Practice questions for week 1: Introduction to valuation

Multiple choice questions:

Use the following information to answer the three questions below: A firm has an opportunity cost of equity of 15%, it can borrow long term debt at a cost of 10%, its marginal tax rate is 50% and it has an expected cash flow to the firm of 150 (in perpetuity). The market value of its equity and debt are 900 and 600, respectively.

1. What is the firm's WACC? Choose the closest number (unless you think it cannot be determined).
    a. 10.19%
    b. 10.87%
    c. 9.82%
    d. 11.55%
    e. It cannot be determined from the data.

    Answer: b (true value is 11%).

2. What is the value of the firm's equity estimated from cash flows to the firm? Choose the closest number (unless you think it cannot be determined).
    a. 1364
    b. 1090
    c. 800
    d. 764
    e. It cannot be determined from the data.

    Answer: d.

3. What is the value of the firm's equity estimated from cash flows to the equity holders? Choose the closest number (unless you think it cannot be determined).
    a. 1364
    b. 1090
    c. 800
    d. 764
    e. It cannot be determined from the data.

    Answer: c.

4. The book value of a firm's debt is 600 and that of its equity is 800. The market value of equity is 1600 and debt has a market value equal to the book value. Assume also that the net operating income of the firm is 80, the interest rate on its debt is 10% and

the marginal corporate tax rate is 50%. What is the ROC of the firm? Choose the closest number (unless you think it cannot be determined).

a. 2.27%
b. 3.64%
c. 5%
d. 5.71%
e. It cannot be determined from the data.

Answer: d.

5. Consider the following statements regarding converting operating lease expenses to financing expenses:

I. Net operating income typically changes.
II. Return on capital typically changes.
III. The WACC typically changes.
IV. The book value of equity typically changes.

Which of the statements are true?

a. I, II, and III.
b. I and II.
c. III and IV.
d. They are all false.
e. They are all true.

Answer: a.

Short Questions:

1. One firm is funded by equity and debt in equal amounts (at market value). One analyst estimated the WACC in the firm at 5% and the stable growth rate of dividends to be 3%. The dividend for the next year is expected to be $3. He estimates an intrinsic value for the share of $150. Assuming the same inputs, do you think his estimate of intrinsic value is too low, too high, or correct? Explain.

Answer: too high, of course. The analyst made a mistake. Which one?

2. Explain how you deal with the income from marketable securities in a firm's valuation?

Answer: check the slides.

Exercises:

1. Consider the following information about a firm in the most recent year:

Variable	Value	Variable	Value
EBIT	800	Book value of equity	2500
Debt	500	Market value of equity	6000
Rd	0.05	Tax rate	0.4
Cost of equity	14%	Lease payments	200

The firm has lease commitments for the following three years of 250, 300, and 350, respectively.

   a. Find the net income, WACC, RoE, and RoC of the firm (with no adjustment for lease expenses).
      Answer: NI=465, WACC=13.15%, RoE=18.6%, RoC=16%.
   b. Find the debt value implicit in the lease. Compute the effects of adjusting lease expenses in the book values of equity, debt, assets, and EBIT. What is your new estimate of WACC, RoC, and RoE?

   Answer: Debt implicit in the lease is 812.55. Adjusted EBIT is 729.15. Adjusted assets, debt and equity are, respectively, 3812.55, 1312.55, and 2500. NI=465, WACC*=12.03%, RoE*=18.60%, RoC*=11.48%. Note that the BV of equity, NI and ROE do not change.*

Practice questions for week 2: From earnings to cash flows and estimating growth

Multiple choice questions:

1. Rio Sinto had a ROE this year of 10% and you expect its ROE next year to be 12% (both on old and existing projects). What should be the firm's growth in earnings next year? Assume a payout ratio of 80%. Choose the closest number unless you think it cannot be determined.
    a. 22.4%.
    b. 8%.
    c. 3.18%.
    d. 2.4%.
    e. It cannot be determined from the data.

Answer a.

