INVESTMENT REDUX

Presented by

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Purpose

- Select investment candidates
- You will do this by means of:

- Intrinsic Value using:
  - FCFF
  - Discounted Earnings
  - Dividend Discount Model
- Comparative Analysis
- Estimating Earnings

What Is An Investment?

A current commitment of $ for a period of time in order to derive future payments that will compensate for:

- The time the funds are committed
- The expected rate of inflation
- Uncertainty of future flow of funds

Reason for investing

By investing (saving money now instead of spending it), you can trade off present consumption for a larger future consumption.

Pure rate of interest

Pure Rate of Interest

- It is the exchange rate between future consumption (future dollars) and present consumption (current dollars). Market determine this rate

- Example: If you can exchange $100 today for $104 next year, this rate is 4% (104/100-1).

Pure time value of money

The fact that people are willing to pay more for the money borrowed and lenders desire to receive a surplus on their savings (money invested) gives rise to the value of time referred to as the pure time value of money.

Other factors affecting value

Inflation:

If the future payment will be diminished in value because of inflation, then the investor will demand an interest rate higher than the pure time value of money to also cover the expected inflation expense.

Other factors affecting value

Uncertainty:

If the future payment from the investment is not certain, the investor will demand an interest rate that exceeds the pure time value of money plus the inflation rate to provide a risk premium to cover the investment risk Pure Time Value of Money.

Other factors affecting value

- Greater Fool Theory
- Sound Investing – Do not pay more for an investment than it is worth
- Beauty may be in the eye of the beholder….not value

Required rate of return

- The minimum rate of return an investor require on an investment, including the pure rate of interest and all other risk premiums to compensate the investor for taking the investment risk.

- Investors may expect to receive a rate of return different from the required rate of return, which is called expected rate of return. What would occur if these two rates of returns are not the same?

Valuation - Myths

- Valuation is objective
- A hard earned valuation is immune to the ravages of time
- Valuation is precise
- The more quantitative the better
- Valuation assumes markets are inefficient
- The end result, not the process, is key

Valuation – the role it plays

Fundamental Analysis –true value of the firm. It is used in:

- Uncovering corporate value
- Portfolio Management
- Acquisitions
- Credit Applications

Valuation

Three approaches:

- Discounted Cash Flow
- Relative valuation
- Contingent claims (options)

Compounding

Concept of adding accumulated interest back to the principal, so that interest is earned on interest

Historical Rates of Return

- Holding Period Return (HPR)

$$HPR = \frac{\text{Ending Value of Investment}}{\text{Beginning Value of Investment}}$$

- Holding Period Yield (HPY)

$$HPY = HPR - 1$$

Annual HPR

Annual HPR and HPY

- $\text{Annual HPR} = \text{HPR}^{1/n}$
- Annual HPY=
- $\text{Annual HPR} - 1 = \text{HPR}^{1/n} - 1$

where n=number of years of the investment

Historical Rates of Return

Example: Assume that you invest $200 at the beginning of the year and get back $220 at the end of the year. What are the HPR and the HPY for your investment?

HPR=Ending value / Beginning value

=$220/200

=1.1

HPY=HPR-1=1.1-1=0.1

=10%

Historical Rates of Return

Example: Your investment of $250 in Stock A is worth $350 in two years while the investment of $100 in Stock B is worth $120 in six months. What are the annual HPRs and the HPYs on these two stocks?

Stock A

- Annual HPR=$HPR^{1/n}$ = $(\$350/\$250)^{1/2}$ =1.1832
- Annual HPY=Annual HPR-1=1.1832-1=18.32%

Historical Rates of Return

Example: Your investment of $250 in Stock A is worth $350 in two years while the investment of $100 in Stock B is worth $120 in six months. What are the annual HPRs and the HPYs on these two stocks?

- Stock B
  - Annual HPR=$HPR^{1/n}$ = ($120/$100)$^{1/0.5}$ =1.2544
  - Annual HPY=Annual HPR-1=1.2544-1=25.44%

Historical Rates of Return

- Computing Mean Historical Returns

  Suppose you have a set of annual rates of return (HPYs or HPRs) for an investment. How do you measure the mean annual return?

