Equity

Equity Valuation: Concepts and Basic Tools

Exam Focus

- Present value models
  - PV of future dividends or free cash flows
- Multiplier models
  - Compare price to a fundamental variable (revenue, earnings, CF)
  - EV models link EBITDA to EV
- Asset-based models
  - Bases value of company on its net assets

Dividend Discount Model

Expect calculational questions to test the following present value scenarios:

- Dividends and a terminal value
- Perpetuity
- Growing perpetuity (Gordon growth model)
  - May involve a delayed start to growth phase
  - May be two-stage growth

Investment Horizon: Example

An investor expects a share to pay dividends of $3.00 and $3.15 at the end of Years 1 and 2, respectively. At the end of the second year, the investor expects the share to trade at $40.00. The required rate of return is 8%.

The market price of the shares is currently $30.00. The shares are *most likely:*

A. overvalued.

B. undervalued.

C. fairly valued.

V_0 = =

Price intrinsic value: therefore, the shares are

-2

Preferred Shares—Perpetuity: Example

The Union Electric Company 4.75% perpetual preferred shares have a required return of 7.5%. The par value of the shares is $100, and there are no embedded options.

What is the intrinsic value of this preferred share?

V_0 = =

Would the value be higher or lower if the share was callable?

A call option is the right of the issuer to redeem the share. Like bonds, this will only ever be done if it benefits the issuer; therefore, the intrinsic value will be if the share is callable.

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Gordon Growth Model: Example

Using the data from Siemens below, work out the historic growth rate (CAGR) in DPS, and the sustainable growth rate g = b × ROE (use averages):

Year	2017	2016	2015	2014	2013
EPS (€)	7.45	6.74	8.85	6.37	5.08
DPS (€)	3.7	3.6	3.5	3.3	3.0
Payout	50%	53%	40%	52%	59%
ROE	15.6%	15.9%	22.3%	18.2%	14.6%
Share price (€)	119.2	104.2	79.94	94.37	89.06

Using the historic growth rate and a required return of 7.5%, what is the intrinsic value of a Siemens share?

Gordon Growth Model: Solution

Solving for *g* from 2013 to 2017:

g = =

(this is referred to as a CAGR)

Using g = b × ROE with averages

g = × =

$$\text{Average return on equity} = \frac{0.5 + 0.47 + 0.6 + 0.48 + 0.41}{5} = 0.49$$

$$\text{Average return on equity} = \frac{15.6 + 15.9 + 22.3 + 18.2 + 14.6}{5} = 17.3\%$$

Using both the historic growth rate and sustainable growth rate, a required return of 7.5%, what is the intrinsic value of a Siemens share?

Gordon Growth Model: Solution (cont.)

$$V_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}$$

Using CAGR:

Using sustainable growth rate:

$V_0 =$ $=$

-2

Delayed Start to Growth: Example

A company does not currently pay a dividend but is expected to do so in 5 years (t = 5). The first dividend is expected to be $4.00 and is expected to grow at 6% into perpetuity. The required return is 10%. What is the estimated current intrinsic value?

$$V_n = \frac{D_{n+1}}{r-g}$$

$V_4 =$ $=$

$V_0 =$ $=$

-2

Two-Stage Growth: Example

The current dividend D_0 is \$5.00. Growth is expected to be 10% a year for 3 years, and then 5% thereafter. The required rate of return is 15%. Estimate the intrinsic value.

$D_1 = \$5(1.1) =$

$D_2 = \$5(1.1)^2 =$

$D_3 = \$5(1.1)^3 =$

$V_2 =$ $=$

$V_0 =$ $=$

-4

Two-Stage Growth: Alternative Solution

Treat high growth dividends separately and add a terminal value representing constant growth dividends.

$D1 = \$5(1.1) = \$5.50$

$D_2 = \$5(1.1)^2 = \$6.05$

$D_3 = \$5(1.1)^3 = \$6.655$

$\text{Terminal value}_3 =$ $=$

$V_0 =$ $\cdot =$

-3

Price Multiples

It is important to know what they are, why we use them, and the pros and cons. Multiples can be used as benchmarks for valuation.

- P/E—also be able to calculate a *justified* forward P/E ratio and understand what drives it higher/lower
- P/B
- P/S
- P/CF

} Calculate from figures provided and understand why it is used

Calculation of Justified Forward P/E: Example

An analyst forecasts the following for Nestle, with the aim of establishing a justified forward P/E:

Dividend payout = 0.68

Long-run ROE = 21.5%

Required rate of return = 9%

$$P_0 = \frac{D_1}{r - g} \xrightarrow{\text{Divide by forecast earnings}} \frac{P_0}{E_1} = \frac{D_1/E_1}{r - g}$$

g = =

$$\frac{P_0}{E_1} = =$$

Enterprise Value

EV = market cap + MV pref + MV debt – cash

- Seen as the "cost of a takeover"
- Useful when comparing companies with different capital structures

EV/EBITDA is a common multiple

- May avoid issue of negative earnings
- Could use operating income as a proxy

Enterprise Value: Example

Using the following information, is the stock overvalued or undervalued on an EV/EBITDA basis?

Stock price	$60.00
Shares outstanding	500,000
MV long-term debt	$7,800,000
BV long-term debt	$7,500,000
Cash and short-term investments	$45,000
Operating profit	$3,000,000
Depreciation/amortization	$600,000
Industry average EV/EBITDA	10.2

Enterprise Value: Solution

Using the following information, is the stock overvalued or undervalued on an EV/EBITDA basis?

