Corporate Finance

Lecture 6: Stock Valuation

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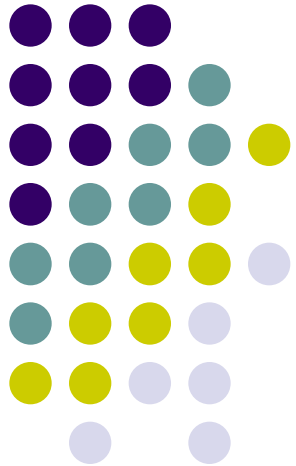

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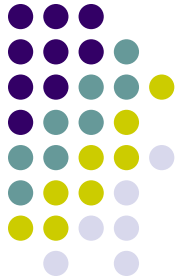
Review of Key Points



- V=D+E
- *Cost of debt* (YTM) is inferred from the bond price
- Expected return of holding bonds (YTM) = current yield + capital gains yield
- Now we examine the valuation of a firm's equity, and infer the *cost of equity* from the market value of equity.

Outline

Stock valuation:

Fundamental valuation:

- Dividend Discount Model (today)
- CAPM (Next class)

Relative Valuation:

- Comparables (today)

Stock Valuation

- Stock holders are entitled with Dividend Payments
- Stock does not have maturity
  - Cash flows of stocks last forever unless the firm issued debt and go bankruptcy, in which case stockholders claims the residual values.
- Secondary Stock Market
  - E.g. Shanghai Stock Exchange, Shenzhen Stock Exchange, NYSE, NASDAQ, etc.

Stock Valuation

- Consider a company that pays dividend each period until infinite time
  - $P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \frac{D_4}{(1+r)^4} + \cdots$
- Thus, the price of a share is given by

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+r)^t}$$

Stock Valuation

- The value of a stock is the present value of future expected dividend per share.
  - A preferred stock promises a *fixed dividend* per share every time the company pays a dividend.
  - Hence, the price of a preferred stock is
  - $P_0 = \sum_{t=1}^{\infty} \frac{D}{(1+r)^t} = \frac{D}{r}$
  - A common stock is not associated with any fixed dividend obligations.

Stock Valuation

For a common stock:

- If dividend per share is expected to grow at the rate **g** per year, then the Gordon growth formula (the growing perpetuity formula) can be used to derive

$$P_0 = \frac{D_1}{r-g} = \frac{D_0(1+g)}{r-g}$$

  - where D_0 is the dividend paid last period.

Stock Valuation

How to estimate the long-term dividend growth rate, g?

- Regression method
- Theoretical method:

g = (1-payout ratio) x ROE

  - $E_{t+1} = E_t + M_t \cdot ROE$ (M: retained earnings)
  - $\frac{E_{t+1}}{E_t} - 1 = \frac{M_t}{E_t} \cdot ROE$
  - g = retention ratio x ROE = (1- payout ratio) x ROE

Key Concept

- As with any financial asset, the discount rate for a stock is also the expected return to investors who buy the stock.
- $P = \frac{D_1}{r-g} \leftrightarrow \boxed{r = \frac{D_1}{P} + g}$
- Expected return = expected cash yield + expected capital gain yield
  - $\frac{D_1}{P}$ = expected cash yield
  - g = expected capital gains yield = $\frac{P_1 - P_0}{P_0}$
- Thus, the stock price is expected to appreciate at the same rate as the growth of dividends or earnings (under a fixed payout rate)
- r can be inferred from D_1, P, and estimates of g, and used to find the NPV of projects.

Drawbacks of DDM

Discount Dividend Model

- Only applicable to the firms with (steady-growing) dividend payments
  - Some companies don't pay dividends
  - Won't apply to companies whose growth rate is not constant
- The risk of cash flows is not explicitly spelled out – hard to link the risk to the formula

Alternative method for stock valuation

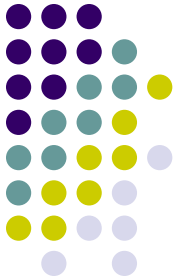
- CAPM – more popular & possibly lower estimation errors (we will talk about it later)

Exercise

Ch9-31 Nonconstant Growth Storico Co. just paid a dividend of $2.95 per share. The company will increase its dividend by 20 percent next year and will then reduce its dividend growth rate by 5 percentage points per year until it reaches the industry average of 5 percent dividend growth, after which the company will keep a constant growth rate forever. If the required return on the company's stock is 13 percent, what will a share of stock sell for today?

