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Portfolio Performance Measures

Given Data:

- Risk-free rate (r_f): 4%
- Market's average return (r_m): 12%
- Excess return regression results for Stocks A and B:
  - Stock A: α_A = 1%, β_A = 1.2
  - Stock B: α_B = 2%, β_B = 0.8
- R-squared and standard deviations:
  - Stock A: R^2 = 0.689, σ(e_A) = 12.2%, σ(A) = 23.5%
  - Stock B: R^2 = 0.493, σ(e_B) = 21%, σ(B) = 28.7%

Calculations:

i. Alpha:

Given α values:
- Stock A: α_A = 1%
- Stock B: α_B = 2%

Supporting Statement and Explanation:
Alpha is given directly for each stock.

ii. Information Ratio:

Information Ratio = α / σ(e)

For Stock A:
Information Ratio_A = 1% / 12.2% = 0.0819672 ≈ 0.0820

For Stock B:
Information Ratio_B = 2% / 21% = 0.0952381 ≈ 0.0952

Supporting Statement and Explanation:
The Information Ratio measures the risk-adjusted return of the portfolio by dividing alpha by the residual standard deviation.

iii. Sharpe Ratio:

Sharpe Ratio = (r_i - r_f) / σ_i

For Stock A:
Sharpe Ratio_A = (12% - 4%) / 23.5% = 0.3404255 ≈ 0.3404

For Stock B:
Sharpe Ratio_B = (12% - 4%) / 28.7% = 0.278042 ≈ 0.2780

Supporting Statement and Explanation:
The Sharpe Ratio provides a measure of risk-adjusted return, comparing the return in excess of the risk-free rate to the standard deviation of the portfolio returns.

iv. Treynor Measure:

Treynor Measure = (r_i - r_f) / β_i

For Stock A:
Treynor Measure_A = (12% - 4%) / 1.2 = 6.6666667 ≈ 6.6667

For Stock B:
Treynor Measure_B = (12% - 4%) / 0.8 = 10

Supporting Statement and Explanation:
The Treynor Measure evaluates how much excess return is generated per unit of market risk, with market risk measured by beta.

Summary Table:

	Stock A	Stock B
i. Alpha	1.0000	2.0000
ii. Information Ratio	0.0820	0.0952
iii. Sharpe Ratio	0.3404	0.2780
iv. Treynor Measure	6.6667	10.0000

Best Choice Under Circumstances:

I. This is the only risky asset to be held by the investor:

Use Sharpe Ratio since the Total Risk matters.
Stock A has a higher Sharpe Ratio (0.3404).

II. This stock will be mixed with the rest of the investor's portfolio, currently composed solely of holdings in the market-index fund:

Use Treynor Measure since Market Risk matters.
Stock B has a higher Treynor Measure (10.0000).

III. This is one of many stocks that the investor is analyzing to form an actively managed stock portfolio:

Use Information Ratio since Specific Risk is analyzed.
Stock B has a higher Information Ratio (0.0952).

Supporting Statement and Explanation:
Different scenarios require different performance measures to find the optimal choice considering the risk and return tradeoff.

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