  - Arithmetic Mean Return (AM)

    $AM = \Sigma HPY / n$

    where Σ HPY=the sum of all the annual HPYs
    n=number of years

  - Geometric Mean Return (GM)

    $GM = [\pi HPY]^{1/n} - 1$

    where π HPR=the product of all the annual HPRs
    n=number of years

Historical Rates of Return

Suppose you invested $100 three years ago and it is worth $110.40 today. The information below shows the annual ending values and HPR and HPY. This example illustrates the computation of the AM and the GM over a three-year period for an investment.

Year	Beginning Value	Ending Value	HPR	HPY
1	100	115.0	1.15	0.15
2	115	138.0	1.20	0.20
3	138	110.4	0.80	-0.20

Historical Rates of Return

$$AM=[(0.15)+(0.20)+(-0.20)] / 3$$
$$= 0.15/3=5\%$$

$$GM=[(1.15) \times (1.20) \times (0.80)]^{1/3} - 1$$
$$=(1.104)^{1/3} -1=1.03353 -1 = 3.353\%$$

Comparison of AM and GM

- When rates of return are the same for all years, the AM and the GM will be equal.
- When rates of return are not the same for all years, the AM will always be higher than the GM.
- While the AM is best used as an “expected value” for an individual year, while the GM is the best measure of an asset’s long-term performance.

Holding Period Return

- Ending value divided by beginning value
- $220/$200 HPR = 1.10
- Annual HPR = $HPR^{1/n}$
- Assume 6 months
- 1.10^{2} = 1.21 or 21%

Holding Period Yield

Holding period yield – HPR – 1

HPR = 1.10

HPY = 1.10 – 1 = .10 or 10 percent

Arithmetic and Geometric Mean

- Arithmetic Mean - generally referred as an average. Add up all the numbers and divide

- Geometric Mean - nth root of all the holding period returns multiplied

Geometric Mean

$$\left(\prod_{i=1}^{n} a_i\right)^{1/n} = \sqrt[n]{a_1 \cdot a_2 \cdot \cdots \cdot a_n}$$

Arithmetic Mean vs Geometric

Year	Beg	End	HPR	HPY
1	$50	$100	2.00	1.00 or 100%
2	$100	$50	0.50	-0.50 or -50%

AM = 1.00 + (-0.50) / 2 = .25 or 25%

GM = $[(2.00) * (0.50)]^{1/2} - 1 = 1-1 = 0$

CAGR

Compound Annual Growth Rate – CAGR

The year-over-year growth rate of an investment over a specified period of time.

The compound annual growth rate is calculated by taking the nth root of the total percentage growth rate, where n is the number of years in the period being considered.

CAGR

$$CAGR = \left(\frac{\text{Ending Value}}{\text{Beginning Value}} \right)^{\left(\frac{1}{\#\text{ of years}} \right)} - 1$$

Valuation

- Discounted Cash Flow
- The foundation of most approaches to valuation
- Based on the concept of present value

Valuation – Present Value

- **Present Value** - an amount today that is equivalent to a future payment, or series of payments, that has been discounted by an appropriate interest rate.

Valuation – Present Value cont.

- Money has time value – Therefore, the present value of a promised future payment is worth less the longer you have to wait to receive it.

- The difference depends on the time periods for compounding and the interest or discount rate.

Valuation – Present Value cont.

The relationship between the present value and future value can be expressed as:

$$PV = FV/(1 + i)^n$$

PV = present value FV = future value

i = interest rate per period

n = number of periods

Valuation – Present Value cont.

- For example, someone contracts to pay you $100 in one year. What is it worth right now?
- Assume the going interest rate is 5%

Valuation – Present Value cont.

$PV = FV/(1 + i)^n$

$PV = \$100/(1.05)^1$

$= \$95.23$

Valuation – Present Value cont.

- Now assume someone contracts to pay you $100 in ten years. What is it worth today?
- The going interest rate is still 5%

Valuation – Present Value cont.

$$PV = FV/(1 + i)^n$$

$$PV = \$100/(1.05)^{10}$$

$$= 100/1.62889$$

$$= \$61.39$$

Valuation – Present Value cont.

