



## **STOCK SELECTION OF MAIN BOARD COMPANIES BASED ON FINANCIAL RATIOS AND EXPECTED SHORTFALL USING PROMETHEE WITH SHARPE RATIO EVALUATION**

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### **Abstract**

*The development of the Indonesian capital market requires stock selection methods that can comprehensively integrate financial statement information and market risk. Conventional approaches that rely on a single indicator are considered insufficient to capture the complexity of stock performance and risk. This study aims to select stocks in the Indonesian Main Board Index using the PROMETHEE method based on financial ratios and Expected Shortfall, and to evaluate risk–return efficiency using the Sharpe Ratio. This research adopts a quantitative approach using financial statement data for 2024 and daily stock price data from January 1 to December 31, 2025. The variables include liquidity, profitability, solvency, bankruptcy risk, stock return, and 95% Expected Shortfall. The results show that PROMETHEE is able to generate systematic stock rankings based on multi-criteria dominance, where stocks with the highest net flow exhibit better fundamental performance and lower extreme risk. However, further analysis reveals that stocks with the highest PROMETHEE rankings do not necessarily have the highest Sharpe Ratios, indicating differences in evaluation dimensions between the two methods. This study concludes that a two-stage approach PROMETHEE as an initial screening tool and the Sharpe Ratio as a subsequent evaluation provides more comprehensive insights for investment decision-making.*

**Keywords:** Multi-Criteria decision making; Decision usefulness; Tail risk; Portfolio performance; Investment evaluation.

### **Abstrak**

Perkembangan pasar modal Indonesia menuntut metode seleksi saham yang mampu mengintegrasikan informasi laporan keuangan dan risiko pasar secara komprehensif. Pendekatan konvensional yang hanya mengandalkan satu indikator dinilai kurang memadai dalam menangkap kompleksitas kinerja dan risiko saham. Penelitian ini bertujuan untuk melakukan seleksi saham pada Indeks Papan Utama Indonesia menggunakan metode PROMETHEE berbasis rasio keuangan dan Expected Shortfall, serta mengevaluasi efisiensi risiko–return menggunakan Sharpe Ratio. Penelitian ini menggunakan pendekatan kuantitatif dengan data laporan keuangan tahun 2024 dan data harga saham harian periode 1 Januari–31 Desember 2025. Variabel yang digunakan meliputi rasio likuiditas, profitabilitas, solvabilitas, risiko kebangkrutan, return saham, dan Expected Shortfall 95%. Hasil penelitian menunjukkan bahwa PROMETHEE mampu menghasilkan pemeringkatan saham yang sistematis berdasarkan dominasi multi-kriteria, di mana saham dengan net flow tertinggi memiliki kombinasi fundamental yang lebih baik dan risiko ekstrem yang lebih rendah. Namun, hasil analisis lanjutan menunjukkan bahwa saham dengan peringkat PROMETHEE tertinggi tidak selalu memiliki Sharpe Ratio tertinggi, yang mengindikasikan perbedaan dimensi evaluasi antara kedua metode. Penelitian ini menyimpulkan bahwa pendekatan dua tahap PROMETHEE sebagai seleksi awal dan Sharpe Ratio

sebagai evaluasi lanjutan memberikan hasil yang lebih komprehensif dalam pengambilan keputusan investasi.

**Kata Kunci:** Multi-Criteria decision making, Decision usefulness, Tail risk, Kinerja portofolio, Evaluasi investasi.

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## INTRODUCTION

The Indonesian capital market has experienced rapid growth, accompanied by increasing participation from both individual and institutional investors. This condition necessitates a more comprehensive and systematic approach to stock selection, particularly in the context of investment decision-making based on reliable information. From an accounting perspective, financial statement information plays a crucial role as it provides insights into a company's performance and financial condition, which serve as the primary basis for evaluating stock prospects. Financial ratios such as Return on Assets (ROA), Return on Equity (ROE), Earnings per Share (EPS), and Debt to Equity Ratio (DER) are widely used to represent profitability and capital structure (Saleh et al., 2022; Subastyan, 2024). This information is relevant as it reflects management's ability to utilize company resources and generate value for shareholders.