- $D_1 = 2.95 \times (1 + 20\%) = 3.54$; $D_2 = 3.54 \times (1 + 15\%) = 4.071$
- $D_3 = 4.071 \times (1 + 10\%) = 4.4781$; $D_4 = 4.4781 \times (1 + 5\%) = 4.7020$
- $D_5 = 4.702005 \times (1 + 5\%) = 4.9371$; …
- $P_0 = \frac{D_0(1+g)}{r-g} \rightarrow$
- $p_3 = \frac{D_3(1+5\%)}{r-5\%} = \frac{D_3(1+5\%)}{r-5\%} = \frac{4.4781\times(1+5\%)}{13\%-5\%} = \$58.78$
- $p_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \frac{P_3}{(1+r)^3} = \frac{3.54}{1+13\%} + \frac{4.071}{(1+13\%)^2} + \frac{4.4781}{(1+13\%)^3} + \frac{58.78}{(1+13\%)^3} = \$50.16$

Relative vs. Fundamental



- **Fundamental valuation**:
  - Valuation derived from fundamentals (cash flows, growth rate, risk, etc.)
    - Dividend discount model
    - CAPM
- **Relative valuation:**
  - Valuation based on the **market valuation of similar or comparable assets**
  - Also called **multiple valuation**.

Steps

- Identify **comparable** firms /assets
  - Similar activity, industry, size, etc.
  - To make sure similar risk, growth, cash flow characteristics.
- Convert market values to **standardized** values by constructing **multiples**
  - Absolute market prices cannot be directly compared
- **Compare** the multiple for the asset being analyzed
  - Control for the differences

Multiples

- **The commonly used multiples include**
  - Earnings multiples
    - **PE 市盈率 (Price/Earnings Ratio)**, PEG (PE / expected growth in earnings), Enterprise Value/EBITDA
      - Enterprise value 企业价值 = Market capitalization市值+ Debt – Cash holding
  - Revenues multiples
    - Enterprise Value/Sales, Enterprise Value/Customers
  - Book value multiples
    - Market Value of Equity/Book Value of Equity, Enterprise Value/Book Value of Assets, Tobin's Q
      - Tobin's Q = Total market value / Total book value of the firm

PE Ratio by Industry, China (2024/12/23)

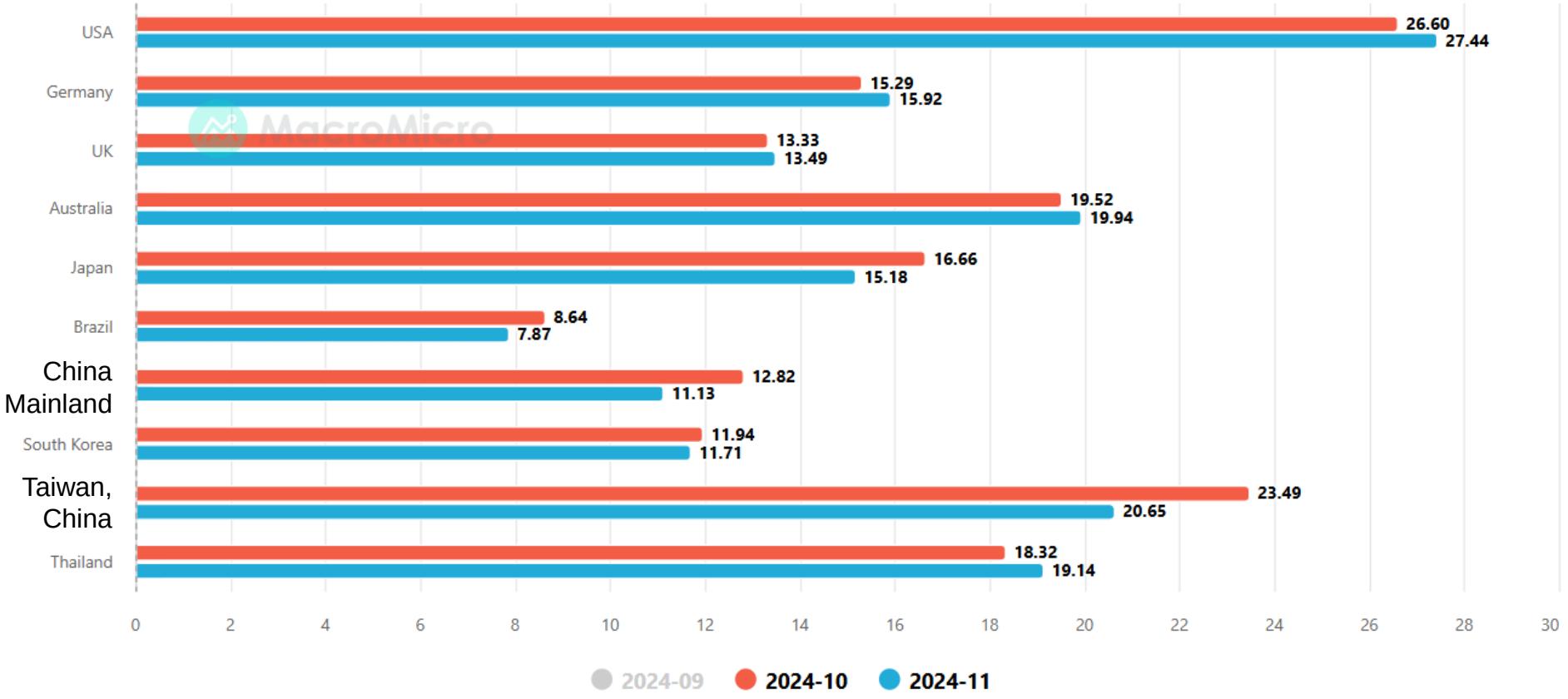
板块名称	股票家数	亏损家数	静态市盈率				
			最新	1个月平均	3个月平均	6个月平均	1年平均
沪深市场	5119	1070	16.85	16.98	16.69	15.36	14.93

