

**Valuation: Final Exam**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Juniper Bank is a small bank that generated \$ 135 million in net income on risk-adjusted assets of \$ 10 billion in the most recent year. The bank maintains regulatory capital (as well as book equity) of \$900 million but would like to increase its regulatory capital ratio to 10% of risk-adjusted assets over the next five years (in equal annual percent installments<sup>1</sup>).
  - a. Assume that Juniper Bank expects to grow its risk-adjusted assets 10% a year for the next five years, while maintaining its return on equity at its current level. Estimate the present value of the FCFE for Juniper Bank each year for the next five years, assuming a cost of equity of 12%.  
(3 points)

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<sup>1</sup> To illustrate, to get from 6% to 12% in three equal percentile installments, you would go to 8% next year, 10% the year after and 12% in the third year.

- b. At the end of year 5, Juniper Bank expects to become a mature bank, growing 3% a year forever. Assuming that the cost of equity will drop to 9% and that the return on equity on new investments will decline to 12% after year 5, estimate the value of equity today. (2 points)

- c. Assume that Juniper Bank has 100 million shares and 25 million options outstanding today, with an average exercise price of \$15 on the latter, estimate the value per share today, using the treasury stock approach. (1 point)

2. You are trying to assess the enterprise value for Oregon Chai, a beverage company that is planning on going public. You have been able to collect the following information (with partial omissions) on the company, a privately owned generic beverage company and publicly traded beverage companies:

	Oregon Chai	Generic Chai (Private)	Beverage Companies
Enterprise Value/Sales	NA	NA	1.5
After-tax Operating margin	10%	4%	8%
Sales/Invested capital	1.50	2.00	1.50
Expected growth rate	3%	3%	3%

- a. If Oregon Chai is expected to generate revenues of \$150 million next year, estimate the fair value of the operating assets of the company for the initial public offering, assuming that publicly traded beverage companies are collectively priced correctly. (3 points)

- b. How much of Oregon Chai's enterprise value would you attribute to its strong brand name? (1.5 points)
- c. If the private business has a cost of capital of 13%, estimate the enterprise value to sales ratio for the generic, privately owned beverage company. (1.5 points)

3. Urban Footwear is an apparel/footwear manufacturer that reported \$10 million in after-tax operating income on revenues of \$500 million in the most recent year; the invested capital in the company at the start of the year was \$200 million. The company is in stable growth, growing 2% a year in perpetuity. The company is also entirely funded with equity, with a cost of equity of 8%. (The risk free rate is 3%, the tax rate is 40% and the equity risk premium is 5%).
- a. Estimate the status quo value of Urban Footwear. (2 points)
  
  
  
  
  
  
  
  
  
  
  - b. Now assume that you believe that a superior management can increase the after-tax operating income on existing assets by 20%, double the return on capital on new investments and increase the debt to capital ratio to 20% (by borrowing money at an after-tax cost of debt of 3%). Estimate the expected value of control in the company, if there is a 40% chance of replacing the existing management with superior management. (2 points)

- c. Finally, assume that Urban Footwear has 10 million voting shares and 15 million non-voting shares. Given your answers to (a) and (b), estimate the value per voting and value per non-voting share. (2 points)

4. You have been asked to assess the value of synergy in an acquisition of SingMia Inc., a Singapore-based apparel firm, by Goodlooks Inc., a US-based apparel firm. You have been provided with the following information (all in US \$):

	Goodlooks Inc.	SingMia Inc.
Country of Incorporation	US	Singapore
Revenues (in millions)	\$10,000	\$5,000
Invested capital (in millions)	\$7,500	\$5,000
Pre-tax operating margin	25%	30%
Effective tax rate	40%	20%
Cost of capital	8.00%	8.00%
Growth rate in perpetuity	3%	3%

- a. Estimate the standalone value of the operating assets in Goodlooks Inc. (1.5 point)
- b. Estimate the standalone value of the operating assets in SingMia Inc. (1.5 points)

- c. Now assume that after the acquisition, Goodlooks plans to move its headquarters to Singapore. By doing so, it expects to cut costs by \$200 million and to lower its effective tax rate to 20% on its operating income. If it will take two years for this move to be completed, estimate the value of synergy in this merger. (You can assume that the cost of capital remains unchanged)
- (3 points)



