Measurement of Risk – Standard Deviation, Beta, and Systematic vs. Unsystematic Risk

# Introduction

This report evaluates the risk profiles of two stocks under consideration by a client at Capital Growth Investments. The analysis focuses on total risk (via standard deviation), market risk (via beta), and return expectations (via CAPM), along with an explanation of systematic and unsystematic risks.

# Part 1: Measuring Total Risk (Standard Deviation Calculation)

Stock A (Tech Company):

- Historical Returns: [12, 8, 15, -5, 10]

- Average Return: 8.00%

- Standard Deviation: 6.90%

Stock B (Retail Company):

- Historical Returns: [7, 5, 9, -2, 6]

- Average Return: 5.00%

- Standard Deviation: 3.74%

# Part 2: Measuring Market Risk (Beta & Expected Return)

The beta coefficient measures a stock’s volatility relative to the market:

- Beta > 1: More volatile than the market

- Beta < 1: Less volatile than the market

Stock A Beta: 1.3 → More volatile than the market

Stock B Beta: 0.8 → Less volatile than the market

Using the Capital Asset Pricing Model (CAPM):

Expected Return = Risk-Free Rate + Beta × (Market Return − Risk-Free Rate)

Stock A Expected Return: 8.50%

Stock B Expected Return: 6.00%

# Part 3: Identifying Systematic vs. Unsystematic Risk

Systematic risk is market-wide and cannot be eliminated (e.g., interest rate changes, recessions). Unsystematic risk is company-specific and can be reduced through diversification.

Standard deviation includes both systematic and unsystematic risks. Beta only measures systematic (market) risk. Investors can reduce unsystematic risk by holding a diversified portfolio of stocks from different sectors.

# Part 4: Written Analysis

Stock A offers higher expected and historical returns but comes with higher total and market risk. Its standard deviation and beta are both higher than those of Stock B, indicating more volatility.

Stock B, on the other hand, provides lower returns but is less risky both in terms of market fluctuations and total variability.

Therefore, Stock A may be suitable for risk-tolerant investors seeking higher returns, while Stock B suits risk-averse investors.

# Conclusion

This analysis highlights how standard deviation and beta help evaluate different aspects of risk. While Stock A is more volatile and potentially rewarding, Stock B offers a more stable investment. Understanding the distinction between systematic and unsystematic risk is essential in constructing a diversified and resilient investment portfolio.

# References

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