

**Valuation: Final Exam**

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

1. TriCity Inc. is a publicly traded company with the following characteristics:
  - It generated \$60 million in after-tax operating income in the most recent year, on revenues of \$ 500 million.
  - The company has 100 million shares trading at \$ 4/share; the book value of equity at the start of the most recent year was \$ 300 million.
  - The company has \$ 200 million in debt outstanding currently (book value, as well as market value) and that number did not change over the course of the most recent year.
  - The company had a cash balance of \$ 100 million at the start of the most recent year, unchanged again over the course of the year.
  - The cost of capital for the firm is expected to be 12% next year, 11% the year after and 10% thereafter (in perpetuity).
  
- a. You expect TriCity's after-tax operating income to grow 20% a year, each year for the next 3 years, and TriCity to maintain its current return on invested capital in perpetuity. Estimate the free cash flows to the firm each year for the next 3 years. (2 points)

- b. At the end of year 3, you expect TriCity to be in stable growth, growing 3% a year in perpetuity, while maintaining its current return on invested capital. Estimate the terminal value at the end of year 3. (2 points)
- c. Assume now that TriCity has 20 million options outstanding, with an average exercise price of \$ 5/share. Using the treasury stock approach, estimate the value per share for the company today. (2 points)

2. Zeller Inc. is a publicly traded retail firm with a financial arm. You have been provided with the following information on the firm's operations (in millions):

	Zeller Retail	Zeller Financial
BV of equity	\$300	\$100
BV of debt (= market value)	\$20	\$200
PV - leases	\$85	\$0
Revenues	\$500	NA
EBITDA	\$65	NA
EBIT (adjusted for leases)	\$50	NA
Net Income	\$30	\$20

- a. You have looked at publicly traded companies in the retail and the financial services businesses and arrived at the following regressions:  
 Retail:  $EV/Sales = 0.60 + 2.50$  (Pre-tax operating margin)  
 Finance:  $P/BV = 0.80 + 4.00$  (Return on Equity)  
 (Example: With a 5% pre-tax margin,  $EV/Sales = 0.60 + 2.50(.05) = 0.725$ )  
 Assuming that Zeller Inc. has no cash balance and 50 million shares outstanding, estimate the value of equity per share. (You capitalized leases for all retail firms in the regression) (3 points)

b. Assuming that the value of equity that you compute in part (a) is a “fair” value (i.e., equal to intrinsic value), estimate the cost of equity that the market is using to value the company. (You can assume that the firm is in stable growth, growing 3% a year in perpetuity). (3 points)

3. Smartcell Inc. is a large market-cap smartphone manufacturer that is considering acquiring Litcell Inc. a much smaller company that develops smartphone software. Both companies are in stable growth (growing 3% a year) currently, with the following characteristics (in millions):

	SmartCell	LitCell
After-tax Operating Income next year	\$100.00	\$15.00
Book value of equity	\$400.00	\$100.00
Book value of debt (= market value)	\$150.00	\$0.00
Cash	\$50.00	\$0.00
Number of shares	100	5
Cost of capital	9%	10%

- a. Assuming that there are no synergies in the merger and that each company's shares are priced at intrinsic value, what exchange ratio (of SmartCell shares for LitCell shares) would make this a fair value acquisition? (2 points)

- b. Now assume that if Smartcell acquires Litcell, the after-tax return on capital and cost of capital of the combined company will converge on SmartCell's current return on capital (with operating income rising for the combined firm) and cost of capital. If SmartCell wants to retain 40% of the value of synergy for its stockholders, what exchange ratio should it offer? (You can assume that the stable growth rate will remain unchanged at 3%.) (4 points)

3. Dry Goods Inc. is a consumer product company that has seen its earnings plummet and is indebtedness increase over the last five years. It operates in two business, packaged goods and toiletries, with the following results (in millions):

	Packaged Goods	Toiletries	Combined firm
Invested Capital	\$600.00	\$900.00	\$1,500.00
After-tax Operating Income next year=	\$66.00	\$54.00	\$120.00
Expected growth rate in perpetuity =	2%	2%	2%

The company currently has 100 million shares trading at \$3 a share and \$ 1,200 million in market value of debt (with an 9% pre-tax interest rate on the debt) and a cost of equity of 20%; the corporate tax rate is 40%, riskfree rate is 2% and the equity risk premium is 6%. (You can assume that both businesses are equally risky)

