

Return and Risk

<u>Common Stocks</u>	If there is market efficiency stock prices cannot be predicted. This means that the return on any stock behaves like a random variable.
<u>Covariance</u>	The covariance measures how much the rates of return on two stocks move in tandem
<u>Covariance positive</u>	A positive covariance is due to a positive correlation coefficient and means that stock returns move in the same direction
<u>Covariance negative</u>	A negative covariance is caused by a negative correlation coefficient and means that asset returns vary inversely

Diversification

Definition	To diversify means to invest in more than one asset. In the present context, this implies to construct a risky portfolio. Diversification reduces portfolio total risk, because it reduces variability.
Firm-specific risk	Can be eliminated by diversifying your portfolio
Systematic risk	Cannot be fully eliminated, is the same for every company

Markowitz Portfolio Selection Model

Definition	How an investor chooses between the risk-free asset and an optimal portfolio In this portfolio selection model investors are risk-averse
Model	The model is an optimization model that maximizes the expected return

Efficient frontier of risky assets

Portfolio selection problem	Solved with quadratic linear programming. Given the expected return and standard deviation for each stock, as well as the correlation coefficient between each possible pair of stocks, the set of efficient portfolios is calculated. The outcome is also known as the efficient frontier of risky assets.
Efficient frontier of risky assets	Efficient portfolios lay on the upward sloping part while inefficient portfolios are on the downward sloping part. Investors are interested in the portfolio with the highest expected return. They will choose the portfolio with the lowest standard deviation. This is called the first stage or setting!!
Risk-free asset	rf is treasury bill. The expected return is denoted by rf
Second stage	Investors are interested in low risk where they place some money in treasury bills and the remainder in common stock portfolio. Best combination is determined by the straight line joining the risk-free interest rate with the efficient Portfolio P*. P+ is better than the rest bc it offers the best ratio of risk premium to standard deviation.
Third stage (Lending and borrowing)	In this stage investors can now borrow money and invest more than 100% of their budget.
Types of investors	1: Invests everything in risk-free assets; 2: 100% invested in risk-free assets and optimal risky portfolio P*; 3: 100% invested in Portfolio P*; 4: More than 100% (lending and borrowing) invested in the optimal risky portfolio P*
Separation Theorem	Tells, that if borrowing and lending at the same rate is allowed the determination of the optimal risk portfolio is independent. Can be separated to two stages 1: Determination of the best Portfolio of common stocks 2: allocation of funds between the optimal risky portfolio P* and Treasury bills In the second stage the investor is a decision maker, in the first one not.

CAPM

CAPM definition	The CAPM aims to explain the properties of a capital market in equilibrium
Old Hypothesis	1: Investors choose their portfolio following Markowitz 2. Investors can borrow and lend at the same rate
New Hypothesis	Homogeneous expectations or beliefs for all investors Means that every investor shares the same view and way of the financial market and the same beliefs of the future evolution. -> Consequence is the optimal risky portfolio P* becomes market portfolio M
Market Portfolio M	Optimal diversified risky portfolio that includes all stocks available in the capital market, each of them participating with the weight that enables this composition. Theoretical Portfolio is different from its proxy in the real world since the latter is designed with a selection of stocks chosen and weighted in such a way that the resulting portfolio is really representative for the whole stock exchange.
Capital Market Line	Expresses the expected return on a portfolio p $E(R_p)$ as a function of its total risk. According to the CML investors allocate their funds between the risk-free asset and the market portfolio in combinations of lending and borrowing.
Security Market Line	Expresses the required rate of return in a context of good diversification where the risk premium is a function of the level of systematic risk or coefficient beta
Coefficient Beta	Is the level of systematic risk. Coefficient beta > 1 aggressive -> reacts to changes more intensively Coefficient beta < 1 defensive return increases or decreases less intensively