

Diversification Classic

The "Diversification Classic" project conducts a detailed examination of portfolio diversification using historical data from Exxon Mobil (XOM) and Darden Restaurants (DRI) over 2005-2009. By employing statistical analysis, portfolio optimization, and testing against the Capital Asset Pricing Model (CAPM), the project assesses the effectiveness of diversification strategies in risk management and return optimization.

Data Description and Preliminary Analysis

The analysis utilizes monthly return data for Exxon Mobil and Darden Restaurants. Initial statistics for these stocks were calculated as follows:

- 1. Exxon Mobil (XOM):**
 - Average Monthly Return: 0.95%
 - Standard Deviation of Returns: 10.05%
- 2. Darden Restaurants (DRI):**
 - Average Monthly Return: 1.42%
 - Standard Deviation of Returns: 10.63%

Correlation between XOM and DRI Returns: 0.52, indicating a moderate positive relationship.

Investment Decision Analysis

Based on the risk-return profile, two scenarios were considered:

- 1. Risk-Free Asset Combination:** The analysis explored which stock between XOM and DRI would be preferable when combined with a risk-free asset, with the results favoring DRI for higher risk tolerance due to its superior return profile.
 - 2. Target Standard Deviation Strategy:** For a portfolio target standard deviation of 15% per annum, the study calculated the optimal mix of the risk-free asset and each stock. The results demonstrated that DRI again provided a higher expected return for a given level of risk.
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Portfolio Optimization

A more complex optimization was conducted to determine the mix of XOM, DRI, and a risk-free asset that would deliver the best possible return at the desired risk level:

- Optimal Weights:

- 1) Exxon Mobil (XOM): 52.91%
 - 2) Darden Restaurants (DRI): 47.09%
 - 3) Risk-Free Asset: Minimal
 - Expected Monthly Return: 1.17%, achieving the target standard deviation with no significant allocation to the risk-free asset, highlighting the benefits of diversification.
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CAPM Assessment

The CAPM analysis involved calculating the beta for each stock and comparing the expected returns based on these betas to the actual returns:

- Both stocks showed higher actual returns than predicted by their betas under CAPM. A regression analysis to test for alpha significance found that neither stock significantly violates the CAPM, indicating that deviations from model predictions were not statistically significant.
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Diversification Impact Analysis

Adjusting the correlation assumption between XOM and DRI to 0.6:

- This adjustment led to a slight increase in the calculated portfolio risk, demonstrating that higher correlations reduce diversification benefits by aligning asset volatilities more closely.
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Conclusions

The "Diversification Classic" project highlights the nuanced benefits of diversification, particularly in how correlation between assets can impact the risk-reduction potential of a portfolio. The findings also emphasize the practical limitations of theoretical models like CAPM in predicting real-world returns.

Future Work

Future analyses could extend to include additional asset classes, a broader range of economic conditions, and longer time horizons to further validate the observed diversification benefits and CAPM model adherence.