Data source: 中证指数

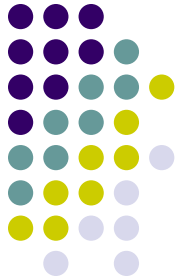
PE Ratio by Industry, China (2024/12/23)

行业代码/名称	证券数量	亏损数量	静态市盈率				
			最新	1个月平均	3个月平均	6个月平均	1年平均
10 能源	81	17	10.75	10.72	10.76	10.85	10.49
15 原材料	721	136	19.65	20.22	19.95	18.58	17.19
20 工业	1695	302	19.29	19.80	19.36	17.52	16.84
25 可选消费	649	105	20.93	21.07	20.44	18.66	19.34
30 主要消费	289	67	23.34	23.70	23.49	21.93	24.06
35 医药卫生	490	98	26.65	27.43	27.32	25.49	24.43
40 金融	128	8	8.80	8.69	8.60	7.88	7.43
45 信息技术	780	215	48.80	48.57	46.98	40.96	38.43
50 通信服务	298	91	29.37	28.85	27.74	24.91	25.42
55 公用事业	139	17	18.87	18.62	18.62	18.76	19.71
60 房地产	110	36	16.59	17.67	17.43	15.36	13.70

PE ratio by country



Relative Valuation is Pervasive



- Most asset valuations are relative.
  - Almost 85% *equity research reports* based on multiples
  - More than 50% acquisition valuations
  - Although DCF is more common in *consulting and corporate finance*, multiple valuation can be good complement.
    - DCF may be used to back into a number obtained by multiple
    - The terminal value for cash flow valuation may be estimated using multiples.

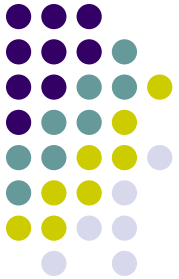
Why Pervasive

"A little inaccuracy sometimes saves tons of explanation." -- H.H. Munro

"If you are going to screw up, make sure that you have lots of companies"

- Relative valuation is likely reflecting the **market perceptions**.
- Important in **IPO** and **acquisition** markets.
  - Since **portfolio managers** are judged by how they perform relative to other managers, relative valuation is more tailored to their needs.
- Relative valuation generally requires less information than discounted cash flow valuation. It could be applied as a **screener**.

