

1. (5 pts) The hypothesis that market prices reflect all available information of every kind is called \_\_\_\_\_ form efficiency.

- B
- A. open
  - B. strong
  - C. semistrong
  - D. weak
  - E. stable

2. (5 pts) In an efficient market, the price of a security will:

- D
- A. always rise immediately upon the release of new information with no further price adjustments related to that information.
  - B. react to new information over a two-day period after which time no further price adjustments related to that information will occur.
  - C. rise sharply when new information is first released and then decline to a new stable level by the following day.
  - D. react immediately to new information with no further price adjustments related to that information.
  - E. be slow to react for the first few hours after new information is released allowing time for that information to be reviewed and analyzed.

3. (5 pts) The unlevered cost of capital is:

- B
- ~~A. the cost of capital for a firm with no equity in its capital structure.~~
  - B. the cost of capital for a firm with no debt in its capital structure.
  - C. the interest tax shield times pretax net income.
  - D. the cost of preferred stock for a firm with equal parts debt and common stock in its capital structure.
  - E. equal to the profit margin for a firm with some debt in its capital structure.

4. (5 pts) The discounted payback rule states that you should accept projects:

- D
- A. which have a discounted payback period that is greater than some pre-specified period of time.
  - B. if the discounted payback is positive and rejected if it is negative.
  - C. only if the discounted payback period equals some pre-specified period of time.
  - D. if the discounted payback period is less than some pre-specified period of time.
  - E. only if the discounted payback period is equal to zero.

5. (5 pts) Beatrice invests \$1,000 in an account that pays 4% simple interest. How much more could she have earned over a five-year period if the interest had compounded annually?

- A. \$15.45
- B. \$15.97
- C. \$16.65
- D. \$17.09
- E. \$21.67

C

6. (5 pts) The intercept point of the security market line is the rate of return which corresponds to:

- A. the risk-free rate of return.
- B. the market rate of return.
- C. a value of zero.
- D. a value of 1.0.
- E. the beta of the market.

Spencer

A

4% simple: 2000

$$\text{Comp: } 1000(1+r)^5 = 1000(1.04)^5 = \frac{1216}{-1000}$$

7. (10 pts) If you own a call option with a strike price of \$36 and the stock is trading at \$25 and the option expires today, how much is the option worth?

\$0 (unexercised)

$\$0$

8. (10 pts) If you invest \$100 a month in a savings account with a SAIR of 6% compounded monthly, how much will you have after 3 years?

~~$\$100 \left(1 + \frac{.06}{12}\right)^{36}$~~   $\$119.67$  *wrong*

$\frac{100 \left(1 + \frac{.06}{12}\right)^{36} - 1}{0.005}$

9. (10 pts) What is the price of a \$1000 bond with a 9% coupon paid semiannually that matures in 5 years if the correct discount rate is 6% SAIR compounded semiannually, and the bond will pay its first coupon six months from now?

9% coupon  $\rightarrow$  \$45 every 6 months

Annuity  $\frac{1}{2}$ :  $45 \left[ \frac{1}{.03} - \frac{1}{.03(1.03)^{10}} \right] = 383.859$

F.V. part:  $\frac{1000}{1.03^{10}} = 744.09$

total  $\$1127.95$

10. (25 points) Royal Dutch Petroleum is considering a new project that complements its existing business. To this point, research and development for this project have cost \$1.5 million. If the project is undertaken, a machine required for the project will need to be purchased, and it costs \$2 million. The project will use a building that the company already owns but could rent for \$14,000 per month. Sales are projected to be \$1.2 million per year over the next five years, and then drop to \$0 thereafter. The machine will be straight-line depreciated over its five-year lifetime and has no salvage value. Costs of goods sold will be 25% of sales. Net working capital must be increased by \$150,000 immediately and will be recovered at the end of the project. Profits of other Royal Dutch Petroleum product lines will increase \$100,000 for the five years of the project. The corporate tax rate is 32%, and the required rate of return for Royal Dutch Petroleum is 16%. Should the project be undertaken?

	0	1	2	3	4	5
Sales		1.2m	1.2m	1.2m	1.2m	1.2m ✓
Cost		-360000	-300000	-300000	-700000	-300000 ✓
Tax		-288,000				
Dep shield		400,000	400,000	400,000	400,000	400,000 ✓
		128,000				
Inv machine - 2m.						
NWC - 150,000						+150,000 ✓
Erosion		+100,000				
O.C. (w/ machine)		-168000	-168000	-168000	-168000	-168000
	- 2.150 M.	932000				1082000

$$- 2.150 + 932000 \left[ \frac{1}{.16} - \frac{1}{.16(1.16)^5} \right] + \frac{1082000}{(1.16)^5} = 775942, \text{ yes!}$$

11. (25 pts) The stock returns over the past four years for an unlevered firm have been 12%, 10%, -6% and 22%. The correlation coefficient with the market portfolio of this stock is .4, and the standard deviation of the market portfolio is 18%. There are no taxes.