Enterprise value = =

EBITDA = =

EV/EBITDA multiple = =

Therefore, the stock is as the actual multiple is above the industry average, 10.2.

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Asset-Based Valuations

- Net assets of company used to provide a baseline minimal value (liquidation value)

Downsides

- Hard to establish market/fair values for some assets
- Valuing intangible assets—whether on or off the books
- Accounting values may diverge from fair values

Solutions

Investment Horizon: Example

An investor expects a share to pay dividends of $3.00 and $3.15 at the end of Years 1 and 2, respectively. At the end of the second year, the investor expects the share to trade at $40.00. The required rate of return is 8%.

The market price of the shares is currently $30.00. The shares are *most likely:*

A. overvalued.

B. undervalued.

C. fairly valued.

$$V_0 = \frac{3.00}{1.08} + \frac{3.15}{(1.08)^2} + \frac{40.00}{(1.08)^2} = \$39.77$$

Price < intrinsic value: therefore, the shares are undervalued.

-2

Preferred Shares—Perpetuity: Example

The Union Electric Company 4.75% perpetual preferred shares have a required return of 7.5%. The par value of the shares is $100, and there are no embedded options.

What is the intrinsic value of this preferred share?

$$V_0 = \frac{\$4.75}{0.075} = \$63.33$$

Would the value be higher or lower if the share was callable?

A call option is the right of the issuer to redeem the share. Like bonds, this will only ever be done if it benefits the issuer; therefore, the intrinsic value will be lower if the share is callable.

Gordon Growth Model: Solution

Solving for *g* from 2013 to 2017:

g = (3.7 / 3) $^{(1/4)}$ – 1 = 5.4%

(this is referred to as a CAGR)

Using g = b × ROE with averages

g = 0.49 × 17.3% = 8.5%

$$\text{Average return on equity} = \frac{0.5 + 0.47 + 0.6 + 0.48 + 0.41}{5} = 0.49$$

$$\text{Average return on equity} = \frac{15.6 + 15.9 + 22.3 + 18.2 + 14.6}{5} = 17.3\%$$

Using both the historic growth rate and sustainable growth rate, a required return of 7.5%, what is the intrinsic value of a Siemens share?

Gordon Growth Model: Solution (cont.)

$$V_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}$$

Using CAGR:

$$V_0 = \frac{€3.70(1.054)}{0.075-0.054} = €185.70$$

Using sustainable growth rate:

Cannot be computed r < g

-2

Delayed Start to Growth: Example

A company does not currently pay a dividend but is expected to do so in 5 years (t = 5). The first dividend is expected to be $4.00 and is expected to grow at 6% into perpetuity. The required return is 10%. What is the estimated current intrinsic value?

$$V_n = \frac{D_{n+1}}{r-g}$$

$$V_4 = \frac{\$4.00}{0.10-0.06} = \$100$$

$$V_0 = \frac{\$100}{(1.10)^4} = \$68.30$$

-2

Two-Stage Growth: Example

The current dividend D_0 is \$5.00. Growth is expected to be 10% a year for 3 years, and then 5% thereafter. The required rate of return is 15%. Estimate the intrinsic value.

D_1= \$5(1.1) =

D_2=\$5$(1.1)^2$ =

D_3=\$5$(1.1)^3$ =

$$V_2 = \frac{\$6.655}{0.15 - 0.05} = \$66.55$$

$$V_0 = \frac{\$5.50}{1.15} + \frac{\$6.05}{(1.15)^2} + \frac{\$66.55}{(1.15)^2} = \$59.68$$

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Two-Stage Growth: Alternative Solution

Treat high growth dividends separately and add a terminal value representing constant growth dividends.

D1= \$5(1.1) = \$5.50

D_2=\$5$(1.1)^2$ = \$6.05

D_3=\$5$(1.1)^3$ = \$6.655

$$\text{Terminal value}_3 = \frac{\$6.655(1.05)}{0.15 - 0.05} = \$69.8875$$

$$V_0 = \frac{\$5.50}{1.15} + \frac{\$6.05}{(1.15)^2} + \frac{\$6.655}{(1.15)^3} + \frac{\$69.8875}{(1.15)^3} = \$59.68$$

-3

Calculation of Justified Forward P/E: Example

An analyst forecasts the following for Nestle, with the aim of establishing a justified forward P/E:

Dividend payout = 0.68

Long-run ROE = 21.5%

Required rate of return = 9%

$$P_0 = \frac{D_1}{r - g} \xrightarrow{\text{Divide by forecast earnings}} \frac{P_0}{E_1} = \frac{D_1/E_1}{r - g}$$

g = 21.5% × (1 – 0.68) = 0.069

$$\frac{P_0}{E_1} = \frac{0.68}{0.09 - 0.069} = 32.38$$

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Enterprise Value: Solution

Using the following information, is the stock overvalued or undervalued on an EV/EBITDA basis?

Enterprise value = $30m + $7.8m – $0.045m = $37.755m

EBITDA = $3m + $0.6m = $3.6m

EV/EBITDA multiple = $\frac{\$37.755m}{\$3.6m} = 10.49$

Therefore, the stock is overvalued as the actual multiple is above the industry average, 10.2.

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