The selection of financial ratios in this study is based on the decision usefulness framework, where accounting information is used to assist investors in assessing company performance and risk. Profitability ratios (ROA, ROE, EPS) reflect the company's ability to generate earnings, liquidity ratios (Current Ratio) indicate the ability to meet short-term obligations, while solvency ratios (DER) describe leverage and financial risk. In addition, indicators such as the Altman Z-Score are used to capture bankruptcy risk, thereby providing a more comprehensive picture of the firm's fundamental condition.

In the context of the Indonesian capital market, the Main Board Index represents companies with large and medium market capitalization, high liquidity, and relatively well-established governance. Stocks included in this index are typically preferred by institutional investors due to their performance stability and higher financial reporting transparency. The increasing interest in main board stocks is also driven by the perception of lower risk compared to small-cap stocks, as well as their role as a benchmark for portfolio formation on the Indonesia Stock Exchange (Indonesia Stock Exchange, 2024). Therefore, the Main Board Index serves as a relevant object for examining stock selection models based on accounting information and market risk.

However, relying solely on financial ratios is insufficient in a dynamic capital market environment. Investors are exposed not only to general price fluctuations but also to extreme losses under certain market conditions. Previous studies indicate that investment decisions that ignore tail risk may lead to suboptimal outcomes (Merlo et al., 2021; Rockafellar & Uryasev, 2000). Therefore, integrating accounting information with market risk measurement becomes essential to improve the quality of stock selection.

In terms of risk measurement, traditional metrics such as volatility and Value at Risk (VaR) have limitations in capturing extreme losses, especially under non-normal return distributions. As an alternative, Expected Shortfall (ES) has gained increasing attention in both academic literature and risk management practice because it measures the expected loss beyond a specified threshold, providing a more comprehensive and coherent representation of risk (Merlo et al., 2021; Rockafellar & Uryasev, 2000).

To integrate multiple criteria in stock selection, Multi-Criteria Decision Making (MCDM) methods provide a relevant approach. Over recent decades, portfolio optimization has evolved from classical models toward multi-criteria frameworks that incorporate various aspects of performance and risk (Salo et al., 2024). The PROMETHEE method, as one of the MCDM techniques, offers advantages in conducting pairwise comparisons among alternatives and generating transparent and interpretable rankings (Zopounidis & Doumpos, 2013). Furthermore, PROMETHEE is flexible in accommodating different types of criteria, whether maximization or minimization.

Several previous studies have applied MCDM approaches in stock selection and portfolio construction. For instance, Sikalo et al. (2023) employed a combined AHP–PROMETHEE approach to evaluate portfolio performance, while Alsanousi et al. (2024) developed a hybrid MCDM method for evaluating stocks based on financial performance. Narang et al. (2022) and Vuković et al. (2020) also demonstrate that integrating multiple criteria within an MCDM framework can improve stock selection quality compared to traditional approaches. Additionally, a comprehensive review by Ghahtarani et al. (2021) highlights that robust and multi-criteria approaches represent a major direction in modern portfolio research.

Nevertheless, most existing studies still rely on conventional risk measures or treat Expected Shortfall as a supplementary analysis rather than incorporating it directly into the ranking process. This study addresses this gap by explicitly integrating Expected Shortfall into the PROMETHEE framework for stock selection within the Indonesian Main Board Index.

Moreover, the results of stock selection using PROMETHEE do not directly reflect investment efficiency in terms of the risk–return trade-off. Therefore, this study employs the Sharpe Ratio as a subsequent analysis to evaluate the risk–return efficiency of selected stocks. This two-stage approach is expected to provide a more comprehensive perspective in investment decision-making.

Based on the above discussion, this study aims to select stocks in the Indonesian Main Board Index based on financial statement information and Expected Shortfall using the PROMETHEE method, and to evaluate the risk–return performance of selected stocks using the Sharpe Ratio. This approach is expected to contribute to the accounting and investment literature, particularly in strengthening the concept of decision usefulness of financial information in investment decisions that explicitly consider market risk.

