

Name: **Corporate Finance**

Question 1. (2 points for each part; total 10 points) Balance sheet analysis

At the end of 2010, Duffee, Inc. had a book value of equity of \$18MM, 2MM shares outstanding with a market price of \$38 per share, cash of \$2MM, and total debt of \$50MM. Calculate the following values as of the end of 2010. **SHOW YOUR WORK!**

a. Market capitalization

b. Market-to-book ratio

c. Book debt-equity ratio

d. Market debt-equity ratio

e. Enterprise value

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Question 2. No-arbitrage

Consider two securities that pay risk-free cash flows over the next two years and that have the current market prices shown here:

Security	Price today	Cash flow in one year	Cash flow in two years
#1	23	25	0
#2	56	0	75

- a. (6 points) What is the no-arbitrage price of a security that pays cash flows of \$100 in one year and \$100 in two years? **SHOW YOUR WORK!**

- b. (6 points) Using the information and the principle of no-arbitrage, what is the annual interest rate on a two-year zero-coupon Treasury bond? **SHOW YOUR WORK!**

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- c) (5 points) As of January 1 2011, what is the net present value of expected earnings in 2013, 2014, ..., until the end of time? SHOW YOUR WORK!

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- c. (4 points) How much money will be in the bank account just after the final deposit at age 65? **SHOW YOUR WORK!**
- d. (5 points) What is “X”? **SHOW YOUR WORK!**
- e. (3 points) Now assume you choose a different value of “X” such that the money in the account runs out after 25 annual withdrawals. If you happen to live beyond 90, you’ll simply beg your kids to take you in. What is the new value of “X”? **SHOW YOUR WORK!**

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- c. (4 points) Explain which of the two projects you will adopt (recall they are mutually exclusive), or, if you do not want to adopt either of them, explain why not.

- d. (3 points) Now use a cost of capital of 4 percent. What are the NPVs of the two projects? **SHOW YOUR WORK!**

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Question 6. Toasters

BuyMore sells toasters per year for \$10 per toaster. It currently buys the toasters from MakeStuff, Inc., which sells them to BuyMore for \$5 per toaster. A vice president of BuyMore recommends that the BuyMore instead manufacture the toasters in-house. If they are produced in-house, the manufacturing and operational expenses would be \$3 per toaster. Manufacturing requires equipment that costs \$3MM. The equipment lasts for five years. BuyMore uses straight-line depreciation. Manufacturing in-house also requires \$500,000 in net working capital for inventory expansion. The vice president's plan is to manufacture the toasters in-house for five years, then switch back to MakeStuff in year six. In the fifth year the net working capital is recovered. The equipment will be worthless at the end of the five years.

BuyMore anticipates sales of 1MM toasters per year for each of the next five years. BuyMore's corporate tax rate is 35% and the opportunity cost of capital for this investment is 12%. Assume that all cash flows are received at year-ends, and that the equipment and net working capital are needed at the end of year zero, one year before any cash flows are generated from sales. BuyMore currently does not have any cash, so it must borrow the funds to both buy the equipment and increase inventories. BuyMore will pay only the interest on the loan for the first four years. In the final year it will pay both interest and the entire principal.

- a. (8 points) Complete the spreadsheet on the next page for the **incremental** values of revenues, costs, net working capital, capital expenditures, and cash flows of the unlevered project. Just to be clear, the project is to replace buying toasters from MakeStuff with in-house manufacturing of toasters.

NO EXPLANATIONS ARE REQUIRED AND ANY EXPLANATIONS GIVEN WILL BE IGNORED.

ANY BLANK SPACES WILL BE INTERPRETED AS MISSING ANSWERS THAT RECEIVE ZERO CREDIT.

Therefore if you believe one of the spaces should have a zero in it, explicitly write in zero.

Name:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Revenues from sale of toasters							
Manufacturing and operating expenditures							
Depreciation							
Earnings before interest and taxes							
Change in net working capital							
Capital expenditures							
Interest expense							
Tax expense							
After-tax profits							
Free cash flow							

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- b. (4 points) BuyMore discovers that it has a five-year contract with MakeStuff, Inc. that states BuyMore must pay MakeStuff an immediate lump sum of \$500,000 if BuyMore either switches toaster suppliers or makes toasters in-house. Is this a sunk cost or should it be included in the spreadsheet? EXPLAIN YOUR ANSWER!

Question 7. Cookies

ChocoChips Inc. expects annual earnings in 2011 of \$8 per share, and it plans to pay a \$5 dividend to shareholders at the end of 2011. The firm will retain \$3 per share of its earnings to reinvest in new projects with an expected return of 12% per year. Suppose ChocoChips plans to maintain the same dividend payout rate indefinitely. Also assume that ChocoChips return on new investment will remain at 12% regardless of the amount of investment that it makes. Finally, assume that ChocoChips will not change its number of outstanding shares.

- a. (5 points) What is your prediction of ChocoChips' growth rate of annual earnings? SHOW YOUR WORK!

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- b. (5 points) If ChocoChips opportunity cost of capital is 9% per year, what is your estimate of the company's stock price at the **end of 2011**, just after the company pays the \$5 dividend? **SHOW YOUR WORK, AND MAKE SURE YOU ARE ESTIMATING THE PRICE AS OF YEAR-END 2011!**
- c. (6 points) You are hired by ChocoChips to determine what will happen to its stock price if the company instead pays a dividend of \$4 at the end of 2011 and retained only \$4 in earnings for reinvestment, and maintained this new, lower payout ratio forever. What is your estimate of ChocoChips stock price at the end of 2011, just after the company pays the \$4 dividend? **SHOW YOUR WORK!**

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Question 8. (5 points) A possibly tricky question, saved for last in case you have extra time.

Hopkins, Inc. is a software company. The only asset on its balance sheet is \$1MM in cash. It will spend all of the cash in the next year to research a potential software project. One year from today (March 1st 2012), the firm will decide whether to adopt the new project, or whether the firm should shut down. Its decision will be based on the project's NPV as of March 1st 2012. Refer to this value as the 3/2012 NPV, to distinguish it from an NPV calculated as of March 2011. Today, the 3/2012 NPV is uncertain, but everyone today knows that there are two possible values of the 3/2012 NPV. It will be either \$10MM or \$-2MM, both with a 50% probability, and the outcome is uncorrelated with anything else in the economy. The project's expected cash flows are discounted at 20% per year; this discount rate is used in calculating the 3/2012 NPVs listed above. The risk-free rate is 5% per year. What is the market value of Hopkins, Inc today (March 2011), assuming that if it adopts the project, it will shut down immediately after the project is completed? **SHOW YOUR WORK!**