Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 2 | February 2025 -Peer-Reviewed Journal

IMPLEMENTATION OF SAFETY FIRST CRITERION FOR OPTIMAL PORTFOLIO FORMATION ON IDX LQ45 LOW CARBON LEADERS 2022-2024 PERIOD

Rema Shonia Meyrawati[1], Dra. Sri Widiyati, M.Si.[2], Manarotul Fatati, S.E., M.M.[3]
Department of Accounting, Study Program Financial Analyst, Politeknik Negeri Semarang, Semarang, Jawa Tengah, Indonesia

ABSTRACT
This study analyzes how the implication of the Safety First Criterion in the optimal portfolio of companies designed to encourage green investments that focus on reducing the impact of carbon emissions and contributing to environmental sustainability. This is a response to the alarming issue of climate change and the environment. This study aims to determine how much the expected return and risk of the optimal portfolio on the IDX LQ45 Low Carbon Leaders for the 2022-2024 period with a sample of 29 stocks. The data used is secondary data in the form of weekly closing stock prices. The results of this study show that of the three Safety First criteria that have the smallest risk is the Roy Safety First criterion which is 0.7% in 2022-2023, while in 2023-2024 it has a risk of 0.23%. On the other hand, the criterion that has the largest return is the Telser Safety First criterion. Telser Safety First has a return of 1.21% in 2022-2023, while in 2023-2024 the return is 0.6%. In addition, there is one stock that remains consistent as an optimal portfolio builder, namely JSMR shares.
KEYWORDS: *Optimal Portfolio, Green Investment, Safety First Criterion, Carbon Emission*

INTRODUCTION

In the last 20 years, climate change and the environment have become the most worrying global issues, which occur due to global warming of 1.5°C as a result of greenhouse gas emissions. On the other hand, Indonesia has committed to reduce its greenhouse gas effect by 29% by 2030 and 41% with international support by 2030 (Grahesti et al., 2022). This commitment was proven at the G20 Presidency event where Indonesia launched the IDX LQ45 Low Carbon Leaders (IDX, 2022)

The increasing awareness of environmental, social and good governance (ESG) impacts, there is growing investor interest in stocks that contribute to sustainability, such as those in the IDX LQ45 Low Carbon Leaders. These stocks not only offer profit potential, but also support efforts to reduce the carbon footprint in the capital market. Investors who invest in the sustainability sector are called green investment (Kahar, 2024).

Based on the Baim & Company report in Databoks (2024), Indonesia is the largest recipient of green investment in Southeast Asia in 2023 compared to its neighboring countries. Therefore, IDX LQ45 Low Carbon Leaders can be the choice of investors who want to invest in sustainable investments that care about the environment, especially carbon emissions. The index has high liquidity with large market capitalization and good fundamentals.

In stock investment there is an expression "*high risk high return*" which means that the greater the return required by the investor, the greater the risk he will face. Investors can minimize risk by doing diversification, investing in several assets that form a portfolio (Dan et al., 2023).

The model used is Safety First Criterion with the IDX LQ45LCL index because it has a stock return movement that tends to fluctuate which is traded in uncertain market conditions. IDX LQ45LCL has the potential to provide greater returns for investors, making it suitable as an investment option in the Indonesian capital market.

Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 2 | February 2025 -Peer-Reviewed Journal

Figure 1.1. Fact Sheet Return IDX LQ45LCL and IHSG



Source: IDX Statistics, 2024

The challenge faced by investors in forming a portfolio is determining the level of risk they can accept. The Safety First Criterion helps investors prioritize investments that provide protection against risk, making it possible to select stocks that can reduce potential losses (Ding & Zhang, 2009).

LITERATURE REVIEW

Signal Theory

Signal theory was first introduced by Spence (1973), suggests that the owner of the information provides a signal or signal in the form of information related to the condition of the company so that it is useful for investors (recipients of information) (Purba, 2023). Signal theory emphasizes the importance of information submitted by companies for potential investors in making investment decisions. According to Jogiyanto (2010) information received by investors can be in the form of positive signals (good news) or negative signals (bad news). The importance of this understanding can help in building an optimal portfolio.