2. Rio Sinto has a book value of equity of 1800 and a book value of debt of 1000. It holds excessive cash on its balance sheet of 600. Its net operating income is 250. The interest rate on its debt is 9% and the corporate tax rate is 35%. Accounts receivable are estimated to be 10% of revenues. What is your estimate of the return on equity in the firm (correcting for excessive cash)? Choose the closest number unless you think it cannot be determined.
    a. 15.96%.
    b. 14.43%.
    c. 11.36%.
    d. 8.93%.
    e. It cannot be determined from the data.

Answer a.

3. You expect Amaton to grow its dividend at a 10% rate for three years and then at 5% forever. The stock just paid a dividend of 50 USD. Assume an opportunity cost of equity for this firm of 12%. What is the present value of the terminal value of this firm? Choose the closest number unless you think it cannot be determined.
    a. 70.
    b. 710.
    c. 785.
    d. 998.
    e. It cannot be determined from the data.

Answer b.

4. Consolidated Editon stock has a price of 2000 and just paid a dividend of 20. The opportunity cost of equity capital is 7% for this firm. Assume its dividends will grow at a rate of 7% a year for 3 years and then at 2% forever. The risk free rate in this economy is 3% and the corporate tax rate is 35%. What is your estimate of intrinsic value of a share of the firm? Choose the closest number unless you think it cannot be determined.
    a. 500
    b. 600
    c. 700
    d. 800.
    e. It cannot be determined from the data.

    Answer a (it is 468).Note that the tax rate and the risk free rate are not required to solve the question.

5. Amaton has a ROE of 20%, a retention ratio of 60%, and a beta of 0.7. It just paid a dividend of 50 USD. The risk free rate is 2%. What is your estimate of the intrinsic value of a share of the firm using Gordon's constant growth model? Choose the closest number unless you think it cannot be determined.
    a. 2000.
    b. 2200.
    c. 2400.
    d. 2600.
    e. It cannot be determined from the data.

    Answer e (we also need the risk premium to estimate the opportunity cost of equity capital).

6. Consolidated Editon stock has a price of 250 and just paid a dividend of 3.5. The opportunity cost of equity capital is 9% for this firm. Assume a constant-growth model for dividends in this firm. What is the long term growth rate in dividends implicit in market expectations? Choose the closest number unless you think it cannot be determined.
    a. 1.40%.
    b. 12.30%.
    c. 12.40%.
    d. 12.72%.
    e. It cannot be determined from the data.

    Answer b (it is 7.5%).

Short Questions:

7. Refer the three broad methods of estimating earnings growth.

   Answer: historical growth, from analysts' estimates, and fundamental growth.

8. What is the impact of leverage on RoE?

   Answer: check the slides. You should explain that it depends, it can both increase or decrease RoE, depending on the relation between RoC and the after-tax cost of debt.

Exercises:

9. Suppose the S&P 500 index is at 1720. Its dividend yield is 5%, the long term risk-free rate is 4% and the long term expected growth rate for the earnings of the firms in the index is 3%. Analysts expect the earnings growth in the next 5 years to be 10%. Assume a risk premium of 4%. Find the intrinsic value of the index. Explain why a two-stage process is adequate in this case. If the index seems mispriced, discuss possible explanations for that.

   Answer: The intrinsic value is 2396, so the index is 28% undervalued. The two-stage process is adequate because the earnings are expected to grow for some time at a pace that cannot be sustained in the long run. The index seems mispriced. Possible explanations could be: i) the market does not believe the high growth rate expected by analysts to take place, ii) the true risk premium can be higher than 4%, iii) the market may have an expected long run growth rate below the 3% assumed.

Practice questions for week 3: DDM and FCFE

Multiple choice questions:

1. You expect Amaton to grow its dividend at a 10% rate for three years and then at 5% forever. The stock just paid a dividend of 50 USD. Assume an opportunity cost of equity for this firm of 12%. What is the terminal value of this firm at the end of the high growth rate? Choose the closest number unless you think it cannot be determined.
    a. 70.
    b. 710.
    c. 785.
    d. 998.
    e. It cannot be determined from the data.

    Answer d.

2. Consolidated Editon stock has a price of 100 and just paid a dividend of 2.6. The opportunity cost of equity capital is 15% for this firm. Assume a constant-growth model for dividends in this firm. What is the long term growth rate in dividends implicit in market expectations? Choose the closest number unless you think it cannot be determined.
    a. 11.80%.
    b. 12.10%.
    c. 12.40%.
    d. 12.70%.
    e. It cannot be determined from the data.