- a. Estimate the intrinsic value per share for Dry Goods, assuming that it continues to be run as is, with its current return on capital and cost of capital remaining unchanged in perpetuity. (2 points)

b. Now assume that there is the possibility that Dry Goods will be offered \$ 600 million for its toiletries business and if it is, it will use the proceeds to retire \$ 300 million in debt (which will lower the pre-tax cost of debt to 7% for the remaining debt) and to invest \$300 million in its packaged goods business (where it will earn the same return on capital as the existing investment in that business). Estimate the intrinsic value per share, assuming that the packaged goods business will remain a stable growth business, growing 2% a year in perpetuity. (3 points)

c. Now assume that the current market price is correct and reflects an expectation that the restructuring in part (b) may happen. Assuming that your intrinsic value per share estimates in (a) and (b) are right, what is the probability of the restructuring happening? (1 point)

5. You are interested in investing an eight-story rental building in Manhattan. The building has 80,000 square feet of rental space and the rental income (pre-tax) next year is expected to be \$60/square foot. You can assume that the building will be fully rented out next year and that the rental income will grow 2% a year in perpetuity; the cost of capital for real estate is 8%.

a. Allowing for a 40% tax rate, estimate how much you would be willing to pay for the building, based just on the rental income. (You can assume no reinvestment is needed) (2 points)

b. Now assume that owning the building will give you the right to add twelve more floors, with a cumulative 100,000 square feet in rentable space, any time over the next 20 years (at which point the rights lapse). The cost of adding these additional floors today is \$ 50 million and given the state of the rental market, you believe that you will be able to get only \$40/square foot (pre-tax) as rental income for this new space, growing at 2% a year in perpetuity. However, the standard deviation in rental income (per square foot) in Manhattan over the last twenty years has been 30% and the risk free rate is 3%. Estimate how much you would be willing to pay for the rental building, with the option to add the additional floors. (2 points for inputs, 2 points for right option value)

S =

K =

t =

$\sigma$  =

r =

*Cumulative Normal Distribution*

d	N(d)	d	N(d)	d	N(d)
-2.95	.0016	-1.00	.1587	1.00	.8413
-2.90	.0019	-.95	.1711	1.05	.8531
-2.85	.0022	-.90	.1841	1.10	.8643
-2.80	.0026	-.85	.1977	1.15	.8749
-2.75	.0030	-.80	.2119	1.20	.8849
-2.70	.0035	-.75	.2266	1.25	.8944
-2.65	.0040	-.70	.2420	1.30	.9032
-2.60	.0047	-.65	.2578	1.35	.9115
-2.55	.0054	-.60	.2743	1.40	.9192
-2.50	.0062	-.55	.2912	1.45	.9265
-2.45	.0071	-.50	.3085	1.50	.9332
-2.40	.0082	-.45	.3264	1.55	.9394
-2.35	.0094	-.40	.3446	1.60	.9452
-2.30	.0107	-.35	.3632	1.65	.9505
-2.25	.0122	-.30	.3821	1.70	.9554
-2.20	.0139	-.25	.4013	1.75	.9599
-2.15	.0158	-.20	.4207	1.80	.9641
-2.10	.0179	-.15	.4404	1.85	.9678
-2.05	.0202	-.10	.4602	1.90	.9713
-2.00	.0228	-.05	.4801	1.95	.9744
-1.95	.0256	.00	.5000	2.00	.9773
-1.90	.0287	.05	.5199	2.05	.9798
-1.85	.0322	.10	.5398	2.10	.9821
-1.80	.0359	.15	.5596	2.15	.9842
-1.75	.0401	.20	.5793	2.20	.9861
-1.70	.0446	.25	.5987	2.25	.9878
-1.65	.0495	.30	.6179	2.30	.9893
-1.60	.0548	.35	.6368	2.35	.9906
-1.55	.0606	.40	.6554	2.40	.9918
-1.50	.0668	.45	.6736	2.45	.9929
-1.45	.0735	.50	.6915	2.50	.9938
-1.40	.0808	.55	.7088	2.55	.9946
-1.35	.0885	.60	.7257	2.60	.9953
-1.30	.0968	.65	.7422	2.65	.9960
-1.25	.1057	.70	.7580	2.70	.9965
-1.20	.1151	.75	.7734	2.75	.9970
-1.15	.1251	.80	.7881	2.80	.9974
-1.10	.1357	.85	.8023	2.85	.9978
-1.05	.1469	.90	.8159	2.90	.9981
		.95	.8289	2.95	.9984