

Multiple choice – 3 points each – 30 points total

1. Suppose a firm uses a constant WACC to make capital investment decisions without any adjustments for risk. The firm will tend to:
 - A. accept profitable, low risk projects and reject unprofitable, high risk projects.
 - B. accept profitable, low risk projects and accept unprofitable, high risk projects.
 - C. reject profitable, low risk projects and accept unprofitable, high risk projects.
 - D. reject profitable, low risk projects and reject unprofitable, high risk projects.
 - E. become less risky over time.

2. The government is trying to decide whether or not to purchase any of the new, advanced missiles it has developed. One of the arguments in favor of purchasing the missiles is that so much money has been spent on their development that it would be a waste of money not to buy any. What is the major problem with this argument?
 - A. It ignores the opportunity cost of the money that has been spent.
 - B. It includes the sunk costs of the decision.
 - C. It includes opportunity costs in the decision.
 - D. It includes changes in net working capital.
 - E. It includes financing costs in the decision.

3. Your company currently manufactures oversized golf clubs and is considering replacing them with supersized clubs. Which of the following is NOT relevant?
 - A. A reduction in revenues of \$300,000 from terminating the oversized line of clubs.
 - B. Land you own with a market value of \$750,000 that may be used for production.
 - C. \$200,000 you spent last year on research and development of the new clubs.
 - D. \$350,000 you will pay Fred Singles to promote the new clubs.
 - E. \$125,000 you will receive from selling the existing production equipment which must be upgraded to produce the new clubs.

4. The EAC method for evaluating projects applies when which of the following project characteristics exist?
 - I. The projects are mutually exclusive.
 - II. The projects have different economic lives.
 - III. The projects will be replaced more or less indefinitely.
 - A. I only
 - B. II and III only
 - C. I and III only
 - D. I and II only
 - E. I, II, and III

5. In an efficient market, investments have which of the following attributes?
- I. Expected return equals zero.
 - II. The NPV equals zero.
 - III. The expected risk premium equals zero.
- A. I only
B. II only
C. I and III only
D. I and II only
E. II and III only
6. Which of the following risks does not exist in a well-diversified portfolio?
- A. Market risk
B. Asset-specific risk
C. Non-diversifiable risk
D. Systematic risk
7. Aziz Equipment invests in a group of risky projects, which increase the unsystematic risk of the firm, but do not affect the systematic risk of the firm. All else the same, the expected risk premium of the company's common stock is likely to:
- A. increase, because the difference between the expected return on the firm's stock and the risk-free rate will widen.
B. decrease, because the difference between the expected return on the firm's stock and the risk-free rate will narrow.
C. remain unchanged, because the systematic risk is unchanged.
D. increase or decrease depending on the IRR of the projects.
8. You hold four stocks in your portfolio: A, B, C, and D. The portfolio has a beta of 1.20. Stock C comprises 40 percent of your portfolio and has a beta of 1.60. If you sell all of your holdings in Stock C and replace it with Stock E with a beta of 1.25, what is the new beta of your portfolio?
- A. 1.00
B. 1.06
C. 1.12
D. 1.25
E. 1.32
9. Which of the following are true? The cost of capital is:
- I. an opportunity cost that depends on the use of funds, not the source.
 - II. the same thing as the required return.
 - III. the same as the WACC for projects with the same risk as the firm.
- A. III only
B. II and III only
C. I and III only
D. I and II only
E. I, II, and III

10. In the _____ approach, we put projects into risk classes in order to assign them discount rates.
- A. pure play
 - B. capital budgeting
 - C. SML
 - D. dividend discount model
 - E. subjective

Partial Credit Problems --- SHOW ALL WORK

Problem 1 (5 points) True or False: A market that is semistrong form efficient is also weak form efficient. Explain.

Problem 2 (10 points) Calculate the WACC for the following firm:

Debt: 4,000 bonds with a par value of \$1,000 and a quoted price of 110.35. The bonds have coupon rate of 7 percent and 27 years to maturity. 6,000 bonds with a par value of \$1,000 and a quoted price of 91.27. The bonds have a coupon rate of 5 percent and 20 years to maturity.

Preferred Stock: 25,000 shares of 4.5 percent preferred selling at a price of \$65.

Common Stock: 160,000 shares of stock selling at a market price of \$106. The beta of the stock is 1.3. The stock just paid a dividend of \$1.05 per share and the dividends are expected to grow at 5 percent per year indefinitely.

Market: The market risk premium is 8 percent and the risk-free rate is 4.5 percent. The company is in the 40 percent tax bracket.

Problem 3 (10 points) You are in charge of deciding whether or not to undertake a new project for your company. The marketing staff has determined that your product will have a price of \$38 per unit and a variable cost of \$23 per unit. Equipment for production will cost \$1,200,000 and be depreciated on a straight-line basis to a zero salvage value over the 6-year life of the product. You can sell the equipment for \$120,000 at the end of the project. Fixed costs are \$150,000 per year and an inventory of \$100,000 is required. The tax rate is 40% and the required return is 13%. What is the minimum number of units sold per year necessary to accept the project?

Problem 4 (10 points) You have found the following information on three stocks and the market. The risk-free rate is 4 percent. If the CAPM holds and the market is efficient, could this situation exist? What would you expect to happen?

	Market	Stock X	Stock Y	Stock Z
Beta		0.80	1.15	1.30
Expected return	12.5%	10.80%	13.50%	15.35%

Problem 5 (3 points) There is a project that will cost \$3.9 million today and last for 14 years. The project will generate cash flows of \$700,000 per year and the required return is 13 percent. What is the NPV of the project?

