



International Congress on Economics, Management and Business Studies

Hosted Online from New York, USA

Date: 23rd January, 2026

Website: <https://econferencia.com>

ANALYSIS OF INVESTMENT PORTFOLIO PERFORMANCE INDICATORS

Khaydarov Khumoyun Begmurod ogli

3rd-year doctoral student

Department of Finance and Financial Technologies

Tashkent State University of Economics

Phone: +998 94 693 59 95

Email: haydarovhumoyun02@gmail.com

Abstract:

This article analyzes investment portfolio performance indicators, particularly Sharpe, Treynor, Sortino, Jensen's Alpha, and Modigliani–Miller indicators, calculated based on a portfolio formed from 15 stocks. Based on the obtained results, scientific conclusions are presented regarding how effective the portfolio is for investors.

Keywords: Portfolio performance, Sharpe ratio, Treynor ratio, Jensen alpha coefficient, Sortino ratio, Modigliani–Miller, ROA, ROE, P/B, P/E, D/E indicators, beta coefficient.

Introduction:

For investors, forming an efficient investment portfolio has always been a pressing issue. Usually, asset efficiency is evaluated using indicators such as ROA, ROE, P/B, P/E, and D/E. However, portfolio efficiency is evaluated using indicators such as Sharpe, Treynor, Sortino, Jensen Alpha, and Modigliani–Miller. These indicators provide investors with a basis for making their investment decisions.



International Congress on Economics, Management and Business Studies

Hosted Online from New York, USA

Date: 23rd January, 2026

Website: <https://econferencia.com>

Analysis and Results:

In our research, we formed a portfolio based on daily stock data over five years from 15 joint-stock companies. In our opinion, it is important to pay attention to the methodological aspects of portfolio performance indicators. For example, the **Sharpe ratio** is an indicator that measures how effectively an investment portfolio generates returns relative to risk. This coefficient was developed by **W. Sharpe**¹ and is one of the main indicators used to evaluate portfolio performance.

$$\text{Sharpe} = \frac{R_p - R_f}{\sigma_p}$$

Where: R_p - average return of the portfolio

R_f - risk-free rate (for example, the average interest rate of government bonds)

σ_p - standard deviation of portfolio returns

Table 1: Interpretation of the sharpe ratio²

| Sharp ratio | Interpretation |
|----------------|--|
| Sharpe < 0 | Portfolio performs worse than the risk-free rate |
| 0 < Sharpe < 1 | Portfolio has low returns |
| 1 < Sharpe < 2 | Portfolio has good returns |
| 2 < Sharpe < 3 | Portfolio has very good returns |
| Sharpe > 3 | Portfolio has optimal returns |

Another indicator is the **Treynor ratio**³, which measures how much return the portfolio generates relative to market risk.

$$\text{Treynor} = \frac{R_p - R_f}{\beta_p}$$

R_p - average return of the portfolio

¹ Sharpe, W. F. (1966). *Mutual Fund Performance*

² Prepared by the author

³ Treynor, J. (1965) How to Rate Management of Investment Funds



International Congress on Economics, Management and Business Studies

Hosted Online from New York, USA

Date: 23rd January, 2026

Website: <https://econferencia.com>

R_f - risk-free rate (for example, government bonds)

β_p -beta coefficient of the portfolio

Table 2: Interpretation of the treynor ratio⁴

| Treynor qiymati | Interpretation |
|-----------------|--|
| $T > 0$ | Portfolio return is higher than the risk-free rate |
| $T = 0$ | Portfolio return equals the risk-free rate |
| $T < 0$ | Portfolio return is lower than the risk-free rate |

Another indicator is **Jensen's Alpha**, which shows how much more or less return the portfolio generated compared to the expected return according to the CAPM model.

$$\alpha_p = R_p - [R_f + \beta_p(R_m - R_f)]$$

Where: α_p -Jensen's Alpha (excess return of the portfolio)

R_p -average portfolio return

R_f -risk free rate

B_p -market beta coefficient

Table 3: Interpretation of Jensen's Alpha⁵

| Jenson alfa | Interpretation |
|--------------|---|
| $\alpha > 0$ | Portfolio return is higher than market return |
| $\alpha < 0$ | Portfolio return is lower than market return |
| $\alpha = 0$ | Portfolio return equals market return |

This indicator measures excess portfolio return, calculated by subtracting the CAPM (Capital Asset Pricing Model) expected return from the average portfolio return. Another important indicator is the **Sortino ratio**, which evaluates

⁴ Prepared by the author

⁵ Prepared by the author



International Congress on Economics, Management and Business Studies

Hosted Online from New York, USA

Date: 23rd January, 2026

Website: <https://econferencia.com>

portfolio performance relative only to downside risk. It focuses only on negative deviations of returns.

$$\text{Sortino ratio} = \frac{R_p - R_f}{\sigma_d}$$

Where: R_p - average portfolio return

R_f - risk free rate

σ_d - Only negative deviations of expected returns are used in the calculation and divided by the number of observations, then the square root is taken. This allows evaluation of the risk associated only with potential losses.

