Session 15: Equity Valuation I

Fall 2025

Outline

- Balance sheet valuation concepts
- Fundamental (intrinsic) value
- The Dividend Discount Model
  - Zero dividend growth
  - Constant dividend growth—the Gordon Growth Model

Balance Sheet Valuation

- **Book value**:

  the net worth of a company as shown on its balance sheet. It's the difference between the book value of the firm's assets and the firm's liabilities

- **Liquidation value**:

  the money you can make when you break up the firm by selling it's assets, paying back its liabilities (debt) and distributing the remainder to the shareholders. It is a lower bound on market value

  If market value is below the liquidation value, the firm becomes an attractive takeover prey (i.e.: It would be profitable for a corporate raider to take it over and liquidate it).

- **Replacement cost:**

  It is the cost of replacing all the firm's assets and liabilities.

  If market price is far above replacement cost, competitors are likely to move into this business (Tobin's q is 1 in the long-run)

Book-to-Market ratio

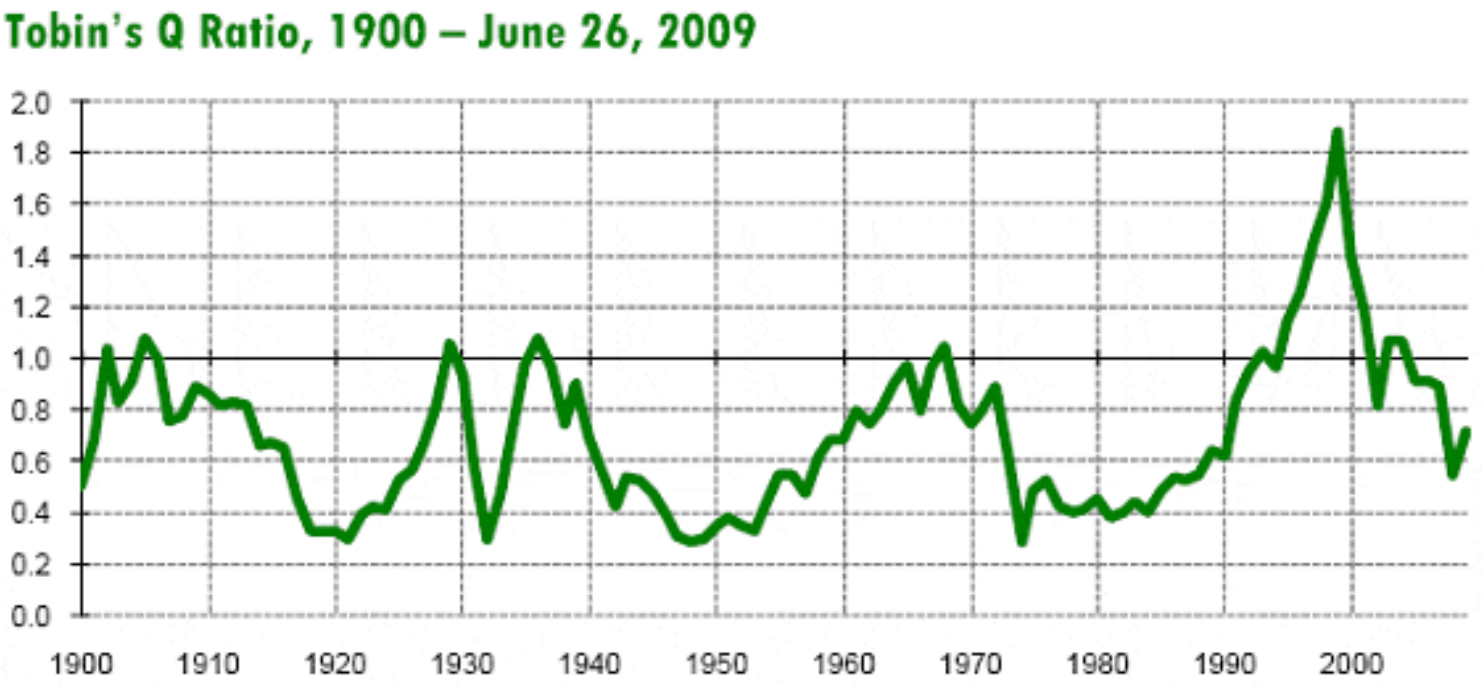
Balance Sheet, Intel 2004 (Book values, $billions)

Assets:	$52.39	Liabilities:	$12.03
		Equity:	$40.36
Total:	$52.39	Total:	$52.39

- There are 5.6 billion shares outstanding
  → 40.36/5.6=$7.20 book value per share
- The market value per share is $21.48
  → Book-to-market ratio is 7.20/21.48=0.34
- Growth firms: low B/M ratio, e.g. Intel (new economy)
- Value firms: high B/M ratio, e.g. utilities (old economy)

Tobin's q

Tobin's q = market value / replacement value



What's the difference between replacement cost and book value? Inflation!

