What Must Be The Beta Of A Portfolio With E(r P)=12.008 8 , If R F =48 And E(r M)= 12% ? (Round Your

What Must Be The Beta Of A Portfolio With E(r P)=12.008 8 , If R F =48 And E(r M)= 12% ? (Round Your

Understanding the beta of a portfolio is fundamental in finance, especially when evaluating its risk relative to the overall market. In this article, we will explore how to determine the beta (β) of a portfolio given specific expected return figures, the risk-free rate, and the expected market return. Specifically, we're asked to find the beta of a portfolio with an expected return $E(r_P) = 12.0088\%$, a risk-free rate $R_f = 48\%$, and an expected market return $E(r_M) = 12\%$. The calculation involves applying the Capital Asset Pricing Model (CAPM), a core concept in modern portfolio theory.

Understanding the Key Concepts

Expected Return of a Portfolio ($E(r_P)$)

- The anticipated return on an investment portfolio based on the weighted average of the expected returns of its constituent assets.
- It reflects the overall profitability expected from the portfolio over a given period.

Risk-Free Rate (R_f)

- The return on an investment with zero risk, often represented by government treasury bills or bonds.
- Used as a baseline in CAPM to measure the excess return of risky assets.

Expected Market Return ($E(r_M)$)

- The average return expected from the market portfolio, representing the overall market's performance.
- Typically based on historical data or market forecasts.

Beta (β)

- A measure of a portfolio's sensitivity to market movements.
- Indicates how much the portfolio's return is expected to change relative to market changes.

Applying the Capital Asset Pricing Model (CAPM)

The CAPM formula links expected return, risk-free rate, market return, and beta as follows:

$$
E(r_P) = R_f + \beta (E(r_M) - R_f)
$$

Where:

- $E(r_P)$: Expected return of the portfolio
- R_f: Risk-free rate
- $E(r_M)$: Expected market return

- β: Beta of the portfolio

Our goal is to solve for β given the other parameters.

Step-by-Step Calculation of Beta

Step 1: Identify the given values

- $E(r_P) = 12.0088\%$
- $R_f = 48\%$
- $E(r_M) = 12\%$

Step 2: Substitute into the CAPM formula

$$
12.0088 = 48 + \beta (12 - 48)
$$

Step 3: Simplify the equation

$$
12.0088 = 48 + \beta (-36)
$$

Step 4: Rearrange to solve for β

$$
\beta (-36) = 12.0088 - 48
$$

$$
\beta (-36) = -35.9912
$$

$$
\beta = \frac{-35.9912}{-36}
$$

Step 5: Final calculation

$$
\beta \approx 1.0003
$$

Rounded to four decimal places, $\beta \approx 1.0003$.

Interpreting the Results

- A beta of approximately 1.0003 indicates that the portfolio's return is very closely aligned with the market's movements.
- If the beta were greater than 1, the portfolio would be more volatile than the market.
- If less than 1, it would be less sensitive to market swings.
- In this case, the portfolio is almost perfectly market-sensitive.

Additional Considerations and Implications

1. Unusual Risk-Free Rate Value

- The risk-free rate provided is 48%, which is exceptionally high compared to typical market rates.
- Such a high rate might suggest a different context or a typographical error.
- It's essential to verify the data before making investment decisions.

2. Realistic Expectations

- A portfolio expected to return approximately 12% with a risk-free rate of 48% implies a high-risk environment or possibly an error.
- Generally, the risk-free rate is much lower, often below 5%.

3. Sensitivity of Beta Calculation

- The calculation relies heavily on accurate data.
- Slight variations in input values can significantly affect the beta estimate.

4. Practical Applications

- Investors use beta to assess portfolio risk relative to market movements.
- Portfolio managers adjust asset weights to achieve desired beta levels aligning with investor risk appetite.

Conclusion

Calculating the beta of a portfolio using the CAPM framework provides valuable insights into its market sensitivity. Given the data—expected return of approximately 12.0088%, a risk-free rate of 48%, and an expected market return of 12%—the beta computes to roughly 1.0003. This indicates that the portfolio's returns are almost perfectly aligned with the market's fluctuations, suggesting it carries a similar level of systematic risk.

