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Analyzing Stock Selection in the Energy Sector: A Python-Based Capital Asset Pricing Model Approach

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Abstract. This study explores the complex aspects of stock valuation and decision-making on the Jakarta Stock Exchange (JKSE), focusing on the Energy Sector, particularly within the Sub-Industry of Oil, Gas, & Coal Equipment & Services. The primary objective is to ascertain "Buy" and "Sell" recommendations grounded in anticipated returns and stock performance. This classification stems from a meticulous examination of each stock's alignment with both its intrinsic value and the overarching market value of the JKSE. Seven stocks (DEWA, DOID, MYOH, PKPK, PTRO, UNIQ, and WINS) merit "Buy" endorsements, as their projected returns surpass their present market valuations, potentially indicating undervaluation. Conversely, "Sell" recommendations are assigned to four companies (ITMA, RUIS, SICO, and TAMU) in cases where projected returns fall short, suggesting either underperformance or overvaluation. Incorporating Python and the Capital Asset Pricing Model (CAPM), this analysis yields a noteworthy insight. Companies like WINS and DOID display a substantial association with the JKSE market value, as evidenced by their notably low P-values of 0.014 and 0.038, respectively. In contrast, the P-values for other companies fall below the 0.05 threshold, implying that the market value of JKSE lacks a substantial impact. This research highlights the complex relationships involving market valuations, stock performance, and investor choices. By discerning the various degrees of correlation and comprehending the factors that influence "Buy" and "Sell"

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recommendations, investors can adeptly navigate the intricacies of the market and optimize their investment returns.

Keywords: *Stock Selection, CAPM, Python, Energy Sector*

Abstrak. Penelitian ini menggali dinamika yang rumit dalam penilaian saham dan pengambilan keputusan di dalam pasar Bursa Efek Jakarta (JKSE) dalam konteks sektor Energi (Sub-Industri Peralatan & Layanan Minyak, Gas & Batu Bara). Titik fokus analisis ini terletak pada penentuan rekomendasi "Beli" dan "Jual" berdasarkan kinerja saham dan hasil yang diantisipasi. Kategorisasi ini mencerminkan evaluasi yang rumit terhadap kesesuaian setiap saham dengan nilai intrinsiknya dan nilai pasar JKSE secara keseluruhan. Tujuh saham (DEWA, DOID, MYOH, PKPK, PTRO, UNIQ, dan WINS) diusulkan sebagai pilihan "Beli," mengingat hasil yang diantisipasi melebihi nilai pasar saat ini, yang mungkin mengindikasikan penilaian rendah. Sebaliknya, rekomendasi "Jual" diberikan untuk 4 perusahaan (ITMA, RUIS, SICO, dan TAMU), di mana hasil yang diharapkan kurang, mengindikasikan penilaian tinggi atau kinerja yang kurang baik. Selain penilaian saham individual ini, penelitian ini juga meluas ke interaksi antara pasar JKSE dan nilai saham individual. Dengan menggunakan Model Penilaian Aset Modal (CAPM) dan Python, analisis ini mengungkapkan temuan yang signifikan. Di antara berbagai perusahaan, DOID dan WINS berkorelasi secara signifikan dengan nilai pasar JKSE, yang diperkuat oleh nilai P yang rendah, yaitu 0,014 dan 0,038, masing-masing. Sebaliknya, perusahaan lain menunjukkan nilai P di bawah ambang batas 0,05, yang mengindikasikan kurangnya pengaruh yang signifikan dari nilai pasar JKSE. Sebagai kesimpulan, penelitian ini menekankan hubungan rumit antara nilai pasar, kinerja saham individual, dan keputusan investor. Dengan memahami tingkat korelasi yang bervariasi dan faktor-faktor yang mendorong rekomendasi "Beli" dan "Jual," investor dapat menghadapi kompleksitas pasar untuk mengoptimalkan portofolio mereka.