Investing

According to Tandelilin (2017) investment can be understood as a commitment to a number of funds or other resources made at this time with the aim of obtaining future benefits. Investment itself is the investment of capital for one or more assets that are owned and have a long period of time in the hope of obtaining future profits (Dan et al., 2023). In making an investment, investors must pay attention to two important factors, return and risk.

Return dan Risk

Return is the result obtained from investment (Sudarsano & Dr. Endri, 2022). In investment, there are two types of return, realized return and expected return. Realized return is the return that has been obtained through data from the past, while expected return is the return that will be obtained in the future followed by uncertain risk. Return and risk have a positive relationship, meaning that high returns will result in high risk as well (Abdullah et al., 2022).

According to (Hartono, 2014) risk is often associated with deviations or deviations from the results received with the expected. This risk occurs because of uncertainty in the future. Investment risk can be in the form of losses on falling share prices, capital not returned because the company goes bankrupt or the shares are difficult to resell.

Optimal Portfolio

Portfolio theory was first introduced in 1952 by Harry Markowitz in his paper entitled Portfolio Selection. This theory explains that investors can optimize their portfolio by choosing a combination of assets that have a balanced risk and return (Markowitz, 1952). To form an optimal portfolio, diversification is needed, namely investing in

Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 2 | February 2025 -Peer-Reviewed Journal

several types of assets to minimize risk. In this theory there is a saying "*don't put all your eggs in one basket*", which means that to get a profit in investing, do not put it in just one type of stock but in different types of stocks in the portfolio (Aunillah & Wahyudi, 2022). This theory is an important basis for investment management and helps investors make better investment decisions.

Optimal Portfolio Safety First Criterion Method

Portfolio theory using the Safety First Criterion method is based on stock price fluctuations that tend to go down or downside risk, which is the risk that causes losses (Hakmi et al., 2023). The portfolio formation process can be improved by adopting more objective criteria in accordance with the objectives set (Francis & Kim, 2013).

The Safety First Criterion focuses on avoiding losses as the top priority in investment decision-making. In this context, investors use the safety first criterion to evaluate portfolios based on the probability of acceptable losses (Ding & Zhang, 2009). In this method, there are three criteria as follows.

a. **Roy Safety First**: (Roy, 1952) developed the Roy Safety First criterion to minimize the possibility of high risk. High risk is the risk of investment return losses lower than expected (Amal et al., 2024). In addition, this method also focuses on risk protection rather than wanting a high level of return.

b. **Kataoka Safety First**: Kataoka (1963) proposed a third form of Safety First Criterion based on the consideration of investors and investment managers who not only want to minimize the probability of loss, but also want to get optimal return (Francis & Kim, 2013). Therefore, the Kataoka Safety First criterion aims to get the maximum return with the minimum risk that has been determined by the investor.

c. **Telser Safety First**: Telser (1955) introduced the Telser Safety First criterion three years after the Roy Safety First criterion came into existence. This criterion assumes that investors want to maximize the expected rate of return with the constraint that the possible loss is not greater than a predetermined value. Thus, this criterion aims to get the largest return.

METHODOLOGY

The methods used in this research are population, sample, data collection method, and data analysis method. The population in this research object is the shares of companies listed in the IDX LQ45 Low Carbon Leaders based on the August 2024 major evaluation. The data used is secondary data from weekly stock closing price data for the period November 2022 - November 2023 and November 2023 - October 2024 obtained from www.investing.com. Portfolio formation is carried out per year to find out whether there are stocks that are consistently included in the stocks forming this portfolio.