Warren Buffett

- "**Intrinsic value** (or fundamental value) is an all-important concept that offers the only logical approach to evaluating the relative attractiveness of investments and businesses. Intrinsic value can be defined simply: It is the discounted value of the cash that can be taken out of a business during its remaining life."
- Example: Book value/intrinsic value of a college education

Fundamental/Intrinsic Value

A stock is a claim to future dividends

- Consider the distribution of next year's dividend, D_1, and price, P_1
- Find the required rate of return, k, with CAPM
- Fundamental-value of the stock at time 0 is $\mathbf{V_0}$:

$$V_0 = \frac{E(D_1) + E(P_1)}{1+k} \Leftrightarrow k = \frac{E(D_1) + E(P_1)}{V_0} - 1$$

- Suppose that there is a mispricing, $P_0 \neq V_0$, then expected HPR:

$$E[r] = \frac{E(D_1) + E(P_1)}{P_0} - 1 \neq k$$

Fundamental vs. Actual Value

- Suppose
  - ✓The current stock price is $48
  - ✓We expect next year's price and dividend to be $52 and $4
  - ✓The beta of the stock is 1.2
  - ✓The risk free rate is 6%
  - ✓The expected market excess return is 5%
- Compute the **required rate of return** and **expected holding period return**

Dividend Discount Model

- Assume that the market is efficient so that the price, P_0, equals the fundamental value, V_0
- Use the fundamental value equation repeatedly:

$$V_0 = \frac{E(D_1)+E(P_1)}{1+k} = \frac{E(D_1)}{1+k} + \frac{E(P_1)}{1+k}$$

$$= \frac{E(D_1)}{1+k} + \frac{E(D_2)+E(P_2)}{(1+k)^2}$$

$$= \frac{E(D_1)}{1+k} + \frac{E(D_2)}{(1+k)^2} + \frac{E(D_3)}{(1+k)^3} + \frac{E(D_4)}{(1+k)^4} + \ldots$$

Zero Dividend Growth

- Suppose that dividends are constant

  $E(D_1) = D_0$, $E(D_2) = D_0$, etc.

- Using the DDM:

$$V_0 = \frac{E(D_1)}{1+k} + \frac{E(D_2)}{(1+k)^2} + \frac{E(D_3)}{(1+k)^3} + \ldots$$

$$= \frac{D_0}{1+k} + \frac{D_0}{(1+k)^2} + \frac{D_0}{(1+k)^3} + \ldots$$

$$= \frac{D_0}{k} = \frac{E(D_1)}{k}$$

Constant Dividend Growth

- Gordon Growth Model (GGM)
- Suppose that expected dividends grow at a rate g

  $E(D_1) = (1+g)D_0$, $E(D_2) = (1+g)^2 D_0$, etc.
- Using the DDM:

$$V_0 = \frac{E(D_1)}{1+k} + \frac{E(D_2)}{(1+k)^2} + \frac{E(D_3)}{(1+k)^3} + \ldots$$

$$= \frac{D_0(1+g)}{1+k} + \frac{D_0(1+g)^2}{(1+k)^2} + \frac{D_0(1+g)^3}{(1+k)^3} + \ldots$$

$$= \frac{D_0(1+g)}{k-g} = \frac{E(D_1)}{k-g}$$

An Example

- Suppose $E(D_1)$=\$4, r_f=6%, β=1.2, $(E[r_M]-r_f)$=5%, g=4%
  - $k = r_f+\beta(E[r_M]-r_f) = 6\%+1.2(5\%) = 12\%$
  - $P_0 = V_0 = E(D_1)/(k-g) = 4/(0.12-0.04) = \$50.00$
- Sensitivity analysis (50% increase in one variable)
  - Suppose $E(D_1)$ =\$6, then P_0 = \$75.00
  - Suppose r_f=9%, then P_0 = \$36.36
  - Suppose $(E[r_M]-r_f)$=7.5%, then P_0 = \$36.36
  - Suppose β=1.8, then P_0 = \$36.36
  - Suppose g=6%, then P_0 = \$66.67