Table 4: Interpretation of the sortino ratio

| Sortino Value | Interpretation |
|-----------------|-----------------------------------|
| sortino < 0 | Portfolio efficiency is low |
| 0 < sortino < 1 | Portfolio has low efficiency |
| 1 < sortino < 2 | Portfolio efficiency is good |
| sortino > 2 | Portfolio efficiency is very good |

The final indicator used to evaluate portfolio efficiency is the **Modigliani–Modigliani (M^2)** indicator, which evaluates portfolio performance similarly to the Sharpe ratio but expresses the result in percentage terms. Formula is

$$M^2 = R_f + (\text{Sharp ratio} * \sigma_m)$$

Where: R_f - risk free rate

σ_m - standard deviation of the market portfolio



International Congress on Economics, Management and Business Studies

Hosted Online from New York, USA

Date: 23rd January, 2026

Website: <https://econferencia.com>

Table 5: Interpretation of the Modigliani–Miller Coefficient⁶

| M^2 value | Interpretation |
|-----------------------|--|
| $M^2 >$ Market Return | Portfolio performs better than the market |
| $M^2 =$ Market Return | Portfolio return equals market return |
| $M^2 <$ Market Return | Portfolio return is lower than market return |

Using the five-year data of selected joint-stock companies, we calculated portfolio efficiency indicators.

Table 6: Portfolio Performance Indicators⁷

| Indicators | Portfolio 1 | Portfolio 2 | Portfolio 3 |
|-------------------|-------------|-------------|-------------|
| Sharpe Ratio | 0.49 | 0.72 | 1.34 |
| Treynor Ratio | 1.72 | 2.09 | 0.16 |
| Jensen Alpha | 1.66% | 3.81% | 6.71% |
| Sortino Ratio | 1.37 | 0.89 | 4.05 |
| Modigliani–Miller | 10.5% | 11.31% | 13.43% |

The Sharpe ratio results reflect portfolio returns relative to total risk (standard deviation). According to this indicator, Portfolio 3 (1.34) clearly demonstrates superiority, meaning it provides the most efficient return relative to risk. Portfolio 2 (0.72) shows moderate performance, while Portfolio 1 (0.49) demonstrates relatively low efficiency. The Treynor ratio reflects evaluation based on market (systematic) risk. In this case, Portfolio 2 (2.09) shows the highest result, indicating the most optimal return relative to market risk. In contrast, the very low value for Portfolio 3 (0.16) suggests either a low beta level or limited correlation with the market. Jensen's Alpha reflects the portfolio manager's asset

⁶ Prepared by the author

⁷ Prepared by the author



International Congress on Economics, Management and Business Studies

Hosted Online from New York, USA

Date: 23rd January, 2026

Website: <https://econferencia.com>

selection ability. Portfolio 3 shows the highest value (6.71%), indicating highly effective active management. Portfolio 2 (3.81%) and Portfolio 1 (1.66%) show lower results. The Sortino ratio, which considers only downside risk, again shows a significant advantage for Portfolio 3 (4.05), indicating effective management of downside risk. Portfolio 1 (1.37) and particularly Portfolio 2 (0.89) show weaker results. The Modigliani –Modigliani (M^2) indicator expresses risk-adjusted returns in percentage terms. Here again Portfolio 3 (13.43%) records the highest result, reinforcing its leadership in overall efficiency.

Conclusion

In conclusion, Portfolio 3 leads in most indicators (Sharpe, Jensen Alpha, Sortino, M^2), demonstrating high profitability and effective risk management. This indicates that the active management strategy of the portfolio was successfully implemented. Portfolio 2 shows superiority in the Treynor ratio, making it particularly suitable for investors who are sensitive to market risk. Portfolio 1, however, demonstrates relatively low results across all indicators and can be considered the least efficient portfolio.

References

1. Sharpe, W. F. (1966). Mutual Fund Performance
2. Treynor, J. (1965). How to Rate Management of Investment Funds
3. Jensen, M. C. (1968). The Performance of Mutual Funds in the Period 1945–1964
4. Sortino, F., & Price, L. (1994). Performance Measurement in a Downside Risk Framework
5. Modigliani, F., & Modigliani, L. (1997). Risk-Adjusted Performance.