5. You are a venture capitalist and are considering investing in HubList, a social media app company. The company reported an EBITDA of \$2 million in the most recent year, on revenues of \$5 million; revenues are expected to grow 150% a year for the next 5 years and the EBITDA/Sales ratio in year 5 is expected to be 40%. After year 5, you expect expected revenue growth to drop to 20% and the EBITDA/Sales ratio to remain at 40%.
- a. You have run a regression of EV/Sales ratios for social media companies against expected revenue growth and target EBITDA margins (in year 5) and arrived at the following result:  
EV/Sales today = 1.50 + 5 (Expected revenue growth in next 5 years) + 2.5 (Target EBITDA/Sales ratio in year 5)  
(With revenue growth of 10% and EBITDA/Sales of 20%, your EV/Sales ratio would be =  $1.50 + 5 (.10) + 2.5 (.20) = 2.50$ )  
If you are planning to invest \$ 10 million in HubList, what percentage of the firm should you get, based on this assessment? (The company has no debt or cash and the cash will be used by one of the founders to cash out of the business.) (2 points)

b. Now assume that the owners of the firm have offered you the option to buy another 20% of the firm at the end of year 5 by paying an extra \$25 million in that year. If the standard deviation in value in the social media sector is 50%, and the five-year T.Bond rate is 2%, estimate the value of this option. (4 points; 2 points for getting inputs rights and 2 points for correct value for the option)

S =

K =

t =

r =

Standard deviation =

Cost of delay (Dividend yield), if any =

*Cumulative Normal Distribution table*

$d$	$N(d)$	$d$	$N(d)$	$d$	$N(d)$
-3.00	0.0013	-1.00	0.1587	1.05	0.8531
-2.95	0.0016	-0.95	0.1711	1.10	0.8643
-2.90	0.0019	-0.90	0.1841	1.15	0.8749
-2.85	0.0022	-0.85	0.1977	1.20	0.8849
-2.80	0.0026	-0.80	0.2119	1.25	0.8944
-2.75	0.0030	-0.75	0.2266	1.30	0.9032
-2.70	0.0035	-0.70	0.2420	1.35	0.9115
-2.65	0.0040	-0.65	0.2578	1.40	0.9192
-2.60	0.0047	-0.60	0.2743	1.45	0.9265
-2.55	0.0054	-0.55	0.2912	1.50	0.9332
-2.50	0.0062	-0.50	0.3085	1.55	0.9394
-2.45	0.0071	-0.45	0.3264	1.60	0.9452
-2.40	0.0082	-0.40	0.3446	1.65	0.9505
-2.35	0.0094	-0.35	0.3632	1.70	0.9554
-2.30	0.0107	-0.30	0.3821	1.75	0.9599
-2.25	0.0122	-0.25	0.4013	1.80	0.9641
-2.20	0.0139	-0.20	0.4207	1.85	0.9678
-2.15	0.0158	-0.15	0.4404	1.90	0.9713
-2.10	0.0179	-0.10	0.4602	1.95	0.9744
-2.05	0.0202	-0.05	0.4801	2.00	0.9772
-2.00	0.0228	0.00	0.5000	2.05	0.9798
-1.95	0.0256	0.05	0.5199	2.10	0.9821
-1.90	0.0287	0.10	0.5398	2.15	0.9842
-1.85	0.0322	0.15	0.5596	2.20	0.9861
-1.80	0.0359	0.20	0.5793	2.25	0.9878
-1.75	0.0401	0.25	0.5987	2.30	0.9893
-1.70	0.0446	0.30	0.6179	2.35	0.9906
-1.65	0.0495	0.35	0.6368	2.40	0.9918
-1.60	0.0548	0.40	0.6554	2.45	0.9929
-1.55	0.0606	0.45	0.6736	2.50	0.9938
-1.50	0.0668	0.50	0.6915	2.55	0.9946
-1.45	0.0735	0.55	0.7088	2.60	0.9953
-1.40	0.0808	0.60	0.7257	2.65	0.9960
-1.35	0.0885	0.65	0.7422	2.70	0.9965
-1.30	0.0968	0.70	0.7580	2.75	0.9970
-1.25	0.1056	0.75	0.7734	2.80	0.9974
-1.20	0.1151	0.80	0.7881	2.85	0.9978
-1.15	0.1251	0.85	0.8023	2.90	0.9981
-1.10	0.1357	0.90	0.8159	2.95	0.9984
-1.05	0.1469	0.95	0.8289	3.00	0.9987
-1.00	0.1587	1.00	0.8413		