Kata Kunci: *Pemilihan Saham, CAPM, Python, Sektor Energi*

Introduction

The stock market serves as a valuable instrument for elucidating the overall well-being and operational efficacy of various industrial sectors by exhibiting dynamic trends and economic sector dynamics. In these sectors, the Oil, Gas & Coal Equipment and Services industry stands out prominently due to its crucial position within the energy sector (Fattouh *et al.*, 2019). The energy sector serves as a fundamental cornerstone within the global economy, and this sub-industry assumes a pivotal role in delivering equipment, services, and expertise essential for supporting energy exploration, production, and distribution operations. The Indonesian economy exhibits a pronounced reliance on the Oil, Gas & Coal Equipment and Services sector, contributing to employment generation, infrastructure development, and energy production. The stock patterns within this sector are significantly influenced by a multitude of intrinsic and extrinsic factors, encompassing supply and demand dynamics as well as market sentiment. To comprehensively grasp these patterns, it is

imperative to consider the principal determinants shaping the industry's performance.

The paramount determinant governing stock dynamics within the industry under scrutiny remains the global energy consumption paradigm. Investments directed towards the extraction, production, and dissemination of coal, oil, and gas resources are driven by the persistent demand for these commodities, particularly as economies undergo industrialization and development (Lamb *et al.*, 2021). Nevertheless, the industry's susceptibility to fluctuations in demand and pricing is underscored by the cyclical nature of commodity markets, which is compounded by advancements in technology, geopolitical perturbations, and the transition towards renewable energy sources. In light of these transformative forces, investors are advised to maintain vigilant awareness of geopolitical developments and the intricate dynamics of the global energy supply (Scholten *et al.*, 2020).

Within the intricacies of the financial domain, investors strive to achieve equilibrium between the prudent management of risk and the optimization of returns. An instrumental framework facilitating informed decision-making in this pursuit is the Capital Asset Pricing Model (CAPM), offering valuable insights into the interplay between risk and return (Basoglu & Long, 2023). Modern portfolio theory and investment analysis rely extensively on the Capital Asset Pricing Model (CAPM), a model first formulated in the 1960s by William F. Sharpe, John Lintner, and Jan Mossin (Vergara-Fernández *et al.*, 2023). At its core, CAPM serves as a mathematical framework essential for investors in their pursuit of quantifying the anticipated return on an asset, while concurrently accounting for the associated market risk. The model is founded on the premise that investors should receive compensation commensurate with the risk they assume, yielding higher expected returns for greater degrees of risk. The CAPM formula incorporates variables such as the market risk premium, the asset's beta coefficient, and the risk-free rate to facilitate these calculations. The yield achieved from an investment associated with minimal risk, as demonstrated by government bonds, is commonly termed the risk-free rate (King, 2009). The degree of an asset's responsiveness to fluctuations in the broader market is assessed through its beta coefficient, wherein an asset with a beta exceeding 1 denotes a higher volatility relative to the market, while a beta value below 1 signifies reduced volatility. The incremental return sought by investors for assuming the risk associated with more volatile assets, in contrast to risk-free options, is termed the market risk premium (Chaudhary *et al.*, 2020).

The Capital Asset Pricing Model (CAPM) encompasses more than its mathematical representation; it constitutes a structured framework for the systematic evaluation of an asset's potential, enabling equitable comparisons among diverse assets. Through the process of portfolio diversification, the model serves to diminish unsystematic risk while emphasizing systematic risks within the portfolio. The expected return ($E(R_i)$) of each asset, under equilibrium conditions, exhibits a linear association with its systematic risk. During periods of economic stability, CAPM facilitates the quantification of systematic risk and permits the juxtaposition of risk and return. Effective investment strategies endeavor to strike a harmonious balance

between targeted returns and minimized risk, or maximal rewards and specified risks. In situations where two propositions yield comparable returns but divergent levels of risk, judicious investors opt for the alternative with the lower risk profile (Mulyaningsih & Heikal, 2022). By evaluating the anticipated return in conjunction with risk considerations, this model additionally aids in the assessment of the equitable pricing, overvaluation, or undervaluation of an investment (Zhang, 2017). This valuation framework finds multifarious applications, including the construction of portfolios and the analysis of individual stocks. Investors can judiciously compose their portfolios by leveraging insights gleaned from the CAPM to select assets that collectively optimize returns within predefined risk parameters.