The sampling technique in this study is purposive sampling technique to determine certain criteria on the sample that are relevant to the research objectives. The sample selection criteria in this study were determined as follows:

1. Companies in IDX LQ45 Low Carbon Leaders listed on the Indonesia Stock Exchange during the research period 2022-2024.
2. Companies in IDX LQ45 Low Carbon Leaders that have closing stock prices and are still operating during the research period 2022-2024 3.
3. The companies in IDX LQ45 Low Carbon Leaders are consistently included during the research period 2022-2024.

Based on the above criteria, a sample of 29 companies was obtained in this study.

The optimal portfolio formation using the Safety First Criterion Method was carried out with the help of the Add in Solver and Toolpak applications in the Microsoft 365 program.

1. Prepare historical data of weekly closing price of each stock.
2. Calculating the stock return or realized return

   Return Realization $(R_{it}) = \frac{P_{it} - P_{it-1}}{P_{it-1}}$

   di mana:

   R_{it} : Return realization

   P_{it} : Stock price i period t

   P_{it-1} : Stock price i period t-1 (previous)
3. Calculating the stock's expected return

   Expected return $(E(R_i)) = \frac{\sum_{i=1}^{n} R_{it}}{n}$

   di mana:

   $E(R_i)$: Expected return of stock i

   R_{it} : Expected return of stock i period t

   n : Number of stock return data

Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 2 | February 2025 -Peer-Reviewed Journal

4. Select stocks that have a positive expected return. Then re-select stocks that have an average $E(R_i) \geq$ value of $E(R_i)$

5. Appreciate stock risk (σ_i)
   Risk (σ_i) = $\sqrt{\frac{\sum_{t=1}^{n}(R_{it}-E(R_i))^2}{n}}$
   σ_i : Risk of stock i

6. Selecting stocks using the Safety First Criterion method.
   The optimal portfolio formation using the Safety First Criterion method is first done by selecting using the three Safety First criteria, namely the Roy Safety First criteria, the Kataoka Safety First criteria, and the Telser Safety First criteria.
   a. Roy's Criteria = $\left[\frac{R_L - E(R_i)}{\sigma_i}\right]$
      R_L s an investor-determined return of 0.015 or 1.5%.
   b. Kataoka Criteria = $E(R_i) - z_\alpha \sigma_i$
      This Kataoka criteria maximizes R_L with z_α which is a critical value where the value of α = 0,05, so that the value z_α = 1,645. (Hakmi et al., 2023)
   c. Telser Criteria $\geq E(R_L) + z_\alpha \sigma_i$
      Where:
      R_L : Investor-determined return
      $E(R_i)$: Expected return of stock i
      z_α : Critical value for significance level α
      σ_i : Risk of stock i

7. Covarian matrix = $\sum_{i=1}^{n}\sum_{j=1}^{n}\left[\sigma_{ij}\right]^{-1}$
   The value of this covariance matrix can be found with the help of the Toolpak program in the Microsoft 365 program.
   Where:
   σ_{ij} : Covariance variance of stock return i with stock
   $\left[\sigma_{ij}\right]^{-1}$: Covariance matrix inverse

8. Find the weight of each stock in the optimal portfolio
9. Calculating the return and risk of the optimal stock portfolio
   Return $E(R_p) = \sum_i^n w_i E(R_i)$
   Risk (σ_p) = $\sqrt{\sum_{i=1}^{n} w_i^2\sigma_i^2 + \sum_{i=1}^{n}\sum_{j=1}^{n} w_i w_j \sigma_{ij}}$
   di mana:
   $E(R_p)$: Portfolio Return
   σ_p : Portfolio risk
   w_i : Stock weight i
   w_j : Stock weight j
   σ_{ij} : Covariance between stocks i and j
   σ_i^2 : Variance of stock i
   n : Number of share

RESULT AND DISCUSSION

Table 4.1 Expected Return Shares for the 2022-2023 Period

NO	Stock Code	E(Ri)	NO	Stock Code	E(Ri)	NO	Stock Code	E(Ri)
1	AKRA	0,0004	11	CPIN	0,0003	21	MAPI	0,0066
2	AMRT	0,0029	12	ESSA	-0,0078	22	MEDC	0,0032
3	ANTM	-0,0045	13	EXCL	-0,0006	23	PGAS	-0,0085
4	ARTO	-0,0145	14	GOTO	-0,0124	24	PGEO	0,0132
5	BBCA	0,0001	15	ICBP	0,0017	25	SIDO	-0,0070

Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 2 | February 2025 -Peer-Reviewed Journal

NO	Stock Code	E(Ri)	NO	Stock Code	E(Ri)	NO	Stock Code	E(Ri)
6	BBNI	0,0012	16	INCO	-0,0084	26	TLKM	-0,0026
7	BBRI	0,0020	17	INDF	0,0001	27	TOWR	-0,0032
8	BBTN	-0,0033	18	ISAT	0,0065	28	UNTR	-0,0031
9	BMRI	0,0024	19	JSMR	0,0062	29	UNVR	-0,0039
10	BRIS	0,0029	20	KLBF	-0,0038			

Source: Data Processed, 2024

Based on table 4.1, of the 29 sample stocks in this study, there are 15 stocks that have positive expected returns and 14 stocks have negative expected returns. Then a selection is made where 14 stocks that have negative expected returns are not included in the calculation, because stocks with negative expected returns are likely to experience losses in the future. Therefore, stocks with positive expected returns can continue to the calculation. Next, the average of 15 stocks that have a positive expected return value will be calculated, which is 0.0017. Then the value of $E(Ri) \geq 0.0017$ is selected which is presented in table 4.2.

Based on 29 stock samples in the 2023-2024 research period, 22 stocks have a positive expected return and the rest are negative. Then, the average of 22 stocks that have a positive expected return will be calculated, which is 0.0022. Then the value of $E(Ri) \geq 0, 0022$ is selected which is given in table 4.2 below.

Table 4.2 Expected Return of Selected Stocks

2022-2023 Period			2023-2024 Period					
No.	Stock Code	E(Ri)	No.	Stock Code	E(Ri)	No.	Stock Code	E(Ri)
1	AMRT	0,0029	1	AKRA	0,0022	11	MEDC	0,0043
2	BBRI	0,0020	2	AMRT	0,0023	12	PGAS	0,0073
3	BMRI	0,0024	3	ARTO	0,0104	13	SIDO	0,0065
4	BRIS	0,0029	4	BBCA	0,0037	14	UNTR	0,0032
5	ICBP	0,0017	5	BBTN	0,0047			
6	ISAT	0,0065	6	BMRI	0,0046			
7	JSMR	0,0062	7	BRIS	0,0164			
8	MAPI	0,0066	8	ESSA	0,0112			
9	MEDC	0,0032	9	ICBP	0,0038			
10	PGEO	0,0132	10	JSMR	0,0034			

Source: Data Processed, 2024

Next, calculate the risk or standard deviation of the selected stocks. Risk is the potential loss that an investor gets from investment activities.

Table 4.3 Risk of Selected Stocks

2022-2023 Period			2023-2024 Period					
No.	Stock Code	σi	No.	Stock Code	σi	No.	Stock Code	σi
1	AMRT	0,0399	1	AKRA	0,0377	11	MEDC	0,0441
2	BBRI	0,0247	2	AMRT	0,0281	12	PGAS	0,0434
3	BMRI	0,0291	3	ARTO	0,0850	13	SIDO	0,0385
4	BRIS	0,0516	4	BBCA	0,0221	14	UNTR	0,0327
5	ICBP	0,0253	5	BBTN	0,0441			
6	ISAT	0,0357	6	BMRI	0,0366			
7	JSMR	0,0481	7	BRIS	0,0457			
8	MAPI	0,0600	8	ESSA	0,0567			
9	MEDC	0,0808	9	ICBP	0,0369			
10	PGEO	0,0909	10	JSMR	0,0381			

Source: Data Processed, 2024

Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 2 | February 2025 -Peer-Reviewed Journal

Based on table 4.3 above, it can be seen that in 2022-2023 PGEO shares have the greatest risk of 0.0909. This is in line with the level of return obtained, which is 0.0132, as well as shares in the 2023-2024 period. Thus, in investment, the higher the return earned by investors, the higher the risk they will bear.

