Summary of 15.415 – Spring 1999

1. **Part A: Introduction and Present Value**
   (a) Firms should maximize *present market value*.
   (b) $$\text{PV} = CF_0 + \frac{CF_1}{1+r_1} + \cdots + \frac{CF_T}{(1+r_T)^T}.$$
   - Discount rate depends on timing and risk.
   - Discount rate equals market required rate of return.

2. **Part B: Valuation**
   (a) Bonds (riskless CFs): Term structure of interest rates.
   - Spot interest rates, discount bonds, coupon bonds, bond yields, foward interest rates.
   - Interest rate risk.
   - Hedging of interest rate risk.

   (b) Stocks (risky CFs): DCF with risk-adjusted rates.
   - Gordon model.
   - Growth opportunities.

   (c) Forwards and Futures
   - Hedging with forward and futures.
   - Forward and futures prices determined by arbitrage.

   (d) Options
   - Options are rights not obligations: nonlinear payoffs.
   - Valuation of options:
     - Valuation relations by arbitrage.
     - Binomial model and Black-Scholes model.

3. **Part C: Return and Risk**

   (a) Modern Portfolio Theory

   - Diversification reduces risk.
   - Investors hold mean-StD efficient portfolios.

   (b) CAPM

   - Investors hold a mixture of riskless and market portfolio.
   - An asset's market beta is a measure of its risk.
   - An asset's risk premium is proportional to its beta.

$$\bar{r}_i = r_F + \beta_{im} \left(\bar{r}_m - r_F \right) .$$

   (c) APT (optional)

   - Factor model of asset returns:
     - common factors.
     - idiosyncratic components.
   - An asset's risk premium is proportional to its factor betas.

4. **Part D: Corporate Finance**

   (a) Market Efficiency

   - Three forms of the Market Efficiency.
   - Implications of Market Efficiency:
     - Trust market prices.
     - Use market prices to extract information.
     - There are no financial illusions.
     - Value comes from economic rents.

(b) Capital Budgeting

- NPV Rule dominates other investment rules.
- Use incremental, after-tax cash flows.
- Use risk-adjusted discount rates:
  - Returns on traded assets in same risk class.
  - CAPM (and APT).
- Take into account value of strategic options.

(c) Financing Decisions

- W/o taxes and imperfections, financing doesn't matter.
- With corporate taxes, debt can be attractive.
- MM-I with and without taxes.
- Cost of financial distress makes debt less attractive.

$$\begin{aligned} \text{Firm value} &= \text{PV of all-equity firm} \\ &+ \text{PV of tax-shield} \\ &+ \text{PV of distress cost.} \end{aligned}$$

(d) Interaction between Investment and Financing Decisions

- Business risk depends on assets.
- Financing affects financial risk of equity.
- MM-II with and without taxes.
- APV and WACC.

(e) Dividend Policy and Hedging Policy

- In perfect markets, these policies do not matter.
- They may matter with taxes and imperfections.