Workshop V: Relative Valuation

Relative Valuation

- Refresher
  - What is relative valuation?
  - Finding comparables
  - Means of comparison
- Book multiples
- Operating multiples
- Sector specific multiples
- Advanced valuation multiples
- Examples galore w/ CIS (if time permits)
What is Relative Valuation

- Relative value principle: what is the market willing to pay?
  - The science of selling to--and buying from--a “bigger idiot”

- Assets with similar attributes and similar earnings potential should sell for similar prices.
  - Apples to apples, same houses on the same block, etc.

- Easier to implement and less time consuming than intrinsic value

- Steps to relative valuation:
  - Find comparable businesses
  - Find the means of comparison

Finding Comparables

- Comparable companies should have similar businesses in a similar industry with similar risks, size, growth, etc.

- No hard set of rules, but obviously:
  - Apples to apples, NOT apples to oranges
  - Exxon Mobile to Royal Dutch Shell, NOT Exxon Mobile to The Gap

- Premiums and discounts can be estimated for dissimilarities
  - Heavier, juicier apples trade at a 10% premium to regular apples
  - Coca-Cola trades at a 50% premium (Price to Sales) to PepsiCo

- Sometimes, there are no comparables, and premiums and discounts cannot be estimated:
  - Whole Foods trade at a 200% premium to Kroger

- Be creative, Look at private equity buy-out multiples, etc.

- Comparables can also serve as a proxy for estimates
Means of Comparison

- **BOOK VALUE MULTIPLES**
  - P/B, P/TBV, Q
  - Assumption: similar businesses with similar returns should be trading at similar relative asset value

- **OPERATING MULTIPLES**
  - P/E, P/S, EV/S, EV/EBITDA, MC/FCFE, EV/FCFF
  - Assumption: similar businesses should have similar earnings power

- **SECTOR SPECIFIC MULTIPLES**
  - EV/Subscriber, EV/Resource in reserve, EV/Thruput of product
  - Assumption: businesses in the same industry that make similar returns on a product should trade in tandem to a common denominator

- **ADVANCED VALUATION MULTIPLES**
  - EVIC / ROIC/WACC, EVGCI / CROIC/WACC
  - Assumption: the market premium/discount of a business, regardless of its size, should be directly proportional to its economic value added compared to similar firms in the industry

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Book Value Multiples

- **Price to Book Equity (P/B)**
  - Ratio between market value of equity and book value of equity

  **Definition:**
  \[
  \text{Price to Book Ratio} = \frac{\text{Market Value of Equity}}{\text{Book value of equity}} = \text{P/BV}
  \]

  **Intuition:**
  - What the market is willing to pay for a firm’s assets
  - Good for when earnings power or tangible value are in the assets
  - Bad when value is not in tangible assets (i.e. service and technology)
  - Bad when book value of equity is negative (i.e. initial project/firm development)
  - Bad when accounting standards differ (i.e. U.S. PP&E vs. Chinese PP&E)
**P/B Ratio Dissected**

- **Price to Book Equity (P/TBV)**
  - Ratio between market value of equity and tangible book value (TBV)
  - **Definition:**
    - Same as P/B, except book value does not include intangibles
    - TBV = Assets – Liabilities – Goodwill – Other intangibles
    - Proxy for liquidation value if TBV approximates replacement value

- **Tobin’s Q (Q)**
  - Ratio between market value of assets in place over replacement cost of assets in place
  - **Definition:**
    - Provides a more updated measure of value of assets than accounting book value
    - Measure has informational discrepancies and do not have precise definition
    - Rationale: firms that earn positive excess returns efficiently will have Q>1, else Q<1
    - I personally have never used this measure

**Book Value Multiples**

- **Price to Book Equity (P/TBV)**
  - \[ P_0 = \frac{DPS}{k_e - g_e} \]
  - \[ P_0 = \frac{(EPS)(Payout Ratio)}{r - g_e} \]
  - \[ P_0 = \frac{(BV_e)(ROE)(Payout Ratio)}{r - g_e} \]

- **Tobin’s Q (Q)**
  - \[ P_0 = \frac{ROE(1 + g)(Payout Ratio)}{r - g_e} \]
  - \[ PBV = \frac{ROE \cdot g_e}{r \cdot g_e} \]
# Earnings Multiples

- **Price to Earnings (P/E)**
  - Ratio between market value of equity and net income to retained earnings
  - **Definition:**
    \[
    \text{PE} = \frac{\text{Market Price per share}}{\text{Earnings per share}}
    \]
  - **Intuition:**
    - What the market is willing to pay for a firm's earnings
    - Good to look at from a fundamental perspective (i.e. growth)
    - Bad because "earnings" is an accounting measure not a cash measure
    - Bad because "earnings" is often distorted by firm-specific factors (i.e. leverage, tax-rates, extraordinary items, etc.)

