Business Valuation

Answer Keys

**Income Approach (DDM) at Rebel**

1.

V0 = $\frac{\left(10\right)(1+.07)^{1}}{(1+.1555)^{1}}$ + $\frac{\left(10\right)(1+.07)^{2}}{(1+.1555)^{2}}$ + $\frac{\left(10\right)(1+.07)^{3}}{(1+.1555)^{3}}$ + $\frac{\frac{\left(10\right)\left(1+.07\right)^{3}(1+.03)}{(.1555-.03)}}{(1+.1555)^{3}}$ = CAD 90.94

kc = .04 + 2.1 (.095 - .04) = .1555 or 15.55%

Yes, the shares appear to be overvalued, so the company should issue new shares now before the market corrects itself.

2.

Best Case

V0 = $\frac{\left(10\right)(1+.09)^{1}}{(1+.1555)^{1}}$ + $\frac{\left(10\right)(1+.09)^{2}}{(1+.1555)^{2}}$ + $\frac{\left(10\right)(1+.09)^{3}}{(1+.1555)^{3}}$ + $\frac{\left(10\right)(1+.09)^{4}}{(1+.1555)^{4}}$ + $\frac{\frac{\left(10\right)\left(1+.09\right)^{4}(1+.04)}{(.1555-.04)}}{(1+.1555)^{4}}$ = CAD 105.94

Worst Case

V0 = $\frac{\left(10\right)(1+.05)^{1}}{(1+.1555)^{1}}$ + $\frac{\left(10\right)(1+.05)^{2}}{(1+.1555)^{2}}$ + $\frac{\frac{\left(10\right)\left(1+.05\right)^{2}(1+.02)}{(.1555-.02)}}{(1+.1555)^{2}}$ = CAD 79.50

No, after using a best and worst-case scenario analysis, the shares still appear to be overvalued, so the company should issue new shares before the market corrects itself.

**Estimating Historical Growth Rates**

1. Arithmetic Mean Historical Growth Rate

(156.52% + 8.33% + 23.08% + (-9.38%) + 20.69% + (-27.62%) + 18.42% + 1.11% + 39.56% + (-11.02%) + 12.39%) / 11 = 12.01%

1(.72 - .46) / .46 = .5652 or 56.52%

Geometric Mean Historical Growth Rate

(.46) (1 + i)11 = 1.27

i = .0967 or 9.67%

The geometric mean should be used because it gives an accurate long-term measure of the growth rate and is not affected by the moving base like the arithmetic mean. The difference between the arithmetic and geometric mean growth rate increases as growth rates become more volatile.

1. Regression Smoothing

y = .6466 + .0455 (x)

Year 1 .6466 + .0455 (1) = .6921

Year 12 .6466 + .0455 (12) = 1.1926

(.6921) (1 + i) 11 = 1.1926

i = .0507 or 5.07%

Geometric mean growth rate with regression smoothing addresses the problem of the first and last values being outliers and thus distorting the geometric mean. The EPS of CAD 0.46 in 2005 appears to have been an outlier, and this approach helps to correct for this, resulting in a lower growth rate. This approach also deals better with negative EPS figures. With the geometric mean, it becomes a problem when the first or last values are negative. For the arithmetic mean, percentage changes are not meaningful when the base is negative.

**Income Approach (DDM) at Amsterdam**

1.

V0 = $\frac{\left(4.50)(.25\right)(1+.290)^{1}}{(1+.111)^{1}}$ + $\frac{\left(4.50\right)(.25)(1+.290)^{2}}{(1+.111)^{2}}$ + $\frac{\left(4.50)(.25\right)(1+.290)^{3}}{(1+.111)^{3}}$ +

 $\frac{\frac{\left(4.50)(.75\right)\left(1+.290\right)^{3}(1+.032)}{(.100-.032)}}{(1+.111)^{3}}$ = CAD 84.76

Terminal value

High-Growth Stage

.045 + 1.2 (.055) = .111

(.15 / (1 - .50) = .300

(.300) (1 - .25) / (1 – (.300) (1 - .25)) = .290

Stable-Growth Stage

.045 + 1.0 (.055) = .100

.05 / (1 - .60) = .125

(.125) (1 - .75) / (1 – (.125) (1 - .75)) = .032

1. Terminal value accounts for 95% (80.18 ÷ 84.76) of Amsterdam’s intrinsic value. Minor errors in estimating the inputs used to calculate terminal value will significantly affect the valuation of the company.

