Security Analysis

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Relative Valuation Approaches

Relative valuation approaches differ from discounted cash flows approaches in that they seek to compare a specific investment to some benchmark group of similar investments in determining the theoretical price.

These ratios include: *price-to-earnings*, *price-to-cash flow*, *price-to-book value* and *price-to-sales*.

Advantage over discounted cash flow valuation:

- does not require a set of inputs that must be estimated.
- Investment values calculated from the DCF models are very sensitive to slight changes in those inputs.

Disadvantages over discounted cash flow valuation:

Provide insight into how assets are currently valued by the market. They do not, however, provide any indication as to whether the market currently overvalues or undervalues those assets.

Relative valuation approaches are most useful when:

- The assets used as benchmarks are similar in terms of industry, size, and risk characteristics. In other words, is it an “apples-to-apples” comparison?

- The overall market or relevant industry groups are not experiencing any peculiar broad valuation extreme. In other words, is there an internet bubble occurring?

1. Price to earnings (P/E)

A P/E multiple is the ratio of a stock's current market price to its earnings per share (EPS)

Two issues must be considered when determining EPS:

- The time horizon over which earnings are measured
- Adjustments that may be made to reported earnings

Earnings per share can be viewed from two perspectives:

- Trailing EPS: considers earnings from the previous twelve months as reported in the company's financial statements
- Leading (also called prospective or forward EPS) earnings per share is an estimate of the earnings for the next twelve months and must be forecast by analysts rather than reported by the company.

Rationales for and Drawbacks to Using P/E Ratios

- Earnings power (as reflected in EPS) is a primary determinant of investment value.
- P/E ratios are easily understood, widely recognized, and commonly employed.
- Differences in long-run average stock returns may be related to differences in P/Es.

Criticisms of P/E as a valuation measure:

- A negative EPS causes the multiple to be useless
- Some of the components of earnings may be volatile or transient, making it hard for analysts to determine the ongoing or recurring EPS, which is most important in finding intrinsic value.
- The ability to manage EPS by varying a firm's accounting practices may cause misleading conclusions about economic performance.

Calculate and interpret P/E

Four issues should be included when determining trailing earnings (analysts are more interested in forecasting earnings in a "normal" year):

- Underlying Earnings
- Effects of Cyclicality
- Accounting Methods
- Possible Dilution Effects

Underlying Earnings

Nonrecurring items are not expected to happen again and are generally excluded in calculating trailing earnings.

Example:

ABC Ltd has been greatly affected by a slowing economy. As a result, 25% of the workforce became redundant in December 20x2. Because of this ABC had a nonrecurring expense (after taxes that reduced earnings by $11,000.000 (or $0.13 per share) in the fourth quarter. ABC's full year earnings were $2.23 per share (on $84,753,363 common shares outstanding).

As of February 20x3, ABC stock price is $38.33 per share ant it has a trailing P/E ratio of 17.19. Given the information above, calculate underlying earnings (earnings adjusted for nonrecurring items) and the trailing P/E ratio of 17.19.

Answer:
Since the nonrecurring expense is a one-time event, it should be added back to full year earnings to obtain underlying earnings. EPS should be similarly adjusted.

Underlying EPS = EPS + Nonrecurring expense per share = $2.23 + $0.13 = $2.36

To arrive at a trailing P/E ratio based on underlying earnings. Divide price by underlying earnings per share.

P/E = $38.33 / $2.36 = 16.24

Effects of Cyclicality

Business cycles repeat, therefore the effect of cycles should be accounted for by calculating normalized earnings. This is especially important for cyclical businesses that may exhibit high P/Es on low EPS at the bottom of the cycle and low P/Es on high EPS during cyclical peaks.

Normalized earnings: may be computed by using either the historical average over a full business cycle or the average ROE methods (ROE × current book value).

Example:
ABC Corporation is affected by the business cycle. The average industry cycle is approximately five years. An analyst believes that the years 20x1 to 20x5 are most representative of ABC's performance over its business cycle. At the end of February 20x6 ABC's stock is selling at $18.49. The table below has the earnings per share (EPS), book value per share (BV) and the return on equity (ROE) for the past five years.