## P/E Ratio Dissected

- **P/E Ratio**
  - \[ P_0 = \frac{\text{DPS}}{k_e - g} \]
  - \[ P_0 = \frac{(\text{EPS} \times \text{Payout Ratio})}{1 + \frac{g}{k_e - g}} \]
  - \[ P_0 = \frac{\text{Forward PE}}{k_e - g} \]
  - \[ P_0 = \frac{\text{Payout Ratio} \times \text{EPS}_0}{k_e - g} \]

- **P/E Ratio Dissected**
  - \[ P_0 = \frac{1}{1 + g} \sum_{t=0}^{\infty} \frac{(1+g)^t}{(1+k_{eq})^t} \]
  - \[ P_0 = \frac{1 - \frac{g}{\text{ROE}_{eq}}}{k_{e,eq} - g} \left(1 + \frac{g}{1+k_{eq}}\right)^{\frac{g}{k_{e,eq} - g}} \]
  - \[ P_0 = \frac{1 - \frac{g}{\text{ROE}_{eq}}}{k_{e,eq} - g} \left(1 + \frac{g}{1+k_{eq}}\right) \]
  - \[ P_0 = \frac{1 - \frac{g}{\text{ROE}_{eq}}}{k_{e,eq} - g} \left(1 + \frac{g}{1+k_{eq}}\right)^{\frac{g}{k_{e,eq} - g}} \]
Earnings Multiples

- **Price to Sales (P/S)**
  - Ratio between market value of equity and the revenues of a company
  - **Intuition:**
    - What the market is willing to pay for a firm’s revenues
    - Good for negative earning firms and turn-around stories
    - Good for value proxy assuming “regression to industry norm”
    - Sucks when business margin dynamics are very different
    - Sucks when there is leverage to distort sales and operating performance

- **Enterprise Value to Sales (EV/S)**
  - Adjust comparables to account for firm value

**P/S Ratio Dissected**

\[
P_0 = \frac{DPS}{r - g_n}
\]

\[
P_0 = \frac{(EPS)(Payout Ratio)(1 + g_n)}{r - g_n}
\]

\[
P_0 = \frac{(Sales)(Net Margin)(Payout Ratio)(1 + g_n)}{r - g_n}
\]

\[
\frac{P_0}{Sales_{0}} = \frac{(Net Margin)(Payout Ratio)(1 + g_n)}{r + g_n}
\]

\[
\frac{Price}{Sales} = \frac{(Payout Ratio)(1-g)}{(1+(k_{es} - g_n))}
\]

\[
\frac{Price}{Payout Ratio} = \frac{(1+g_n)}{(1-(k_{es} - g_n))}
\]

\[
\frac{EV}{Sales} = \frac{(Payout Ratio)(1+g_n)(1+g_n)}{(k_{es} - g_n)(1+(k_{es} - g_n))}
\]
**Earnings Multiples**

- **Enterprise Value to EBITDA (EV/EBITDA)**
  - Ratio between market value of equity and net income to retained earnings
  - **Definition:**
    \[
    \text{EV/EBITDA} = \frac{\text{Market Value of Equity + Market Value of Debt - Cash}}{\text{EBITDA}}
    \]
  - **Intuition:**
    - Measure of what the market is willing to pay for a firm’s operating performance
    - Ignores items below “operating income” line
      - Corrects differences in leverage, tax rates, below-the-line items
    - Used frequently by buy-side analysts
    - Will not present accurate measure of comparable value if leverage, tax rates, below the line items are material in the long-term

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**EV/EBITDA Dissected (via Damodaran)**

