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Performance evaluation
NEW YORK STOCK EXCHANGE
LIVERMORE

Outline

Trading on information

- Investors may seek to exploit information they have obtained, believing markets are inefficient
- They might buy assets they believe are undervalued or will increase in value
- They might sell assets they believe are overvalued or will decrease in value

Considering risks

- Trying to exploit perceived market inefficiencies will change the return on their investments
- As they will deviate from their optimal portfolio, the risk of their portfolio will also change
- To assess the performance of investors, we need to take this risk into account

Risk types

Systematic risk The risk affecting the market as a whole

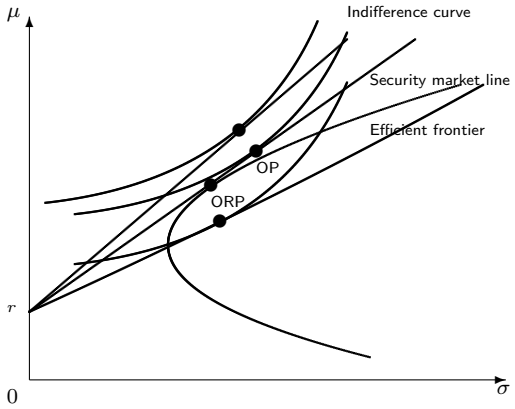
Unsystematic risk The risk affecting only an individual asset

- To assess the performance of an investor, we need to adjust their returns by the risk they are taking
- Depending on the relevant risk, we need to make different adjustments

Considering total risk

- If we are concerned about the total risk, we use variance as a risk measure
- From portfolio theory we know that decisions are made using the mean return and return variance
- We can compare returns and risks building on portfolio selection theory

Portfolio selection



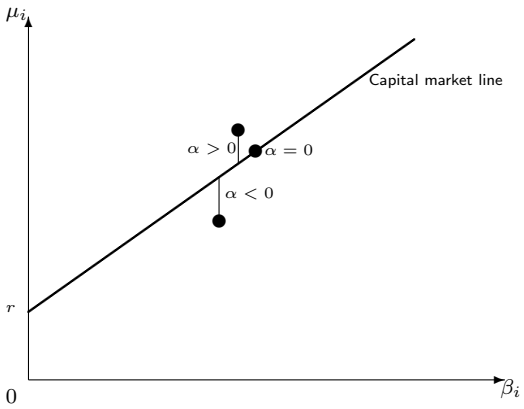
Slope as performance measure

- A higher slope corresponds to a higher utility level
- We use the slope as a performance measure
- The vertical direction gives the excess return of the investor over the risk-free rate
- The horizontal direction represents the risk
- $SR_i = \frac{\mu_i - r}{\sigma_i}$
- The Sharpe ratio measures the excess return relative to the total risk the investor takes

Using asset pricing benchmark

- If their portfolio is well-diversified, the investor will not be concerned with idiosyncratic risk
- Rather than total risk, the risk assessment will be based on systematic risk only
- We can use the Capital Asset Pricing Model (CAPM) to determine the return required for a given systematic risk

Using the CAPM as a benchmark



Differences in returns

- The CAPM gives the excess return of an asset as the excess return of the market, adjusted for systematic risk
- $\hat{\mu}_i - r = \beta_i (\mu_M - r)$
- The performance measure is the difference of the actual return and the return implied by the CAPM
- $\alpha = \mu_i - \hat{\mu}_i$
- Jensen's α only considers systematic risk, any idiosyncratic risk will be ignored

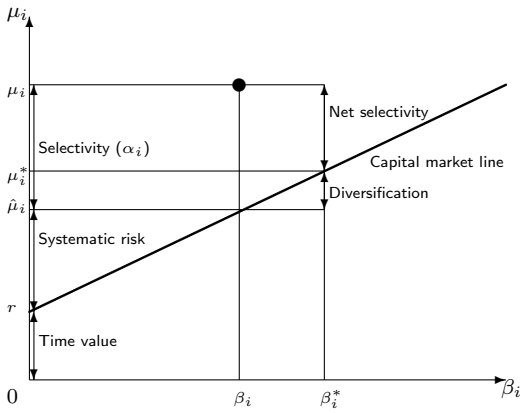
Adjusting performance for idiosyncratic risk

- The Sharpe ratio takes into account systematic and idiosyncratic risk, while Jensen's α only takes into account systematic risk
- A main shortcoming using Jensen's α is that it does not consider the potential for an investor incurring additional idiosyncratic risks
- If actual returns follow the CAPM, then $\hat{R}_i = r + \beta_i (R_M - r)$

$\Rightarrow$ Total risk: $\sigma_i^2 = \beta_i^2 \sigma_M^2$

- If an investor now incurs total risk σ_i, then the systematic risk equivalent to this total risk is $\beta_i^* = \frac{\sigma_i}{\sigma_M}$

Determining net selectivity



Net selectivity

- The selectivity is Jensen's α
- Investors may take additional idiosyncratic risk, equivalent to a total systematic risk of β_i^*
- This will increase the benchmark return to μ_i^*
- Taking into account the idiosyncratic risk, the net selectivity represents the value added by investors

- Exploiting market inefficiencies
- Sharpe ratio
- Jensen's α
- Portfolio return decomposition
- Summary

Importance of risk adjustments

- Investors exploiting market inefficiencies may generate higher returns
- Higher returns might be associated with higher risks
- Taking into account the additional risks, shows if investors generate economic profits
- Risk adjustments can be made for systematic risk only or for all risks
- Systematic risk is appropriate if a portfolio is well diversified
- Total risk should be used if a portfolio is not well diversified

Choice of performance measure

- Adjusting returns with different risk measures can lead to different results
- An investor might generate a high Jensen's α
- The same investor might increase its idiosyncratic risk and this can lead to a low performance if measured by the Sharpe ratio
- Determining which performance measure to use will depend on which type of risk is relevant

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