First Course in Financial Quantitative Analysis

Overview

There are numerous mathematical applications in the financial world – banking, insurance, funds, investments, etc. Contextualizing the underlying mathematical and statistical concepts and approaches collectively makes what is referred to as quantitative analysis.

Although systems make up the bulk of not all the parts of calculations, practitioners must master these skills to appreciate those applications' impact on their firms. This course follows an approach of lecturing and case studies.

Course content

- Time value of money
    - Interpretation of interest rate
    - Future and the present value of a single stream of cash flows
- Discounted Cash flow applications
    - Net Present Value (NPVs) and Internal Rate of Return (IRR)
    - Portfolio return measurement: time a dollar-weighted return
    - Money market yields
- Statistical concepts and market returns
    - Measurement scales
    - Data using frequency distributions
    - Graphic presentation of data
    - Measures of central tendency
    - Quantiles
    - Measures of dispersions
    - Symmetry, skewness, and return distributions
    - Kurtosis in return distributions
    - Using geometry and arithmetic means
- Probability concepts
    - Probability, expected return, and variance
    - Portfolio expected return
    - Principles of counting
- Common probability distributions
    - Discreet random variables
    - Continuous random variables
- Sampling an estimation
    - Simple random sampling
    - Stratified random sampling
    - Time-series and cross-sectional data
    - Distribution of the sample mean

- Point and interval estimation
- Sampling biases
- Hypothesis testing
- Correlation and regression
  - Correlation analysis
  - Linear regression
  - Multiple linear regression
- Violation of regression assumptions
- Time series analysis
  - Trend models
  - Autoregressive times-series moels
  - Random walks and unit roots
  - Moving averages and time series models
  - Seasonality in time-series models