Safety First Criterion Method Stock Selection

Stock selection using the Safety First Criterion method can be done by selecting stocks that have the highest level of return from each criteria. Of the 10 stocks selected in the 2022- 2023 period and 14 stocks selected for the 2023-2024 period, 1 stock will be eliminated which has the smallest return rate so that there are only 9 stocks in the 2022-2023 period and 13 stocks in the 2023-2024 period for each criteria.

Roy Safety First

Roy's criteria have general criteria for minimizing Prob (Rit< RL), where the expected rate of return for each stock or RL is 1.5%. Stocks included in the portfolio with Roy Safety First criteria can be seen in table 4.4 as follows.

Table 4.4 Roy's Criteria

2022-2023 Period			2023-2024 Period					
Stock Code	**Roy**	**Ket.**	**Stock Code**	**Roy**	**Ket.**	**Stock Code**	**Roy**	**Ket.**
AMRT	0,3024	Selected	AKRA	0,3387	Selected	MEDC	0,2433	Selected
BBRI	0,5269	Selected	AMRT	0,4527	Selected	PGAS	0,1765	Selected
BMRI	0,4328	Selected	ARTO	0,0536	Selected	SIDO	0,2210	Selected
BRIS	0,2344	Selected	BBCA	0,5114	Selected	UNTR	0,3620	Selected
ICBP	0,5268	Selected	BBTN	0,2328	Selected			
ISAT	0,2369	Selected	BMRI	0,2838	Selected			
JSMR	0,1822	Selected	BRIS	0,0302	Not Selected			
MAPI	0,1395	Selected	ESSA	0,0676	Selected			
MEDC	0,1462	Selected	ICBP	0,3028	Selected			
PGEO	0,0193	Not Selected	JSMR	0,3044	Selected			

Source: Data Processed, 2024

Kataoka Safety First

Optimal portfolio formation based on Kataoka criteria is done by maximizing predetermined returns (RL) with the limit Rit < RL ≤ α, where the probability of the return is smaller or equal to the minimum return limit. The value of α = 0,05 so that the value $Z_\alpha = Z_{0,05} = 1{,}645$. Stocks included in the portfolio with Kataoka Safety First criteria can be seen in table 4.5 as follows.

Table 4.5 Kataoka Criteria

2022-2023 Period			2023-2024 Period					
Stock Code	**Kataoka**	**Ket.**	**Stock Code**	**Kataoka**	**Ket.**	**Stock Code**	**Kataoka**	**Ket.**
AMRT	0,0628	Selected	AKRA	0,05979	Selected	MEDC	0,06825	Selected
BBRI	0,0386	Not Selected	AMRT	0,0439	Selected	PGAS	0,06408	Selected
BMRI	0,0455	Selected	ARTO	0,12941	Selected	SIDO	0,05689	Selected
BRIS	0,0820	Selected	BBCA	0,03268	Not Selected	UNTR	0,05055	Selected
ICBP	0,0399	Selected	BBTN	0,06783	Selected			
ISAT	0,0521	Selected	BMRI	0,0555	Selected			
JSMR	0,0728	Selected	BRIS	0,05885	Selected			
MAPI	0,0920	Selected	ESSA	0,08203	Selected			
MEDC	0,1297	Selected	ICBP	0,05692	Selected			
PGEO	0,1363	Selected	JSMR	0,05936	Selected			

Source: Data Processed, 2024

Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 2 | February 2025 -Peer-Reviewed Journal

Telser Safety First

Optimal portfolio formation based on Telser criteria is a portfolio with the highest expected return. In this criterion maximizes E(Ri) with restrictions Rit < RL ≤ α. The value of α = 0, 05 so that the value of $Z_\alpha = Z_{0,05} = 1{,}645$. Shares included in the portfolio with Telser Safety First criteria can be seen in table 4.6 as follows.