Valuation Ratios Under the GGM

- Price-dividend ratio

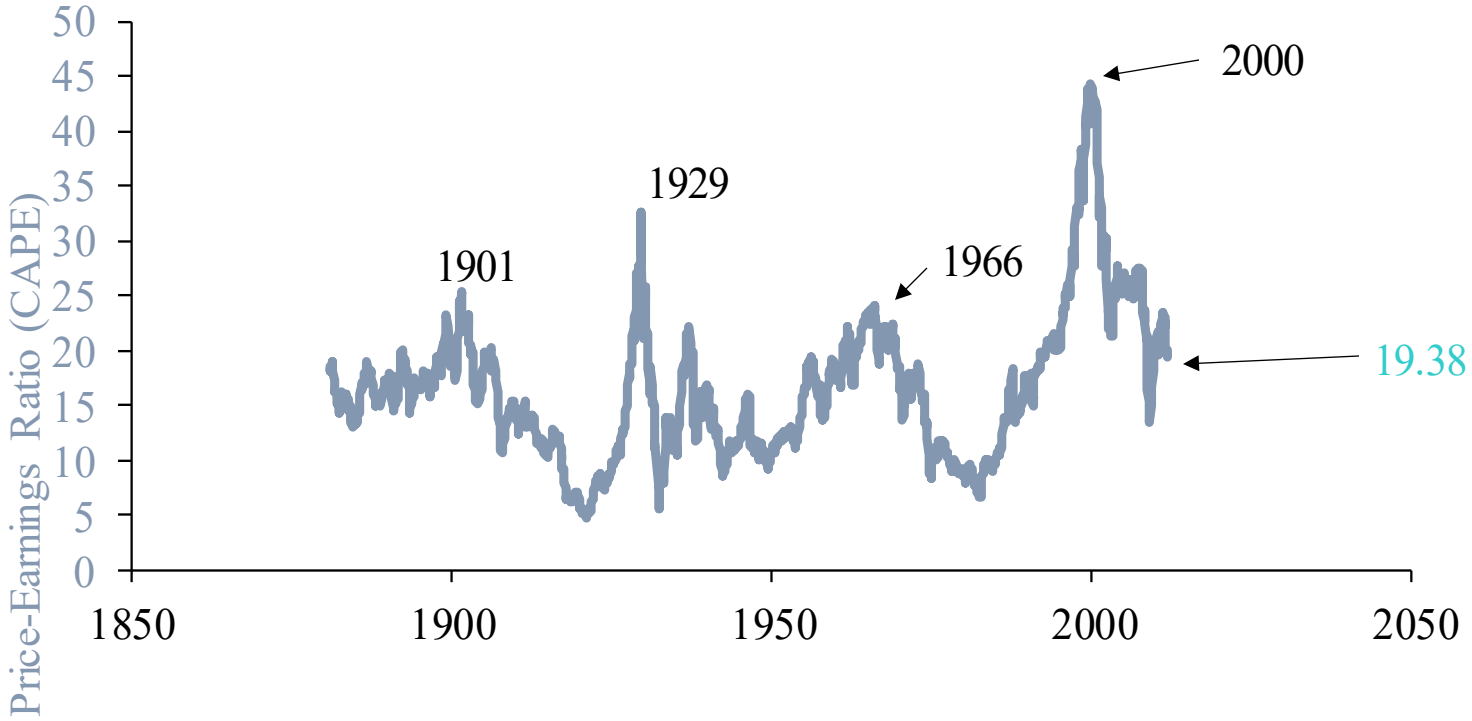
$$\frac{P_0}{D_0} = \frac{1+g}{k-g}$$

- Price-earnings ratio
  - $D_0=(1-b)E_0$ with "earnings retention ratio" of b

$$\frac{P_0}{E_0} = \frac{(1+g)(1-b)}{k-g}$$

- Price-to-book ratio (market-to-book ratio)
- Price-to-sales ratio

U.S. (Trailing) P/E Ratio



http://www.econ.yale.edu/~shiller/data.htm

Conclusion

Under a few simple assumptions we can develop an intuitive stock valuation model that depends on

- Current earnings
- Future earnings (growth)
- Discount rates (TVM and risk)

Assignments

- Reading
  - BKM: Chapter 13
  - Problems: 13.2-13.3, 13.5-13.7, 13.11-13.16, CFA 13.1-13.2
- Assignments
  - Problem Set 4 due 29th October (Session 18)