## **LITERATURE REVIEW**

Research on multi-criteria methods and PROMETHEE has demonstrated significant development in financial applications and asset selection. The MCDM approach enables the integration of various fundamental indicators and risk measures to produce more informative rankings than single-rule approaches (Basilio et al., 2018). The combination of PROMETHEE with other weighting techniques (e.g., AHP, CRITIC) and fuzzy

variants is frequently proposed to enhance robustness and address uncertainty in financial data (Sikalo et al., 2023; Papapostolou et al., 2024; Zolfani et al., 2022). Furthermore, the development of PROMETHEE variants such as Temporal PROMETHEE II extends the method's capability to capture time dynamics in criteria, which is particularly relevant when analyses involve separate financial reporting and return periods (Wątróbski, 2023). Empirical studies across various stock markets support the effectiveness of MCDM and PROMETHEE in screening stocks and constructing initial portfolios prior to further quantitative optimization (Basilio et al., 2018; Jing et al., 2023).

The literature on risk measurement highlights the superiority of Expected Shortfall (ES) over Value at Risk (VaR) when focusing on extreme losses and coherent risk measures. ES has become the preferred choice among regulators (e.g., Basel) and academics for capturing tail risk relevant to investors and risk managers (Zaevski & Nedeltchev, 2023; Broda et al., 2018). Several methodological studies have introduced estimation and backtesting techniques for ES, including joint VaR–ES regression, quantile regression, and composite quantile methods, to improve estimation accuracy for heteroskedastic and heavy-tailed return data (Christou & Grabchak, 2022; Du & Escanciano, 2017). Studies on ES approximation for heavy-tailed distributions also highlight efficient numerical methods applicable to real stock market data (Broda et al., 2018), while modern backtesting approaches propose tests that separate ES validation from VaR to directly assess tail risk measurement performance (Bayer & Dimitriadis, 2018; Hué et al., 2024).

Several studies have integrated fundamental criteria (financial ratios) and market risk measures within stock selection or portfolio allocation frameworks, showing that incorporating advanced risk measures such as ES alongside financial ratios can improve the selectivity of stock candidates compared to relying solely on fundamental indicators or classical volatility measures (Jing et al., 2023; Sikalo et al., 2023; Zolfani et al., 2022). However, the literature also emphasizes that the choice of preference functions, scaling/normalization, and weighting schemes in PROMETHEE can influence ranking stability. Therefore, sensitivity and robustness analyses are essential (Sikalo et al., 2023). Moreover, a two-stage approach—where MCDM is followed by risk–return metrics such as the Sharpe Ratio—is often recommended to ensure that final decisions reflect empirical risk–return efficiency, since outranking results do not always correspond to ex-post efficiency (Kan, Wang, & Zheng, 2024; Basilio et al., 2018).

Several studies reinforce the relevance of integrating financial statement information and risk measurement in the Indonesian market context. Empirical research from Indonesia highlights the role of financial ratios in explaining stock price movements and the relevance of multi-criteria decision support systems for stock selection (Saleh, 2022; Subastyan, 2024). In addition, applications of PROMETHEE for stock selection and local decision support systems demonstrate that outranking methods are practical and relevant for domestic investor decision-making (Am & Yaqin, 2022). These local findings support the argument that integrating ES and accounting ratios within the PROMETHEE framework can provide important empirical contributions for investors and regulators in the Indonesian capital market.

Recent empirical and methodological reviews highlight several research gaps relevant to this study: (1) relatively few studies incorporate ES directly as a criterion within PROMETHEE, as most treat risk as a post-selection analysis; (2) the need for ES estimation methods suitable for emerging markets with distinct liquidity conditions and

return distributions; and (3) the need to test the sensitivity of PROMETHEE results to different preference functions (usual, linear, Gaussian, asymmetric) when combining accounting ratios and tail risk measures. These gaps open opportunities for empirical contributions, particularly when applied to Indonesian stock indices with clearly defined financial reporting and return periods, thereby providing practical implications for increasingly risk-aware domestic investors (Zaevski & Nedeltchev, 2023; Christou & Grabchak, 2021; Wątróbski, 2023; Kan et al., 2024).

## **RESERACH METHODS**

This study employs a quantitative approach using a multi-criteria decision-making (MCDM) method to perform stock selection based on financial statement information and market risk. The PROMETHEE II method is used as the primary technique to generate stock rankings based on a set of fundamental and risk criteria, while the Sharpe Ratio is applied as a subsequent analysis to evaluate the risk–return performance efficiency of the selected stocks. This approach is chosen because it enables the systematic and transparent integration of multiple dimensions of accounting information and risk (Basilio et al., 2018; Sikalo et al., 2023).