Table 4.6 Telser Criteria

2022-2023 Period			2023-2024 Period					
Stock Code	**Telser**	**Ket.**	**Stock Code**	**Telser**	**Ket.**	**Stock Code**	**Telser**	**Ket.**
AMRT	0,0807	Selected	AKRA	0,0770	Selected	MEDC	0,0875	Selected
BBRI	0,0556	Not Selected	AMRT	0,0612	Selected	PGAS	0,0864	Selected
BMRI	0,0629	Selected	ARTO	0,1549	Selected	SIDO	0,0784	Selected
BRIS	0,0999	Selected	BBCA	0,0514	Selected	UNTR	0,0687	Selected
ICBP	0,0566	Selected	BBTN	0,0876	Selected			
ISAT	0,0737	Selected	BMRI	0,0751	Selected			
JSMR	0,0940	Selected	BRIS	0,0902	Not Selected			
MAPI	0,1137	Selected	ESSA	0,1082	Selected			
MEDC	0,1479	Selected	ICBP	0,0757	Selected			
PGEO	0,1645	Selected	JSMR	0,0778	Selected			

Source: Data Processed, 2024

Of the 10 stocks for the 2022-2023 period, 9 stocks with the highest value were selected, while in the 2023-2024 period 13 stocks were selected from 14 stocks with the highest value. Stocks with the smallest value are not selected in the optimal portfolio with Roy, Kataoka, and Telser Safety First criteria. These stocks in order based on their respective criteria are PGEO, BBRI, and BBRI in the 2022-2023 period, while for 2023-2024 they are BRIS, BBCA, and BBCA.

The portfolio that has been formed with the three criteria in the Safety First Criterion method above will be searched for the weight of each stock to evaluate the quality of the resulting portfolio in order to obtain a portfolio that has a risk in accordance with investor preferences and obtain maximum returns. Before that, a variance-covariance matrix is first formed to facilitate the calculation process.

In Roy's criteria there is a negative stock weight. The weight of a negative value stock or often called a short sell is a short selling process that requires investors to borrow shares from other parties, then sell them in a portfolio composition in the hope that the share price will fall (Hakmi et al., 2023). Therefore, it is necessary to normalize the stock weights so that there are no negative stock weights. Normalization of stock weights can be done with the help of a solver on Ms. Excel.

Table 4.7 Weight of Roy Criteria Share

2022-2023 Period		2023-2024 Period	
Assets	**Proportion**	**Assets**	**Proportion**
AMRT	16,61%	ARTO	18,50%
BMRI	2,69%	BMRI	20,42%
ISAT	4,69%	ESSA	14,51%
JSMR	42,91%	ICBP	0,30%
MAPI	33,10%	JSMR	3,44%
		MEDC	6,47%
		PGAS	20,28%
		SIDO	16,09%
Total	**100%**	**Total**	**100%**

Source: Data Processed, 2024

Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 2 | February 2025 -Peer-Reviewed Journal

Investors can choose to allocate most of their funds into the optimal portfolio with Roy Safety First criteria. In 2022-2023, the proportion of funds in each stock, namely JSMR shares have a proportion of 42.91%, MAPI shares have a proportion of 33.10%, AMRT shares of 16.61%, ISAT shares of 4.69%, and BMRI shares of 2.69%. BBRI, BRIS, ICBP, and MEDC stocks have a proportion of 0 funds, meaning that investors decide not to allocate their funds into these stocks. In 2023-2024, the proportion of funds in each stock is BMRI by 20.42%, PGAS by 20.28%, ARTO by 18.50%, SIDO by 16.09%, ESSA by 14.51%, MEDC by 6.47%, JSMR by 3.44%, and ICBP by 0.30%. Then the same calculation is done on the Kataoka and Telser criteria to determine the proportion of each stock.