**Income Approach (DDM) at Samantha**

1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
| ROA | 0.1800 | 0.1800 | 0.1500 | 0.1200 | 0.0900 |
| Debt ratio | 0.2000 | 0.2000 | 0.2667 | 0.3333 | 0.4000 |
| ROE | 0.2250 | 0.2250 | 0.2046 | 0.1800 | 0.1500 |
| Payout ratio | 0.2500 | 0.2500 | 0.4167 | 0.5833 | 0.7500 |
| Sustainable growth | 0.2030 | 0.2030 | 0.1355 | 0.0811 | 0.0390 |
| Beta | 1.3600 | 1.3600 | 1.2400 | 1.1200 | 1.0000 |
| Risk-free rate | 0.0400 | 0.0400 | 0.0400 | 0.0400 | 0.0400 |
| Market risk premium | 0.0500 | 0.0500 | 0.0500 | 0.0500 | 0.0500 |
| Cost of equity | 0.1080 | 0.1080 | 0.1020 | 0.0960 | 0.0900 |

V0 = $\frac{7.70}{1.1080}$ + $\frac{9.26}{1.2277}$ + $\frac{10.51}{1.3529}$ + $\frac{11.36}{1.4828}$ + $\frac{\frac{11.80}{(.09 -.0390)}}{1.4828}$ = CAD 185.96

 **Dividend Growth**

 Year 1 (6.40) (1 + .2030) = 7.70

 Year 2 (7.70) (1 + .2030) = 9.26

 Year 3 (9.26) (1 + .1355) = 10.51

 Year 4 (10.51) (1 + .0811) = 11.36

 Year 5 (11.36) (1 + .0390) = 11.80

 **Discount Rates**

 Year 1 (1 + .108) = 1.1080

 Year 2 (1.1080) (1 + .1080) = 1.2277

 Year 3 (1.2277 (1 + .1020) = 1.3529

 Year 4 (1.3529) (1 + .0960) = 1.4828

**Income Approach (FCFE) at Global**

1.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **2010** | **2011** | **2012** |
| Net income | 9,000 | 9,450 | 9,923 |
| Add: Depreciation | 9,000 | 9,450 | 9,922 |
| Minus: Capital expenditures | 11,000 | 11,550 | 12,127 |
| Minus: Increase in NWC | 1,000 | 1,050 | 1,102 |
| Add: Increase in long-term debt | 2,000 | 2,100 | 2,205 |
| FCFE | 8,000 | 8,400 | 8,821 |

kc = .04 + 1.30 (.05) = .105

V0 = $\frac{8,000}{(1+ .105)^{1}}$ + $\frac{8,400}{(1+ .105)^{2}}$ + $\frac{8,821}{(1+ .105)^{3}}$ + $\frac{\frac{\left(8,821\right)(1+ .03)}{(.105 -.03)}}{(1+ .105)^{3}}$ = CAD 110,443

**Income Approach (FCFF) at Pulsar**

1.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **2015** | **2016** | **2017** |
| EBIT (1 – t)1 | 15,000 | 16,125 | 16,912 |
| Add: Non-cash charges (depreciation) | 10,000 | 10,750 | 11,275 |
| Minus: Capital expenditures2 | 18,383 | 17,038 | 15,676 |
| Minus: Increase NWC3 | 1,217 | 912 | 640 |
| FCFF | 5,400 | 8,925 | 11,871 |

1 20,000 (1 - .25), 21,500 (1 - .25), 22,550 (1 - .25)

2 (155,283 – 136,900), (172,321 – 155,283), (187,997 – 172,321)