The object of this study consists of stocks included in the Indonesian Main Board Index. The data used comprise two types: financial statement data and stock price data. Financial statement data are obtained from companies' annual reports for the year 2024, while stock price data consist of daily closing prices over the period from January 1, 2025, to December 31, 2025. This separation of periods is intended to avoid look-ahead bias and to reflect forward-looking investment decision-making (Basilio et al., 2018).

Financial statement data are obtained from audited financial reports published by companies and available through the Indonesia Stock Exchange (IDX) as well as official company websites. Daily stock price data are collected from the capital market data source Yahoo Finance. The risk-free rate is proxied using the BI 7-Day Reverse Repo Rate obtained from Bank Indonesia.

Data processing and analysis are conducted using Microsoft Excel for initial data processing and tabulation, and R for calculating returns, Expected Shortfall, PROMETHEE, and Sharpe Ratio. The use of these tools ensures computational accuracy and facilitates research reproducibility (Sikalo et al., 2023).

The variables used as criteria in the PROMETHEE method include:

- (1) Working Capital (WC)
- (2) Current Ratio (CR)
- (3) Return on Assets (ROA)
- (4) Return on Equity (ROE)
- (5) Earnings per Share (EPS)
- (6) Debt to Equity Ratio (DER)
- (7) Altman Z-Score
- (8) Mean Stock Return
- (9) Expected Shortfall (ES) 95%

Working Capital and Current Ratio represent liquidity variables. Return on Assets (ROA), Return on Equity (ROE), and Earnings per Share (EPS) represent profitability variables. Capital structure is measured using the Debt to Equity Ratio (DER), while bankruptcy risk is represented by the Altman Z-Score.

The selection of variables in this study aims to comprehensively represent firm performance through a multi-criteria approach. Working Capital (WC) and Current Ratio (CR) serve as liquidity indicators, Return on Assets (ROA), Return on Equity (ROE), and Earnings per Share (EPS) as profitability indicators, and Debt to Equity Ratio (DER) as a measure of capital structure. Internal firm risk is captured by the Altman Z-Score, while mean stock return reflects market performance, and Expected Shortfall (ES) 95% is used to capture extreme loss risk. The combination of these variables within the PROMETHEE framework enables a stock selection process that integrates both fundamental and risk aspects.

The formulas used in this study are as follows:

$$\text{Working Capital} = \text{Current Assets} - \text{Current Liabilities} \quad (1)$$

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (2)$$

$$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}} \quad (3)$$

$$\text{ROE} = \frac{\text{Net Income}}{\text{Total Equity}} \quad (4)$$

$$\text{DER} = \frac{\text{Total Liabilities}}{\text{Total Equity}} \quad (5)$$

All financial statement variables are treated as maximization criteria, except for DER, which is treated as a minimization criterion.

Stock risk is measured using Expected Shortfall (ES) at a 95% confidence level, based on daily stock returns over the period from January 1 to December 31, 2025. Expected Shortfall measures the expected loss under worst-case conditions beyond the Value at Risk threshold and is considered more capable of capturing extreme risk compared to traditional risk measures.

Mathematically, Expected Shortfall is defined as:

$$ES_{\alpha} = E(R_t | R_t \leq VaR_{\alpha}) \quad (6)$$

In this study, Expected Shortfall is treated as a minimization criterion within the PROMETHEE method; therefore, a lower ES value indicates lower extreme loss risk.

The identification of top-performing stocks is conducted using the Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE), specifically the PROMETHEE II approach to generate a complete ranking. PROMETHEE compares stock alternatives pairwise based on each selected criterion.

For each criterion  $k$ , the difference in value between two alternatives  $a$  and  $b$  is calculated as:

$$d_k(a, b) = g_k(a) - g_k(b) \quad (7)$$

This study uses the Usual preference function, which is defined as follows:

$$P_k(a, b) = \begin{cases} 1, & \text{if } d_k(a, b) > 0 \\ 0, & \text{if } d_k(a, b) \leq 0 \end{cases} \quad (8)$$

The aggregated preference value between alternatives is calculated as:

$$\pi(a, b) = \sum_{k=1}^m w_k P_k(a, b) \quad (9)$$

where  $w_k$  represents the weight of each criterion. All criteria in this study are assigned equal weights.

