Spring 2023 Name:

Valuation: Final Exam

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

1. You have been asked to estimate the cost of equity for a Colossus Logistics, a company that operates in two businesses and two countries. You have been given the following information on **the values of the businesses**, broken down by geography and business (in millions of dollars)

	US	Mexico	Unlevered Beta
Shipbuilding	$ 800.00	$ 400.00	1.25
Trucking	$ 200.00	$ 100.00	0.9
Rf in local currency	3%	5%	
ERP	6%	9%	
Tax rate	25%	25%	

If the market capitalization of the company is $900 million, and the company is fairly valued, estimate the cost of equity in US $ for the company. (3 points)

2. You are valuing an unlevered company with revenues of $1.5 billion in the most recent year, that is currently fully owned by its owner, but which expects to attract a private equity investor in year 2 and to go public in year 3.

	Most recent year	*1*	*2*	*3*	*After year 3*
Revenues ($ millions)	$1,500	Grows at 10% a year			3%
Operating margin (after tax)		5%	10%	15%	15%
Sales to Capital		4.00	4.00	4.00	
Correlation with market (of investors' portfolio		0.25	0.50	1.00	

If the unlevered beta for the business that the company is 0.75, the riskfree rate is 3% and the equity risk premium is 6%, estimate the value of equity today. (You can assume that the company earns a ROIC = Cost of capital after year 3) (3 points)

3. You are trying to wrap up the valuation of a publicly traded company, and find yourself with lots of loose ends:
   a. The company is expected to generate $240 million in expected FCFF next year, growing at 3% a year in perpetuity, and has a cost of equity of 10%, a pre-tax cost of debt of 6% and a cost of capital of 9%.
   b. The company has a cash balance of $400 million that it invested in US treasury bonds, when they were yielding 2%. Those bonds currently have ten years left to maturity and are yielding 4%, and have not been marked to market.
   c. The company has cross (minority) holdings in other companies that have a book value of $250 million; the price to book ratio for these holdings is 2.00.
   d. The company has consolidated one subsidiary and the minority interest in that subsidiary is recorded at $400 million; the price is equal to book value
   e. The company has no conventional debt, but it has contractual commitments of $100 million/year for five years that you believe should be treated as debt.

   Estimate the value of equity in this firm. (3 points)

4. You are valuing Carstell Inc., a mature restaurant company, that has been targeted in a class-action lawsuit, with the following characteristics:

Expected EBIT (1-t) next year ($ millions)	Expected % growth forever	Return on capital	Cost of capital	Cost of debt (pre-tax)
$180	3%	20%	8%	5%

The company has no debt, but if it does lose the lawsuit, it will have to pay out $40 million/year in perpetuity. If the company has 137 million shares outstanding, trading at a fair price of $20/share, what is the probability that the market is attaching that the company will lose the lawsuit. (4 points)

5. You are trying to price Revelli Inc, a multi-business company, and have been provided the following information on the businesses (in millions of dollars):

	Expected in the next year				*Current values*	
	Revenues	EBITDA	EBIT (1-t)	FCFF	BV Equity	Net Debt
Construction	$2,000	$200	$100	$40	$750	$500
Retail	$1,500	$120	$40	$30	$180	$20
Advertising	$500	$200	$150	$120	$450	$50

You have run one market-wide regression that you believe works across different sectors, and estimated the following:

EV/Sales = 0.80 + 1.25 (EBITDA/Sales) - 0.90 (Reinvestment Rate) + 7.50 (After-tax Return on Invested Capital)

(Enter percentages as decimals, i.e., 35% as 0.35 in this regression)

Estimate the pricing of equity in this business. (3 points)

6. You are a consultant, specializing in marketing strategies, and you have been approached by Lonagra Inc., a consumer product company, that currently operate a low-margin business, with high sales turnover, and is considering a shift to a premium pricing strategy, with higher margin, albeit with lower sales turnover:

	Low Margin, High Sales (current)	High Margin, Lower Sales (proposed)
After-tax Operating Margin	8%	12%
Sales to Invested Capital	1.5	1.25
Expected growth rate in perpetuity	3%	3%
Invested Capital ($ mil)	$1000	$1000

The firm currently trades at an EV/Sales of 1.20, which fairly reflects its current low margin strategy. Estimate the percentage change in enterprise value from moving to a higher margin strategy. (4 points)

7. Volpe Steel is an over-levered, publicly traded company that is being targeted by an activist, who is planning to reduce its debt load, while making itself more operationally efficient:

	Status Quo	*Restructured*
Book Equity ($ million)	$250.00	$500.00
Book Net Debt ($ million)	$500.00	$250.00
EBIT (1-t) next year ($ millions)	$60.00	$75.00
Cost of capital	9%	8%
Expected growth	3%	3%

If there is a 40% chance that the activist will succeed in getting the firm to restructure, estimate the expected value of equity in Volpe Steel. (3 points)

8. Nodia Inc. is planning an acquisition of Wolfe Inc., with the intent of improving its margins and reducing its working capital needs after the merger. You have collected the information on the acquiring and target firms are below:

	Acquiring	*Target*
Revenues next year (in $ millions)	$1,500	$1,000
After-tax operating margin (next year)	8%	6%
Net Cap Ex (next year, in $ millions)	$20	$20
Change in Working capital (next year, in $ millions)	$20	$10
Cost of capital	8%	8%
Growth rate in perpetuity	3%	3%

Once acquired, Nodia believes that it can improve Wolfe's after-tax margin to match its own and eliminate all working capital requirements for Wolfe, without affecting future growth. Estimate the value of synergy in this merger. (3 points)

9. Roadrunner Gaming is a start-up gaming platform that hopes to attract subscription-paying users to its platform. It has no subscribers right now, but expects to have 50 million subscribers, three years from now.
   a. The market is expected to attach a pricing of $120 per subscriber in year 3, and you plan to discount that pricing back to today at a cost of equity of 25%. If you plan to buy 20% of the company today, how much would you pay for it? (1 point)

   b. You believe that there is a 50% standard deviation in the estimating pricing (subscriber count and pricing), but you have the option to buy the remaining 80% of the company at the end of year 3 at $120/subscriber. Estimate the value of this option. Start by showing the key inputs (r =3%) for valuing the option: (1 point)

      S = t = r = 3%

      K = σ =

      Show the value of the option below: (2 points)

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		