

Problem Set

PROBLEM SET: Summarizing Valuation

Exercise 1.

FCF estimation [4]

You are given the following information about a corporation.

The tax on EBITA for 2011 is 20, the amount of necessary cash as a percentage of sales is 2%, and from the income statement and the balance sheet we have

Statement of income

	2010	2011
Sales	250	300
Operating expenses (excluding depreciations)	180	200
Depreciations	45	50
Interest expenses	250	250
Provision for income taxes	10	12
Dividends	30	35
Capital Expenditures	45	50

Consolidated Balance Sheet

	2010	2011
Cash and marketable securities	20	25
Accounts receivables	20	22
Inventory	15	5
Accounts payable	3	6
Taxes Payable	40	60
Debt (book value)	100	100
Common equity (book value)	100	150

1. Compute the Free Cash Flow for year 2011
2. Compute Net Income and reconcile Net Income to NOPLAT.

Exercise 2.

Terminal Value [1]

The terminal value in a capital budgeting project is generally much lower than the initial investment. The terminal price in a stock valuation is generally much higher than the initial investment. How would you explain the difference?

Exercise 3.

AMR [4]

Amarindo, Inc (AMR), is a newly public firm with 10 million shares outstanding. You are doing a valuation analysis of AMR. You estimate its free cash flow in the coming year to be \$15 million, and you expect the firm's free cash flows to grow by 4% per year in subsequent years. Because the firm has only been listed on the stock exchange for a short time, you do not have an accurate assessment of AMR's equity beta. However, you do have beta data for UAL, another firm in the same industry

UAL	
Equity Beta	1.6
Debt Beta	0.3
Debt/Equity Ratio	1

AMR has a much lower debt-equity ratio of 0.30, which is expected to remain stable, and its debt is risk free. AMR's corporate tax rate is 40%, the risk-free rate is 5%, and the expected return on the market portfolio is 11%.

1. Estimate AMR's equity cost of capital
2. Estimate AMR's share price

Exercise 4.

Red Cat [5]

Red Cat Inc. is a non-listed company that has expected perpetual Free Cash Flow of \$8 million per year. Red Cat has issued a perpetual bond with face value of \$50 million and annual coupon of 5.2632%. The debt-to-equity ratio for Red Cat is 1.0. Red Cat has 4 million common shares outstanding. An industry analyst has collected the following information about traded comparables:

Traded comparable	Stock beta (β_E)	Debt-to-equity ratio (D/E)
Green Cat	1.105	0.5
Yellow Cat	1.440	1.0
Black Cat	1.520	1.0

The cost of debt for Red Cat and the comparable firms is 5% annually. The market risk premium and the risk free rate is also 5% per year. The tax rate is 40%

1. Estimate the value of common equity for Red Cat using the Adjusted Present Value approach.
2. Estimate the value of common equity for Red Cat using the Total Enterprise Value (WACC) approach.
3. Red Cat currently has one owner. This owner plans to sell out 20% of the equity in Red Cat. What would you be willing to pay for a stock in Red Cat?

Exercise 5.

Comparables [3]

You have the following information for a company you are valuing and for a comparable company:

Comparable company:

Stock Price	23.45
Number of Shares outstanding	6.23 mill
Value of debt	18.45 mill
Est EBITDA next year	17 mill
Est income next year	5.3 mill

Company you are valuing

Value of debt	3.68 mill
Est EBITDA next year	4.4 mill
Est income next year	1.5 mill

Estimate the enterprise value of the company you are evaluating using the P/E and enterprise value/EBITDA multiples.

Exercise 6.

Chrysler [3]

It is 4 April 2007, and your company is considering the possibility of purchasing the Chrysler automobile manufacturing business from the German car manufacturer DaimlerChrysler. DaimlerChrysler has hinted that it might be interested in selling Chrysler. Since Chrysler does not have publicly traded shares of its own, you have decided to use Ford Motor Company as a comparable company to help you determine the market value of Chrysler.

This morning, Ford's shares were trading at \$8.15 and the company had 1.89 billion shares outstanding. You estimate that the market value of all the company's other outstanding securities (excluding the ordinary shares but including special shares owned by the Ford family) is \$100 billion and that its revenues from auto sales were \$143.3 billion last year.

Chrysler's revenue in 2006 was \$62.2 billion.

Based on the enterprise value/revenue ratio, what is the total value of Chrysler that is implied by the Ford market values?

Exercise 7.

Google [2]

Your boss has asked you to estimate the intrinsic value of the equity for Google, which does not currently pay any dividends. In your valuation you are trying to choose between the free cash flow to equity (FCFE) approach and the Dividend Discount Model (DDM) approach. Which would be more appropriate in this instance? Why? What concerns would you have in applying either of these valuation approaches to a company such as this?

Exercise 8.

Changing Valuation? [2]

You have just received a business valuation report that is dated six months ago. Discuss the factors that might have changed during the past six months and, therefore, caused the value of the business today to be different from the value six months ago. Which of these changes affect the expected cash flows and which affect the discount rate that you would use in a discounted cash flow valuation of this company?