In this optimal portfolio, there is one stock that remains consistent as an optimal portfolio builder, namely JSMR shares. JSMR shares are consistently included as optimal portfolio forming stocks using the Roy and Kataoka criteria, while in the Telser criteria there are no consistent stocks. This indicates that JSMR shares are worthy of consideration by investors because they are consistently included as optimal portfolio forming stocks.

Table 4.8 Expected Return and Portfolio Risk

Portfolio	2022-2023 Period		2023-2024 Period	
	E(Rp)	σp	E(Rp)	σp
Roy Safety First	0,0040	0,0070	0,0049	0,0023
Kataoka Safety First	0,0046	0,0070	0,0065	0,0040
Telser Safety First	0,0121	0,0158	0,0066	0,0042

Source: Data Processed, 2024

It can be concluded from the three Safety First criteria that have the smallest risk is the Roy Safety First criterion, which is 0.007 (0.7%) in 2022-2023, while in 2023-2024 it is 0.0023 (0.23%). When compared to the Kataoka Safety First and Telser Safety First criteria, Roy Safety First has the lowest level of return and risk. Meanwhile, Telser Safety First has the highest return. In addition, the risk of the three criteria in 2022-2023 is greater than in 2023- 2024. This happens because the portfolio-forming stocks in 2022-2023 are fewer in number than the portfolio-forming stocks in 2023-2024. Thus, for investors who tend to avoid risk (risk averse) it is recommended to choose the optimal portfolio with Roy Safety First criteria, while for investors who like risk (risk taker), the optimal portfolio with Telser Safety First criteria is more recommended.

CONCLUSION AND IMPLICATION

Based on the results of research that has been conducted on the application of safety first criterion for optimal portfolio formation on IDX LQ45 Low Carbon Leaders for the period November 2022 to October 2024, it can be concluded that in the calculation of expected return there are 22 stocks that are positive. The optimal portfolio with Roy Safety First and Kataoka Safety First criteria in 2022-2023 consists of five stocks and in 2023-2024 consists of eight stocks. On the other hand, the Telser Safety First criteria only have three stocks forming the optimal portfolio in 2022-2023 while in 2023-2024 there are five stocks. In addition, there is one stock that remains consistent as an optimal portfolio builder, namely JSMR shares.

The optimal portfolio of the Safety First Criterion method in 2022-2023 has an expected return portfolio of 1.21% per week with a portfolio risk of 1.58%. In 2023-2024, it has an expected portfolio return of 0.66% per week with a portfolio risk of 0.42% (based on Telser Safety First criteria). Thus, for investors who tend to avoid risk (risk averse), it is recommended to choose the optimal portfolio with Roy Safety First criteria, while for investors who like risk (risk taker), the optimal portfolio with Telser Safety First criteria is highly recommended.

For companies whose shares are not included in the optimal portfolio formation, it is advisable to conduct an evaluation while still implementing a sustainable system. The goal is to achieve optimal returns so that the company can be an investment choice for investors for sustainable investment in the future.

REFERENCES

1. *Abdullah, S., Huda, M., Istiyarti, S., Chasanah, U., Ikhsan, F., Susilo, S., Firmansyah, A., Fauzi, R., & Boy, D. V. (2022). IMPLEMENTASI MODEL INDEKS TUNGGAL DALAM PEMBENTUKAN PORTOFOLIO OPTIMAL PADA SAHAM SYARIAH MES BUMN 17 PERIODE NEW NORMAL Model Markowitz menggunakan nilai variance untuk mencari tingkat ukuran risiko . non-linear secara ma. 5(November 2021), 157–163.*
2. *Amal, M. A., Laksito, G. S., & Sulaiman, I. M. (2024). The Implementation of Roy's Safety-First Criterion in Stock Portfolio Selection. International Journal of Mathematics, Statistics, and Computing. https://doi.org/10.46336/ijmsc.v2i1.64*

