
**THE EFFECT OF INVESTMENT OPPORTUNITY SET ON FIRM VALUE
WITH PROFITABILITY AS A MODERATING VARIABLE IN THE IDX
ENERGY SECTOR 2022-2024**

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Abstract

Firm value is a key barometer reflecting market assessments of a corporation's achievements and future projections. This research focuses on examining the impact of investment opportunities on firm value, with profitability as a moderating factor, across all companies listed on the IDX, particularly in the energy sector, from 2022 to 2024. Purposive sampling was used to select the sample, resulting in 51 observations and 153 data points. Moderated Regression Analysis (MRA) was used for data processing using EViews 13 software. Empirical findings demonstrate that investment opportunities have a unidirectional and significant impact on firm value (PBV). However, profitability (ROA) does not appear to moderate the relationship between investment opportunities and firm value. This clarifies that investor groups within the energy sector allocate a higher priority toward long-term growth capacity rather than short-term earnings variations when assessing a company's market worth.

Keywords: Investment Opportunity Set, Profitability, Company Value, MBVE, ROE

INTRODUCTION

The shift from biomass to fossil fuels, triggered by the Industrial Revolution, has fundamentally transformed the global energy landscape and become a primary driver of global economic growth. The shift in the power supply system has had a massive positive impact on accelerating macro-financial growth through the push to increase the diversity of power supply sources, along with steps to reduce the impact of fluctuating fossil fuel prices on the financial situation (Yang et al., 2024). Growing public awareness of environmental issues is driving companies to be more socially and environmentally responsible in their operations (Jayanti et al., 2024). The global energy transition is not only changing the energy sources used but is fundamentally altering how the market evaluates energy companies.

The operational performance executed by management, along with the perspective of the *investor*, directly shapes the *firm value*. Based on the study by Mukhtaruddin et al., (2024) the conceptualization of *firm value* is reflected through the total market capitalization of equity possessed by the *company*. The total market value shows the level of investor assessment of the effectiveness of corporate work along with future projections. Assessments of corporate value and sustainability must be analyzed using financial indicators and economic models capable of comprehensively depicting the company's condition and performance (Horobet et al., 2025).

The energy sector is one of the areas that shows this movement the most, considering that this area contributes to foreign exchange contribution to gross domestic income (Salsabilah et al., 2025). Companies in this sector not only act as drivers of development but also as entities bearing the greatest environmental risks. The valuation of a company can be determined by various elements, for example financial performance, stock market situation, and the good name of the corporation from the perspective of investors and the general public (Winarso, 2025). Thus, the increase in investment activity and the number of energy sector issuers signals a larger *investment opportunity* set in the future.

Investors allocate their funds to company stocks deemed capable of generating returns (Pradnya et al., 2022). In this context, the investment opportunity component is the main reference for investors to measure projected expansion and corporate profitability in the future. The investment opportunity aspect reflects the corporation's capabilities in optimizing capital as well as investment opportunities to support progress in the future (Firmansyah et al., 2022). Business entities that have bright investment opportunities prefer to allocate internal capital to fund investment project agendas that bring profits to the company rather than distributing it to share owners in the form of dividends (Luh et al., 2024). This explanation shows that *investment opportunity* plays a large role as a parameter for expansion projections and the attractiveness of corporations in the eyes of investors.

Generally, the market ratio measured through the *Market-to-Book Value of Equity* (MBVE) serves as a primary indicator to determine the actual *investment opportunity set* available to a *company*. Such circumstances do not merely portray the company current state but additionally signify its upcoming outlooks, which can be observed through the results of its financial performance measurements (Ariyadni & Irawati, 2023). Corporations possessing an elevated *investment opportunity* commonly obtain an enhanced public appraisal owing to the assumption that those entities hold enduring expansion capabilities along with the capacity to

yield continuous *profitability* (Pradnya et al., 2022). Apart from that, the expansion of *Investment Opportunity Set* influence toward *firm value* is likewise contingent upon how efficiently the asset administration plans are executed and the composition of the funding structure implemented (Widjaja et al., 2024). This implies that the magnitude of the magnitude of investment opportunities does not always directly lead to an increase in firm value if not balanced by managerial capability in optimizing available resources.

