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The Effect of Fuel Price Increase Information Framing on Investment Decisions in Energy Sector Stocks: The Role of Risk Perception and Overconfidence

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Abstract

This study aims to examine the effect of fuel price increase information framing on investment decisions in energy sector stocks, with risk perception as a mediator and overconfidence as a moderator. The study employs an experimental research design, in which respondents were randomly assigned to one of three framing conditions. Data were analyzed using PROCESS Macro Model 7 in SPSS. The results indicate that 1) positive framing has a significant positive effect on investment decisions, while negative framing has no significant effect, 2) framing does not have significant effect on risk perception, 3) risk perception has a significant positive effect on investment decisions, 4) risk perception does not mediate framing and investment decisions, 5) overconfidence does not moderate the effect of framing on risk perception and 6) overconfidence does not moderate the indirect effect of framing on investment decisions through risk perception.

Keywords: Framing Effect, Investment Decisions, Risk Perception, Overconfidence.

INTRODUCTION

Investment decisions are influenced not only by objective financial information, but also by the way information is presented to investors. Traditional finance assumes that investors behave rationally by evaluating all available information before making investment decisions. However, behavioral finance suggests that cognitive biases and psychological factors often influence investors' judgments, causing them to deviate from rational decision-making (Kahneman & Tversky, 1979; Nofsinger, 2018). One of the most widely studied cognitive biases is the framing effect, which explains that individuals may arrive at different

decisions when identical information is presented in different ways.

The framing effect has become increasingly relevant in financial markets, particularly during periods of economic uncertainty. Macroeconomic events, such as inflation, interest rate adjustments, and fuel price changes, frequently become major sources of information that shape investors' expectations. In Indonesia, government announcements regarding fuel price (BBM) adjustments often trigger widespread public discussion because they affect inflation, production costs, and corporate profitability

across various industries. However, these announcements may also create different investor responses depending on whether the information emphasizes potential opportunities or potential losses.

Interestingly, the energy sector presents a unique context in this situation. Unlike many industries that experience increased operational costs due to rising fuel prices, energy companies may benefit from higher commodity prices and increased market demand. Consequently, identical information about fuel price increases can generate different investment responses depending on how the information is framed. Positive framing may encourage investors to focus on future opportunities and corporate growth, whereas negative framing may direct their attention toward economic uncertainty and investment risk.

Previous studies have consistently demonstrated that framing influences financial decision-making (Tversky & Kahneman, 1981; Levin et al., 1998). Nevertheless, empirical findings remain inconclusive regarding the psychological mechanisms through which framing affects investment decisions. Several studies report that investors' risk perception mediates the relationship between information framing and investment behavior, whereas others suggest that framing directly influences investment decisions without substantially altering investors' perception of risk. These inconsistent findings indicate that additional investigation is required to clarify the underlying decision-making process.

Behavioral finance literature also emphasizes that investors possess different psychological characteristics that may influence how they process financial information. One important behavioral bias is overconfidence, defined as an excessive belief in one's own knowledge, judgment, and forecasting ability (Barber & Odean, 2001). Overconfident investors tend to underestimate uncertainty and rely excessively on their personal assessments when making investment decisions. Consequently, the effectiveness of information framing in shaping risk perception may vary according to investors' level of overconfidence. Despite its theoretical importance, empirical evidence regarding the moderating role of overconfidence in the relationship between framing and risk perception remains limited, particularly in emerging markets.

Another limitation of previous studies is that most framing research has been conducted using general financial scenarios, stock market simulations, or laboratory experiments without considering sector-specific macroeconomic information. Research examining fuel price announcements as an experimental stimulus remains scarce, particularly in the context of Indonesia's energy sector. Furthermore, previous studies generally investigated mediation or moderation separately, while limited attention has been given to the moderated mediation mechanism that simultaneously explains how framing influences investment decisions through risk perception under different levels of overconfidence.

This study addresses these gaps by examining the effect of fuel price increase framing on investment decisions in Indonesia's energy sector. Specifically, this study investigates whether risk perception mediates the relationship between framing and investment decisions and whether overconfidence moderates the influence of framing on risk perception. To analyze these relationships, this study employs Hayes' PROCESS Macro Model 7, which enables the examination of moderated mediation within a single analytical framework.

The findings of this study are expected to contribute to the behavioral finance literature by extending the application of framing theory in the context of macroeconomic information and sector-specific investment decisions. Practically, the results provide insights for investors, financial analysts, and policymakers regarding how different presentations of economic information may influence investment behavior in capital markets, particularly within the energy sector.

