The Spiffy Guide to Finance

Warning: This is neither complete nor comprehensive. I fully expect you to read the textbook and go through your notes and past homeworks.

Wai-Hoong Fock
Chapter One

Blah.

Chapter Two

Key Concepts: (1) Present Value
(2) Risk
(3) Rate of Return

- Present Value

Present value is the value of future dollars today.

Key thing here is to understand that a dollar today is worth more than a dollar tomorrow. Therefore, you need to discount your future dollars with an appropriate discount rate (also known as the hurdle rate or the opportunity cost of capital). In other words, the reward investors demand for accepting a delayed payment (on a loan).

\[ PV = \frac{C_1}{1 + r} \]

Where,
\( C_1 \) is your expected payoff at \( t = 1 \)
\( r \) is the discount rate

NPV is essentially the PV of a project less that initial investment

\[ NPV = C_0 + \frac{C_1}{1 + r} \]

Where,
\( C_0 \) is your initial investment at \( t = 0 \)

Rule 1: Accept investments that have positive NPVs

By adding a positive NPV project to your portfolio, you can increase your consumption possibilities both today and tomorrow!
- Risk

? Do not forget that there is always an element of risk involved.

? Future payments are almost never secure payments (unless it’s a U.S. T-Bill: hence a risk-free asset).

? A safe dollar is worth more than a risky dollar.

? Hence the riskier the project, the higher the discount rate, and the less the project is worth today.

- Rate of Return

? Rate of return is the profit as a proportion of the initial outlay.

\[
\text{RoR} = \frac{\text{Profit}}{\text{Investment}}
\]

Rule 2: Accept investments that offer rates of return in excess of the opportunity costs of capital.

Chapter Three

Key Concepts: (1) Bonds and how to value them

- Bonds

? Three main types of bonds

? Pure discount (Zero coupon)

? Coupon bond

? Consol

? Zero Coupon

\[
PV = \frac{F}{(1+r)^T}
\]

? Coupon Bond

\[
PV = \sum \left[ \frac{C_t}{(1 + r)^T} \right] + \left[ \frac{F}{(1+ r)^T} \right]
\]

? Consol

\[
PV = \frac{C}{r}
\]
Chapter Four

Key Concepts: (1) Stocks and how to value them

- Stocks
  ? Two main ways to value a security
    ? Dividend yields method
    ? Future growth earnings method
  ? Dividend yields

  \[
  \text{Price} = PV \text{ (expected future dividends)} = \sum \frac{\text{DIV}_t}{(1 + r)^T}
  \]

  ? Even if dividends = 0 in early periods, this does not necessarily mean that price of stock = 0. Later dividends must be considered. Often, profits in the early life of a firm will be ploughed back into investments – this in turn increases future profits and therefore future dividends.

  ? Future growth earnings

  \[
  \text{Price} = PV \text{ of constant stream of earnings} + PV \text{ growth opportunities} = \frac{\text{EPS}}{r} + \text{NPVGO}
  \]

  ? This is essentially another way to think about the first valuation method as future dividends will depend on both \( \frac{\text{EPS}}{r} \) and NPVGO via savings and investment ploughback.

Chapter Seven

Key Concepts: (1) Portfolio Risk
  (2) Diversification and Risk
  (3) Individual Securities and Portfolio Risk

- Portfolio Risk
  ? Portfolio risk for a two-stock portfolio depends on both their individual variability as well as their covariance.

  \[
  \text{Portfolio Variance} = \sigma_1^2 + \sigma_2^2 + 2(x_1x_2)\sigma_{12}
  \]
- Diversification and Risk

? There are essentially two types of risk.

? Unique risk

? Market risk

- Individual Securities and Market Risk

? The risk of a well-diversified portfolio depends on the market risk of the securities included in the portfolio.

? One measures market risk of any security by looking at its sensitivity to the market. In other words by examining the stock’s beta ($\beta$).

? Stocks with $\beta$s greater than 1 tend to amplify the overall movement of the market. Stocks with positive $\beta$s move in the same direction as the market.

\[ \beta = \frac{\gamma_{im}}{\sigma_m^2} \]

Where $\gamma_{im}$ = covariance b/n stock and market

$\sigma_m^2$ = variance of the market

Where $\gamma_{im}$ = correlation coefficient
Chapter Eight

Key Concepts:  (1) Mean-Standard Deviation Analysis  
(2) CAPM

- Mean-Standard Deviation Analysis

? The mean-standard deviation diagram essentially highlights the relationship between expected return and risk (as measured by portfolio variance).

? The curve that is the boundary of possible mean-standard deviation combinations of possible stocks is made up of two different types of portfolios.

? Efficient portfolios

? Dominated portfolios

? Efficient portfolios

? Maximum return for that given standard deviation

? The most efficient trade-off between risk and variance

? We will always want to move up (increase returns) and move left (decrease risk) to the efficient frontier.

? Dominated portfolios

? Minimum return for that given standard deviation
The Tangency portfolio and optimal investment

Here we introduce the notion that we can borrow and lend at some risk-free rate.