The previous examples assume interest is paid once a year at the end of the year.

Suppose interest is paid more than once a year

Valuation – Present Value cont.

- *At interest compounded q times a year:*
- $PV = FV/(1 + r/q)^{nq}$
- Or in the same example but compounding monthly (q = 12)
- $P = 100{,}000/(1 + 0.05/12)^{120} = 100{,}000/1.64701 = 60716$

Valuation – Present Value cont.

- For example, if interest is compounded monthly: q = 12
- $PV = FV/(1 + r/q)^{nq}$
- $P = \$100,000/(1 + 0.05/12)^{120}$

  $= \$100,000/1.64701 = \$60,716$

Valuation – Relative Valuation

- Majority of Valuations are relative in nature
- Example – Using an industry standard P/E ratio to value a firm
- Assumes market reliability
- Individual stocks are valued incorrectly

Class 1 - Part II

Accounting Statements

Accounting Statements – Balance Sheet

- Assets

  Current – Short life span

  Fixed - Long Lived Real Assets

  Financial Investments

  Intangible

Accounting Statements – Balance Sheet

- Liabilities
  - Current – Short-term liabilities
  - Debt – Long term obligations
  - Other – Other long term obligations

Accounting Statements

- Shareholder Equity

  - Common Stock
  - Additional Paid in Capital
  - Retained Earnings

Accounting Statements

- Assets = Liabilities + Shareholder Equity

Accounting Statements

Assets	Liabilities
Cash	Short-term debt
Accounts receivable	Customer advances
Inventory	Accounts payable
Other current assets	Accrued liabilities
	Interest payable
	Taxes payable
	Dividends payable
= Current Assets	= Current Liabilities
	Bonds payable (L.T. Debt)
Investments	
Goodwill	Common stock
Plant, Property & Equipment	Add'l paid-in capital
Other long-term assets	Retained earnings
= Long-term Assets	= Stockholders' Equity
Total Assets	= Total Liabilities & Equity
(i.e., Current Asssets + Lomg-term assets)	(Current Liabilities + Long-Term Debt + Equity)

Accounting Statements – Income Statement

Revenues
- Operating Expenses

= Operating Income
- Financial Expenses
- Taxes

= Net Inc. before Extraordinary Items
+- Extraordinary Items
- Preferred Dividends