However, it's crucial to scrutinize the input data, particularly the unusually high risk-free rate, to ensure accurate analysis and decision-making. Portfolio managers and investors should always contextualize these metrics within the broader market environment and their specific investment goals.

By understanding and applying the CAPM effectively, investors can better navigate risk management and optimize their portfolios to meet desired return and risk profiles.

Remember: Always verify data accuracy and consider market conditions when utilizing models like CAPM for investment analysis.

Frequently Asked Questions

What is the formula to calculate the beta of a portfolio given its expected return, risk-free rate, and market return?

The beta of a portfolio can be calculated using the Capital Asset Pricing Model (CAPM) formula: Beta = (E(rP) - Rf) / (E(rM) - Rf).

Given E(rP) = 12.0088%, Rf = 4.8%, and E(rM) = 12%, what is the beta of the portfolio?

Beta = (12.0088% - 4.8%) / (12% - 4.8%) = (7.2088%) / (7.2%) ≈ 1.0012.

Why is the beta of a portfolio important for investors?

Beta measures the sensitivity of a portfolio's returns to market movements, helping investors assess the risk and expected return relative to the market.

How does a beta greater than 1 affect a portfolio's risk and return?

A beta greater than 1 indicates the portfolio is more volatile than the market, implying higher potential returns and higher risk.

What assumptions are made when using CAPM to determine beta?

CAPM assumes markets are efficient, investors are rational, there are no transaction costs, and beta remains constant over time.

If the expected return of the portfolio increases, how does that impact its beta?

An increase in the expected return, assuming the risk-free rate and market return are constant, would suggest a higher beta if the excess return increases proportionally.

Can beta be negative, and what does that imply?

Yes, a negative beta indicates the portfolio moves inversely to the market, providing potential hedge benefits during market declines.

What are the limitations of using beta as a sole measure of portfolio risk?

Beta only measures systematic risk and ignores unsystematic risk, and it assumes historical relationships persist, which may not always hold.

How should an investor interpret a beta close to 1.0 in the context of the given data?

A beta close to 1.0 suggests the portfolio's returns are closely aligned with the market, indicating average market-related risk.

Additional Resources

Beta of a Portfolio: Understanding Its Calculation and Significance

When analyzing investment portfolios, the concept of beta plays a critical role in assessing the risk relative to the overall market. The beta coefficient measures a portfolio's sensitivity to market movements, providing investors with insights into potential volatility and risk exposure. Determining the beta of a portfolio is essential for portfolio management, risk diversification, and aligning investments with an investor's risk appetite. This article explores how to calculate the beta of a portfolio given specific expected return parameters, the importance of beta in modern portfolio theory, and practical implications for investors.

Understanding the Components of Portfolio Beta

Before delving into the calculation, it's crucial to understand the key variables involved:

- **E(rP)**: Expected return of the portfolio, given as 12.0088%
- **Rf**: Risk-free rate, specified as 48%
- **E(rM)**: Expected return of the market, given as 12%
- **Beta** (β): Measure of the portfolio's volatility relative to the market

At first glance, the provided figures present some anomalies—particularly the risk-free rate exceeding the expected return of the market, which contradicts standard assumptions. Typically, the risk-free rate is lower than the expected market return. Therefore, this discrepancy suggests a need for clarification or perhaps a typographical error. For the sake of this analysis, we'll interpret the figures as given but also discuss how to handle such inconsistencies.

Theoretical Framework: Capital Asset Pricing Model (CAPM)

The primary model used to relate expected return, risk-free rate, beta, and market return is the Capital Asset Pricing Model (CAPM):

$$E(rP) = Rf + \beta \, [E(rM) - Rf]$$

This formula states that the expected return of a portfolio depends on the risk-free rate plus a risk premium adjusted by the beta coefficient.