Subsequently, the leaving flow, entering flow, and net flow values are calculated as follows:

$$\phi^+(a) = \frac{1}{n-1} \sum_{x \neq a} \pi(a, x) \quad (10)$$

$$\phi^-(a) = \frac{1}{n-1} \sum_{x \neq a} \pi(x, a) \quad (11)$$

$$\phi(a) = \phi^+(a) - \phi^-(a) \quad (12)$$

The net flow value is used as the basis for stock ranking, where a higher value indicates an alternative that better satisfies the criteria.

As a subsequent analysis, stocks classified as favorable based on the PROMETHEE selection results are further evaluated using the Sharpe Ratio to assess risk–return performance efficiency. The Sharpe Ratio is calculated using daily stock returns for 2025 and the risk-free rate proxied by the average BI 7-Day Reverse Repo Rate for 2025, converted into a daily rate.

The Sharpe Ratio formula is:

$$\text{Sharpe Ratio}_i = \frac{\bar{R}_i - R_f}{\sigma_i} \quad (12)$$

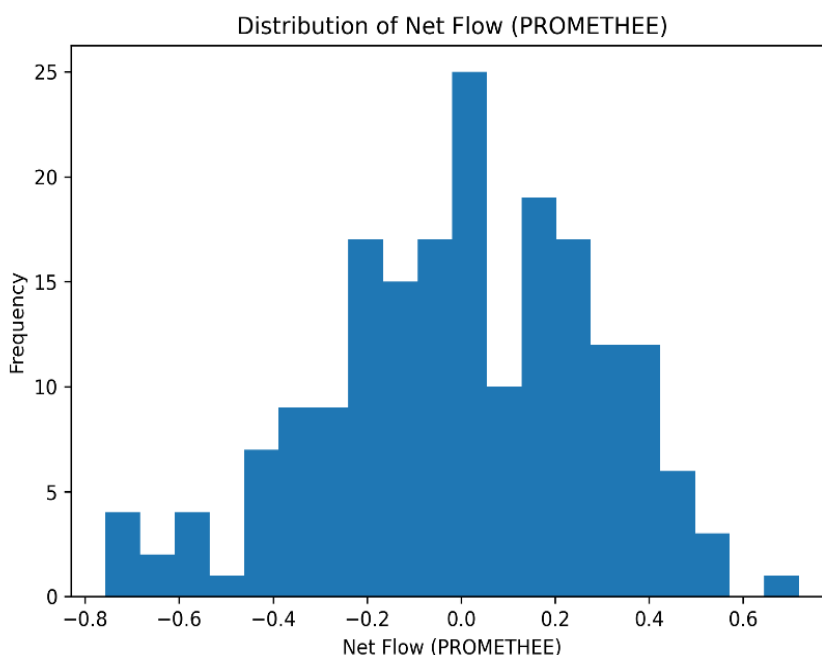
where  $\bar{R}_i$  represents the average return of stock  $i$ ,  $R_f$  is the daily risk-free rate, and  $\sigma_i$  is the standard deviation of stock returns.

The Sharpe Ratio analysis aims to provide additional information regarding the investment performance efficiency of stocks selected through PROMETHEE, without influencing the main stock selection process.

1. The data processing steps in this study are as follows:
2. Collect financial statement data and stock price data.
3. Calculate financial ratios and stock returns.
4. Estimate the 95% Expected Shortfall.
5. Perform data normalization and determine preference directions.
6. Calculate the PROMETHEE preference index.
7. Compute leaving flow, entering flow, and net flow.
8. Rank stocks based on PROMETHEE II.
9. Identify stocks classified as favorable.
10. Calculate the Sharpe Ratio as a subsequent analysis.
11. Interpret the results and accounting implications.

## RESULTS AND DISCUSSIONS

The results of data processing using the PROMETHEE II method produce leaving flow, entering flow, and net flow values for all stocks in the Main Board Index. The net flow value is used as the basis for stock ranking, where a higher value indicates a greater level of preference based on the integration of financial statement information and Expected Shortfall risk.



**Figure 1.** Distribution of PROMETHEE Net Flow Values of Main Board Index Stocks  
Source: Data processing results

Figure 1 shows the distribution of PROMETHEE net flow values for all stocks in the Main Board Index. The distribution spreads across both positive and negative values, indicating a clear differentiation among stocks based on the integration of financial ratios and Expected Shortfall. Stocks with positive net flow values demonstrate relative dominance in pairwise comparisons, while negative values indicate weaker positions in a multi-criteria context.