In addition to *the Investment Opportunity Set*, profitability is also a key consideration in explaining firm value. Higher reported profitability in financial statements indicates better financial performance, which ultimately reflects improved investor welfare and a more promising assessment of the firm's future prospects (Christiaan et al., 2023). High profitability reflects excellent company prospects, which are perceived as a positive signal by the market and possess the capacity to expand the company valuation in the long run (Kusumaningrum, 2022).

Referring to the volatile movements of *company valuation* across the *energy sector* throughout the 2022 to 2024 timeframe, there are a number of factors influencing the rise and fall of these companies' values, including the *Investment Opportunity Set* (IOS) measured by MBVE and profitability measured using ROE.

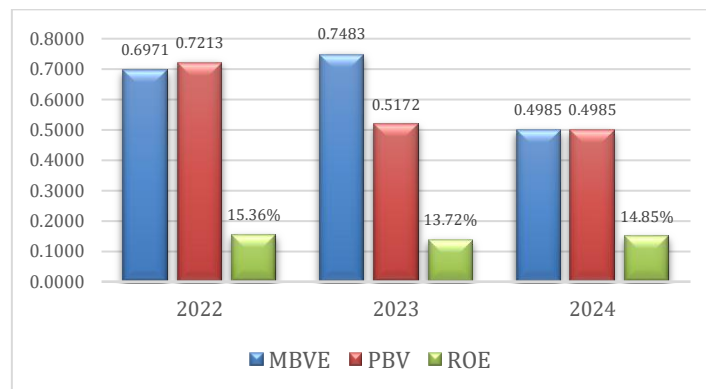


Figure 1.
Average MBVE, PBV, and ROE for the 2022-2024 Period

Source: www.idx.co.id (Data processed in 2025)

Drawing from Figure 1, the mean MBVE applied as an indicator for the *investment opportunity* within *energy sector* enterprises demonstrated variations during 2022-2024, expanding from 0.6971 (2022) up to 0.7483 (2023), before dropping down to 0.4985 (2024). Nonetheless, the upward shift of the *investment opportunity* throughout 2023 ran counter to the movement of *company valuation* represented by PBV, given that the PBV conversely experienced a contraction from 0.7213 down to 0.5172, and further declined to 0.4985 in 2024. Meanwhile, profitability, as measured by *Return on Equity*, fluctuated from 15.36% (2022), dropping to 13.72% (2023), and then rising to 14.85% (2024). This situation indicates that increased investment opportunities and profitability have not always been positively reflected by the market in the company's valuation, resulting in a gap between theory and empirical conditions for energy sector companies during the 2022-2024 period.

Conceptual assumptions suggest that elevated *profitability* ought to intensify the connection linking the *investment opportunity* toward *firm value*, since superior earnings demonstrate administration efficiency in executing potential business options. However, the phenomenon observed in energy sector companies during the 2022-2024 period indicates conditions that do not fully align with this theory. In 2024, Return on Equity (ROE) increased, but Market to Book Value of Equity (MBVE) and Price to Book Value (PBV) actually declined. This condition indicates that increased profitability does not necessarily boost investor confidence or corporate value. Furthermore, an expansion in *investment opportunity* options does not invariably run parallel with an appreciation of corporate worth, hence establishing a disparity against established conceptual frameworks and empirical evidence that warrants further investigation.

Studies by Fenny & Irawati (2023), Maulana et al. (2025), Zenabia & Falih (2024), Wardani & Machdar (2023), and Warisqia Dwi Yuli Lestari & Tumirin Tumirin (2024) state that the IOS exerts a meaningful upward influence toward *firm value*. On the other side, inquiries carried out by Mutmainah et al. (2024) along with Mariva et al. (2022) demonstrate that *investment opportunity* yields no influence toward *firm value*. These conflicting outcomes imply the involvement of alternative elements that might alter the correlation linking *investment opportunity* and *firm value*, with *profitability* being one such component. Superior *profitability* possesses a tendency to elevate equity pricing while conveying optimistic indications toward *investor* circles, subsequently steering toward an enhancement in *firm value* (Nikmah, 2020). Conversely, low profitability can limit the realization of investment opportunities, so IOS is not always positively received by the market.

REVIEW OF LITERATURE

Signaling Theory

The mechanism by which an entity transmits indicators toward outside observers concerning the company current state along with its upcoming outlooks is clarified through *Signaling Theory*. These signals consist of information about what management has done to achieve its objectives of the owners (Fajar Ilmiyono et al., 2021). This investigation evaluates the link connecting the *investment opportunity set* and *firm value*, which is *moderate* by *profitability*.

