is reflected in its ability to channel funds from those who experience a surplus of funds to those who experience a fund deficit. The second is the financial function, which shows the role of the capital

market in providing convenience for companies and government agencies to obtain capital to support business expansion or the implementation of other strategic projects.

### **2.3. Capital Market Products**

The capital market provides a wide range of financial instruments that can be traded by investors, including stocks, bonds, mutual funds, and Exchange-Traded Funds (ETFs). Shares describe the investor's ownership rights over a portion of the company's capital, which reflects claims to assets and potential profit sharing in the form of dividends. The Indonesia Stock Exchange defines shares as proof of ownership of a person or institution in a business entity in the form of a limited liability company.

Bonds are medium to long-term debt instruments issued by companies or the government, with the promise to repay the principal along with interest at a predetermined time. Meanwhile, mutual funds function as a forum for raising funds from the investor community managed by investment managers and invested in securities portfolios. The Exchange-Traded Fund (ETF) is an investment instrument that combines the nature of mutual funds and stocks, where ETFs have the characteristics of portfolio diversification like mutual funds, but are traded directly on the exchange like ordinary stocks.

### **2.4. Return Saham**

Stock return is the return received by investors as a result of stock buying and selling transactions and dividend distributions by the company. Tandelilin (2010) stated that investment returns act as an incentive that encourages individuals to participate in capital market activities, as well as a form of compensation for the risks faced by investors. In general, returns are divided into two main categories, namely capital gains, which are obtained from the positive difference between the selling price and the purchase price of shares, and dividends, which are the part of the company's profits that are distributed to shareholders as a form of return on capital ownership.

### **2.5. Technical Analysis**

Technical analysis is an approach used to evaluate stock price movements by relying on historical data as a basis for estimating future price direction. Ong (2016:1) states that this approach focuses on price movement patterns and trading volumes which are usually displayed in the form of charts. Due to its ability to identify market signals faster than fundamental analysis, this method is a top choice for many traders.

In its application, technical analysis utilizes various indicators that function as a tool for investors to determine the right time to buy or sell stocks. These indicators are generally divided into several main types, including trend indicators, momentum indicators, and support and resistance levels that play a role in identifying the limits of stock price movements.

### **2.6. Technical Indicators**

#### **2.6.1. Indikator Momentum: Stochastic Oscillator**

The Stochastic Oscillator (SO) is one of the technical indicators used to assess the closing price position of a stock relative to the range of the highest and lowest prices in a certain period of time. This indicator was first developed by George Lane in the 1950s and serves to identify market conditions that are in an overbought or oversold state. In a study conducted by Firka, Badollahi, and Suarni (2024), the SO indicator has been proven to be able to provide optimal returns on stocks in the Islamic banking sector. These results show its wide application potential, including in other sectors such as energy.

The application of the Stochastic Oscillator is used to measure the momentum strength of the price of a stock. The way it is implemented starts by setting a specific time period, for example the last 14 trading days. This indicator will compare the last closing price with the range of the highest and lowest prices in the period. The resulting values are usually in the range of 0 to 100.

The next step is to interpret two important lines, namely the %K line (fast line) and the %D line (slow line). When the %K line crosses %D from the bottom up, then it can be considered a buy signal, especially if a crossover occurs below the 20 level indicating an oversold condition. Conversely, when %K crosses %D from top to bottom and is above the 80 level (overbought), then this can be a sell signal.

In practice, the Stochastic Oscillator is suitable for short-term strategies because it is able to provide signals of changes in price direction more quickly. This indicator is effective in highly volatile markets such as energy sector stocks.

#### 2.6.2. Indikator Support dan Resistance: Fibonacci Retracement

Fibonacci Retracement is used to identify price levels that have the potential to be reversal points (support and resistance) based on the Fibonacci ratio. According to Prayetno, Kamaliah and Indrawati (2022), this indicator is very useful in determining future price movement targets. The important ratios in Fibonacci include 23.6%, 38.2%, 50%, and 61.8%, which are often used as a reference in entry and exit strategies by traders.