The asymmetric distribution suggests that only a subset of stocks possesses a combination of strong fundamentals and low extreme risk, while others lag behind. This indicates that the PROMETHEE method has strong discriminatory power in distinguishing stock quality.

Table 1 presents the top 10 stocks based on PROMETHEE criteria. The results show that the highest-ranked stocks exhibit relatively strong fundamental performance and lower Expected Shortfall risk compared to others. Therefore, PROMETHEE effectively functions as an initial screening tool based on multi-criteria accounting information and extreme risk.

**Table 1.** Top 10 Stocks Based on PROMETHEE

Rank	Code	Company Name	Net Flow
1	MARK	Mark Dynamics Indonesia Tbk	0.7189
2	WIIM	Wismilak Inti Makmur Tbk	0.5473
3	KLBF	Kalbe Farma Tbk	0.5109
4	SUNI	Sunindo Adipersada Tbk	0.5062
5	VICI	Victoria Investama Tbk	0.4697
6	ACES	Ace Hardware Indonesia Tbk	0.4462
7	DMAS	Puradelta Lestari Tbk	0.4392
8	MIKA	Mitra Keluarga Karyasehat Tbk	0.4321
9	TSPC	Tempo Scan Pacific Tbk	0.4321
10	ADMR	Adaro Minerals Indonesia Tbk	0.4250

**Source:** Data Processing Results.

The results indicate that stocks with the highest PROMETHEE rankings exhibit a combination of relatively strong fundamental performance and lower Expected Shortfall risk compared to other stocks. Thus, PROMETHEE effectively functions as an initial screening tool based on multi-criteria accounting information and extreme risk.

A subsequent analysis is conducted by calculating the Sharpe Ratio for the selected stocks. The Sharpe Ratio measures return efficiency relative to total risk (volatility), thereby providing a different perspective compared to PROMETHEE.

**Table 2.** Top 10 Stocks Based on Sharpe Ratio

Rank	Code	Company Name	Sharpe Ratio
1	SMSM	Selamat Sempurna Tbk	0.1424
2	MIKA	Mitra Keluarga Karyasehat Tbk	0.1351
3	JTPE	Jaya Trishindo Tbk	0.1118
4	LPKR	Lippo Karawaci Tbk	0.0817
5	IPCC	Indonesia Kendaraan Terminal Tbk	0.0667
6	MDLN	Modernland Realty Tbk	0.0623
7	TAPG	Triputra Agro Persada Tbk	0.0591
8	OMED	Jayamas Medica Industri Tbk	0.0528
9	PANR	Panorama Sentrawisata Tbk	0.0508
10	LSIP	PP London Sumatra Indonesia Tbk	0.0473

**Source:** Data Processing Results.

The results indicate that stocks with the highest Sharpe Ratio do not necessarily come from the top PROMETHEE rankings. This suggests that short-term risk–return efficiency is not always aligned with dominance in fundamental performance and extreme risk.

To identify stocks that are consistently superior both in multi-criteria selection and risk–return efficiency, the PROMETHEE and Sharpe Ratio rankings are combined using a composite ranking approach (sum of ranks).

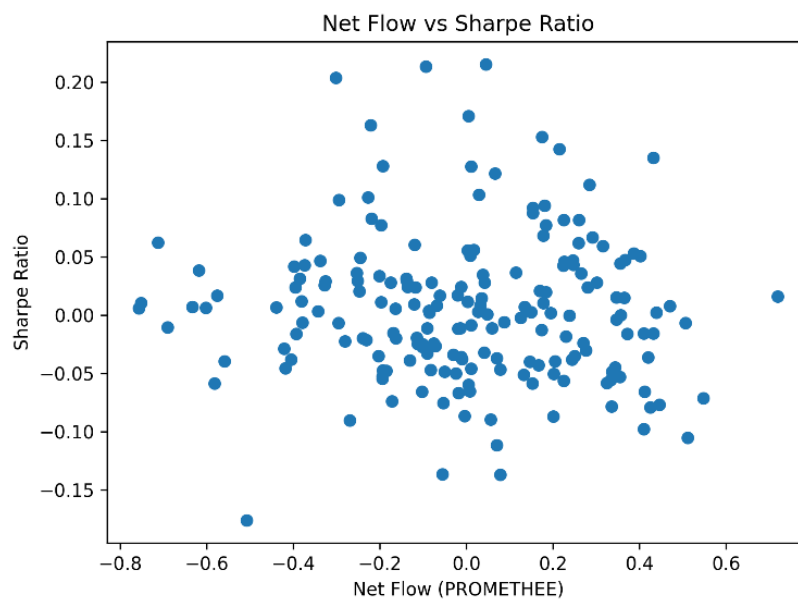
**Table 3.** Top 10 Stocks Based on Combined Ranking

