Summary of 15.415 – Spring 1999

1. Part A: Introduction and Present Value
   (a) Firms should maximize present market value.
   (b) \[ PV = CF_0 + \frac{CF_1}{1 + r_1} + \cdots + \frac{CF_T}{(1 + r_T)^T}. \]
   - 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, forward 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.
\[ \bar{r}_i = r_F + \beta_{im} (\bar{r}_m - r_F) \]

(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.

\[
\text{Firm value} = \text{PV of all-equity firm} + \text{PV of tax-shield} + \text{PV of distress cost}.
\]

(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.