The paper makes a significant contribution to the literature by providing a detailed analysis of stock valuation and decision-making on the Jakarta Stock Exchange (JKSE), with a specific focus on the energy sector. It incorporates the use of Python and the Capital Asset Pricing Model (CAPM) to yield noteworthy insights into the market dynamics and stock performance. The study delves into the complex relationships involving market valuations, stock performance, and investor choices, offering valuable insights for investors striving to achieve equilibrium between risk management and returns in the financial domain.

Literature Review

The significance of choosing the right stocks within this sector cannot be overstated, given the high levels of volatility attributed to commodity price fluctuations, regulatory modifications, and geopolitical risks. The CAPM, widely acknowledged in the financial domain, stands as a tool that can facilitate investors in assessing the anticipated return rates of stocks based on their systematic risk, as quantified through beta (Rutkowska-Ziarko *et al.*, 2022). Additionally, the energy sector contends with systematic risks including fluctuations in oil and gas prices, global energy demand, and regulatory alterations. Consequently, the comprehension of beta and the systematic risk is of utmost importance in stock selection within this sector.

Previous similar research paper in Indonesia titled “Empirical Testing of the Five-Factor Model of Fama and French in Indonesia as an Emerging Capital Market.” This paper examines the model’s effectiveness in explaining stock returns, compares it with traditional asset valuation models, and emphasizes the need for further empirical testing in the Indonesian stock exchange (Saleh, 2020). Another similar research paper from China titled “A Comparison of CAPM and Fama-French Three Factor Model under Machine Learning Approaching.” This paper compares CAPM and the Fama-French three factor model using a machine learning approach to analyze portfolio risk and return in the Hanoi stock market. It explores the limitations of traditional models, introduces machine learning techniques, and evaluates their effectiveness in forecasting portfolio returns (Khoa & Huynh, 2023)

In the realm of investment and corporate procedures, various asset pricing models are utilized for the estimation of a stock’s systematic risk, often measured by beta. Nevertheless, the CAPM is frequently adopted. The widespread application of the

CAPM in practical scenarios can be attributed to a couple of plausible factors. Firstly, this model presents a straightforward linear correlation between a stock's beta and its anticipated returns, making it user-friendly. Additionally, the CAPM benefits from the ready accessibility of its components' data, such as stock and market returns, which are consistently and conveniently obtainable to all investors (Pham & Phuoc, 2020).

The conventional form of the CAPM provides a lucid depiction of capital market behavior if its fundamental assumptions are adhered to. However, there exist two primary challenges. The initial challenge pertains to the substantial disparity between some of these foundational assumptions and real-world conditions. This incongruence is not inherently problematic. It becomes problematic only when these deviations from reality fail to significantly impact the model's explanatory capacity. The second challenge lies in the CAPM's depiction of equilibrium conditions concerning macro-level returns. It does not extend to describing the micro-level equilibrium in relation to the behavior of individual investors. In practice, most investors and institutions maintain portfolios of risky assets that differ from the market portfolio. Consequently, while the model is adept at elucidating the behavior of capital markets as a collective entity, it does not encompass the behavior of individual investors. An investor's portfolio typically deviates from the market portfolio. Consequently, variations of the standard CAPM have been formulated by modifying its fundamental assumptions. These adaptations aim to provide a more comprehensive understanding and elucidation of the standard CAPM, encompassing both investor behavior and asset pricing (Luca, 2018).