Investment Opportunity Set

The *investment opportunity set* denotes financial allocations concerning the holdings possessed and deployed by a *company* to advance subsequent wealth expansion (Wulandari & Trisnawati, 2021). Companies with a high *investment opportunity set* are typically perceived as having greater growth prospects, making them more attractive to investors. A higher value indicates a higher level of prosperity for shareholders (Dewi & Sembiring, 2022). A *company investment opportunity set* possesses the capacity to alter how administrators, proprietors, *investor* circles, and lenders perceive the organization (Yusra et al., 2024).

$$MBVE = \frac{\text{Outstanding Share} \times \text{Closing Price}}{\text{Total Equity}} \times 100\%$$

Profitability

The operational capacity of a company to maximize net earnings relative to its utilized capital, which serves as a benchmark for the investor to evaluate managerial efficiency, is

represented by *profitability*, and this financial metric provides a clear view regarding how effectively resources are managed to generate sustainable returns for the *investor* (Yusra et al., 2024). Companies with high profitability are highly sought after by investors because they are viewed as highly profitable; conversely, *investor* groups decline to allocate capital arbitrarily across any random *company* (Kusumaningrum, 2022). Consequently, *profitability* frequently serves as a baseline for fiscal execution and a major element in attracting *investor* interest, given that it illustrates revenue continuity alongside *company* fiscal soundness.

$$ROE = \frac{\text{Net Profit}}{\text{Total Equity}} \times 100\%$$

Enterprise Value

Corporate value mirrors *investor* viewpoints regarding administrative achievements in supervising *company* endowments. Enterprise value reflects how well or poorly management manages its assets, as evidenced by the financial performance metrics achieved (Mariva et al., 2022). An elevated equity price translates into expanded gains for equity owners; consequently, this situation attracts investors because increased demand for shares leads to a rise in enterprise value (Yusra et al., 2024).

$$PBV = \frac{\text{Market Price per Share}}{\text{Book Value per Share}} \times 100\%$$

This inquiry intends to examine the *investment opportunity set* influences toward *firm value* by incorporating *profitability* as a *moderating* metric across organizations registered at the Indonesia Stock Exchange. In academic terms, this inquiry is anticipated to back the progression of corporate finance literature through broadening empirical data concerning the link between *investment opportunity set*, *profitability*, and *firm value*. This inquiry also resolves an existing academic void stemming from variations in earlier analyses, while presenting functional suggestions for corporate administrators and *investor* parties in making strategic decisions regarding investment and financial performance management.

1. To what extent does the Investment Opportunity Set influence the firm value of entities operating in the energy sector listed on the Indonesia Stock Exchange (IDX) during the 2022-2024 period?
2. How does profitability moderate the influence of the Investment Opportunity Set on the firm value of entities operating in the energy sector listed on the Indonesia Stock Exchange (IDX) during the 2022-2024 period?

Empirical literature on this topic has largely focused on firms, but the capacity of profitability to act as a moderating variable has rarely been examined, resulting in conflicting results and the precise moderation mechanism of profitability remaining unresolved, particularly in the context of emerging markets (Marsifa et al., 2025). Theoretically, profitability is anticipated to intensify the link connecting the *investment opportunity set* and *firm value* since enterprises with superior earning levels generally hold broader fiscal capacities to execute their *investment opportunity set* (Kadek et al., 2022). However, empirical results show significant variation across studies. Putri & Machdar (2023) established that *profitability* amplifies the *investment opportunity set* influences toward *firm value*, since superior earnings transmit an optimistic indication toward *investor* circles regarding the enterprise capacity to govern expansion options.

Conversely, discrepancies exist as alternative inquiries demonstrate that *profitability* fails to perform a meaningful function as a *moderating* element within this link. An analysis executed by Hutapea et al., (2020) focusing on petroleum and gas enterprises in Indonesia established that *profitability* does not meaningfully alter the link connecting the *investment opportunity set* and *firm value*. The capacity of a *company* operating within the *energy sector* to transform its capital allocations into an expansion of *firm value* generates substantial financial returns.

RESEARCH METHOD

This inquiry implements a quantitative research framework utilizing descriptive along with causal analytical techniques to verify the causal connections across variables (Paramita dkk., 2021; Sugiyono, 2023). The main objective of this analysis is to evaluate the investment opportunity set influences toward firm value, incorporating profitability to act as a moderating element, focusing on energy sector enterprises registered at the Indonesia Stock Exchange (idx) spanning the 2022-2024 period.

