**Problem Set**

PROBLEM SET: Summarizing Valuation

**Exercise 1.**

*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 2.**

*Bubba* [3]

Bubba Ho-Tep Company reported net income of $300 million for the most recent fiscal year. The firm had depreciation expenses of $125 million and capital expenditures of $150 million. Although they had no interest expense, the firm did have an increase in net working capital of $20 million.

1. What is Bubba Ho-Tep's free cash flow?

**Exercise 3.**

*EMR* [2]

At the end of fiscal year 2014, Emerson Electric Co. (EMR) has net property, plant and equipment equal to $3.5 billion. The ending balance for 2013 was $3.507 billion, and the firm had depreciation expense during 2014 equal to $0.727 billion.

1. How much did the company spend on new property, plant and equipment during 2014?

**Exercise 4.**

*South Tel* [5]

South Tel communications is considering the purchase of a new software management system. The system is called B-image and it is expected to reduce drastically the amount of time that company technicians spend installing new software. South Tel's technicians currently spend 6,000 hours per year on installations, which costs South Tel $25 per hour. The owners of the B-image system claim that their software can reduce time on task by a least 25%. The system requires an initial investment of $55,000 and an additional investment of $10,000 for technician training on the new system. Annual upgrades will cost the firm $15,000 per year. The tax treatment of software purchases sometimes calls for amortization of the initial cost over time; sometimes the cost can be expensed in the year of the purchase. Before the tax experts are consulted and for purposes of this initial analysis, South Tel faces a 30% tax rate and uses a 9% cost of capital to evaluate projects of this type.

1. Assume that South Tel has sufficient taxable income from other projects so that it can expense the cost of the software immediately. What are the free cash flows for the project for years zero and one?

**Exercise 5.**

*Growth in earnings* [2.5]

You are trying to estimate the growth rate in earnings per share at Time Warner from 1996 to 1997. In 1996, the earnings per share was a deficit of $0.05. In 1997, the expected earnings per share is $0.25. What is the growth rate?

- $-600\%$
- $+600\%$

- $+120\%$
- Cannot be estimated

**Exercise 6.**

*Long Term Growth Rate* [2.5]

A common estimate for the long term growth rate (the growth rate beyond the horizon) is the nominal GDP growth rate. Why is this a common choice?

**Exercise 7.**

*Growth estimation* [1]

Consider estimating growth from fundamentals for Deutsche Bank. In 2007, Deutsche Bank reported net income of 6.51 billion euros on a book value of equity of 33,475 billion euros at the start of the year (end of 2006). The resulting return on equity is 19.45%.

$$\text{Return on Equity} = \frac{\text{Net Income}_{2007}}{\text{Book value of equity}_{2006}} = 19.45\%$$

In 2007, Deutsche Bank paid out 2.146 billion euros to equity investors. The resulting retention ratio is 67.03%

$$\text{Retention ratio} = 1 - \frac{\text{Dividends}}{\text{Net Income}} = 1 - \frac{2.146}{6.510} = 67.03\%.$$

1. Find an estimated growth rate for Deutsche Bank.

**Exercise 8.**

*Apple's Cash Pile* [2]

In class we discussed the cash holdings of Apple, Inc, the US tech firm.

In accounting terms, the working capital is the difference between current assets (inventory, cash and accounts receivable) and current liabilities (accounts payables, short term debt and debt due within the next year)

A cleaner definition of working capital from a cash flow perspective is the difference between non-cash current assets (inventory and accounts receivable) and non-debt current liabilities (accounts payable).

How do you match this last definition with the cash pile of Apple?

**Exercise 9.**

[3]

In order to value a project which is not scale enhancing you need to:

(a) Typically calculate the equity cost of capital using the risk adjusted beta of another firm in the industry before calculating the WACC.

(b) Typically increase the beta of another firm in the same line of business and then calculate the discount rate using the SML.

(c) Typically you can simply apply your current cost of capital.

(d) Discount at the market rate of return since the project will diversify the firm to the market.

(e) I choose not to answer.

**Exercise 10.**

*Intrinsic Valuation* [2]

Damodaran distinguishes three types of valuation

- "In intrinsic valuation, you value a business based upon the cash flows you expect that business to generate over time.
- In relative valuation, you value a business based upon how similar businesses are priced.
- In asset based valuation, you value a business by valuing its individual assets. These individual assets can be tangible or intangible."

Which of these approaches are most approproate when splitting up or liquidating a company?

**Exercise 11.**

*The Chef's Choice* [3]

Assume that you have been asked to value a upscale French restaurant for sale by the owner (who also happens to be the chef). Both the restaurant and the chef are well regarded, and business has been good for the last 3 years.

The potential buyer is a former investment banker, who tired of the rat race, has decide to cash out all of his savings and use the entire amount to invest in the restaurant.

You have access to the financial statements for the last 3 years for the restaurant. In the most recent year, the restaurant reported $ 1.2 million in revenues and $ 400,000 in pre-tax operating profit . While the firm has no conventional debt outstanding, it has a lease commitment of $120,000 each year for the next 12 years.

Suppose you use the above information as basis for forecasts, together with risk estimates, to do a valuation, and then is told that part of the draw of the restaurant comes from the current chef. It is possible (and probable) that if the chef moves on, there will be a drop in interest from customers.