The modified CAPM model, which deviates from the standard assumptions of the traditional CAPM, aims to provide a more comprehensive understanding of asset pricing by incorporating investor behavior and asset pricing. The modification to the model often accounts for factors such as market frictions, investor preferences, and the impact of information asymmetry on stock valuations. These adjustments allow for more nuanced assessment of the relationship between risk and expected returns, taking into consideration the complexities of real-world market conditions.

The paper may not elaborate further on the modified CAPM model due to the scope limitations of the research. Since the primary focus of the paper is on the application of the traditional CAPM and its analysis of stock selection in the energy sector, delving into the details of modified CAPM models may exceed the intended scope of the study. However, future research endeavors could aim to explore the implications and intricacies of modified CAPM models in the context of stock valuation within the energy sector.

Within the energy industry, where stock selection is especially important because of the industry's vulnerability to changes in regulations and commodity prices, academics have worked to improve the predictive ability of conventional models such as the CAPM. For example, the researchers suggest including developments in renewable energy, environmental policies, and technical advancements into the CAPM framework. This adjustment takes into account how the energy industry is

changing and how new green technologies interact with more conventional fossil fuels. Investors might get a more sophisticated knowledge of systematic risk and possible returns by fine-tuning the model to account for the particular dynamics of the industry.

Moreover, the literature indicates that there are continuous discussions on whether the CAPM can effectively represent the linkages between risk and return, particularly when non-normal distributions and extreme market occurrences are present. To address some of the issues with the CAPM, substitute models have been developed, including the Carhart four-factor model and the Fama-French three-factor model. These models include other variables, such size, value, and momentum, to provide investors with a more complete set of tools for making decisions and to better explain stock returns. Scholars contend that a one-size-fits-all strategy could not work well for industries with wide variations, such as the energy sector, where specific risk factors and market dynamics are important determinants of stock performance.

In summary, the research indicates an increasing need for sector-specific adjustments and consideration of behavioral elements to strengthen the applicability of the CAPM in the dynamic energy market, even though it is still a frequently used instrument for measuring systematic risk and projected returns. Continual research endeavors are directed on improving current models and creating novel frameworks that more closely correspond with the distinct features and difficulties present in the energy industry, with the ultimate goal of supporting investors in making more customized and knowledgeable decisions.

Method

Dataset Collection

The dataset employed for the analysis presented in this article comprises eleven stocks sourced from companies actively engaged in the Oil, Gas & Coal Equipment and Services sector, as outlined in Table 1. This dataset encapsulates the period spanning from August 2022 to August 2023, thereby affording a comprehensive temporal perspective for the evaluation of the performance and trends within the specified industry. The dataset serves as a robust foundation for the ensuing analysis, facilitating an in-depth exploration of the mechanisms through which company-specific variables and market dynamics influence stock performance within this sector.

Table 1. Data Observation

No	Stock Name	Code	Sub Industry
1	Darma Henwa Tbk	DEWA	
2	Delta Dunia Makmur Tbk	DOID	
3	Sumber Energi Andalan Tbk	ITMA	
4	Samindo Resources Tbk	MYOH	
5	Perdana Karya Perkasa Tbk	PKPK	Oil, Gas, Coal
6	Petrosea Tbk	PTRO	Equipment, &
7	Radiant Utama Interinsco Tbk	RUIS	Services
8	PT Sigma Energy Compressindo Tbk	SICO	
9	PT Pelayaran Tamarin Samudra Tbk.	TAMU	
10	PT Ulina Nitra Tbk	UNIQ	
11	Wintermar Offshore Marine Tbk	WINS	

Source: Indonesia Stock Exchange. (2023). Monthly Stock Performances. *Annual Report 2023*, p.45.