    Answer b (it is 12.09%).

3. Linkedina has a ROE of 20% that is expected to stay like that for years 1 to 3. In year 4 the ROE is expected to change to 12% (for both new and old projects) and stay there forever. The firm's stock has just paid a dividend of 3 AUD and the retention ratio is 25%. Assume the retention ratio is held constant forever and the opportunity cost of equity capital is 14%. What is your estimate of the value of a share of the firm? Choose the closest number unless you think it cannot be determined.
    a. 15.84.
    b. 21.08.
    c. 29.82.
    d. 32.51.
    e. It cannot be determined from the data.

Answer b.

4. Disley just reported a net income of 1201, capital expenditures of 700, depreciation of 500 and net working capital of 250. What is Disley's free cash flow to equity? Choose the closest number unless you think it cannot be determined.
    a) 500.
    b) 600.
    c) 700.
    d) 800.
    e) It cannot be determined from the data.

    Answer: e. We need the change in NWC and information about the debt structure.

Short Questions:

5. How would you choose between one stable-growth, two-stage, or three-stage model?

    Answer: Check the slides. It depends on the recent historical growth of the firm.

Exercises:

6. Consider the information below about ABN ANTRO and the economy where it operates:

Variable	value	Variable	value
Risk free rate	3%	EPS year 0	2
Risk premium	5%	Dividend year 0	0.5
ROE (high growth)	20%	ROE (long run)	8%
Beta (high growth)	1.5	Beta (long run)	1
Growth (long run)	2%	High growth period	5 years

    Assume also that the new ROE in the long run applies only to new projects.

    a. Compute the retention ratio of the firm in the high growth period. What is the current sustainable rate in the high growth period?

        Answer: The retention ratio is 75% and the growth rate is 15%.

    b. Assuming the growth rate given for the long run, what should be the retention ratio in the long run?

        Answer: 25%.

c. Find the opportunity cost of equity capital in this firm in the short and in the long run.

Answer: It is 10.5% in the short run and 8% in the long run.

d. What is your estimate of the value of equity in the firm assuming that the ROE in the long run only applies to new investment projects?

Answer: 33.96.
Hint: You should get this table for EPS and dividends:

Year	EPS	DPS	PV
1	2.30	0.58	0.52
2	2.65	0.66	0.54
3	3.04	0.76	0.56
4	3.50	0.87	0.59
5	4.02	1.01	0.61
6	4.10	3.08	

The terminal value is 51.29 and the estimate of value is 33.96.

e. How would you change your answer to the previous question if the new ROE in the long run applies both to old and new projects?

Answer: In this case the value would be 15.64. Hint: The terminal value is 21.12.

7. Nestliu operates in an economy with a risk-free rate of 4%. In year 0, the firm had earnings of 80, revenues of 1200, capital expenditures of 150, and depreciation of 60 (all values per share). You decide to value the firm using a two-stage FCFE model. Consider the following values in your valuation:

variable	value	variable	value
Discount rate in high growth stage (HG)	10%	Discount rate in stable stage (LR)	8%
RoE (HG)	16%	RoE (LR)	10%
Retention ratio (HG)	80%	Growth (LR)	3%
Debt to capital ratio	40%	NWC to revenues	12.24%
Net Capex / Revenues (HG)	Current ratio to revenues	Length of HG stage	5 years.

Assume also that: i) in the long run the Net Capex / Revenues ratio will be at a level consistent with the long run retention ratio; ii) the ROE in the long run applies only to new projects.

a. Find the expected EPS for years 1 to 5.

Answer: 90.24, 101.79, 114.82, 129.52, and 146.10.

b. Find the FCFE for years 1 to 5.

Answer: 18.05, 20.36, 22.96, 25.90, and 29.22.

c. What is your estimate of the intrinsic value of one share in Nestliu?

Answer: 1394.