1. Will this information lead to a change in valuation?

**Exercise 12.**

*Transaction costs* [2]

Consider the following quote

> "If you buy stock in a publicly traded firm and then change your mind and decide to sell, you face modest transaction costs. If you buy a private business and change your mind, it is far more difficult to reverse your decision."

1. Is this correct?
2. If it is, how can one account for this issue in valuations?

**Exercise 13.**

*Choice of horizon in valuation* [2]

Assume that you are analyzing two firms, both of which are enjoying high growth. The first firm is Earthlink Network, an Internet service provider, which operates in an environment with few barriers to entry and extraordinary competition. The second firm is Biogen, a biotechnology firm that is enjoying growth from two drugs for which it owns patents for the next decade. Assuming that both firms are well managed, which of the two firms would you expect to have a longer high-growth period? (Justify your answer)

1. Earthlink Network
2. Biogen
3. Both are well-managed and should have the same high-growth period.

**Exercise 14.**

*Growth Rates* [2]

The growth rates from historical earnings, analysts projections, and fundamentals, can often be very different. The differences can be best explained by which of the following statements

(a) The past is not always a good indicator of the future.

(b) Analysts are biased toward making optimistic estimates of growth.

(c) The inputs used to estimate fundamental growth reflect what happened last year rather than what we expect will happen in the future.

(d) All of the above.

**Exercise 15.**

*Short answer questions* [3]

For each of the below questions, give a short answer.

1. Suppose the firm you are valuing for the last two years have had negative EBIT. Should you use these as the basis for projecting the future earnings of the firm?
2. What are the two most typical methods for estimating a terminal value (horizon value)?
3. 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?
4. What is the most common source of *goodwill* in a corporation's balance sheet?
5. There are three methods for dealing with interactions between investment decisions and financing: Adjusted Present Value, Flow to Equity, and WACC. Which of these account for expected bankruptcy costs?
6. Firms do at times repurchase shares. How do such repurchases affect corporate valuations?
7. In valuations, what is the most important insight from sensitivity analysis?
8. (1) Under what circumstances would it be appropriate for a firm to use different costs of capital for its different operating divisions? (2) If the overall firm WACC were used as the hurdle rate for all divisions, would the riskier divisions or the more conservative divisions tend to get most of the investment projects? Why?

**Exercise 16.**

*Parnassus* [10]

Parnassus Corporation plans to invest \$150 million in a new generator that will produce free cash flows of \$20 million per year in perpetuity. The firm is all equity financed, with an equity cost of capital of 10%.

1. What is the NPV of the project ignoring any costs of raising funds?
2. Suppose the firm will issue new equity to raise the \$150 million, and has after-tax issuance costs equal to 8% of the proceeds. What is the NPV of the project including these issuance costs, assuming all future free cash flows generated by it will be paid out?

3. Suppose that instead of paying out the project's future free cash flows, a substantial portion of these free cash flows will be retained and invested in other projects, reducing Parnassus' required fundraising in the future. Specifically, suppose the firm will reinvest all free cash flows for the next 10 years, and then pay out the cash flows after that. If its issuance costs remain constant at 8%, what is the NPV of the project including issuance costs in this case?

**Exercise 17.**

*Discounting* [2]

Consider three approaches to valuation

1. The Dividend discount model
2. FCFE (equity) discount model
3. FCFF (firm) valuation model

For which of these should discounting be done using the cost of equity?

(It can be more than one).

**Exercise 18.**

*Goodyear* [10]

Suppose Goodyear Tire and Rubber Company has an equity cost of capital of 8.5%, a debt cost of capital of 7%, a marginal corporate tax rate of 25%, and a debt-equity ratio of 2.6. Suppose Goodyear maintains a constant debt-equity ratio.

1. What is Goodyear's WACC?
2. What is Goodyear's unlevered cost of capital?
3. Explain, intuitively, why Goodyear's unlevered cost of capital is less than its equity cost of capital and higher than its WACC.

**Exercise 19.**

*Nielsen* [10]

Nielson Motors (NM) is a newly public firm with 25 million shares outstanding. You are doing a valuation analysis of Nielson and you estimate its free cash flow in the coming year to be $40 million. 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 Nielson's equity beta. However, you do have the following data for another firm in the same industry:

| Equity Beta | Debt Beta | Debt-Equity Ratio |
|---|---|---|
| 1.8 | 0.4 | 1.5 |

Nielson has a much lower debt-equity ratio of 0.5, which is expected to remain stable, and Nielson's debt is risk free. Nielson's corporate tax rate is 21%, the risk-free rate is 5%, and the expected return on the market portfolio is 10%.

1. Calculate Nielson's estimated equity beta.
2. Calculate Nielson's equity cost of capital.
3. What is your best estimate of Nielson's share price?

**Exercise 20.**

*Luther* [3]

Suppose Luther Industries is considering divesting one of its product lines. The product line is expected to generate free cash flows of $2 million per year, growing at a rate of 3% per year. Luther has an equity cost of capital of 10%, a debt cost of capital of 7%, a corporate tax rate of 21%, and a debt-equity ratio of 2. If this product line is of average risk and Luther plans to maintain a constant debt-equity ratio, what after-tax amount must it receive for the product line in order for the divestiture to be profitable?