Data Analysis

The Capital Asset Pricing Model (CAPM) constitutes a cornerstone in modern finance, offering a systematic framework for assessing the relationship between an asset's risk and its anticipated return. Financial analysts and investors commonly employ this approach for purposes such as constructing diversified portfolios, ascertaining equilibrium pricing for financial instruments, and appraising the desirability of prospective investments. In this methodology section, we expound upon the key components, underlying assumptions, and procedures entailed in the application of the CAPM formula to analyze the market and project returns (as delineated in Equation 1). The risk-free rate utilized in this study stands at 6.61% (Trading Economics, 2023).

$$R_i = R_f + \beta_i (R_m - R_f)$$

In Equation 1, (R_i) stands for the anticipated asset return, R_f represents the risk-free rate, which is commonly associated with government bond yields, β_i indicates the asset's beta coefficient, reflecting its responsiveness to market fluctuations, and R_m denotes the expected market return.

Result

Based on the provided data and recommendations, DEWA, DOID, MYOH, PKPK, PTRO, UNIQ, and WINS have shown positive annual returns, whereas TAMU, SICO, RUIS, and ITMA have exhibited negative annual returns over the analysis period (Table 2). Projected yearly returns for each stock are determined using Equation 1, which serves as the foundation for these calculations. Stocks are categorized as "Buy" or "Sell" based on recommendations, advising investors on whether to acquire or divest these stocks, considering their historical performance and anticipated returns.

The "buy" or "sell" decision for a specific stock hinge on its relative market value within the broader JKSE (Jakarta Stock Equity) market. Investors employ this assessment to make informed choices in line with their risk preferences and financial goals. A "sell" decision is prudent when a stock is perceived as overvalued, indicating that its market price surpasses its intrinsic value. Such a determination is supported

by evidence suggesting that the expected return value exceeds the actual annual return. This circumstance implies that the current market price of the stock might not be sustainable over the long term, potentially yielding reduced returns for investors.

Conversely, undervaluation indicates that the market price of a stock falls below its intrinsic value, prompting a "buy" recommendation. In this context, investors identify an expected return value that is lower than the annual return. This situation presents discerning investors with the chance to purchase stocks at a price lower than their projected actual value. The decision to "buy" in this context is based on the expectation that the market will eventually acknowledge the stock's complete potential, leading to an increase in its price and improved long-term returns. Essentially, this decision-making process adheres to the concept of valuation equilibrium, where market prices eventually converge with the genuine worth of a stock. Investors operate within the dynamic sphere of stock trading, driven by the interplay among a stock's intrinsic value, its market price, and the overarching value of the JKSE market. In essence, the intricate interplay between investor decisions and market valuations epitomizes an ongoing pursuit to achieve equilibrium between reward and risk. The decision to "buy" or "sell" stems from a comprehensive examination of market patterns, company fundamentals, and the likelihood of price fluctuations. This analytical method empowers investors to harmonize their strategies with market dynamics to successfully achieve their financial goals.

Table 2. The Calculation of Annual Return (R_i), Market Return, and the Expected Annual Return (E_{Ri})

No	Code	Annual Return (R _i)	Market Return	Expected Annual Return (E _{Ri})	Value	Recommendation
1	DEWA	0.047586	-0.019711	0.022348	Undervalue	BUY
2	DOID	0.090681	-0.019711	-0.195457	Undervalue	BUY
3	ITMA	-0.483876	-0.019711	-0.044146	Overvalue	SELL
4	MYOH	0.025413	-0.019711	0.023471	Undervalue	BUY
5	PKPK	0.167172	-0.019711	-0.083840	Undervalue	BUY
6	PTRO	0.380743	-0.019711	0.040929	Undervalue	BUY
7	RUIS	-0.209620	-0.019711	0.080101	Overvalue	SELL
8	SICO	-0.251400	-0.019711	0.204816	Overvalue	SELL
9	TAMU	-1.391092	-0.019711	0.546744	Overvalue	SELL
10	UNIQ	1.588140	-0.019711	0.092259	Undervalue	BUY
11	WINS	0.832527	-0.019711	-0.409588	Undervalue	BUY

Source: Data Processed (2023)

