Problem Set

PROBLEM SET: Summarizing Valuation

Exercise 1.

A company named Magne Jernilden ASA is evaluating a move to a new location. The local community is offering a sweetener to encourage the move. The local community is offering Magne Jernilden ASA a 5 year, zero coupon, interest free loan of kr 5 million. Magne Jernilden ASA is paying 10% interest on its current debt.

What is the value to Magne Jernilden ASA of the offer made by the local community?

1. kr 0
2. kr 0,2 million
3. kr 0,5 million
4. kr 1,9 million
5. I choose not to answer.

Exercise 2.

Omicron [3]

You are given the following information about Omicron Industries (Market values in $millions)

Assets		Liabilities		Cost of Capital	
Cash	0	Debt	200	Debt	6%
Other Assets	500	Equity	300	Equity	12%

Omicron's tax rate (τ_c) is 21%.

Omicron is considering a project with the following Free Cash Flows (Millions)

Year	0	1	2	3
Free Cash Flows	($100)	$40	$50	$60

Assume that this new project is of average risk for Omicron and that the firm wants to hold constant its debt to equity ratio.

1. Find Omicron's weighted average cost of capital.
2. Find the NPV for Omicron's new project.
3. Find the debt capacity for Omicron's new project in year 0.

Exercise 3.

Household products [4]

Your firm is considering expanding its household products division. You identify Proctor & Gramble as a firm with comparable investments. Suppose PG's equity has a market capitalization of $144 billion and a beta of 0.55. PG also has $37 billion of AA rated debt outstanding, with an average yield of 3.1%. The current risk free interest rate is 3%. You have evaluated the current market risk premium to be 5%.

Your firm is an all-equity firm. What cost of capital should you use in evaluating the investment in the household products division?

Exercise 4.

Divisional WACC usage [5]

Explain how a firm might use a divisional WACC (a separate WACC for each division) approach to avoid overinvesting in divisions with more risky projects and underinvesting in divisions with less risky projects.

Exercise 5.

Ratios [5]

1. Parry Electronics is a regional electronics wholesaler and distributor which earned $1,250,000 in EBITDA this year based on revenues of $4,000,000. The enterprise values of publicly traded firms that operate in the same industry currently are valued at 5-6 times their current EBITDA. What is your estimate of the enterprise value of Parry Electronics?

   If Parry is small relative to the size of the comparison firms with assets only one-tenth the size of the largest firm in the industry, how would this influence your valuation estimate? Explain.

2. In the tech sector, the price of an IPO is often stated as a multiple of its sales, which is then compared to the price/sales ratio of comparable firms. Why do you think that analysts use price/sales ratios in this setting rather than price/earnings ratios?

Exercise 6.

Google [30]

Google Inc. of Mountain View, California, operates the most popular and powerful search engine on the Web. The company went public using an unconventional Dutch auction method on August 19, 2004. The resulting IPO was the largest Internet IPO ever, raising $1.67 billion and leaving the firm with 271,219,643 shares of common stock.

	Earthlink	Yahoo	eBay	Microsoft
Financial Information	ELNK	YHOO	EBAY	MSFT
2003 Shares Outstanding(thousands)	159 399	655 602	646 819	10 800 000
2003 Fiscal Close Stock Price	$ 10.00	$ 45.03	$ 64.61	$ 25.64
Market Capitalization(mill)	$ 1 594	$ 29 521	$ 41 790	$ 276 912
Short Term Debt (thousands)	$ 900	$ 0	$ 2 800	$ 0
Long Term Debt (thousands)	$ 0	$ 750 000	$ 124 500	$ 0
Cash & Equivalents (thousands)	$ 349 740	$ 713 539	$ 1 381 513	$ 6 438 000
Short Term Investments (thousands)	$ 89 088	$ 595 975	$ 340 576	$ 42 610 000
EBITDA (thousands)	$ 218 100	$ 455 300	$ 818 200	$ 14 656 000
Net Income (thousands)	$ (62 200)	$ 237 900	$ 441 800	$ 9 993 000
Calculated EPS	(0.39)	0.36	0.68	0.93

While Google commands a wide lead over its competitors in the search engine market, it is witnessing increased pressure from well-funded rival entities. Yahoo! Inc., with a market cap of approximately $38.43 billion, is generally regarded as following a business model very similar to Google's.

1. Use the data found in the Exhibit for the following companies as comparables in your analysis: Earthlink, Yahoo!, eBay and Microsoft. Compute the IPO value of Google shares using each of the comparable firms separately, and then use an average "multiple" of the comparable firms to do the analysis. Assume that Google's forecasted values at the time of the IPO are as follows: Net income is $400 million, EBITDA is approximately $800 million, cash and equivalents are $430 million, and interest-bearing debt (total short-term and long-term) equals only $10 million.

2. Which of the four comparable firms do you think is the best comparison firm for Google? Why?

Exercise 7.