Practical Issues



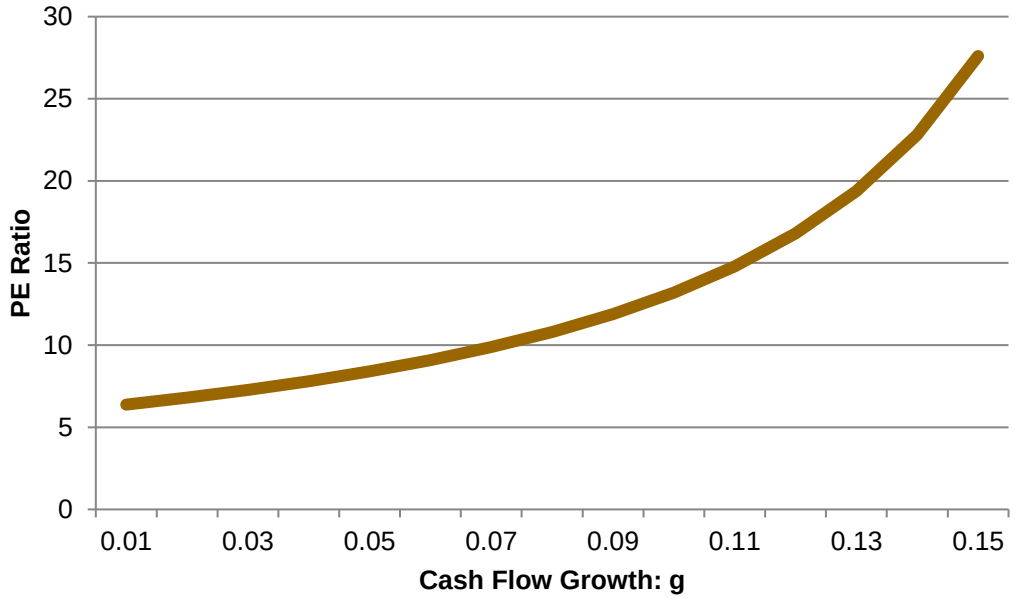
- Pick the comparable firms
- Consistency of definition
- Distribution
- Adjustments for private firms
- Market may be wrong

Comparable Firms

- Ideally, **as many as possible** comparable publicly traded firms
- In practice, it is very difficult (and perhaps impossible) to find firms that share the **same risk, growth, cash flow, capital structure, payout policy, etc**.
- To see why they matter:
  - $P_o = \frac{D_0(1+g)}{r-g} = \frac{bE_0(1+g)}{r-g} \leftrightarrow \frac{P_0}{E_0} = \frac{b(1+g)}{r-g}$
  - Thus, P/E depends on earnings growth, payout ratio, discount rate.
  - Financial policy affects risk and required returns (r), and maybe less obviously, growth rate g.

P/E and Fundamentals

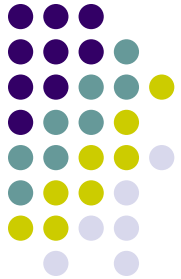
- Relationship to growth is positive but non-linear



Consistency

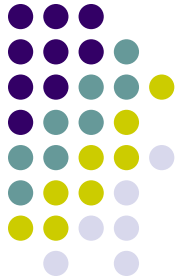
- Same methods to estimate inputs:
  - **Historical P/E**, based on last fiscal year's earnings
  - **Trailing P/E**, based on earnings of last four quarters
  - **Forecasted P/E**, based on consensus forecasted earnings for the next fiscal year
- Same accounting methods
  - Diluted vs. non-diluted P/E
    - Diluted EPS is based on the *number of shares* assuming all the convertible securities and employee options have been exercised.
- Make sure you understand how exactly it was calculated if it was done by someone else.

Distribution



- Check the cross sectional distribution of the multiple to judge whether a particular value is too high or low
  - Max and min, standard deviation?
  - Use median or mean?
  - Throw out outliers?

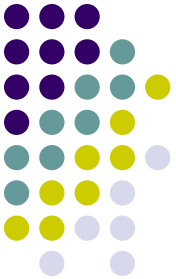
Private Firms – Adjustments



Public firms as the comparable for private firms

- **Control premium**
  - Public firm stock is traded in small stakes, while private firm transactions often involve a change in control.
  - Control allows changing managers, setting their pay, determining firm's payout policy, even its strategy.
  - Might be around 25-50%.
- **Marketability discount**
  - Takes time to find potential buyers of shares.
  - Might be as high as 35-50%.

Private Firms – Deal Multiple



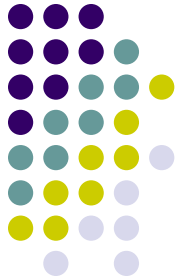
Alternatively, you can use **multiples from past deals**

- ***Recent*** transactions of the ***same type*** and ***similar firm***
- E.g., M&A deal multiple: Transaction Value/Target Firm Earnings

But "no asset gets sold twice in the market, for it's not the same market and the asset is not the same asset"

- Sometimes there is a long time between transaction and valuation date, so be alert to the changing risks and growth expectations.

Market May be Wrong



- In a relative valuation, you are only concluding that the stock is *undervalued/overvalued* **compared to the market**
- Multiples are certainly useful *if market perception is what you actually need (e.g. in IPOs).*
  - Hilton IPOed on Dec 12, 2013 at $21bn (or $32.4k per room)
  - Marriott and Starwoods, its two main rivals, were trading at $30.8k per room on average