The "Buy" recommendation for DEWA, DOID, MYOH, PKPK, PTRO, UNIQ, and WINS stocks signifies that their expected returns surpass their current market valuations, potentially rendering them attractively priced. Conversely, the "Sell" advice for ITMA, RUIS, SICO, and TAMU stocks reflects concerns over potential overvaluation or a lower-than-expected performance, manifesting as expected returns falling short of market values. These "Sell" recommendations pertain to stocks with negative annual returns and are underpinned by the belief that the associated risks outweigh the anticipated returns. Constructing a diversified portfolio is a prudent strategy for

investors seeking to mitigate risk while optimizing returns. This approach necessitates the achievement of a balance between relatively stable options (as per "sell" recommendations) and high-risk, high-return stocks (as denoted by "buy" recommendations). The "Buy" advice for DEWA, DOID, MYOH, PKPK, PTRO, UNIQ, and WINS, despite their favorable individual annual returns, may reflect a circumspect market sentiment, potentially stemming from volatility or unaccounted-for factors within the available dataset.

To investigate the proposition that the market value of JKSE impacts the individual stock values of companies, an analytical approach employing CAPM and Python was undertaken. The findings reveal that out of all the companies, only two, DOID (Delta Dunia Makmur) and WINS (Wintermar Offshore Marine), exhibit a substantial correlation with the JKSE market value (Table 3). Specifically, the statistical analysis assigns P-values of 0.014 and 0.038 to DOID and WINS, respectively, signifying the strength of the influence.

The absence of a P-value surpassing the 0.05 threshold for other companies implies that, statistically speaking, they do not exhibit a significant relationship with the JKSE market value. This lack of significance suggests that the market value of JKSE does not exert a substantial influence on the stock values of these companies. A noteworthy case is PTRO, where the highest P-value of 0.929 is observed, accompanied by a coefficient of 0.1640. This indicates a weak correlation between the JKSE market value and PTRO's stock value. The high P-value and relatively small coefficient suggest that any impact of JKSE's market value on PTRO's stock value is limited, and any observed changes might be coincidental rather than causative. The coefficient of 0.1640 implies that, for every unit change in JKSE's market value, PTRO's stock value changes by only a small fraction of that unit. These results emphasize the heterogeneity of the market and highlight the varying degrees of influence that the JKSE market value has on different companies. While some companies exhibit significant correlation, others demonstrate minimal to no impact, underlining the importance of considering individual company characteristics and external factors when analyzing market relationships.

Table 3. Linear Regression Analysis Using Python

No	Code	Coefficient	P-Value	Analysis
1	DEWA	1.0080	0.338	Variable RM is not significant with R (DEWA)
2	DOID	2.9976	0.014	Variable RM is significant with R (DOID)
3	ITMA	1.4832	0.411	Variable RM is not significant with R (ITMA)
4	MYOH	0.4850	0.156	Variable RM is not significant with R (MYOH)
5	PKPK	1.6799	0.221	Variable RM is not significant with R (PKPK)
6	PTRO	0.1640	0.929	Variable RM is not significant with R (PTRO)
7	RUIS	-0.0919	0.901	Variable RM is not significant with R (RUIS)
8	SICO	-0.5217	0.354	Variable RM is not significant with R (SICO)
9	TAMU	-5.0986	0.177	Variable RM is not significant with R (TAMU)
10	UNIQ	-1.0237	0.813	Variable RM is not significant with R (UNIQ)
11	WINS	5.2282	0.038	Variable RM is significant with R (WINS)

Source: Data Processed (2023)

