

**Boston College**  
**MF 127: Corporate Finance**  
**Professor Strahan**  
**Final Exam, 2005**

**Name:**

***Instructions:***

**There are 100 points for the exam.**

**You are allowed to have 1 sheet of paper with formulas (two-sides) and a calculator.**

**Read all of the questions carefully!**

**There are 9 pages to the exam (some are blank). You have 2.5 hours.**

**Be brief, but show all relevant calculations (partial credit will be assigned).**

**Your answers must be legible. All answers must appear on the exam itself. If you need more space, use the back of the page.**

**Good luck.**

True, False, Uncertain. (5 points each)

Explain why the following statements are true, false, or uncertain.

1. Managers compensated with large amounts of stock options prefer share repurchases to cash dividends.

T. Paying dividends lowers the stock price, whereas stock repurchases do not.

2. The value of a given project to a high-beta firm will be lower than the value to a lower beta firm because the high-beta firm's WACC is higher.

F. The NPV of a project depends on the beta and financing (risks) of the project, which is not necessarily the same as the WACC of the firm investing in the project.

3. Buying a call option is a positive NPV investment because the owner will only exercise the option if the stock price exceeds the strike price.

F. The cost of buying the call equals to PV of expected future cash flows. In other words, as in all trades in an efficient market, buying call options has 0 NPV.

4. A firm near financial distress will tend to reject low-risk investment projects, even if they have positive net present value.

T. This is the problem of debt overhang. It happens because most of the benefits of the project go to the bondholder rather than the stockholder.

5. Shareholders are not concerned about the magnitude of bankruptcy costs, because bondholders – not shareholders -- must pay them.

F. It is true that bondholders pay the costs of bankruptcy after the fact, but shareholders bear the expected costs of bankruptcy in the form of higher interest rates, more restrictive covenants, etc.

Long Problems (point totals vary)

1. Because of previously unexpected high demand for its natural peanut butter, Captain Carrot's Health Foods is considering replacing its old manually operated peanut butter maker with a new automated model. The old machine was purchased five years ago for 20,000 and has a 10 year useful life. The salvage value is zero. The machine could be sold today for 8,000. The new machine costs 50,000 and has a five year useful life. It, too, has a zero salvage value. This machine would reduce labor costs by 18,000 per year. No changes in net working capital are needed. The marginal tax rate is 40% while a 15% return is required. Do you replace or not? (24 points)

**Ann. Depreciation (old)=20,000/10=2,000    Ann. Depreciation (new)=50,000/5=10,000**

**T = 0**

**Cost of new machine = -50,000**

**Revenue from sale of old machine = +8,000**

**Book Value of old machine = 20,000 – (2,000\*5) = 10,000**

**Value of Capital Gains Tax Shield = (10,000-8,000)(0.4) = +800**

**Total = -50,000+8,000+800 = -41,200**

**T=1...5**

**CF from Operations = NOI(1-t)+Dt = (18,000)(1-0.4) + (10,000 – 2,000)(0.4) = 14,000**

**NPV = -41,200 + 14,000[PVAF(5yr, 15%)]**

$$\text{NPV} = -41,200 + 14,000[3.3522]$$

$$\text{NPV} = \$5,730$$

2. Hand is considering making an offer to acquire Glove.

*Pre-Merger Announcement Data*

	<u>Hand</u>	<u>Glove</u>
Stock Price	15	10
Number of Shares	1,000,000	250,000

Glove's expected dividend is \$1 per share (paid next year), and is expected to grow forever at a constant 5% per year. However, the acquisition will lead to permanent cost reductions for Glove that will allow its dividend to rise to \$1.25 next year. Thereafter, dividends will again grow at 5%. Nothing about Hand's business is affected by the merger.

A. What is the synergy of this merger? (5 points)

$$\text{Price of Glove Initially} = 10 = 1/(r-0.05) \Rightarrow r = 15\%$$

$$\text{Price of Glove with Synergy} = 1.25/(0.15 - 0.05) = 12.50$$

$$\text{Synergy} = \$2.5 * 250,000 = \$625,000$$

B. Hand offers to buy all of Glove's stock in exchange for 175,000 shares of newly issued stock. What is the Premium of the merger? (5 points)

$$\text{Value of Combined company} = 15,000,000 + 2,500,000 + 625,000 = \$18.125 \text{ million}$$

$$\text{Cost of buying Glove} = 18.125 * (175,000 / (175,000 + 1,000,000)) = \$2.699 \text{ million}$$

$$\text{Premium} = 2.699 - 2.5 = \$0.199 \text{ million}$$

C. What happens to the stock price of Hand after the merger is announced (but before the acquisition happens)? (5 points)

$$\text{NPV} = \text{Synergy} - \text{Premium} = 0.625 - 0.199 = \$0.4255 \text{ million}$$

So, price of hand rises to \$15.4255

The other way to get it is take the total value of the combined company and divide by total share outstanding after the merger =  $18.125 / 1.175 = 15.4255$

D. What happens to the stock price of Glove after the merger is announced (but before the acquisition happens)? (5 points)

$$\text{Glove's price goes up to reflect the premium} = (2.5 + 0.199) / 0.25 = \$10.796$$

3. CS holdings is an all equity firm with 1 million shares outstanding and a stock price of \$20 per share. The market expects next year's dividend to be \$1 per share, and for dividends to grow at a constant rate of 5% forever.

A. What is the required return on equity for CS? (5 points)

$$20 = 1 / (r_s - 0.05) \rightarrow r_s = 10\%$$

**Note that this equals  $r_0$  because there is no debt.**

B. Suppose that CS issues a perpetual bond worth \$10 million at a rate of 6%, and will use the proceeds to repurchase stock. The tax rate is 35%. What is the market value of CS equity after the repurchase? (5 points)

**The PV of tax shields equals  $Bt = 10 * 0.35 = \$3.5$  million.**

**So, after the recapitalization:  $V_1 = V_u + 3.5 = 20 + 3.5 = \$23.5$ . Since  $B = 10$ ,  $S = 13.5$**

C. What is the required return on equity for CS after the capital structure change? (5 points)

**$R_s = r_0 + B/S(r_0 - r_b)(1-t)$ . So,**

$$R_s = 10\% + (10/13.5)(10\% - 6\%)(0.65) = 11.93\%$$

4. Comment how the yields compare for the following types of bonds (assume everything else is the same) (16 points)

a. Bonds with and without sinking funds

**Sinking funds lead to lower yields because they protect against default risk**

b. Callable v. non-callable bonds

**Callable bonds have higher yields because firms will call the bond (prepay) when interest rates fall or when the firm's credit rating improves. This lowers the upside on the bond, so a higher yield compensates the bondholder for this lost opportunity.**

c. Convertible v. non-convertible bonds

**Convertible bond has lower yield because the bondholder has the option to convert to stock if the firm does well. The issuer gets compensated for giving away upside to the bondholder by getting a lower yield on the bond.**

d. Short term debt v. long-term debt

**Short term debt has lower yield because it is safer. Fewer things can go wrong over a short time horizon.**