Rank	Code	Company Name	Net Flow	Sharpe Ratio
1	MIKA	Mitra Keluarga Karyasehat Tbk	0,4321	0.1351
2	JTPE	Jaya Trishindo Tbk	0,2840	0.1118
3	OMED	Jayamas Medica Industri Tbk	0,3862	0.0528
4	PANR	Panorama Sentrawisata Tbk	0,4015	0.0508
5	LSIP	PP London Sumatra Indonesia Tbk	0,3663	0.0473
6	SMSM	Selamat Sempurna Tbk	0,2146	0.1424
7	IPCC	Indonesia Kendaraan Terminal Tbk	0,2910	0.0667
8	LPKR	Lippo Karawaci Tbk	0,2604	0.0817
9	TAPG	Triputra Agro Persada Tbk	0,3157	0.0591
10	DSSA	Dian Swastatika Sentosa Tbk	0,3557	0.0442

**Source:** Data Processing Results.

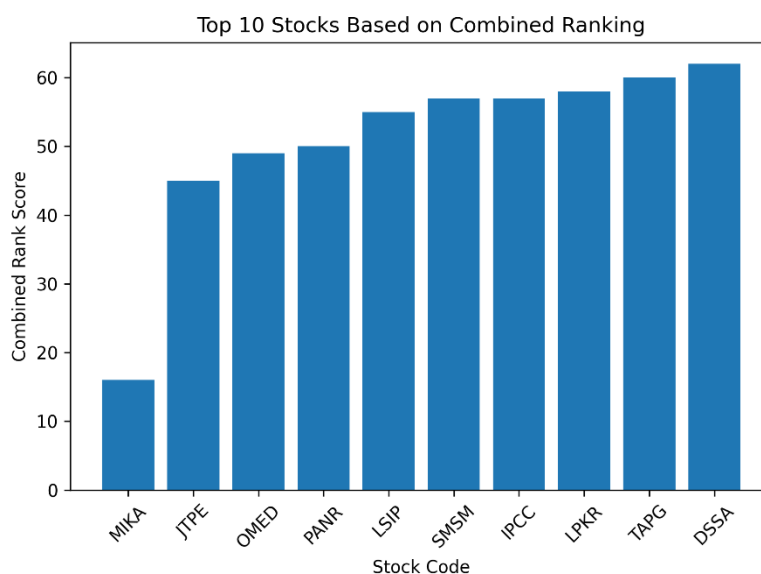
The results indicate that PT Mitra Keluarga Karyasehat Tbk. (MIKA) is the most consistently superior stock based on both approaches, while other stocks exhibit a trade-off between fundamental–risk quality and return efficiency.

The differences in rankings between PROMETHEE and the Sharpe Ratio confirm that the two methods capture different evaluation dimensions. PROMETHEE assesses stocks based on relative dominance across financial ratios and Expected Shortfall risk, whereas the Sharpe Ratio evaluates risk–return efficiency based on volatility. Therefore, the use of the Sharpe Ratio as a subsequent analysis, rather than as a criterion within PROMETHEE, represents a sound methodological approach and avoids double counting risk.



**Figure 2.** Relationship between PROMETHEE Net Flow and Sharpe Ratio  
**Source:** Data Processing Results.

Figure 2 illustrates the relationship between PROMETHEE net flow values and the Sharpe Ratio in a scatter plot. The dispersed pattern of points without a strong linear trend indicates that the relationship between the two variables is not directly proportional. Some stocks with high net flow exhibit moderate or even low Sharpe Ratios, while others with medium net flow display relatively high Sharpe Ratios. This suggests that multi-criteria dominance based on fundamentals and Expected Shortfall does not always align with risk return efficiency based on volatility.