Exercise 9.

Control [2]

Does the expected rate of return that is calculated using CAPM, with a beta estimated from the return on shares in the public market, reflect a minority or a controlling ownership position? How is it likely to differ between a minority and a controlling position?

Exercise 10.

WWM [3]

You are hired by the CEO of World Wide Movers, a company specialized in relocating families and businesses world wide, as a strategy consultant. In the past, World Wide Movers got help from another group of consultants to formulate a strategy that would help the company to grow their top line at double digits annually. Although World Wide Movers were able to follow the advice and succeeded to grow the company – their stock price moved very little. In fact, the stock price of World Wide Movers has been lagging the stock price of their main competitors – even if these companies has been growing far less than World Wide Movers.

Explain to the CEO of World Wide Movers why growing more than their competitors does not automatically create shareholder value.

Exercise 11.

Short Answers - Valuation [1]

Short answers

1. In valuations, what is the most important insight from sensitivity analysis?

Solutions

PROBLEM SET: Summarizing Valuation

Solution to Exercise 1.

FCF estimation [4]

1. Computing the Free Cash Flow for year 2011

Sales	300
Costs	-200
Depreciation	-50
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EBITA	50
Taxes on EBITA	-20
Changes in taxes payable	20
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NOPLAT	50
Depreciation	50
Increase in A/R	-2
Increase in inventories	10
Increase in A/P	3
Increase in necessary cash	-1
Capex	-50
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FCF	60

2. Computing Net Income and reconciling Net Income to NOPLAT.

Note here that clearly all the interest expenses can not be used to reduce taxable income, since the amount set aside for taxes in 2007 is 12.

We calculated EBITA as 50. The taxes on EBITA is 20, hence the tax rate is $\frac{20}{50} = 40\%$.

Given that the taxes are estimated as 12, EBT must have been 30.

Sales	300
Operating expenses	-200
Depreciation	-50
Interest expenses	-20
EBT	30
Taxes	-12
Net Income	18
Decrease in taxes payable	20
Interest after taxes	12
NOPLAT	50

Solution to Exercise 2.

Terminal Value [1]

A capital budgeting project generally has a finite life. Consequently it loses value over time. A stock has an infinite life. It generally increases in value over time, both as a consequence of inflation and real growth.

Solution to Exercise 3.

AMR [4]

1. Estimate AMR's equity cost of capital

UAL

$$r_E = 0.05 + 1.6(0.11 - 0.05) = 14.6\%$$

$$r_D = 0.05 + 0.3(0.11 - 0.05) = 6.8\%$$

Unlevered cost of equity

$$r^* = 0.5r_E + 0.5r_D = 0.5 \cdot 0.068 + 0.5 \cdot 0.146 = 10.7\%$$

AMR

$$r_D = 0.05$$

$$D/E = 0.3$$

$$\frac{E}{E+D} = \frac{1}{1 + \frac{D}{E}} = 0.769$$

$$r^* = 0.107 = (1 - 0.769)r_D + 0.769r_E$$

$$r_E = \frac{0.107 - (1 - 0.769)0.05}{0.769} = 0.1241 = \underline{12.41\%}$$

One can alternatively work with betas:

UAL unlevered beta

$$\beta = 0.5 \cdot 1.6 + 0.5 \cdot 0.3 = 0.95$$

Equity beta AMR

$$0.95 = (1 - 0.769) \cdot 0 + 0.769 \cdot \beta_E$$

$$\beta_E = \frac{0.95}{0.796} = 1.193$$

$$r_E = 0.05 + 1.193 \times 0.06 = 12.16\%$$

(Some roundoff error to be expected)

2. Estimate AMR's share price

$$WACC = (1 - 0.769)(1 - \tau)r_D + 0.769r_E$$

$$WACC = (1 - 0.769)(1 - 0.4)0.05 + 0.769 \cdot 0.1241 = 0.10238$$

Value of firm

$$\text{Value} = \frac{15}{0.10238 - 0.04} = 240.46$$

Subtract debt

$$\text{Equity value} = 0.796 \cdot 240.46 = 191.41$$

Divide by number of shares outstanding of 10 million, share price is 19.14.

Solution to Exercise 4.