Investments [2]

Evaluate, by designing as price up, price down, no effect or impossible to tell, the effects of the following investment decisions on stock prices:

1. A stable company with no growth opportunities takes a project with a NPV of $100 million.
2. A growth company (e.g., Microsoft) takes a project with an NPV of $100 million
3. A company takes on a project with a NPV of negative $100 million.
4. A company announces an acquisition of a target firm for $500 million (the true value of the firm is only $350 million.)
5. A company announces that it will be investing excess cash in treasury bonds.

Exercise 8.

PG [3]

Prokter and Gramble (PG) has historically maintained a debt-equity ratio of approximately 0.20. Its current stock price is $50 per share, with 2.5 billion shares outstanding. The firm enjoys very stable demand for its products, and consequently it has a low equity beta of 0.50 and can borrow at 4.20%, just 20 basis points over the risk free rate of 4%. The expected return on the market is 10%, and PG's tax rate is 35%.

(a) This year, PG is expected to have free cash flows of $6.0 billion. What constant expected growth rate of free cash flow is consistent with its current stock price?

Exercise 9.

Terminal Value [4]

Terminal value refers to the valuation attached to the end of the planning period and that captures the value of all subsequent cash flows.

Estimate the value today for each of the following sets of future cash flow forecasts:

(a) Claymore Mining Company anticipates that it will earn firm free cash flow (FCFs) of $4 million per year for each of the next five years. Moreover, beginning in year 6, the firm will earn FCF of $5 million per year for the indefinite future. If Claymore's cost of capital is 10%, what is the value of the firm's future cash flows?

(b) Shameless Commerce Inc has no outstanding debt and is being evaluated as a possible acquisition. Shameless's FCFs for the next five years are projected to be $1 million per year, and, beginning in year 6, the cash flows are expected to begin growing at the anticipated rate of inflation, which is currently 3% per annum. If the cost of capital for Shameless is 10%, what is your estimate of the present value of the FCFs?

Exercise 10.

MS [3]

In early 2018, Microsoft Corporation had a market capitalization of $716 billion, $89 billion in debt, and $133 billion in cash. If its estimated equity beta was 1.04, estimate the beta of Microsoft's underlying business enterprise.

Exercise 11.

Cash [3]

Most firms, private and public, have assets on their books that can be considered to be non-operating assets. The first and most obvious example of such assets is cash and near-cash investments – investments in risk-less or very low-risk investments that most companies with large cash balances make.

1. Discuss how these type of holdings are treated in valuations.

2. Specifically, some of these holdings are in the form of marketable financial assets, such as corporate bonds. How does one treat holdings of corporate bonds in terms of valuation?

Exercise 12.

Occidental Petroleum [5]

Occidental Petroleum produces and markets crude oil. The following are selected numbers from the financial statements for 1992 and 1993 (in millions).

	1992	1993
Revenues	8,494.0	9,000.0
(less) Operating Expenses	(6,424.0)	(6,970.0)
(less) Depreciation	(872.0)	(860)
EBIT	1,198.0	1,170.0
(less) Interest Expenses	(510.0)	(515.0)
(less) Taxes	(362,0)	(420.0)
Net Income	326.0	235.0
Working Capital	(45.0)	(50.0)
Total Debt	5.4 billion	5.0 billion

The firm has capital expenditures of 950 million in 1992 and 1 billion in 1993. The working capital in 1991 was 190 million, and the total debt outstanding in 1991 was 5.75 billion. There were 305 million shares outstanding, trading at $21 per share.

(a) Estimate the cash flows to equity in 1992 and 1993.

(b) Estimate the cash flows to the firm in 1992 and 1993.

Exercise 13.

Morgan Indus [5]

Consider an investment opportunity available to Morgan Industries (Morgan), a hypothetical firm. The firm can make an investment in equipment to produce a new product line. The equipment will last for three years. At that time, Morgan can decide whether to continue, change, or end the product line. Thus the decision horizon is three years. The investment will be assumed to occur at the end of the current year, with sales beginning next year. The investment will be fully depreciated over the three years, even though Morgan believes the equipment will have some economic value (salvage value) at the end of the decision horizon. The specific assumed values for this investment are summarized in Table 1.

Table 1. Morgan's new product line investment summary.

Initial investment	180,000
Salvage value	20,000
Fixed annual cash operating expenses	55,000
Revenue in the first year	400,000
Cash variable expenses (% of revenue)	70%
Working capital needs (% of revenue)	10%
Growth rate of sales	15%
Tax rate	25%

1. Calculate the Free Cash Flow for this investment

Exercise 14.

A corporation's Annual Report contains the following information:

Sales: 2,000,000 kr.
Variable costs: 850,000 kr.
Overhead costs: 395,000 kr.
Depreciation: 248,000 kr.
Corporate tax rate: 34%

Calculate the corporation's after-tax cash flows

1. 582,620 kr.
2. 724,620 kr.
3. 755,000 kr.
4. 977,620 kr.
5. I choose not to answer.