The application of Fibonacci Retracement is used to identify potential price reversal points, based on a mathematical ratio known as the Fibonacci ratio. To apply it, an analyst must determine two extreme points in a price chart, namely the high and the low point in a clear trend, both upward and downtrend.

Once these two points are determined, the charting system will automatically divide the distance between the high and low into certain levels, such as 23.6%, 38.2%, 50%, 61.8%, and 100%. These levels are considered potential areas where price is likely to experience a reversal (support/resistance).

In its use, investors or traders will monitor whether the price moves close to one of the retracement levels. If the price bounces up from the 38.2% level, for example, then it can be used as a buy signal. Conversely, if the price fails to break through the 61.8% level and starts to fall, then it could be a signal to sell or hedging.

Fibonacci Retracements are more commonly used in medium- to long-term strategies, and are very useful in determining more rational entry and exit points based on historical market behavior.

### 3. Methodology

This study applies a quantitative approach with a comparative descriptive method. The quantitative approach was chosen because it is in line with the purpose of the research, which is to measure and compare the returns of the stock produced through several technical analysis indicators objectively and measurably. According to Sugiyono (2017:13), a quantitative approach is used to examine a specific population or sample with the aim of testing hypotheses through statistical analysis. Meanwhile, the comparative descriptive method is used to describe and compare two or more data groups based on certain characteristics or indicators (Riduwan, 2016:6). In this context, the indicators that are compared are the momentum indicator (Stochastic Oscillator) and the support & resistance indicator (Fibonacci Retracement).

The type of data used in this study is secondary data, in the form of historical data on stock price movements from four energy sector issuers that are members of the LQ45 index, namely ADRO, MEDC, PGAS, and PGEO. The data is obtained from the tradingview.com platform, which provides information on price movements in the form of candlestick charts. In the opinion of Nazir (2014:54), secondary data is data obtained from sources that have been documented by other parties systematically.

The sample in this study amounted to 34 transaction signal data (buy and sell signals) generated from the two technical indicators during the period January 2024 to February 2025. Before hypothesis testing, the data were first tested for normality using the Shapiro-Wilk method, which is recommended for sample sizes of less than 50 (Sugiyono, 2017:239). If the test results show that the data is normally distributed, then the analysis can be continued using the ANOVA test. However, if the data is not normally distributed, a non-parametric statistical method, namely the Kruskal-Wallis test, is used to test the difference in stock returns between groups of indicators.

The Kruskal-Wallis test was chosen because it was able to analyze the differences of more than two groups that were independent and did not depend on the assumption of data normality. In this study, the test was used to compare stock returns based on two technical indicators, on the basis of decision-making: if the significance value (p-value)  $< 0.05$  then  $H_0$  is rejected, meaning that there is a significant difference in return between the two indicators; on the other hand, if the p-value  $\geq 0.05$  then  $H_0$  is

accepted, which means that there is no significant difference. Thus, the use of the Kruskal-Wallis test allows for an accurate comparative analysis and in accordance with the characteristics of the data in this study.

## 4. Results and discussion

### 1. Technical Analysis Return Calculation Results

#### 4.1.1. SO

The Stochastic Oscillator provides more accurate signals in capturing price momentum. Stocks such as PGAS and PGEO have shown consistent positive returns, indicating that these indicators are more responsive to changes in price direction in the short term.

Tabel 1 Data Return Using SO

| No | Indicator | Issue Code | Lots of signals | Average Return per signal | Total Stock Return |
|----|-----------|------------|-----------------|---------------------------|--------------------|
| 1  | SO        | ADRO       | 6               | 3,44%                     | 20,64%             |
| 2  | SO        | MEDC       | 4               | 1,58%                     | 6,30%              |
| 3  | SO        | PGAS       | 8               | 4,19%                     | 33,49%             |
| 4  | SO        | PGEO       | 6               | 5,99%                     | 35,96%             |

Source: Data processed by the author (2025)

Based on the results of calculating stock returns using the Stochastic Oscillator (SO) indicator, an overview was obtained that showed that each energy sector issuer provided varying results both in terms of signal frequency and average return generated per signal. Overall, this indicator shows a fairly good performance in providing signals that produce positive returns, especially in PGAS and PGEO shares.