3 (34,223 – 22,056) – (30,800 – 19,850), (36,789 – 23,710) – (34,223 – 22,056), (38,586 – 24,867) – (36,789 – 23,710)

V0 = $\frac{5,400}{(1+ .102)^{1}}$ + $\frac{8,925}{(1+ .102)^{2}}$ + $\frac{11,871}{(1+ .102)^{3}}$ + $\frac{\frac{\left(11,871\right)(1+ .03)}{(.102-.03)}}{(1+ .102)^{3}}$ = 148,015.65

148,015.65 x 1,000 = 148,015,650

148,015,650 - 54,250,000 + 34,750,000 = CAD 128,515,650

2.

The earnings potential of the idle land is not included in the FCFF model since the land is not currently generating income for the company. An estimate of the land’s fair value must be added to the value of the business to compensate. This would apply to the FCFE method as well.

3.

Debt instruments usually trade in secondary markets that provide reliable measures of their market value. By valuing the firm from the perspective of both debt and equity holders using the FCFF method and then deducting the market value of debt, a more accurate measure of the value of the firm to equity holders is determined. Also, the weighted average cost of capital, which is the interest rate used to discount FCFF, is generally more stable than the cost of equity used in the FCFE model, providing a better measure of the value of the firm.

**Normalizing EPS**

1. (2.17 + 1.18 + .90 + 1.19 + .57 + 1.17) / 6 = 1.20

27.45 / 1.20 = 22.88

1. (.1270 + .1153 + .0745 + .1766 + .0855 + .1804) / 6 = .1266

(.1266) (14.29) = 1.81

27.45 / 1.81 = 15.17

1. Historical average ROE is more accurate because it better incorporates inflation and the growth of the company over the business cycle.

**Market Multiples Approach (P/E) at Regal**

1.

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Price ($)** | **Normalized Trailing EPS** | **P/E** |
| ABC | 56.67 | 3.14 | 18.05 |
| ACME | 45.91 | 2.09 | 21.97 |
| Widgets | 23.56 | 1.68 | 14.02 |
| Bloggins | 44.78 | 2.99 | 14.98 |
| Comparable Mean | 17.26 |

Average EPS

(5.10 + 4.21 + 2.34 + 1.67 + 2.55 + 3.21) / 6 = 3.18

Average ROE

(27.50 + 20.10 + 14.56 + 5.60 + 12.45 + 16.67) / 6 = 16.15

(.1615) (18.56) = 3.00

Regal

Average EPS = 35.56 / 3.18 = 11.18

Average ROE = 35.56 / 3.00 = 11.85

Recommendation

Buy Regal as its P/E is well below the peer group average of 17.26 under both approaches for calculating normalized trailing EPS. It is currently valued at CAD 35.56, but a more appropriate value may be CAD 51.78 (17.26 X CAD 3.00). CAD 3.00 was used instead of CAD 3.18 because it was calculated using average ROE ratios instead of average EPS.

1. Normalizing EPS helps to even out cyclical variations in earnings over a business cycle.

3.

* Comparable companies may not be very similar to Regal, even though they are in the same sub-industry.
* A sample size of only four companies may be insufficient to establish a reliable estimate.
* There could be a good reason for Regal’s lower P/E, such as higher risk or lower growth, so its share price may not move toward the peer group's average P/E over time.

**Historical Market Multiples Approach (P/E) at Lancaster**

1. (14.00 + 15.40 + 17.92 + 15.54 + 13.58) / 5 = 15.29

Based on Trailing EPS

P0 = (15.29) (4.10) = CAD 62.69

Based on Leading EPS

P0 = (15.29) (4.35) = CAD 66.51

Lancaster’s share, which currently trades at CAD 52.44, appears to be undervalued based on both trailing and leading EPS. Leading EPS likely provides the best estimate of the share’s fair value since it is forward-looking.

2.

This approach may be used if reliable market data is not available for comparable companies. This method should not be used if a firm’s business mix or level of financial or operational leverage has been altered, as past data will not be representative of future performance.