Exercise 15.

Savile [5]

Savile Investors is evaluating the purchase of an apartment complex which will require a total outlay of $4,000,000. Ninety percent of the outlay will be financed by a 5-year loan at 12% that requires annual interest payments. The principal will be paid off in five equal increments beginning at time $t = 1$. The net after-tax operating cash flows are estimated to be $900,000 in the first year and $1,100,000 in each of the next 4 years. Savile estimates it needs a 20% return on the investment. Its tax rate is 40%.

Using flow-to-equity (FTE), should Savile make the investment?

Exercise 16.

Company Value [4]

You are valuing a company using the WACC approach and have estimated that the free cash flows from the firm (FCFF) in the next years will be €36.7, €42.6, €45.1, €46.3 and €46.6 million, respectively. Beginning in year 6, you expect the cash flows to decrease at a rate of 3% per year for the indefinite future. You estimate that the appropriate WACC to use in discounting these cash flows is 10%. What is the value of the company?

Exercise 17.

Santa Fe Pacific [8]

Santa Fe Pacific, a major rail operator with diversified operations, had earnings before interest, taxes and depreciation, of $637 million in 1993, with depreciation amounting to $235 million (offset by capital expenditure of an equivalent amount). The firm is in steady state and expected to grow 6% a year in perpetuity. Santa Fe Pacific had a beta of 1.25 in 1993 and debt outstanding of $1.34 billion. The stock price was $18.25 at the end of 1993, and there were 183.1 million shares outstanding. The expected ratings and the cost of debt at different levels of debt for Santa Fe are shown in the following table. The treasury bond rate is 7%, and the firm faced a tax rate of 40%.

$\frac{D}{D+E}$	Rating	Cost of Debt (pre-tax)
0%	AAA	6.23%
10%	AAA	6.23%
20%	A+	6.93%
30%	A-	7.43%
40%	BB	8.43%
50%	B+	8.93%
60%	B-	10.93%
70%	CCC	11.93%
80%	CCC	11.93%
90%	CC	13.43%

The earnings before interest and taxes are expected to grow 3% a year in perpetuity, with capital expenditures offset by depreciation. (The tax rate is 40% and the treasury bond rate is 7%.)

1. Estimate the cost of capital (WACC) at the current debt ratio.
2. Estimate the cost of capital (WACC) at a debt ratio of 50%.
3. Estimate the value of the firm at the above two debt ratios.

Exercise 18.

Repurchases. [2]

In recent years firms has been engaging in stock repurchases, ie. that the firm buys back its own shares. Should one account for such practices in a firm valuation? If we should, where would one modify the typical firm valuation analysis?

Exercise 19.

True/False [5]

For each of the following statements, state whether it is true or false. If you say it is false, also indicate *why* it is false, in one or two sentences.

1. The Adjusted Present Value (APV) method discounts the Free Cash Flow to the firm at the (levered) equity cost of capital.
2. The Flow to Equity method discounts the Free Cash Flow to Equity at the (levered) equity cost of capital.
3. In theory, APV, FTE and WACC will all give the same present value, but in practice one will often find different present values.
4. Valuation is the estimation of the market value of an asset/firm. When one values a company, the valuation of its equity should equal the market value of shares outstanding.
5. For firms listed on stock exchanges one can estimate the beta risk of the company directly from historical stock returns for the stock.

Exercise 20.

Short Answers [3]

Short answer questions

(a) When we estimate the firm's cost of capital, we typically first estimate the equity cost of capital by finding a relevant beta. If a firm is traded on a stock exchange we use historical data on returns to estimate beta. What do we do if the firm's stock is not traded on an exchange?

(b) How do we estimate the market value of a company's debt?

(c) In doing comparables analysis, one have to select a set of comparable companies. What was the trade-off between a large versus a small number of comparable companies?

(d) Firms do at times repurchase shares. How do such repurchases affect corporate valuations?

(e) There are various beta adjustments proposed in the literature, such as the BARRA and Bloomberg adjustments. What underlying problem(s) are such methods meant to address?

(f) A company's *hurdle* rate is the cost of capital used to value the company. What types of investments can be evaluated using the company's current hurdle rate?

Exercise 21.

Roofing [4]

You own a business that specializes in designing and producing roofs for houses in central Spain. Your annual costs include office rent of €14 400, salaries for four designing engineers of €240 000, design software costs of €12 000 and other overhead costs of €3000. An average roof in the region is priced at €3500. It costs €1200 in raw material, €1100 in labor and €100 in other expenses (for example, purchasing building permits.) The effective tax rate for your business last year was 20%.

(a) What is the minimum number of roofs you need to sell to earn a profit?

Exercise 22.

Liquidity [2]

In some valuation settings one discusses a *liquidity premium*.

(a) What motivation does one typically see for discussing liquidity?

(a) For what types of companies is it most relevant to discuss liquidity?