Red Cat [5]

1. APV calculation

Traded comparable	Stock beta (β_E)	Debt-to-equity ratio (D/E)	Unlevered beta
Green Cat	1.105	0.5	0.85
Yellow Cat	1.440	1.0	0.9
Black Cat	1.520	1.0	0.95
Average			0.90

The unlevered cost of equity:

$$r = r_f + \beta_U(\text{Market Risk Premium}) = 0.05 + 0.9 \times 0.05 = 0.095$$

Value of debt

$$D = \frac{0.052632 \times 50}{0.05} = 52.63 \text{mill}$$

Enterprise value

$$TEV = \frac{FCF}{r_U} + \tau D = \frac{8}{0.095} + 0.4 \cdot 52.63 = 105.26 \text{mill}$$

Value of equity

$$E = TEV - D = 105.26 - 52.63 = \underline{52.63 \text{mill}}$$

2. WACC calculation

Levered beta

$$\beta_E = \left(1 - (1 - \tau) \frac{D}{E}\right) \tau = (1 - (1 - 0.4)1.0)0.9 = 1.44$$

Levered cost of equity

$$r_E = r_f + \beta_E(E[r_m] - r_f) = 0.05 + 1.44 \times 0.05 = 0.122$$

The WACC

$$WACC = 0.5 \cdot 0.122 + 0.5(1 - 0.5)0.05 = 0.076$$

Enterprise value

$$TEV = \frac{FCF}{WACC} = \frac{8}{0.076} = 105.25 \text{mill}$$

Value of equity

$$E = TEV - D = 105.26 - 52.63 = 52.63 \text{mill}$$

3. Per share value of Red Cat assuming it was liquid and listed on a stock exchange is

$$P_a = \frac{52.63}{4} = 13.16$$

Since the stock will be non-listed, you should demand a discount of 15 to 20 percent. Let us say 15%.

$$P_b = P_a(1 - 0.15) = 11.18$$

Maybe you would also like to negotiate a discount to reflect the fact that the current owner will have control, say 5%.

$$P_C = P_b(1 - 0.05) = 10.62$$

In sum, you should demand a discount to reflect the illiquidity of the stock and the control held by the majority owner.

Solution to Exercise 5.

Comparables [3]

$$\begin{aligned} \left(\frac{P}{E}\right)_{\text{comparable}} &= \left(\frac{\text{Share price}}{\text{Earnings per share}}\right)_{\text{comparable}} \\ &= \frac{23.45}{5.3/6.23 \text{ shares}} = 27.6 \\ \left(\frac{\text{Enterprise value}}{EBITDA}\right)_{\text{comparable}} &= \left(\frac{V_D + V_E}{EBITDA}\right)_{\text{comp}} \\ &= \frac{\text{€}18.45 + (\text{€}23.45 \times 6.23 \text{ shares})}{\text{€}17.0} = 9.68 \end{aligned}$$

Using the P/E multiple, we can calculate the value of the equity as

$$E = \left(\frac{P}{E}\right)_{\text{comparable}} \times \text{Net Income} = 27.6 \times \text{€}1.5 \text{ mill} = \text{€}41.4 \text{ mill}$$

This suggests an enterprise value of (mill)

$$V = E + D = 41.4 + 3.68 = 45.08$$

Using the enterprise/EBITDA multiple, we obtain

$$\left(\frac{\text{Enterprise value}}{EBITDA}\right)_{\text{comparable}} \times EBITDA = 9.68 \times \text{€}4.4 \text{ mill} = \text{€}52.59 \text{ mill.}$$

Solution to Exercise 6.

Chrysler [3]

Need to calculate this as a ratio.

From Ford, Enterprise Value/Revenue:

Equity mkt value = 8.15×1.89 bill = 15.4 bill.

Enterprise Value = Equity mkt value + \$ 100 bill = 115.4 bill

Revenue 143.3 bill

Enterprise Value / Revenue = $115.4/143.3 = 0.805$.

Assume Chrysler has same Enterprise Value / Revenue Ratio:

$0.805 = \text{Enterprise Value Chrysler} / \text{Revenue Chrysler}$:

$0.805 = \text{Enterprise Value Chrysler} / 62.2$

Enterprise Value Chrysler = $0.805 \times 62.2 = 50$ bill.

Solution to Exercise 7.

Google [2]

Need to use FCFE, discounting dividends are not particularly useful if they are currently zero.

However, Google is a challenging company to value, not that likely that they will settle down to a relatively predictable future cash flows.

Can alternatively think in terms of options, Google as a collection of ideas (patents), some of which will results in large values.

Solution to Exercise 8.

Changing Valuation? [2]

Lots of things can have changed

- Business outlook, affecting cash flow estimates
- Interest rates, eg risk free rate, affecting cost of capital
- Systematic risk (beta), affecting cost of capital

Solution to Exercise 9.

Control [2]

The estimate is for the minority position.

The controlling position is likely to also include a *control premium*.

Solution to Exercise 10.

WWM [3]

The main point is that growing the company will not create value unless ROIC is greater than the cost of capital.

The following frameworks make this point in a simple way:

1. Economic Profit (The McKinsey book)

$$\begin{aligned} \text{Economic Profit} &= \text{Invested capital} \times (\text{ROIC} - \text{WACC}) \\ &= \text{NOPLAT} - \text{Invested Capital} \times \text{WACC} \end{aligned}$$

2. Economic value added (Stern Stewart & Co)

$$\text{EVA} = \text{NOPAT} - \text{Capital} \times \text{Cost of Capital}$$

Solution to Exercise 11.

Short Answers - Valuation [1]

1. Understanding value drivers.