# Equity Securities

TOPIC 4: ESTIMATING SUSTAINABLE GROWTH

(LECTURE EXAMPLES & SOLUTIONS ONLY)

LA TROBE UNIVERSITY

Outcome 4.1

## Historical growth rates

- **Calculate the historical growth rate for GE**
- The first step is to calculate the return for each year

$$R_{1992} = \frac{0.41 - 0.42}{0.42} = -2.38\%$$

| Year | EPS | Return |
|---|---|---|
| 1991 | 0.42 | |
| 1992 | 0.41 | -2.38%- |
| 1993 | 0.40 | -2.44% |
| 1994 | 0.58 | 45.00% |
| 1995 | 0.65 | 12.07% |
| 1996 | 0.72 | 10.77% |
| 1997 | 0.82 | 13.89% |
| 1998 | 0.93 | 13.41% |
| 1999 | 1.07 | 15.05% |
| 2000 | 1.27 | 18.69% |



Outcome 4.1

## Historical growth rates

- **Calculate the historical growth rate for GE using**
  - **Arithmetic growth**

$$AA = \frac{\sum_{t=-n}^{t=-1} g_t}{n} = \frac{124.07\%}{9} = 13.78\%$$

| Year | EPS | Return |
|---|---|---|
| 1991 | 0.42 | |
| 1992 | 0.41 | -2.38%- |
| 1993 | 0.40 | -2.44% |
| 1994 | 0.58 | 45.00% |
| 1995 | 0.65 | 12.07% |
| 1996 | 0.72 | 10.77% |
| 1997 | 0.82 | 13.89% |
| 1998 | 0.93 | 13.41% |
| 1999 | 1.07 | 15.05% |
| 2000 | 1.27 | 18.69% |
| | Total | 124.07% |



Outcome 4.1

## Historical growth rates

- **Calculate the historical growth rate for GE using**
  - **Geometric growth**

$$GA = \left(\frac{E_0}{E_{-n}}\right)^{1/n} - 1 = \left(\frac{1.27}{0.42}\right)^{1/9} - 1 = 13.08\%$$

| Year | EPS |
|---|---|
| 1991 | 0.42 |
| 1992 | 0.41 |
| 1993 | 0.40 |
| 1994 | 0.58 |
| 1995 | 0.65 |
| 1996 | 0.72 |
| 1997 | 0.82 |
| 1998 | 0.93 |
| 1999 | 1.07 |
| 2000 | 1.27 |
| Average | 0.727 |



Outcome 4.1

## Historical growth rates

- **Calculate the historical growth rate for GE using**
  - **Linear regression**

$$EPS = 0.2033 + 0.0952t$$

$$\text{Average EPS} = \frac{0.0952}{0.727} = 13.10\%$$

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0.971993989 |
| R Square | 0.944772315 |
| Adjusted R Square | 0.937868854 |
| Standard Error | 0.073924614 |
| Observations | 10 |

ANOVA

| | *df* | *SS* |
|---|---|---|
| Regression | 1 | 0.747891212 |
| Residual | 8 | 0.043718788 |
| Total | 9 | 0.79161 |

| | *Coefficients* | *Standard Error* |
|---|---|---|
| Intercept | 0.203333333 | 0.050500125 |
| X Variable 1 | 0.095212121 | 0.008138832 |



Outcome 4.1

## Historical growth rates

- **Calculate the historical growth rate for GE using**
  - **Log-linear regression**

$$EPS = -1.1288 + 0.1335t$$

$$\text{Average EPS} = 13.35\%$$

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0.981089236 |
| R Square | 0.962536089 |
| Adjusted R Square | 0.9578531 |
| Standard Error | 0.084600498 |
| Observations | 10 |

ANOVA

| | *df* | *SS* |
|---|---|---|
| Regression | 1 | 1.471091645 |
| Residual | 8 | 0.057257954 |
| Total | 9 | 1.528349599 |

| | *Coefficients* | *Standard Error* |
|---|---|---|
| Intercept | -1.12881371 | 0.057793143 |
| X Variable 1 | 0.133534317 | 0.009314208 |