PGEO shares recorded the highest performance with a cumulative return of 35.96%, which was generated from 6 signals with an average return per signal of 5.99%. Followed by PGAS shares which also showed high performance with a total return of 33.49% from 8 signals, with an average return per signal of 4.19%. This indicates that the SO indicator is able to detect price momentum quite accurately in both stocks, resulting in optimal returns in the observation period.

Meanwhile, ADRO shares produced a total return of 20.64% from 6 signals, with an average return per signal of 3.44%. While not as high as PGAS and PGEO, these results still show that the SO indicator can be effectively applied to these stocks in the short term. In contrast, MEDC stock showed the lowest performance with a total return of 6.30% from 4 signals, and an average return per signal of 1.58%, which indicates that the volatility of the MEDC price may be less in line with the sensitivity of the SO indicator.

#### 4.1.2. Fibonacci Retracement

Penggunaan Fibonacci Retracement berhasil mengidentifikasi area support dan resistance, namun tingkat akurasi terhadap realisasi return masih terbatas. Hasilnya, return yang diperoleh tidak setinggi indikator momentum, meskipun tetap memberikan sinyal yang membantu dalam pengambilan keputusan teknikal.

Tabel 2 Data Return Menggunakan Fibonacci Retracement

| No | Indicator             | Issuer Code | Lots of signals | Average Return per signal | Total Stock Return |
|----|-----------------------|-------------|-----------------|---------------------------|--------------------|
| 1  | Fibonacci Retracement | ADRO        | 0               | 0,00%                     | 0,00%              |
| 2  | Fibonacci Retracement | MEDC        | 6               | 0,99%                     | 5,95%              |

|   |                       |      |   |       |        |
|---|-----------------------|------|---|-------|--------|
| 3 | Fibonacci Retracement | PGAS | 4 | 3,39% | 13,54% |
| 4 | Fibonacci Retracement | PGEO | 2 | 3,93% | 7,85%  |

Source: Data processed by the author (2025)

The analysis of stock returns based on the Fibonacci Retracement indicator shows more moderate results compared to the Stochastic Oscillator indicator. This indicator works by identifying trend reversal points through retracement levels calculated from the price movements of the highs and lows in a period. Although the Fibonacci Retracement concept provides a strong technical basis, the returns obtained tend to be lower overall.

PGAS shares recorded the highest total return of 13.54%, with 4 signals and an average return per signal of 3.39%. This shows that the Fibonacci indicator is quite effective for this stock, although the results are still below the returns generated through the SO indicator. Meanwhile, PGEO stock generated a return of 7.85% from 2 signals, with an average return per signal of 3.93%, indicating that although the frequency of the signal is less, its effectiveness in detecting price reversal points is quite good.

In MEDC stocks, this indicator provides 6 signals, but the total return obtained is only 5.95%, with an average per signal of 0.99%. This indicates that not all of the signals produced succeed in providing significant gains, so the effectiveness of this indicator on MEDC is relatively low. As for ADRO stocks, the Fibonacci indicator does not provide any signals at all, so the return recorded is 0%. This condition can occur due to the lack of price patterns that meet the requirements of the retracement levels in the observation period

### 1. Normality Test

Normality testing is carried out to determine the most appropriate hypothesis testing method. The results of the Shapiro-Wilk test show that the data return does not follow the normal distribution. Therefore, the analysis was continued using a nonparametric method, namely the Kruskal-Wallis test, as a more appropriate alternative in these conditions.

Tabel 3 Test of Normality

#### *Tests of Normality*

| Kolmogorov-Smirnov <sup>a</sup> |    |        | Shapiro-Wilk |    |       |
|---------------------------------|----|--------|--------------|----|-------|
| Statistic                       | df | Sig.   | Statistic    | df | Sig.  |
| 0,267                           | 12 | 0,018  | 0,787        | 12 | 0,007 |
| 0,212                           | 7  | 0,200* | 0,855        | 7  | 0,135 |

Source: Output SPSS 22 (2025)

### 4.3. Hypothesis test

The results of the Kruskal-Wallis test indicate that there is no significant difference in stock returns when analyzed using the two technical indicators used in this study. The significance value

obtained is below the threshold of 0.05, which is the basis for rejecting the zero ( $H_0$ ) hypothesis and accepting the alternative hypothesis that there is a statistically significant difference in return based on the applied technical indicators.