- **Equations:**
  - \[ P_0 = \frac{\text{DPS}}{k_e - g} \]
  - \[ V_0 = \frac{\text{FCFF}}{\text{WACC} - g} \]

- **FCFF Calculation:**
  \[
  \text{FCFF} = \text{EBIT (1-t)} - (\text{Cap Ex} - \Delta \text{Working Capital})
  = (\text{EBITDA} - \text{DA}) (1-t) - (\text{Cap Ex} - \Delta \text{Working Capital})
  = \text{EBITDA} (1-t) - \text{DA} (1-t) - \text{Reinvestment}
  \]

- **Value Calculation:**
  \[
  V_0 = \frac{\text{EBITDA} (1-t) - \text{DA} (1-t) - \text{Reinvestment}}{\text{WACC} - g}
  \]

- **EV/EBITDA Calculation:**
  \[
  \frac{V_0}{\text{EBITDA}} = \frac{(1-t) - \frac{\text{DA}}{\text{EBITDA}}}{\text{WACC} - \frac{\text{EBITDA}}{\text{EBITDA}}}
  \]
Earnings Multiples

- **Mkt Cap to FCF to Equity (MC/FCFE)**
  - Ratio between market value of equity to cash-earnings to equity holders
  - Intuition:
    - What the market is willing to pay for a firm’s pure cash-flow to equity holders
    - Good for measuring the cash-earnings power of a firm
    - Sucks when there’s material leverage or big tax differences
    - Sucks when reinvestment is significant

- **Enterprise Value to FCF to Firm (EV/FCFF)**
  - Ratio between firm value to cash-earnings to equity and debt holders
  - To a certain extent, fixes distortions in MC/FCFE created by leverage
  - What both equity holders and debt holders own in assets and get in cash

Sector Specific Multiples

- Quantifying industry qualities
  - Link firm value to operating details and output
  - Provides “intuitive and qualitative” way of estimating value
  - Can be computed without going to financial statements
  - Great for firms with inaccurate or no financial statements

- Numerator is usually *enterprise value*
- Denominator is usually an *operating unit* that generate revenue
- Ex: commodity companies, manufacturing firms, subscription-based firms, internet firms
Sector Multiple Examples

Value per commodity unit = \frac{\text{Market Value of Equity} + \text{Market Value of Debt}}{\text{Number of units of the commodity in reserves}}

Value per unit product = \frac{\text{Market Value of Equity} + \text{Market Value of Debt}}{\text{Number of units produced (or capacity)}}

Value per Subscriber = \frac{\text{Market Value of Equity} + \text{Market Value of Debt}}{\text{Number of Subscribers}}

Value per Customer = \frac{\text{Market Value of Equity} + \text{Market Value of Debt}}{\text{Number of Customers}}

Value per Site Visitor = \frac{\text{Market Value of Equity} + \text{Market Value of Debt}}{\text{Number of Visitors/Site}}

Advanced Valuation Multiples

- **EV/IC to ROIC/WACC**
  - Ratio between the market value of capital over the book value of capital and economic return of firm
  - Intuition:
    - Combines book metrics and earnings metrics nicely
    - What the market is willing to pay in excess of book for economic return

- **EV/GCI to CROCI/WACC**
  - “Cash” measure of EV/IC to ROIC/WACC
  - Intuition:
    - Better measure of economic value than EV/IC to ROIC/WACC
EV/GCI to CROCI/WACC Dissected

- **GCI** (Gross cash invested) = Gross tangible and intangible assets before depreciation or write-offs + investments in associates + working capital
- **CROCI** (Cash return on cash invested) = Post tax, pre interest cash-flow as a percentage of average GCI
- **ROIC** (Return on invested capital) = EBITA – cash taxes on EBITA as a percent of net tangible assets + operating working capital

This is the ultimate measure of implied market discounts/premiums as a result of (1) the level, volatility, and duration of economic return (2) reinvestment

Pros and Cons

**Pros**
- Simple to calculate and explain
- Captures the intangible in a “market discount/premium”
- Does not have as many explicit assumptions and projections
- Very useful as a “reality check”

**Cons**
- Definition of a comparable firm is subjective
- Does not hint at market over/under valuation
  - Tech bubble (market cap per eyeball), real estate bubble (house on the next block)
- Prone to manipulation and oversimplification
Examples

- See external documents