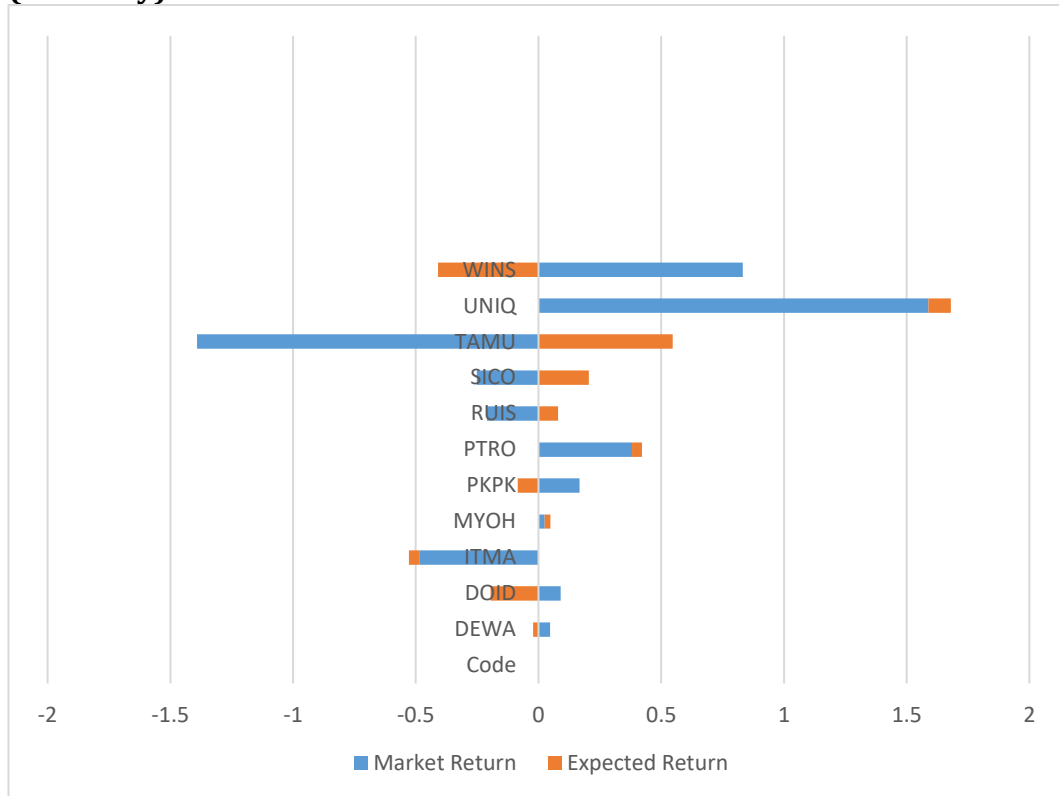
Discussion

The phenomenon of stock undervaluation within the global Oil, Gas & Coal Equipment and Services sector results from a multifaceted interplay between various factors. Some of these factors are inherent to the industry, while others are contingent upon broader market and economic conditions (Panayotou, 1993). Market sentiment plays a pivotal role in shaping stock valuations (Bajo & Raimondo, 2017). Negative sentiments, frequently originating from uncertainties in regulatory policies, geopolitical unrest, or concerns about the global economic conditions, can trigger cautious behavior among investors. As a result, stock prices may decrease, resulting in situations of undervaluation. Price swings can be influenced by psychological reactions to adverse news and sentiments, even if they are fundamentally justified. The volatility of commodity prices, especially in the oil, gas, and coal sectors, is closely tied to the performance of the Oil, Gas & Coal Equipment and Services industry. The sector's fortunes are intrinsically intertwined with variations in the prices of these commodities, exerting influence on firms' revenues and profitability. Prolonged periods of elevated or diminished volatility can engender a perception of heightened risk, potentially contributing to stock prices being undervalued relative to the underlying intrinsic value of the companies involved.

The energy sector, encompassing the specified subsector, is distinguished by its inherent cyclicity. Economic contractions or alterations in the energy market can result in diminished allocations for activities related to exploration, drilling, and related services. In challenging times, stock prices may depreciate due to the industry's cyclicity, thereby resulting in diminished revenues and earnings for participating firms. The energy sector is considerably susceptible to government policies, encompassing political, regulatory, and legislative factors. Alterations in tax laws, environmental regulations, or licensing requirements can significantly affect the financial stability and operational dynamics of companies. The inherent uncertainty associated with such changes can lead investors to undervalue these companies, stemming from a reduced optimism regarding the prospects.

