STUDY SESSION

1

Quantitative Methods (1)

This study session introduces quantitative concepts and techniques used in financial analysis and investment decision making. The time value of money and discounted cash flow analysis form the basis for cash flow and security valuation. Methods for organizing and visualizing data are presented; these key skills are required for effectively performing financial analysis. Descriptive statistics used for conveying important data attributes such as central tendency, location, and dispersion are also presented. Characteristics of return distributions such as symmetry, skewness, and kurtosis are also introduced. Finally, all investment forecasts and decisions involve uncertainty: Therefore, probability theory and its application quantifying risk in investment decision making is considered.

READING ASSIGNMENTS

Reading 1	The Time Value of Money by Richard A. DeFusco, PhD, CFA, Dennis W. McLeavey, DBA, CFA, Jerald E. Pinto, PhD, CFA, and David E. Runkle, PhD, CFA
Reading 2	Organizing, Visualizing, and Describing Data by Pamela Peterson Drake, PhD, CFA, and Jian Wu, PhD
Reading 3	Probability Concepts by Richard A. DeFusco, PhD, CFA, Dennis W. McLeavey, DBA, CFA, Jerald E. Pinto, PhD, CFA, and David E. Runkle, PhD, CFA

LEARNING OUTCOMES

READING 1. THE TIME VALUE OF MONEY

The candidate should be able to:

a interpret interest rates as required rates of return, discount rates, or opportunity costs;

b explain an interest rate as the sum of a real risk-free rate and premiums that compensate investors for bearing distinct types of risk;

c calculate and interpret the effective annual rate, given the stated annual interest rate and the frequency of compounding;

d calculate the solution for time value of money problems with different frequencies of compounding;

e calculate and interpret the future value (FV) and present value (PV) of a single sum of money, an ordinary annuity, an annuity due, a perpetuity (PV only), and a series of unequal cash flows;

f demonstrate the use of a time line in modeling and solving time value of money problems.

READING 2. ORGANIZING, VISUALIZING, AND DESCRIBING DATA

The candidate should be able to:

a identify and compare data types;

b describe how data are organized for quantitative analysis;

c interpret frequency and related distributions;

d interpret a contingency table;

e describe ways that data may be visualized and evaluate uses of specific visualizations;

f describe how to select among visualization types;

g calculate and interpret measures of central tendency;

h evaluate alternative definitions of mean to address an investment problem;

i calculate quantiles and interpret related visualizations;

j calculate and interpret measures of dispersion;

k calculate and interpret target downside deviation;

l interpret skewness;

m interpret kurtosis;

n interpret correlation between two variables.

READING 3. PROBABILITY CONCEPTS

The candidate should be able to:

a define a random variable, an outcome, and an event;

b identify the two defining properties of probability, including mutually exclusive and exhaustive events, and compare and contrast empirical, subjective, and a priori probabilities;

c describe the probability of an event in terms of odds for and against the event;

d calculate and interpret conditional probabilities;

e demonstrate the application of the multiplication and addition rules for probability;

f compare and contrast dependent and independent events;

g calculate and interpret an unconditional probability using the total probability rule;

h calculate and interpret the expected value, variance, and standard deviation of random variables;

i explain the use of conditional expectation in investment applications;

j interpret a probability tree and demonstrate its application to investment problems;

k calculate and interpret the expected value, variance, standard deviation, covariances, and correlations of portfolio returns;

l calculate and interpret the covariances of portfolio returns using the joint probability function;

m calculate and interpret an updated probability using Bayes' formula;

n identify the most appropriate method to solve a particular counting problem and analyze counting problems using factorial, combination, and permutation concepts.