Outcome 4.1

## Historical growth rates

- Aracruz, a Brazilian paper and pulp manufacturer, reported a loss in EPS of -0.067 reals in 1998 and a profit of 0.065 reals in 1999
- **Estimate a 1999 growth rate for Aracruz**
- 1999 growth rate using:
  - actual values $g_{1999} = \frac{0.065 - (-0.067)}{-0.067} = -197\%$
  - positive values $g_{1999} = \frac{0.065 - (-0.067)}{0.065} = 203\%$
  - absolute values $g_{1999} = \frac{0.065 - (-0.067)}{0.067} = 192\%$



Outcome 4.2

## Growth in earnings per share

- In the year just ended, a company began with shareholder's equity of $1,000,000, earned $250,000 in net income and paid dividends of $100,000
- **Calculate the company's sustainable growth rate and demonstrate it's proof**

$$b = \frac{\text{Income} - \text{Dividends}}{\text{Income}} = \frac{250{,}000 - 100{,}000}{250{,}000} = 0.6$$

$$ROE = \frac{\text{Income}}{\text{Equity}} = \frac{250{,}000}{1{,}000{,}000} = 0.25$$

$$g = b \times ROE = 0.6 \times 0.25 = 0.15 = 15\%$$



Outcome 4.2

## Growth in earnings per share

- Baggai Enterprises has an ROA of 10%, retains 30% of earnings and has an equity multiplier of 1.25
- Mondale Enterprises also has an ROA of 10%, but it retains two-thirds of earnings and has an equity multiplier of 2.00
- **Calculate and compare the dividend growth rates of the two companies**

$$g_{j,t} = \text{Retention Ratio}_{j,t} \times \text{Profitability}_{j,t} \times \text{Efficiency}_{j,t} \times \text{Leverage}_{j,t}$$

- Baggai $g_{j,t} = 0.30 \times 0.10 \times 1.25 = 3.75\%$
- Mondale $g_{j,t} = 0.67 \times 0.10 \times 2.00 = 13.33\%$



Outcome 4.2

## Growth in earnings per share

- Dell Corporation (DELL) is not currently paying a dividend. It's historical ratios are shown below.

| Year | Profit Margin (%) | Asset Turnover (x) | Financial Leverage (x) |
|---|---|---|---|
| 2000 | 6.83 | 2.56 | 2.28 |
| 1999 | 6.60 | 2.75 | 2.41 |
| 1998 | 8.00 | 3.27 | 3.08 |

- You believe that these ratios are not sustainable. You estimate for the next ten years a margin of 5%, turnover of 2.5x and a leverage of 2.0x
- **Calculate Dell's sustainable growth rate for 10 years**

$$g_{j,t} = 1.00 \times 0.05 \times 2.50 \times 2.00 = 25\%$$



Outcome 4.2

## Growth in earnings per share

- After 10 years you estimate Dell's ratios will revert to industry averages; i.e. a margin of 4.5% reflecting declining margins in the industry, turnover of 1.5x, closer to industry efficiency, and leverage of 2.0x, a modest reduction from recent levels
- You also believe that as a mature company it will need to offer a dividend payout ratio of 15%
- DELL's trailing EPS is $0.76, and you estimate its beta at 1.45
- The risk-free rate is 5.0% and the equity risk premium is 5.7%
- **Calculate a value for DELL based on an appropriate DDM valuation model**



Outcome 4.2

## Growth in earnings per share

- Long-term sustainable growth rate

$$g_{j,t} = \text{Retention Ratio}_{j,t} \times \text{Profitability}_{j,t} \times \text{Efficiency}_{j,t} \times \text{Leverage}_{j,t}$$
$$= 0.85 \times 0.045 \times 1.50 \times 2.00 = 11.48\%$$

- Required rate of return

$$E(R_i) = R_f + \beta_i \left[ E(R_M) - R_f \right]$$
$$= 0.05 + 1.45(0.057) = 0.133 = 13.3\%$$

Outcome 4.2

## Growth in earnings per share

- Forecast Year 11 dividend is given by
  - Current EPS
  - Which grows for 10 years at the 10-year growth rate
  - And then grows for 1 year at the long-term growth rate
  - Multiplied by the dividend payout ratio

$$EPS_{11} = \$0.76 \times (1+0.25)^{10} \times (1+0.1148) \times 0.15 = \$1.18$$

- Value of Dell at Year 0 (using the Gordon Growth Model)

$$V_0 = \frac{1.18}{0.133 - 0.1148} \times \frac{1}{(1+0.133)^{10}} = \$18.60$$

Slides drafted by Wilson Toh, La Trobe School of Economics & Finance based on Damodaran (2002).

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