LITERATURE REVIEW

Behavioral Finance Theory

Behavioral Finance Theory explains that investment decisions are not solely driven by rational analysis but are also influenced by psychological biases, emotions, and cognitive limitations. Contrary to the assumptions of traditional finance, investors frequently rely on heuristics when processing information under uncertainty, leading to systematic deviations from rational decision-making (Kahneman & Tversky, 1979; Nofsinger, 2018).

Prospect Theory

Prospect Theory, introduced by Kahneman and Tversky (1979), argues that individuals evaluate potential gains and losses relative to a reference point rather than based on final wealth outcomes. The theory suggests that people tend to be risk-averse when facing potential gains but become risk-seeking when confronted with potential losses.

Framing Effect

The framing effect refers to the tendency of individuals to make different decisions depending on how information is presented rather than on the information itself (Tversky & Kahneman, 1981). Positive framing emphasizes potential benefits, whereas negative framing highlights possible losses or risks.

Risk Perception

Risk perception represents an individual's subjective assessment of uncertainty and potential losses associated with a particular decision (Slovic, 1987). In investment activities, risk perception influences how investors evaluate market opportunities and determine acceptable levels of financial risk.

Overconfidence

Overconfidence is a behavioral bias characterized by excessive confidence in one's knowledge, analytical ability, and investment skills (Barber & Odean, 2001).

Investment Decision

Investment decision refers to the process by which investors allocate financial resources after evaluating available information, expected returns, and associated risks (Bodie, Kane, & Marcus, 2021). Although traditional finance assumes rational decision-making, behavioral finance argues that investment decisions are often affected by psychological factors such as framing effects, risk perception, and cognitive biases.

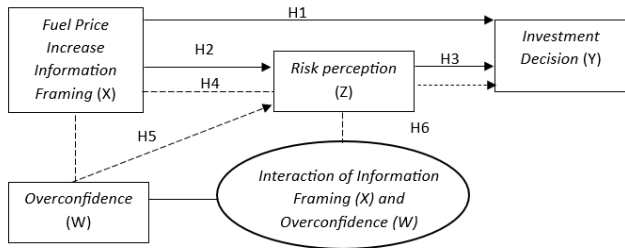


Figure 1. Conceptual Model

METHODOLOGY

This study employed a quantitative approach using an experimental research design with a between-subjects posttest-only design. The experiment involved three treatment groups receiving different information framing related to the increase in fuel prices (positive framing, negative framing, and neutral framing). The population consisted of undergraduate students of the Faculty of Economics and Business who had prior investment experience in the capital market. Since the exact population size was unknown, participants were selected using purposive sampling based on predetermined criteria, including being an active student and having experience in stock investment. A total of 159 respondents participated in the study, with 53 respondents assigned to each experimental group. Primary data were collected through an online questionnaire distributed after respondents read the experimental scenario.

The research examined investment decision as the dependent variable, fuel price increase information framing as the independent variable, risk perception as the mediating variable, and overconfidence as the moderating variable. In addition, financial literacy and investment experience were included as control variables. All construct measurements were adapted from previous validated studies and assessed using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The collected data were analyzed using IBM SPSS Statistics with Hayes' PROCESS Macro Model 7, which enables the examination of moderated mediation effects through bootstrap estimation.

RESULTS AND DISCUSSION

Manipulation Check

Table 1. Manipulation Check Results

Groups	Amount	Mean
Positive Framing	53	4.15
Negative Framing	53	2.53
Neutral Framing	53	3.15

Source: Processed Primary Data (2026)

Based on table 1, the results showed that respondents in the positive framing group perceived the information as emphasizing potential gains, whereas respondents in the negative framing group perceived the information as emphasizing potential losses. These findings indicate that the framing manipulation was successfully implemented and that each experimental group perceived the intended treatment consistently.

Data Analysis Results

a. Validity Test Results

Table 2. Validity Test Results

Variables	Indicators	Corrected Item-total Correlation
Risk Perception	RP1	0.392
	RP2	0.511
	RP3	0.634
	RP4	0.521
	RP5	0.534
	RP6	0.496
	RP7	0.505
	RP8	0.526
Overconfidence	OC1	0.473
	OC2	0.534
	OC3	0.512
	OC4	0.569
	OC5	0.634
	OC6	0.607
	OC7	0.521
	OC8	0.511
Investment Decisions	ID1	0.625
	ID2	0.526
	ID3	0.548
	ID4	0.483
	ID5	0.505
	ID6	0.496
	ID7	0.451
	ID8	0.476
Financial Literacy	FL1	0.512
	FL2	0.569
	FL3	0.634
	FL4	0.607
	FL5	0.621