Key features of CAPM:

- Provides a way to quantify risk-adjusted expected return
- Assumes markets are efficient, and investors are rational
- Beta reflects systematic risk, which cannot be diversified away

Limitations:

- Assumes a single-period horizon
- Relies on the assumption of market efficiency
- Sensitive to input inaccuracies

Calculating the Portfolio Beta: Step-by-Step Approach

Given the data:

- $E(r_P)$ = 12.0088%
- R_f = 48%
- $E(r_M)$ = 12%

The core task is to find β (beta) of the portfolio.

Step 1: Rearrange the CAPM formula

$\beta = [E(r_P) - R_f] / [E(r_M) - R_f]$

Step 2: Substitute the known values

β = (12.0088% - 48%) / (12% - 48%)

Note the units: all are percentages; ensure they are consistent.

Step 3: Perform the calculation

Numerator: 12.0088% - 48% = -35.9912%

Denominator: 12% - 48% = -36%

Therefore,

□ = -35.9912% / -36% □ 0.9998

Step 4: Interpret the result

The beta is approximately 1, indicating the portfolio moves almost exactly in line with the market.

Analyzing the Result and Its Implications

The calculated beta of approximately 1 suggests that the portfolio has a risk profile similar to the overall market, assuming the data is accurate. This means:

- The portfolio is expected to experience similar percentage swings as the market
- Investors seeking market-level risk can consider this portfolio suitable
- The portfolio might not provide diversification benefits if the market itself is volatile

However, the initial data raises questions:

- The risk-free rate exceeds the expected return of the market, which conflicts with typical market assumptions
- Such an anomaly indicates potential data errors or misinterpretations

Practical considerations:

- Always verify data accuracy before making investment decisions

- Recognize that real-world data may not always fit theoretical models perfectly
- Use beta as a guide rather than an absolute measure

Pros and Cons of Using Beta in Portfolio Management

Pros:

- Risk Assessment: Beta provides a quantifiable measure of systematic risk
- Portfolio Optimization: Helps in constructing portfolios aligned with risk tolerance
- Performance Evaluation: Assists in comparing expected versus actual risk exposure
- Market Sensitivity: Offers insights into how the portfolio reacts to market movements

Cons:

- Data Sensitivity: Beta calculations rely heavily on historical data, which may not predict future performance
- Market Assumptions: Assumes market efficiency and rational investors
- Limited Scope: Only measures systematic risk, ignoring unsystematic risk
- Potential for Misinterpretation: Anomalies like inconsistent data can lead to incorrect conclusions

---

Features and Practical Applications of Portfolio Beta

- Risk Management: Investors can adjust portfolio composition based on desired beta levels
- Performance Benchmarking: Comparing portfolio beta to market movements aids in performance

analysis

- Strategic Asset Allocation: Incorporate beta insights to balance risk and return
- Hedging Strategies: Use beta to identify when to hedge against market downturns

---

Conclusion

Determining the beta of a portfolio is an essential aspect of investment analysis, providing insights into the portfolio's risk relative to the market. Based on the provided data, the calculated beta approximates 1, indicating a portfolio that mirrors the market's volatility. However, the unusual figures—specifically, the risk-free rate exceeding the expected market return—highlight the importance of verifying data accuracy and understanding the context in which these figures are presented.

In practical terms, investors should consider beta as a valuable, yet not infallible, tool in their decision-making arsenal. Combining beta analysis with other metrics such as alpha, Sharpe ratio, and qualitative assessments ensures a comprehensive approach to portfolio management. Ultimately, understanding and accurately calculating beta enables investors to align their portfolios with their risk tolerance and investment goals effectively.

Note: Always ensure data validity and consider market conditions when applying theoretical models like CAPM to real-world scenarios.

What Must Be The Beta Of A Portfolio With E R P 12 008 8 If R F 48 And E R M 12 Round Your

What Must Be The Beta Of A Portfolio With E R P 12 008 8 If R F 48 And E R M 12 Round Your

Related Articles

- Using A Two-stage Dividend Discount Model, Compute The Intrinsic Value Using The Following Information
- What Is The Area Of The Entire Plot Of Land (Including The Land Occupied By The House, Backyard, Front
- 3) AndWhat Is The Equation, In Point-slope Form, Of The Line Thatis Perpendicular To The Given Line And

Back to Home