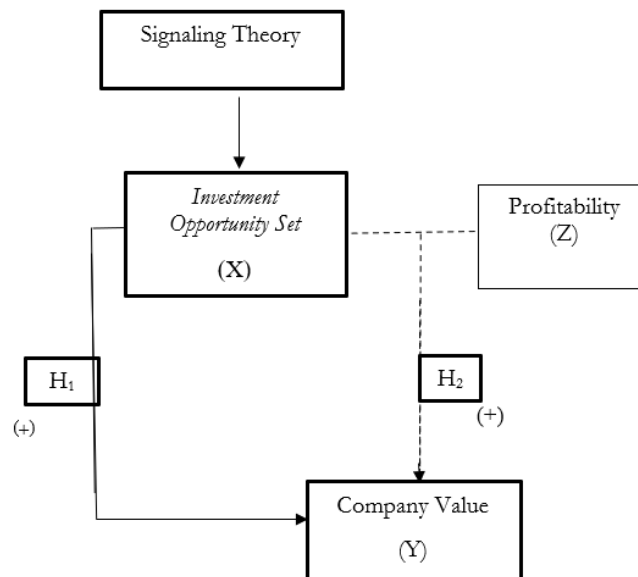


Figure 2
Conceptual Framework

Participant choosing was executed utilizing a *purposive sampling* approach determined by these specific benchmarks: (1) *energy sector* enterprises continuously registered at the Indonesia Stock Exchange within the 2022 to 2024 timeframe; (2) *energy sector* corporations that failed to publish thorough yearly disclosures throughout 2022-2024; (3) *company* entities presenting fragmentary details concerning the analyzed metrics (the necessary documentation is ordinarily retrievable within the fiscal disclosures on the *company* online portal or the *idx* portal throughout the 2022-2024 timeframe).

Table 1
Sample Selection Using Purposive Sampling

No	Criteria	Number Companies	Number Data
1	Corporate entities operating within the <i>energy sector</i> that maintain continuous listing status on the Indonesia Stock Exchange (<i>IDX</i>) from 2022-2024	88	264
2	Corporate entities operating within the <i>energy sector</i> that fail to present complete annual disclosures throughout the 2022-2024 period	(34)	(102)
3	Companies that provided data related to research variables is incomplete (the complete data is available in financial company <i>the company's website</i> or <i>the IDX website</i> for the 2022-2024 period)	(3)	(9)
	Total	51	153

Utilization of secondary information requires collecting public data directly from the formalized *IDX* online network alongside the individual portals of each *company*. Quantitative evaluation within this inquiry was performed utilizing E-Views 13 computational tools. This computational assessment commenced with descriptive statistics to offer a comprehensive summary concerning the parameters of the analyzed information. Panel data regression model applies Moderated Regression Analysis (MRA) to examine how *profitability* operates as a *moderating* factor within the structural *influence* of the *investment opportunity set* toward *firm value*. Researchers can ensure the selection of a precise estimation model for panel data by systematically applying both the *Chow* and *Hausman* evaluation procedures. Additionally, this study conducted tests of classical assumptions, including tests for multicollinearity and heteroscedasticity, to ascertain that the analytical configuration satisfies the required statistical criteria. Hypothesis evaluation was carried

out utilizing partial examinations (t-tests) to establish the standalone *effect* belonging to each individual metric under observation.

Panel configurations represent an integration of time series records information tracked across a designated temporal span and cross-sectional records information comprising details from distinct subjects gathered at an identical moment. In this study, the model used combines elements of both types of data (Basuki, 2021: 5); (Paramita, 2021: 113). The general panel data regression model is:

$$Y = \alpha + \beta \text{IOS}_{it} + e$$

Information:

Y	=	Company Value
α	=	Constants
$\beta_{1,2}$	=	Regression Coefficients
IOS	=	<i>Investment Opportunity Set</i>
e	=	Standard Error
i	=	Company Data
t	=	Time Period Data

Hypothesis Development

The Relationship Between the Investment Opportunity Set and Firm Value

The investment opportunity set denotes those commercial pathways open for execution by investor groups (Ilahi & Suryantini, 2025). Based on signaling theory, companies with a high investment opportunity set will send positive signals to investors. When investors perceive that a company has a strong investment opportunity set, they will react positively by assigning a premium to the company's stock price, which is demonstrated through an upward movement in firm value (PBV). Research by Muadz & Sastradipraja., (2024) clarifies that the investment opportunity set operates as a positive indicator for investor circles when interpreting a company expansion outlook, subsequently delivering a meaningful positive impact toward firm value. Correspondingly, literature presented by Zenabia & Falih, (2024) along with Ariyadni & Irawati, (2023) affirms that the investment opportunity set yields a meaningful positive effect toward firm value.