= Net income to shareholders

Accounting Statements - Cash Flow

Cash Flow from Operations

+ Cash Flow from Investing

+ Cash Flow from Financing

= Net Change in Cash Balance

Accounting Statements - Free Cash Flow

Free Cash Flow = Cash Flow from Operations – Capital Expenditures

Accounting Statements - FCFF

Free Cash Flow to the Firm or FCFF =

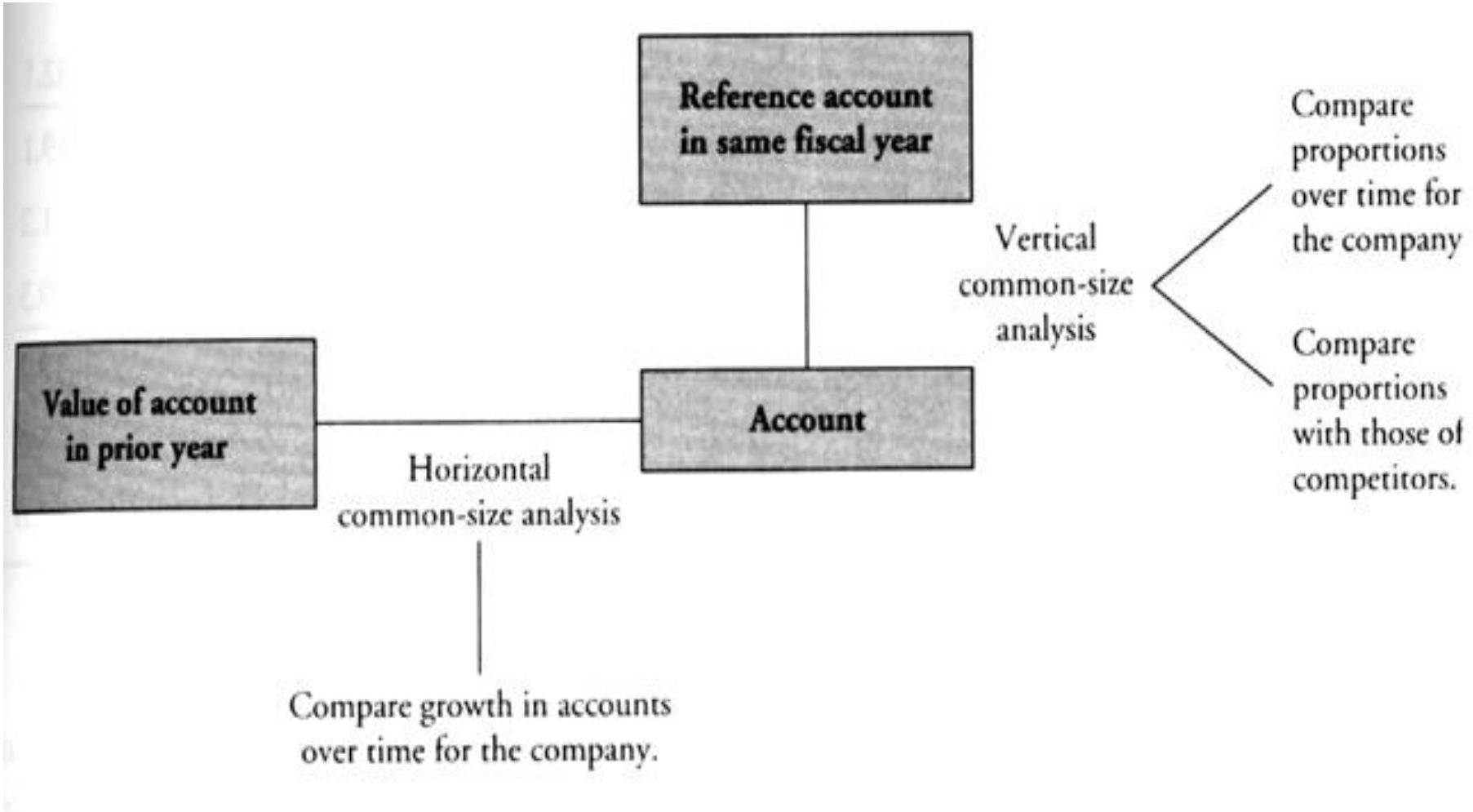
Net Operating Profit (NOP)

- Taxes

-Net Investment

-Net change in working capital

Accounting Statements



Accounting Statements

Common Size Analysis

Vertical – compare the accounts in a given period to a benchmark item in that same year

- Income Statement – revenues
- Balance Sheet – total assets

Accounting Statements

Common Size Analysis

- Horizontal –the accounts in a given period are a benchmark or base.
- Restate accounts in subsequent periods as a percentage of the comparable account in the base period

Financial Ratio Analysis

- Activity Ratios – Effectiveness is using asset investments to work
- Liquidity Ratios – Ability to meet short-term and intermediate debt obligations
- Solvency Ratios – Ability to meet long-term debt obligations
- Profitability Ratios – Ability to generate profits

Financial Ratio Analysis

- Activity – Turnover ratios such as:

- Inventory Turnover =

$$\frac{\text{Cost of goods sold}}{\text{Average Inventory}}$$

Financial Ratio Analysis

- Liquidity – Generate cash for immediate needs

Current Ratio =

$$\frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Financial Ratio Analysis

- Solvency – Asses a company's level of financial risk

Debt-to-Equity Ratio =

$$\frac{\text{Total Debt}}{\text{Total shareholder equity}}$$

Financial Ratio Analysis

- Profitability – Asses a company's level of profitability

Operating profit margin =

$$\frac{\text{Operating income (EBIT)}}{\text{Total revenue}}$$