The capital market line represents the portfolios that optimally combine all investments.

The tangency portfolio is therefore also considered the optimal portfolio as anywhere else on the capital market line lies above the efficient frontier.

From \( r_f \) to \( T \), investor is lending and investing in \( T \).

From \( T \) onwards to the right, investor is borrowing money and re-investing it into \( T \).

At any point on the capital markets line (except for \( T \)), you are better off than if you were on the efficient frontier alone – you will be better off holding a combination of the risk-free asset and the optimal portfolio (\( T \)).

- CAPM

Highlights the key relationship between risk and return.

The expected risk premium of a stock or portfolio varies in direct proportion to beta.

As mentioned before, beta is a measure of sensitivity to the market.

\[
\text{Expected risk premium on stock} = \beta \times \text{expected risk premium on market}
\]

Assumptions of the CAPM

Risk-free portfolio is truly riskless.

Markets are frictionless – investors can borrow and lend at the same rate

Investors have homogenous beliefs – that beta is the only reason that expected returns differ
According to the CAPM, all investments must plot along the security market line.

The Capital Market Line Versus The Security Market Line

As seen above, it is possible for investments (stock 1 and stock 2) with the same expected return to have different standard deviations, but they must have the same beta.

This is why the standard deviation of a stock has no real implications for returns.

A change in β is the only reason as to a difference in expected returns.

Chapter Nine

Key Concepts: (1) Beta
(2) Capital Structure
- Estimating $\beta$ if there is no historical data
  
  ? Financial leverage
    
    ? Proportion of debt to equity
    ? Higher the debt, the higher the $\beta$

  ? Operating leverage
    
    ? Proportion of fixed costs to variable costs
    ? Higher the ration, the higher the $\beta$

  ? Cyclical nature of project
    
    ? $\beta$ depends on how the project moves with the business cycle.

  ➔ These considerations help us determine of the $\beta$ is less than, greater than, or close to 1, but cannot tell us the exact figure.

- Capital Structure and the Company cost of capital

  ? Financial leverage does not affect the risk or the expected return on the firm’s assets, but it does push up the risk of the common stock and leads stockholders to demand a correspondingly high return.

  \[
  r_{assets} = \frac{D}{V} r_{debt} + \frac{E}{V} r_{equity}
  \]

  Where $V = D + E$

  \[
  \beta_{assets} = \frac{D}{V} \beta_{debt} + \frac{E}{V} \beta_{equity}
  \]

  ? Any change in financial structure has no impact on the amount of risk of the cash flows on the total package of debt and equity. In other words, it has no impact on the risk borne by the investments as chosen through capital budgeting decisions.

  ? It does, however, affect the return on the individual security, i.e. $r_{debt}$ and $r_{equity}$ change.

  ? Mathematically, the proportions of $D$ or $E$ to $V$ also change with the changing returns so that $r_{assets}$ does not change.

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**Chapter Thirteen**

**Key Concepts:**  
1. Forms of Market Efficiency  
2. Lessons of Market Efficiency

- Forms of Market Efficiency
  
  ? Weak Form
    
    ? Prices only reflect the information contained in the record of past prices

  ? Semi-strong Form
    
    ? Prices reflect the above as well as all public information
- Lessons of Market Efficiency
  ? Markets have no memory
    ? Technical analysis is pointless.
  ? Trust Market Prices
    ? In an efficient market, prices contain all available information about the value of each security.
  ? Read the Entrails
    ? Security prices can tell us a lot about the company’s prospects.
  ? There are No Financial Illusions
    ? Investors are concerned solely with the firm’s cash flows and the portion of those cash flows to which they are entitled.
  ? The DIY alternative
    ? In an efficient market, investors will not pay others for what they can do equally well themselves – Stockholders can obtain financial leverage on their own accounts without having to pay a premium for a leveraged firm.
  ? Seen One Stock, Seen Them All
    ? Stocks are like perfect substitutes – demand is highly elastic.

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**Chapter Seventeen**

Key Concepts: (1) Modigliani-Miller

- Modigliani-Miller
  ? Key Assumptions
    ? Capital markets are perfect and complete
    ? Before tax operating profits (EBIT) not affected by capital structure
    ? Corporate and personal taxes are not affected by capital structure
    ? Firm’s choice of capital structure does not convey information to the market

  ? Proposition I
    ? Firm’s total value is independent of its capital structure (law of conservation of value)
      ? Pie will be just as large regardless of how it is sliced.
    ? Firm value is determined on the left-hand side of the balance sheet (real assets), not by the proportion of debt and equity.
Proposition II

Expected rate of return on the common stock of a levered firm increases in proportion to the debt-equity ratio (D/E).

Rate of increase depends on the spread between \( r_A \) and \( r_D \).

\[ r_E = r_A + \frac{D}{E}(r_A - r_D) \]

- Proposition II: Rate of return shareholder’s can expect to receive on their shares increases as the firm’s debt-equity ratio increases.
- Proposition I: financial leverage has no effect on shareholder’s wealth.