	20x5	20x4	20x3	20x2	20x1
EPS	$1.55	$0.86	$0.37	$0.86	$1.66
ROE	13.1%	7.3%	3.1%	7.2%	14.1%
BV	$12.10	$11.54	$11.94	$11.95	$11.91

Using the above information:

1. Calculate the normalized earnings per share using the *historical average* method and calculate a revised P/E ratio.
2. Calculate the normalized earnings per share using the average *return on equity* method and calculate a revised P/E ratio.

Answer:

1. The average EPS over the cycle (20x1-20x5):
=($1.55+0.86+0.37+0.86=1.66)/5 = $5.30/5 = $1.06

P/E = Stock price / Normalized EPS = $18.49 / $1.06 = 17.44

2. The average ROE over the cycle (20x1-20x5)
=(13.1%+7.3+3.1+7.2+14.1)/5 = 44.8%/5=8.96%

Multiplying the average ROE times the current book value per share results in the normal EPS.

Normalized EPS = 8.96% × $12.10 = $1.08

Next find P/E
P/E = Stock Price /Normalized EPS = $18.49/$1.08 = 17.12

Accounting Methods

Differences in accounting methods between the companies under consideration should be reconciled by adjusting EPS accordingly. Otherwise P/Es will not be comparable.

Example:
ABC corporation's shares are trading at $45.25 and the Company's trailing EPS are $1.25. In comparison, XYZ corporation has a share price of $38.00 and trailing EPS of $1.35. An analysis wishes to compare the two firm's trailing P/E ratios, but discovers that ABC corporation uses LIFO for inventory and XYZ uses FIFO. ABC corporation's trailing EPS would rise to $1.40 if the Company used the FIFO inventory method. Calculate the trailing P/E ratios on a consistent accounting basis.

Answer:
The trailing P/E ratios should be calculated using the FIFO earnings for each company.
ABC Corporation: P/E = $45.25/$1.40 = 32.32
XYZ Corporation: P/E = $38.00/$1.35 = 28.15

Possible Dilution Effects

It may also be necessary to adjust EPS in the event that holders of other company securities have options that allow for conversion to common shares.

Basic earnings per share is equal to total earnings divided by the weighted average number of shares outstanding; diluted earnings per share includes not only the shares outstanding but also employee stock options, convertible bonds, convertible preferred stocks, and equity warrants.

Example:

ABC industries reported June, 30 20x6 basic EPS of $3.06 and diluted EPS of $2.90. the shares are trading at $65.00. Calculate trailing P/E ratios using basic and diluted EPS.

Answer:

The trailing P/E ratio using basic EPS = $65.00/$3.06 = 21.24

The trailing P/E ratio using diluted EPS = $65.00/$2.90 = 22.41

2. Price to book (P/B)

Price to book value (P/BV) relates stock price to a balance sheet item. Book value is calculated as shareholders' equity (assets less liabilities) less any value attributable to preferred stock.

Rationales for and Drawbacks to Using P/B Ratios

Arguments in favor of P/B as a valuation measure include:

- Unlike P/E multiples, P/B can be used all the time. This is because boom value is almost always positive.
- Book value is more stable than earnings. Therefore, P/B may be more meaningful when EPS is volatile.
- For highly liquid companies (such as insurance, investment, finance, and banking), book value may be a more appropriate measure and may actually approximate market value.
- Book value can be employed for companies expected to cease operations
- Research indicates that long-run average stock returns are related with differences in P/B values.

The shortcomings of P/B are:

- Book value ignores the importance of other factors that may be essential to a company's value (such as workforce skills and level of education).

- P/B may be deceptive if large differences exist among the asset levels of the companies under consideration.

- The effects of accounting differences among companies may impair the usefulness of P/B as a comparison tool.

Determining book value and calculating the Firm's P/B

Book value per share is calculated as follows:

$$\text{Book value per share} = \frac{\text{Shareholder's Equity-Preferred Equity}}{\text{Number of Common Shares Outstanding}}$$

Book value may be further adjusted for two reasons: to render a book value that better reflects the fair value of shareholders' investment and to enable comparisons among different stocks.

Possible adjustments include:

- Many analysts subtract the value of intangible assets. While this may be appropriate for some intangible assets (goodwill), it may not be appropriate for all (patents and copyrights).
- Adjustments for off-balance sheet assets and liabilities. Where significant, book value should be adjusted fir these items. Also, some items are reported at cost (such as land) and others at market value (such as marketable securities). P/BV comparisons would be more useful if all assets were reported at fair value.
- Adjustments for differing accounting treatments, such as LIFO and FIFO are also appropriated.