H₁: The investment opportunity set has a positive and significant effect on firm value

The Role of Profitability as a Moderator of the Relationship Between the Investment Opportunity Set and Firm Value

Profitability represents a company inherent capacity to accumulate earnings (Wulandari & Trisnawati, 2021). Regarding its function to moderate, profitability operates to amplify the link connecting the investment opportunity set and firm value. Concurrently, a company profitability performs a prominent task in offering visibility regarding and implications for the firm's ability to generate revenue (Putri & Machdar, 2023). A high investment opportunity set without strong profitability may be viewed as a weak or unconvincing signal.

H₂: Profitabilitas memoderates the effect the Investment Opportunity Set on firm value

Discussion

Panel Data Regression Estimation Model

1. Chow Test

Table 2
Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.080666	(50,101)	0.0000
Cross-section Chi-square	169.214052	50	0.0000

Source: Data processed using E-Views 13

Pointing to Table 2, the outcomes of the Chow evaluation demonstrate that the probability index stands at 0.0001, which is below 0.05, thereby validating H_a , which means the most suitable configuration is the Fixed Effect Model (FEM).

2. Hausman Test

Table 3
Results of the Hausman Test

Effects Test	Chil-Sq Statistic	Chil-Sq. d.f.	Prob.
Cross-section random	65.613084	1	0.0000

Source: Data processed using E-Views 13

Referring Table 3, the outcomes generated from the Hausman evaluation indicate a probability index of 0.00001, which is > 0.05 ; consequently, H_a is dismissed, confirming that the Fixed Effect Model (FEM) represents the most suitable configuration.

Classical Assumption Test

1. Multicollinearity Test

Table 4
Results of the Multicollinearity Test

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
X	0.002407	2.542186	1.602457
Z	0.033790	2.404259	1.730454
XZ	0.018707	2.789000	2.498280
C	0.002282	2.121699	NA

Source: Data processed using E-Views 13

The data described above demonstrates that the Centered VIF index for variable X (*investment opportunity set*) stands at $1.6 < 0.8$, for variable Z (ROE) reaches $1.7 < 0.8$, and for the X-Z combined metric hits $2.4 < 0.8$. Since each of these metrics sits underneath the allowable

threshold of 10, the deduction can be made that the analytical setup within this inquiry remains unhampered by multicollinearity complications. Accordingly, no intense association links the independent metrics, rendering the analytical setup appropriate for subsequent evaluations.

2. Heteroscedasticity Test

Table 5
Results of the Heteroscedasticity Test

Variable	Prob.
X	0.8540
Z	0.0518
C	0.9789

Source: Data processed using E-Views 13

Referring to Table 5, the outcomes extracted from the heteroscedasticity evaluation reveal that variance irregularities exist within the analytical framework of this inquiry. This condition suggests that the error variance is not constant, which can affect the accuracy of the estimates. Therefore, to address this issue, the robust standard error (White) method was employed, which produces estimates that remain consistent and reliable even in the presence of heteroscedasticity. The occurrence of variance irregularities within the analytical framework can be managed by applying robust standard adjustments (White) to ensure that the estimation results remain accurate (Yuswandani et al., 2024). Consequently, the subsequent hypothesis testing results are based on this improved model.

Panel Data Regression Analysis

Table 6
Results of Panel Data Analysis

Variable	Coefficient	Sig.Probability
C	0.053099	0.2681
X_IOS	0.782767	0,0000

Source: Data processed using E-Views 13

Referring from Table 6, the formulation for the analytical framework equation can be structured in the following manner:

$$NP = 0.053099 - 0.782767IOS + \epsilon_0$$

The constant metric of 0.053099 shows that assuming the independent metric (X) stands at zero, the *company* worth (Y) will equal 0.053099. The *investment opportunity set* metric (X) exhibits a *positive effect* with a parameter value of 0.782767, which implies that each 1% upward shift in X will elevate the *company* worth by 0.782767, assuming alternative metrics remain unchanged.