3. *Aunillah, M. W., & Wahyudi, W. (2022). Analisis Portofolio Optimal CAPM dan Single Index Model pada Perusahaan IDX30. Jurnal Ilmiah Ekonomi Islam, 8(2), 2231. https://doi.org/10.29040/jiei.v8i2.5772*
4. *Dan, E. E., Universitas, B., Agustin, A. T., & Abundanti, N. (2023). STUDI KOMPARASI PEMBENTUKAN PORTOFOLIO OPTIMAL. 12(05), 795–809.*
5. *Databoks. (2024). Indonesia, Wadah Investasi Hijau Terbesar di Asia Tenggara. Katadata Media Network. https://databoks.katadata.co.id/ekonomi-makro/statistik/b0704e1d78a5c68/indonesia-wadah-investasi-hijau-terbesar-di-asia-tenggara*
6. *Ding, Y., & Zhang, B. (2009). Optimal portfolio of safety-first models. Journal of Statistical Planning and Inference, 139(9), 2952–2962. https://doi.org/10.1016/J.JSPI.2009.01.018*
7. *Francis, J. C., & Kim, D. (2013). Modern Portfolio Theory: Foundations, Analysis, and New Developments. Wiley. https://books.google.co.id/books?id=NdK0wAkiPg0C*
8. *Grahesti, A., Fahma, D., & Pramuningtyas, E. (2022). Green Sukuk : Investasi Hijau Berbasis Syariah dalam Mewujudkan Ketahanan Terhadap Perubahan Iklim di Indonesia. 8(03), 3374–3382.*
9. *Hakmi, H., Dharmawan, K., & Widiastuti, R. S. (2023). PENERAPAN METODE SAFETY FIRST CRITERION PADA SELEKSI SAHAM UNTUK PEMBENTUKAN PORTOFOLIO. 12(2), 100–105.*
10. *Hartono, J. (2014). Teori dan Praktik Portofolio dengan Excel (B. Hernalyk (ed.)). Salemba Empat.*
11. *IDX. (2022). BEI Luncurkan Indeks IDX LQ45 Low Carbon Leaders pada B20 Side Event. Indonesia Stock Exchange. https://www.idx.co.id/en/news/news/441614*
12. *Jogiyanto, H. M. (2010). Teori Portofolio dan Analisis Investasi (Edisi Ketu). Yogyakarta BPFE.*
13. *Kahar, R. H. (2024). Investment Portfolio Optimization Using Black-Litterman Model in Smart Carbon Economy Transition. 5(1), 104–110.*
14. *Kataoka, S. (1963). A Stochastic Programming Model. Econometrica, 31(1/2), 181–196. https://doi.org/10.2307/1910956*
15. *Markowitz, H. (1952). Portfolio Selection. The Journal of Finance, 7(1), 77–91. https://doi.org/10.2307/2975974*
16. *Prof. Dr. Eduardus Tandelilin, M. B. A. C. W. M. C. S. A. (2017). Pasar Modal: Manajemen Portofolio dan Investasi. PT Kanisius. https://books.google.co.id/books?id=EcjnEAAAQBAJ*
17. *Purba, R. B. (2023). Teori Akuntansi: Sebuah Pemahaman untuk Mendukung Penelitian di Bidang Akuntansi (ke-1). Merdeka kreasi Group. https://books.google.co.id/books?id=RoG3EAAAQBAJ*
18. *Roy, A. D. (1952). Safety first and the holding of assetts. Econometrica, 20, 431. https://api.semanticscholar.org/CorpusID:153974075*
19. *Spence, M. (1973). Job Market Signaling. The Quarterly Journal of Economics, 87(3), 355–374. https://doi.org/10.2307/1882010*
20. *Sudarsano, & Dr. Endri. (2022). Formation of Optimal Stock Portfolio Using the Single Index Model in the Covid-19 Pandemic. EPRA International Journal of Economics, Business and Management Studies, August, 58–71. https://doi.org/10.36713/epra11103*
21. *Telser, L. G. (1955). Safety First and Hedging 1. The Review of Economic Studies, 23(1), 1–16 . https://doi.org/10.2307/2296146*