There is similar research paper titled "Investment Decision Using Capital Asset Pricing Model (CAPM) in Indonesia's Banking Sector" by Mulyaningsih and Heikal that could provide additional insights. The paper analyzed the expected return of individual stocks based on the return market and risk-free rate under the Capital Asset Pricing Model (CAPM). It found that two out of six digital banking stocks were categorized as efficient or undervalued, suggesting that investors should consider buying or holding these stocks. The regression model indicated that the excess return variable had a positive and substantial effect on stock returns. The paper also highlighted the importance of extending the research duration, increasing the sample size, and incorporating dividends into the overall return for more credible investment decisions (Mulyaningsih & Heikal, 2022).

Figure 1. The Comparison of Market Return and Expected Return (Annually)



Renewable energy sources and efficiency-enhancing technologies are gaining prominence, driven by technological progress and the increasing emphasis on sustainability. Failure to adapt to these transformative trends could constrain growth opportunities for businesses, potentially rendering their stock prices undervalued within the evolving industry landscape. Stock valuation may be discounted due to a lack of investor attention, attributable to factors such as limited recognition, reduced trading volumes, or inadequate analyst coverage. Consequently, these circumstances may lead to instances of undervaluation, presenting opportunities for investors who recognize the underlying potential.

Elevated debt levels can trigger investor concerns, particularly in struggling industries. Companies with substantial debt burdens may be deemed riskier investments, potentially resulting in undervaluation as the market factors in this perceived risk. A sector's companies facing stagnant or declining financial performance could lead the market to view their stocks as undervalued, reflecting market skepticism about their prospects. It's important to acknowledge that financial markets are not always completely efficient. Stocks can be incorrectly priced and undervalued due to behavioral biases, disparities in information, and market irregularities. Astute investors can seize opportunities when discerning disparities between stock prices and intrinsic value, capitalizing on market inefficiencies. A range of macroeconomic factors, such as interest rates, inflation, and the general economic growth, hold substantial sway over how investors perceive the energy sector and its

individual firms. Unfavorable macroeconomic circumstances can result in undervaluation, as investors lower their expectations for future results.

Conclusion

Analysis of stock performance within the Jakarta Stock Exchange (JKSE) market unveils a dynamic milieu characterized by substantial disparities between expected returns and individual annual returns. Notably, seven of the scrutinized stocks (DEWA, DOID, MYOH, PKPK, PTRO, UNIQ, and WINS) manifest positive annual returns, underscoring their growth trajectory over the specified period. Conversely, the narratives of four companies (ITMA, RUIS, SICO, and TAMU) diverge as each exhibits a diminution in value throughout the analysis, signifying a negative individual annual return.

An intricate array of recommendations arises upon meticulous examination of the intricacies associated with each stock, directing investor choices toward either "Buy" or "Sell" classifications. This categorization arises from the congruence between the intrinsic value of each stock and the overarching market value of JKSE. In the case of seven stocks (DEWA, DOID, MYOH, PKPK, PTRO, UNIQ, and WINS), their anticipated returns surpass their current market appraisals, indicating potential undervaluation and warranting a "Buy" recommendation. Conversely, four stocks (ITMA, RUIS, SICO, and TAMU) warrant a "Sell" recommendation due to their projected returns falling short, signaling overvaluation or the potential for underperformance. By elucidating the intricate interplay among market values, individual stock dynamics, and strategic investor decisions, this comprehensive analysis offers a holistic guide for portfolio optimization.

By considering the study's findings, some recommendations for future study are investigating the fluctuations in global financial markets, especially in the wake of momentous occurrences like the COVID-19 epidemic, assessing the emergence of renewable energy sources and the energy transition, and scrutinizing the contingency plans for oil corporations and nations that export oil. Analyzing the Capital Asset Pricing Model's (CAPM) use and consequences in various financial and economic contexts.

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