- What is the beta for the stock?
- If the risk free rate is 4% and the market return is 12% what is the correct return for an asset with the beta you calculated in a)?
- If the firm changed its debt to equity ratio to 1, what would the new beta of the stock be (assuming the beta of the debt is 0)?
- If you wanted to build a portfolio that had the same return as this stock <sup>Accd. to CAPM. Avg. 4 yr return</sup> what is the smallest standard deviation that you must accept?

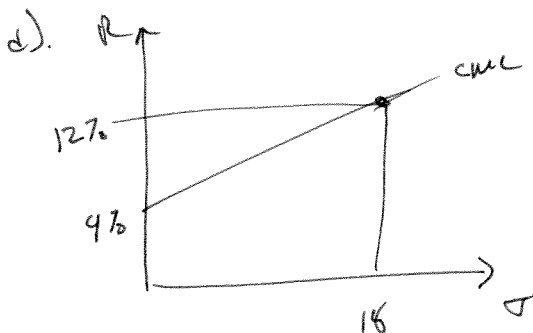
$$\bar{R} = 9.5 \quad \sigma_s^2 = \frac{1}{4} \left( (12-9.5)^2 + (10-9.5)^2 + (-6-9.5)^2 + (22-9.5)^2 \right) = 106.75$$

$$\sigma_s = 10.037$$

$$\rho = \frac{\sigma_{sm}}{\sigma_m^2} = \frac{\rho \sigma_s \sigma_m}{\sigma_m^2} = \frac{\rho \sigma_s}{\sigma_m} = \frac{(0.4)(10.037)}{18} = .22 = \beta_s$$

b).  $R_s = 4\% + (12-4) \cdot .22 = 5.76$

c).  $\beta_A = .22 \quad \beta_A = \frac{1}{2}\beta_D + \frac{1}{2}\beta_E \Rightarrow \beta_A = \frac{1}{2}\beta_E \Rightarrow \beta_E = 2 \cdot (.22) = .44$



$$R = 4\% + \sigma \cdot \left( \frac{8}{18} \right)$$

$$9.5 = 4\% + \frac{8}{18} \sigma$$

$$\sigma = 12.375$$

12. (20 pts) You are considering opening an online bookstore, which you will call Nile. Your startup costs will be \$1 million, and provide earnings before interest and taxes of \$175,000 per year. The corporate tax rate is 34%. You find the following information about Amazon: its debt-to-equity ratio is 0.55 and its equity beta is 1.1. The risk free rate is 4%, the expected market risk premium is 7%, and Amazon (and you as Nile) can borrow at 4%.

a. What is Amazon's  $R_{WACC}$ ?

b. Should you undertake your startup?

~~Assume that all~~  
Assumptions?

$$r_S = 4\% + 7\%(1.1) = 11.7\% \quad r_D = 4\%$$

$$r_{WACC} = \frac{E}{D+E} (11.7\%) + \frac{D}{D+E} \cdot 4\% (1 - T_c)$$

$$\frac{D}{E} = .55$$

$$D = .55E$$

$$= \frac{E}{.55E+E} (11.7\%) + \frac{.55}{1.55} \cdot 4\% (.66)$$

$$= 8.485\%$$

b.  $NPV_{Startup} = -1 + \frac{175,000(1-T_c)}{.08485} = +361,225, \text{ so yes}$

13. (20 pts) Williamson expects earnings before interest and taxes (EBIT) of \$100,000 every year into perpetuity. The firm currently has no debt, but it can borrow at 10% per annum. Williamson's unlevered cost of equity ( $r_0$ ) is 25% and the firm is subject to a corporate tax rate of 40%.

- What is the value for the firm?
- What will the value of Williamson be if it borrows \$100,000 and uses it to repurchase equity?
- After the repurchase, what is the cost of equity ( $r_S$ )

$$a). \text{ Value} = \frac{100,000 (1 - T_c)}{.25} = \frac{60,000}{.25} = 240,000$$

$$b). V_L = V_U + T_c B = 240,000 + (100,000) \cdot .4 = 280,000$$

$$c). r_S = r_0 + \frac{B}{S} (r_0 - r_D) (1 - T_c)$$

$$= .25 + \frac{100,000}{180,000} (.25 - .10) (.6) = 30.7\%$$