Moderated Regression Analysis (MRA)

Table 7
MRA Results

Variabel	Coefficient	Sig.Probability
C	0.053099	0.2681
X*Z_IOS*Profitability	0.059212	0.6657

Source: Data processed using E-Views 13

The formulation for the empirical regression model is structured below, derived from the statistical outputs presented in Table 7:

$$NP = .053099 - 0.782767IOSit + 0.059212 (IOS*P) it + \varepsilon_0$$

The constant parameter of 0.053099 shows that assuming the standalone metric (*investment opportunity set*) alongside its combined expression with *profitability* (investment opportunity set x Z) equal zero, the *company* worth (Y) stays at 0.053099. The multiplier index for *investment opportunity set* x Z, recorded at 0.059212, this implies that a single-unit expansion in *profitability* elevates the effect of the *investment opportunity set* toward *firm value* by 0.059212.

Partial Hypothesis Testing (t- Test)

Table 8 Results of the t-Test

Variabel	Coefficient	Sig.Probability	Kesimpulan
IOS	0.782767	0.0000	Ha diterima
IOS_Profitability	0.059212	0.6657	Ha ditolak

Source: Data processed using E-Views 13

Referring to Table 8, the *investment opportunity set* (X) metric exhibits a p-value of 0.0000 (< 0.05), thereby validating Ha. The *positive* parameter of 0.782767 shows a *positive effect* of the *investment opportunity set* toward *firm value*. The combined expression between *investment opportunity set* and *profitability* presents a p-value of 0.6657 (> 0.05), hence Ha is dismissed. *Profitability* fails to function to *moderate* the correlation linking the *investment opportunity set* and *firm value*.

Evaluating the analytical outcomes, the *investment opportunity set* displays a *positive* and meaningful effect toward *firm value*, supported by a p-value of 0.0000 (< 0.05) and a parameter value of 0.782767. These outcomes demonstrate that an expanded *investment opportunity set* corresponds to a superior *firm value*. This determination corresponds with Signaling Theory, which posits that an elevated *investment opportunity set* conveys a *positive* indication toward *investor* groups regarding the *company* subsequent expansion outlook, thereby amplifying *firm value*. An upward shift in *firm value* runs parallel with an enhancement in stockholder prosperity (Romli & Zaputra, 2021). These analytical findings likewise reinforce the inquiries executed by Putri & Suzan (2025), Mulyani dkk. (2022), and Wardani & Machdar (2023) found that statistical calculations indicate that the availability of an *investment opportunity set* yields a positive influence regarding the accumulation of *firm value*.

Conversely, the analytical outcomes reveal that *profitability* does not *moderate* the effect of the *investment opportunity set* toward *firm value*, as demonstrated by the combined metric p-value of 0.6657 (> 0.05). This outcome matches the inquiry of Hutapea et al. (2020), which demonstrates that *profitability* is unable to *moderate* the correlation linking the *investment opportunity set* and *firm value*. This clarifies that *investor* circles are inclined to favor the actual commercial execution of the

enterprise over future enterprise options that remain prospective; consequently, the expansion of capital allocations does not automatically translate into immediate market premium recognition when current earnings performance remains unchanged.

CONCLUSION

Empirical evidence gathered throughout this evaluation leads to several core determinations:

1. The availability of an *investment opportunity set* exerts a substantial positive influence on the accumulation of firm value
2. Empirical calculations demonstrate that *profitability* fails to *moderate* the *influence* generated by the *investment opportunity set* regarding *firm value*

The analytical outcomes of this inquiry demonstrate that the *investment opportunity set* exerts a meaningful *positive effect* toward *firm value*, which indicates that potential commercial options serve as a primary consideration for *investor* groups when evaluating an enterprise subsequent outlook. *profitability* was not established to *moderate* this association; therefore, fluctuations in current net earnings do not alter the way the market values the long-term *investment opportunity* portfolio held by entities within the *energy sector*. This inquiry bears constraints concerning the participant boundaries, which concentrates solely on the *sector energy*, the brief monitoring timeframe, and the deployment of restricted metrics. Consequently, subsequent academic work is advised to broaden the corporate categories, elongate the timeframe, and incorporate extra metrics to render the final analytical outcomes more thorough.

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