Example:

The XYZ company has total assets of $400,000,000, total liabilities of $100,000,000, and preferred equity of $25,000,000. the stock is trading at $40 per share. If the company has 100,000,000 common shares outstanding, what is its price/book value ratio?

Book value = $400,000,000-$100,000,000 - $25,000,000 = $275,000,000

$$\text{Book value per share} = \frac{\$275{,}000{,}000}{100{,}000{,}000 \text{ shares}} = \$2.75/\text{share}$$

$$\text{Price/book Value} = \frac{\$40.00}{\$2.75} = 14.5$$

3. Price to sales (P/S)

Some analysts approach common stock valuation from the premise that all growth starts with sales. The price-to-sales ratio is calculated by dividing the price per share by the net annual sales per share.

Rationales for and Drawbacks to Using P/S Ratios

The arguments for the use of the P/S ratios are:

- Sales are less vulnerable to being "managed" than earnings or book value.
- Sales figures are always positive. P/S can be used when P/E cannot (when EPS is negative).
- P/S may be more meaningful because sales aren't as volatile as earnings.
- It may be more appropriate for valuing mature, zero-income, or cyclical businesses.
- Research indicates that long-run average stock returns are related to differences in P/S values.

The arguments against using P/S ratios are:

- A firm may be unprofitable despite significant sales growth. Since a business must eventually be able to generate cash flow and positive net income if it is to continue as a viable entity, a multiple based on sales may not be valid.
- Cost structure differences among firms are not captured by P/S ratios.
- Revenue recognition accounting practices may bias sales numbers.

Determining Sales and Calculating the Firm's P/S

Net sales per share (total sales minus returns and customer discounts) may be trailing or forward looking.

The security's price is then divided by net sales per share. The analyst should carefully consider the firm's revenue recognition practices!

Example:

The ABC Company reports 20x6 fiscal year sales of $2,000,000,000. Analyst projected sales are $2,100,000,000. The company's shares are trading at $40 per share. If ABC has 100,000,000 common shares outstanding, what are ABC's price/sales ratios for trailing and projected sales?

Answer:

$$Trailing\ \ Sales/Share = \frac{\$2,000,000,000}{100,000,000\ shares} = \$20/share$$

$$\Pr ojected\ \ Sales/Share = \frac{\$2,100,000,000}{100,000,000\ shares} = \$21/share$$

$$\Pr ice/Sales_{Trailing} = \frac{\$40}{\$20} = 2.0$$

$$\Pr ice/Sales_{\Pr ojected} = \frac{\$40}{\$21} = 1.9$$

4. Price to Cash Flow (P/CF)

Many analysts favor price-to-cash flow ratios as valuation indicators. Studies have shown that institutional investors use P/CF more often than P/E, P/B, or P/S.

Rationales for and Drawbacks to Using P/CF Ratios

The arguments for the use of the P/CF ratios are:

- Cash Flow can't be as easily manipulated as earnings
- Cash Flow is normally more stable than earnings. Therefore, price-to-cash flow may be more meaningful than P/E when earnings are volatile.
- Price-to-cash flow can address the accounting-related quality of earnings issue.
- Research indicates that long-run average stock returns are related to differences in price-to-cash flow values.

Potential Problems with price-to-cash flow are:

Some cash flow approximations have limitations. For example, adding back non-cash charges to net income arrives at cash flow from operations, but items that change operating cash flow are ignored (such as non-cash revenue and net working capital change).

Calculate and interpret P/CF

Different definitions of cash flow. One approximation is EPS plus depreciation and amortization. Other, EBITDA. Both of these common measures ignore major cash flows, such as capital spending and working capital requirements.

Example:

The ABC company has earnings per share of $2.30 for 20x6. The company's 20x6 income statement shows depreciation and amortization of $25,000,000 and other noncash expenses of $4,000,000. 20x6 working capital and fixed capital investments were $8,000,000 and $30,000,000 respectively. ABC has 100,0000,000 common shares outstanding and the shares are trading at $40.00 per share. Calculate P/CF using the CF defined as EPS plus depreciationa nd amortization.