**Figure 3.** Top Ten Stocks Based on Combined Ranking Using PROMETHEE and Sharpe Ratio  
**Source:** Data Processing Results.

The results of this study indicate that the PROMETHEE method, which integrates financial ratios and Expected Shortfall, produces stock rankings that differ substantially from performance measurements based on the Sharpe Ratio. These findings both confirm and extend previous studies, which suggest that multi-criteria decision-making (MCDM) methods, particularly PROMETHEE, are effective in stock selection as they simultaneously incorporate multiple criteria and provide more informative rankings compared to single-indicator approaches (Basilio et al., 2018; Sikalo et al., 2023).

However, this study offers an important contribution beyond prior research. Unlike previous studies that generally employ volatility or conventional risk measures (Narang et al., 2022; Vuković et al., 2020), the results demonstrate that incorporating Expected Shortfall as a direct criterion in PROMETHEE leads to a selection process that is more sensitive to extreme loss risk. This suggests that integrating tail risk measures into stock selection enhances ranking quality compared to traditional risk-based approaches.

Furthermore, this study finds that stocks with the highest PROMETHEE rankings do not necessarily exhibit the highest Sharpe Ratios. This finding challenges the implicit assumption in some portfolio studies that multi-criteria selection automatically leads to optimal risk return efficiency (Sikalo et al., 2023). Instead, the results are consistent with Kan et al. (2024), who show that Sharpe Ratio-based measures can yield different evaluations compared to factor-based or multi-criteria selection models. In other words, outranking methods such as PROMETHEE and risk–return efficiency measures such as the Sharpe Ratio capture different dimensions of investment performance.

From a methodological perspective, these findings also support recommendations in the literature that a two-stage approach initial selection using MCDM followed by evaluation using risk return metrics can provide a more comprehensive analysis (Basilio et al., 2018). This approach enables investors not only to identify stocks with strong fundamentals and low extreme risk but also to ensure that these stocks are efficient in terms of investment performance.

Moreover, this study provides empirical evidence from an emerging market context, specifically Indonesia, which remains relatively underexplored in the international MCDM literature. Basilio et al. (2018), focusing on the Brazilian market, demonstrate the effectiveness of MCDM in portfolio construction, while Ghahtarani et al. (2021) highlight that market characteristics and return distributions can influence portfolio selection outcomes. Consistent with these findings, this study shows that within the Indonesian Main Board Index, the integration of Expected Shortfall produces a more selective ranking structure that is not fully aligned with volatility-based risk measures. This underscores the importance of domestic market characteristics in shaping multi-criteria selection outcomes.

Therefore, the identified empirical gap is that previous studies have not explicitly compared PROMETHEE rankings based on Expected Shortfall with risk–return efficiency evaluation using the Sharpe Ratio in an emerging market context. This study addresses this gap by demonstrating that a two-stage approach provides more comprehensive insights than relying on a single method alone.

## **CONCLUSION**

The PROMETHEE method is able to generate systematic stock rankings based on a combination of financial ratios and extreme loss risk. Stocks with the highest net flow values exhibit relatively stronger fundamental characteristics and lower Expected Shortfall compared to other stocks. However, the subsequent analysis using the Sharpe Ratio shows that stocks with the highest PROMETHEE rankings do not necessarily have the highest risk–return efficiency. This finding indicates that PROMETHEE and the Sharpe Ratio capture different evaluation dimensions. PROMETHEE focuses on relative dominance based on multi-criteria fundamentals and extreme risk, whereas the Sharpe Ratio measures return efficiency relative to total volatility.

Thus, this study concludes that a two-stage approach—using PROMETHEE as an initial screening tool and the Sharpe Ratio as a subsequent evaluation—provides more comprehensive results than relying on a single method. The integration of Expected Shortfall as a direct criterion within PROMETHEE also enhances the model’s sensitivity to extreme loss risk, thereby improving the quality of the stock selection process.

Investors are recommended to adopt this two-stage approach, where PROMETHEE is used for initial screening based on financial ratios and Expected Shortfall risk, followed by Sharpe Ratio evaluation to assess risk–return efficiency. Future research may examine the sensitivity of criteria weights and compare Expected Shortfall with alternative risk measures to further improve the robustness of stock selection models.

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