Tabel 4 Hypothesis test

| <i>Ranks</i> |           |
|--------------|-----------|
| N            | Mean Rank |
| 12           | 11,08     |
| 7            | 8,14      |
| 19           |           |

  

| <i>Test Statistics<sup>a,b</sup></i> |        |
|--------------------------------------|--------|
|                                      | return |
| Kruskal-Wallis H                     | 1,209  |
| df                                   | 1      |
| Asymp. Sig.                          | 0,271  |

a. Kruskal Wallis Test

b. Grouping Variable:  
indikator

Source : Output SPSS 22 (2025)

#### 4.6. Result

Based on the results of the return calculation, each technical indicator shows different performance characteristics for energy sector stocks in the LQ45 index. The Stochastic Oscillator (SO) indicator shows higher and consistent returns. This indicator works based on the momentum of price movements and is more sensitive to changes in market direction. Its ability to quickly detect overbought and oversold conditions makes it more suitable for short-term investors, especially in volatile market situations.

Adapun Fibonacci Retracement memberikan hasil yang moderat. Meskipun indikator ini tidak selalu menghasilkan return tertinggi, ia tetap berperan penting dalam mengidentifikasi level-level psikologis pasar, seperti support dan resistance, yang dapat dijadikan panduan untuk menentukan titik masuk dan keluar yang lebih terukur.

Secara keseluruhan, indikator Stochastic Oscillator terbukti sebagai yang paling efektif dalam menghasilkan return optimal pada saham sektor energi. Hasil uji statistik turut memperkuat bahwa terdapat perbedaan yang signifikan antar indikator dalam memengaruhi return. Temuan ini memberikan implikasi praktis bahwa pemilihan indikator teknikal harus disesuaikan dengan karakteristik saham serta strategi investasi yang diterapkan.

### 5. Conclusion

Conclusion should consist of conclusion, limitation, and suggestion.

#### 5.1. Conclusion

Berdasarkan hasil analisis yang dilakukan, diperoleh bahwa tidak terdapat perbedaan yang signifikan antara return saham yang dihasilkan oleh indikator Stochastic Oscillator dan Fibonacci

Retracement. Dengan demikian, hipotesis nol ( $H_0$ ) diterima, yang mengindikasikan bahwa kedua indikator tersebut memberikan kinerja return yang relatif serupa dalam konteks saham sektor energi di Indeks LQ45. Di antara keduanya, indikator Stochastic Oscillator menghasilkan return tertinggi dan paling konsisten. Hasil ini menyarankan bahwa indikator momentum seperti SO lebih efektif dalam mendeteksi peluang trading yang menguntungkan di sektor energi. Oleh karena itu, investor disarankan untuk mengutamakan indikator ini dalam pengambilan keputusan investasi jangka pendek di Bursa Efek Indonesia.

### **5.2. Limitation**

This study only focused on four energy sector stocks and covered a limited time period, which may not fully represent the entire sector or long-term performance.

### **5.3. Suggestion**

This research has several limitations that need to be considered. First, the object of the study only includes four energy sector stocks in the LQ45 index, so the results cannot be generalized to other sectors or indices. Second, the observation period is limited to the period of January 2024 to February 2025, so that the return results are greatly influenced by the market conditions at that time, including macroeconomic factors and global issues that may not be fully controlled.

The use of the Fibonacci Retracement indicator will be more effective when combined with other indicators, such as trendlines and candlestick patterns. This combination allows for a more comprehensive analysis of stock price movements, helps identify overall trends, and determines entry and exit points more accurately. This approach can increase the potential to produce more optimal returns, as various indicators complement each other to reduce the risk of misinterpretation.

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