Hint: for this question you should get the results below:

	1	2	3	4	5	6
Earnings	90.24	101.79	114.82	129.52	146.1	150.48
Net Capex(1-lambda)	60.91	68.71	77.5	87.42	98.61	40.32
NWC	165.68	186.88	210.8	237.78	268.22	276.27
D NWC (1-Lambda)	11.28	12.72	14.35	16.19	18.26	4.83
FCFE	18.05	20.36	22.96	25.9	29.22	105.33
FCFE=NI(1-b)	18.05	20.36	22.96	25.9	29.22	105.33
Present value	16.41	16.82	17.25	17.69	18.14	

Value	1394.41
TV	2106.69

Practice questions for week 4: Relative valuation and recent research related to fundamental analysis

Multiple choice questions:

1. Which of the statements below is true?
    a) Holding all else equal the price-to-earnings ratio of a stock should be smaller if its payout ratio is high.
    b) Asness, Frazzini, and Pedersen (2013) in their QMJ paper find that stocks of firms with higher profitability earn positive risk-adjusted returns.
    c) Asness, Frazzini, and Pedersen (2013) in their QMJ paper find that stocks of firms with higher leverage earn positive risk-adjusted returns.
    d) The top group of mutual funds by previous performance still has negative alpha with respect to their benchmarks.
    e) All statements a) to d) are false.

    Answer: b. Note that this question makes reference to the discussion in class of the results of recent research.

2. Rio Sinto has a payout ratio of 50%, book value of equity per share of 300 AUD, an expected long-run growth rate of dividends of 6% and an opportunity cost of equity capital of 15%. What should be Rio Sinto's price-earnings ratio from fundamentals? Choose the closest number unless you think it cannot be determined.
    a) 10.
    b) 9.
    c) 7.
    d) 6.
    e) It cannot be determined from the data.

    Answer: d. It is 5.89. Note that the information on the book value of equity is not needed.

3. Which of the following multiples is not consistently defined?
    a) Price / net income.
    b) Value / EBIT.
    c) Price / Book value of equity.
    d) Value / net income.
    e) Value / Book value of assets.

    Answer: d.

Short Questions:

4. What is the main conclusion of the paper of Gibson, Safieddine, and Sonti (2004)?

   Answer: Stocks bought more heavily by institutional investors in SEOs have better performance in the following year. This is suggestive of a stock picking ability by institutional investors in the primary market.

5. Comment: "According to the QMJ paper differences in quality across firms do not become smaller over time."

   Answer: The statement is false. They do become smaller but they also stay significant at least 10 years after. They show strong persistence but also reversion to the mean.

Exercises:

6. You expect the firm Amazona to grow at a fast pace of 15% for 10 years (the high growth stage) and at a stable rate of 4% after that. The retention ratio is 60% in the high growth stage and 25% after that. The firm should be more risky in the high-growth stage (beta of 1.2) than in the stable growth (beta of 0.8). Assume a risk free rate of 5% and a risk premium of 6%.
   a. Find the discount rates that should apply to the cash flows of each stage of the firm.

      Answer: we should have a discount rate of 12.2% in the high growth stage and 9.8% in the long run.

   b. Find the P/E ratio that should prevail in the long-run for this firm.

      Answer: In the long run the P/E should be 13.45.

   c. Find the equilibrium P/E ratio for this firm now.

      Answer: The P/E now should be 21.80. Note that you do not need the growing annuity formula to solve this part of the exercise but with such a long high-growth period it does make the computation shorter. You can check more information about this formula at: http://www.financeformulas.net/Growing-Annuity-Payment.html

Practice questions for week 5: Private equity

Multiple choice questions:

1. Which of the following is not known as a private equity strategy?
    a. Venture capital
    b. Mezzanine financing
    c. LBOs
    d. Distressed debt
    e. Low risk debt.

Answer: e.

2. Venture capital returns had dismal returns from 2000 to 2010.
    a. True
    b. False

Answer: a.

3. In private equity the intrinsic value does not depend on the level of diversification of the buyer.
    a. True
    b. False

Answer: b.

Short Questions:

4. What are the alternative methods to estimate the capital structure in a private firm?

    A: See slide 15.

5. What are the three broad scenarios for valuation of a private equity company?
    A: Private to private, private to publicly traded company, private to public (IPO).