Answer

$$Cash\ Flow/Share = \$2.30 + \frac{\$25,000,000}{100,000,000 Shares} = \$2.55/Share$$

$$\Pr ice/CashFlow = \frac{\$40.00}{\$2.55} = 15.7$$

Note: A weakness of the above calculation is the cash flow being used. It ignores noncash expenses and investments in working capital and fixed capital

Relative Valuation Approaches (Summary)

If the multiple is less than the mean for the peer group, stock appears relatively undervalued

Earnings Multiplier Approach

Based on the principle that dividends are paid out of earnings

$$\downarrow \frac{P_0}{E_1 \uparrow} = \frac{\text{Net Income-Preferred Dividends}}{\#\ \text{Common Shares Outstanding}} \updownarrow$$

Lower side of the peer group the stock is relatively undervalued

Payout rate

$$DIV_t = K \times E_t$$

$$P_{CS} = \frac{DIV_1}{r_{CE} - g_{DIV}} = \frac{K\ E_1}{r_{CE} - g_E}$$

$$P/E_1 = \frac{K}{r_{CE} - g_E}$$ = justifiable / appropriate P/E_1 multiple

$P/E_1 \times EPS_1$ = intrinsic value

Limitations:

- Accounting Methods / non-recurring items
- Management Bias / Estimates
- Earnings tend to be Volatile / Negative

Other Multiples

Price-to-Cash Flow

Harder for management to manipulate than earnings

$$\downarrow \quad P/CF_i = \frac{P_t}{CF_{t+1}} \quad \uparrow$$

Projected CF per Common Share

Lower side of the peer group the stock is relatively undervalued

Price-to-Book

Better for companies with liquid assets that reflect current values (e.g. Banks) – Less volatile & Can't be negative

$$\downarrow \quad P/BV_i = \frac{P_t}{\uparrow BV_{t+1}} \quad = \frac{\uparrow \text{Assets-Liabilities-Preferred Stock}}{\downarrow \text{\# CSO}}$$

Projected

Price-to-Sales Sales are more stable than earnings and can be used to value early-stage companies not yet earning profits

$$\downarrow \; P/S_i = \frac{P_t}{\uparrow S_{t+1}} = \frac{\uparrow \text{Sales}_1}{\downarrow \#\ \text{CSO}_1}$$

Sales:

- Can't be negative
- Less management bias – general rule (everybody is using accrual basis)

Tony Fong is estimating the appropriate P/E ratio for Slate Quarry Inc, a mature, open-pit mining company. Tony has made the following estimates about Slate Quarry Inc:

Required return	14%
Past 1-year return on equity	16%
Dividend growth rate	3%
Earnings retention rate	30%
Current stock price / share	$8.00

Based on this data and an applying the constant growth dividend discount model, an appropriate P/E ratio for the Slate Quarry is:

a. 2.7
b. 5.4
c. 6.4
d. 2.3

Choice "c" is the correct. The key to converting the constant growth model (CGM) to a P/E model is to recognize that the dividend at t=1 (DIV_1) will equal the dividend payout ratio K times the t=1 earnings. In general:

$$DIV_t = K_t + E_t$$

Thus, assuming the dividend payout ratio is constant over time, $K \times E_1$ can be substituted for DIV_1. The CGM is now rewritten as:

$$P_{CS} = \frac{DIV_1}{r_{CE} - g_E} = \frac{K \times E_1}{r_{CE} - g_E}$$

Next, to turn the formula into a P/E ratio, divide both sides by E_1

$$P/E_1 = \frac{K}{r_{CE} - g_E}$$

Note that this problem provides the retention ratio (1-k) and not the payout ratio. The payout ratio is 70% (1-30%).

The formula can now be used for Slate Querry:

$$P/E_1 = \frac{70\%}{0.14\text{-}0.03} = 6.4\%$$

Tony could then multiply this P/E estimate by his year 1 estimated earnings to arrive at a stock price today. This value will be the same number as if Tony simply computed the stock's value using the basic CGM and substituting his estimate of KE_1 for DIV_1.

Choice "a" is incorrect. This answer incorrectly uses the retention rate in the numerator (instead of the dividend payout ratio).

Choice "b" is incorrect. This answer incorrectly uses the past 1-year ROE in the denominator (instead of the required return). The past ROE does not indicate the return investors will require on the stock going forward.

Choice "d" is incorrect. This answer incorrectly uses both the past 1-year ROE in the denominator (instead of the required return) and the retention rate in the numerator (insteda of the dividend payout ratio)