Source: Processed Primary Data (2026)

Based on table 2, the results indicated that all questionnaire items met the validity criteria, with corrected item-total correlation values exceeding the minimum threshold of 0.30.

b. Reliability Test Results

Table 3. Reliability Test Results

Variables	Indicators	Cronbach's Alpha
Risk Perception	8	0.735
Overconfidence	8	0.857
Investment Decisions	8	0.897
Financial Literacy	5	0.797

Source: Processed Primary Data (2026)

Based on table 3, the results showed that all constructs demonstrated Cronbach's Alpha values greater than 0.70. Therefore, all measurement instruments were considered and reliable for further statistical analysis.

c. Hypothesis Testing

Hypothesis testing was performed using PROCESS Macro Model 7 developed by Hayes (2022). Positive and negative framing were transformed into dummy variables, while neutral framing served as the reference category. Financial literacy and investment experience were included as control variables.

Hypothesis	Path	β	p-value
H1	X (Positive) $\rightarrow$ Investment Decisions	0.152	0.021
	X (Negative) $\rightarrow$ Investment Decisions	-0.065	0.304
H2	X (Positive) $\rightarrow$ Risk Perception	0.014	0.826
	X (Negative) $\rightarrow$ Risk Perception	-0.024	0.728
H3	Risk Perception $\rightarrow$ Investment Decisions	-Positive 1.432 -Negative 1.423	0.000
H4	X (Positive) $\rightarrow$ Risk Perception $\rightarrow$ Investment Decisions	-0.150	0.209
	X (Negative) $\rightarrow$ Risk Perception $\rightarrow$ Investment Decisions	-0.227	0.150
H5	X (Positive) $\rightarrow$ Overconfidence $\rightarrow$ Risk Perception	0.110	0.322
H6	Index of Moderated Mediation	- Positive: CI - 0.155; 0.454 - Negative: CI - 0.333; 0.314	

Source: Processed Primary Data (2026)

Discussion

The results revealed that positive framing had a significant positive effect on investment decision ($\beta = 0.152$, $p = 0.021$), whereas negative framing showed no significant effect ($\beta = -0.065$, $p = 0.304$). Thus, the direct effect of framing on investment decision was only supported for positive framing.

Furthermore, neither positive framing ($\beta = 0.014$, $p = 0.826$) nor negative framing ($\beta = -0.024$, $p = 0.728$) significantly affected risk perception, indicating that the framing manipulation did not alter respondents' perception of investment risk.

In contrast, risk perception significantly influenced investment decision in both analytical models. The effect was positive and statistically significant for the positive framing model ($\beta = 1.432$, $p < 0.001$) as well as for the negative framing model ($\beta = 1.423$, $p < 0.001$), suggesting that respondents' perception of investment risk played an important role in shaping their investment decisions.

The mediation analysis showed that risk perception did not mediate the relationship between framing and investment decision, as all bootstrapped confidence intervals for the indirect effects included zero. Therefore, the indirect effect of framing through risk perception was not statistically significant.

The moderation analysis further indicated that overconfidence did not moderate the relationship between framing and risk perception. The interaction between positive framing and overconfidence was not significant ($\beta = 0.110$, $p = 0.322$), and the interaction between negative framing and overconfidence was also insignificant ($\beta = 0.001$, $p = 0.990$).

Finally, the moderated mediation analysis demonstrated that the Index of Moderated Mediation was not significant for either experimental condition. For positive framing, the index was 0.158 with a 95% bootstrap confidence interval ranging from -0.155 to 0.454 . For negative framing, the index was 0.002 with a confidence interval ranging from -0.333 to 0.314 . Since both confidence intervals included zero, the conditional indirect effects did not differ across levels of overconfidence. Consequently, the moderated mediation hypothesis was not supported.

Overall, the findings indicate that positive framing directly influences investment decisions, whereas risk perception and overconfidence do not function as the proposed mediating and moderating mechanisms within the tested conceptual model.

CONCLUSION

Based on the results of data processing, the following conclusions were obtained: 1) positive framing has a significant positive effect on investment decisions, while negative framing has no significant effect, 2) framing does not have significant effect on risk perception, 3) risk perception has a significant positive effect on investment decisions, 4) risk perception does not mediate framing and investment decisions, 5) overconfidence does not moderate the effect of framing on risk perception and 6) overconfidence does not moderate the indirect effect of framing on investment decisions through risk perception.

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