Exercises:

6. You own a private firm in the industrial sector. Your publicly traded competitors have, on average, levered betas of 1.3 and an r-square of 25%. The average D/E ratio in the sector is of 0.25. Your firm targets a capital structure with a D/E ratio of 0.5. The tax rate in the economy if 0.25. Long-term bonds yield 4% and the risk premium is 8%.
    a. What is the unlevered beta of the sector? (4 points)
    A: 1.095 (approx.).

    b. What is the bottom-up levered beta of the firm? (3 points)
    A:1.51 (approx.). It is also acceptable to refer here instead the result already considering the impact of non-diversification in the beta (beta=3.02 aprox.).

    c. What is the cost of equity in your firm if:
        i. You are fully invested in your firm. (4 points)
        A: 28.16%.
        ii. Your investment in the firm represents a relatively small amount of your total wealth. (4 points)
        A: 16.08%.

7. You are considering buying a bar called “John’s”. The bar is leased for 20 years and the annual lease expense is $60,000. The bar is operating at full capacity and it has revenues of $800,000 per year. The bar spends $120,000 a year on wages. The owner currently manages the bar but does not pay himself a specific wage for that. You expect that hiring a manager to replace him would cost $100,000 a year. Assume that cost of goods sold is 30% of revenues. The sector of restaurants and bars has one unlevered beta of 0.8. On average the r-square of the respective CAPM regressions is 16%. The sector has a mean D/E ratio of 0.25 (you can assume the same ratio for the bar). The tax rate is 40%, the yield on a long term bond is 3% and you estimate a risk premium of 5%. Assume the current owner is quite popular with the clients and so the bar without him would experience a drop in revenues of 10%. You expect a ROC for the long run of 10% and a growth rate of 1%. Consider the following table with estimates of adequate default spreads for small businesses:

Interest Coverage Ratio	*Rating*	*Spread*
> 12.5	AAA	0.75%
9.5 - 12.5	AA	1.00%
7.5 - 9.5	A+	1.50%
6 - 7.5	A	1.80%
4.5 - 6	A-	2.00%
3.5 - 4.5	BBB	2.25%
3 - 3.5	BB	3.50%
2.5 - 3	B+	4.75%
2 - 2.5	B	6.50%
1.5 - 2	B-	8.00%
1.25 -1.5	CCC	10.00%
0.8 - 1.25	CC	11.50%
0.5 - 0.8	C	12.70%
< 0.5	D	14.00%

a. Compute the current EBIT and NI of the business as reported in the books. (2 points)
A: EBIT=380 and NI=228.

b. Compute the interest coverage ratio for this bar and its cost of debt. What is the debt implicit in the lease of the bar? (5 points)
A: Coverage=380/60=6.33. In the table you can see that the corresponding default spread is 1.8%. Therefore the before-tax cost of debt is 4.8%. The implicit debt is 760.58.

c. What is your estimate of the EBIT and NI if you buy the bar? Use the short-cut method to deal with the interest expense implicit in the lease. (5 points)
A: The adjusted EBIT should be 260.51 and the NI 134.4. Of the 60 of lease expense 23.49 correspond to depreciation and 36.51 to interest.

d. Compute the WACC for your investment in this bar assuming that most of your wealth will be committed to the investment. How much are you willing to pay for the bar? (5 points)
A: If you commit all (or almost all) of your wealth to the investment the relevant levered beta of the firm is 2.3. Therefore the cost of equity will be 14.50% and the WACC 12.18%.The intrinsic value of the firm from the perspective of the buyer is 1271.3. So the maximum amount he will be willing to pay for the equity is 510.73.

e. How would your answer to the previous question change if the investment in the bar represented only a small portion of your wealth? (3 points)
A: In that case the adequate cost of equity would be 7.60%, the WACC 6.66%, and the value of equity in the firm 1751.46. This illustrates how much the value of a firm depends on the buyer in a private equity context.

8. A private firm has equity of 4000 and debt of 1000 (book values) and a FCFF of 100. The risk premium is 6%, the risk-free rate 3% and the corporate tax rate 30%. Cost of debt is 4% and the expected growth rate of FCFF is 2% forever. The firm operates in a sector with an unlevered beta of 0.5. Assume that the book and market values of debt are the same. Find the "market" value of equity that produces consistency in the D/E ratio, beta levered, and the WACC.

Answer: Starting with book values your first estimate of market value of equity will be 1698.41. If you keep re-iterating you should find that a market value of equity of 1825 produces internally consistent results.