Problem 6 (7 points) In one year, it is possible that the project will be a runaway success. If this is true, the company can spend \$1,500,000 at that time to expand production. After expansion, the annual cash flows would be \$1,025,000 per year. The likelihood of expansion is 40 percent. Assume the project will still end 14 years from today. What is the value of the option to expand?

Problem 7 (25 points)

LINKIN PARK COMPUTER

Linkin Park Computer is a small computer manufacturer located in Fairbanks, Alaska. You have been hired as an outside consultant to evaluate the feasibility of the company's planned expansion into printers.

Company History: Linkin Park Computer (LPC) was founded 26 years ago by Chester Bennington and has built computers over the entire life of the company. The company has never manufactured peripherals such as printers and scanners.

The Problem: The management of LPC is deciding whether or not to undertake the production of printers to complement their line of computers. LPC has determined that the necessary equipment will cost \$25 million and will be depreciated on a 7-year MACRS schedule (Page 249 of the textbook). The project will require an initial investment of \$500,000 and an additional investment of \$50,000 each successive year of the project. LPC expects to sell 90,000, 105,000, 115,000, 125,000 and 110,000 printers each year for the next five years, respectively, in conjunction with their computers. These printers will be sold at a price of \$129 each. LPC also plans to sell 15,000 printers per year at a price of \$169 on a stand-alone basis. Variable costs of manufacturing the printers are \$34 each and fixed costs are \$700,000 per year. The equipment used in the production of the printers can be sold for \$6 million in five years.

Other Issues: Since you have been hired as a consultant, you are going to be paid a fee of \$25,000 for your analysis. LPC currently uses Durst printers when a new computer is sold. In return, Durst has signed a contract to purchase 2,000 LPC computers each year. The contract calls for the delivery of 2,000 computers per year for the next two years. LPC believes the contract would be renewed they continued to use Durst printers. It is expected that the contract would be renewed for an additional 15 years. If LPC manufactures its own printers, Durst will not renew the contract. The computers are sold to Durst at a price of \$1,200 and have a variable cost of \$480. The tax rate for LPC is 35%. The cost of capital for the computer printer industry is 13%. LPC has an optimum capital structure of 40 percent debt and 60 percent equity. The floatation costs of debt are 5 percent and the floatation costs of equity are 7 percent. The company typically finances the equity portion of new projects using 35 percent retained earnings and 65 percent outside equity. Floatation costs are not applicable to net working capital.

Analysis: Calculate the payback period, NPV and IRR. Can you use each of these in this analysis? Should LPC produce the new printer?

Answer Key**FIN 6100****EXAM #2****Spring 2009**

1. C
2. B
3. C
4. E
5. B

6. B
7. C
8. B
9. E or C
10. E

MC #8

$$.4(1.6) + X = 1.20$$

$$X = .56$$

$$.4(1.25) + .56 = 1.06$$

Problem #1

True. Historical information is also public information; weak form efficiency is a subset of semi-strong form efficiency.

Problem #2*Debt*

Bond 1:

Enter	54		-\$1,103.50	\$35	\$1,000
	N	I/Y	PV	PMT	FV

Solve for

3.10%

$$3.10 \times 2 = 6.21\%$$

$$k_{d1} = 6.21 (1 - .40)$$

$$= 3.72\%$$

Bond 2:

Enter	40		-\$921.70	\$25	\$1,000
	N	I/Y	PV	PMT	FV

Solve for

2.87%

$$2.87 \times 2 = 5.74\%$$

$$k_{d2} = 5.74 (1 - .40)$$

$$= 3.44\%$$

Preferred Stock

$$k_p = \frac{D_1}{P_0} = \frac{4.50}{65} = .0692 \text{ or } 6.92\%$$

Equity

$$k_e = R_f + \beta[E(R_M) - R_f] = 4.5 + 1.3[8] = 14.90\%$$

$$k_e = \frac{D_1}{P_0} + g = \frac{1.05(1.05)}{106} + .05 = .0604 \text{ or } 6.04\%$$

Too low, so ignore.

Debt1:	$4,000 \times \$1,103.50 =$	$\$4,414,000$	$w_d = .155$
Debt2:	$6,000 \times \$932.60 =$	$\$5,476,200$	$w_d = .192$
PS:	$25,000 \times \$65 =$	$\$1,625,000$	$w_p = .057$
E:	$160,000 \times \$105 =$	<u>$\\$16,960,000$</u>	$w_e = .596$
		$\$28,475,200$	

$$WACC = (.155 \times 3.72) + (.192 \times 3.44) + (.057 \times 6.92) + (.596 \times 14.90) = 10.51\%$$

Problem #3

ICO

Equipment	<1,200,000>
NWC	<u><100,000></u>
	<1,300,000>

Salvage value

$$(BV - MV)(\text{Tax rate}) = (\$0 - 120,000)(.40) = -\$48,000$$

$$\$120,000 - 48,000 = \$72,000$$

$$NPV = 0 = -\$1,300,000 + OCF(PVIFA_{6,13\%}) + \$172,000/1.13^6$$

$$\$1,217,385.21 = OCF(3.997549789)$$

$$\$304,532.84 = [(P - VC)Q - FC](1 - \text{tax rate}) + \text{Dep}(\text{tax rate})$$

$$\$304,532.84 = [(\$38 - 23)Q - 150,000](1 - .40) + \$200,000(.40)$$

$$\$224,532.84 = [\$15Q - 150,000](.60)$$

$$\$224,532.84 = \$9Q - 90,000$$

$$\$314,532.84 = \$9Q$$

$$Q = 34,948$$

Problem #4

Using CAPM:

$$E(R_M) = 4\% + 1[12.5\% - 4\%] = 12.5\% = 12.5\%$$

$$E(R_X) = 4\% + 0.80[12.5\% - 4\%] = 10.80\% = 10.80\%$$

$$E(R_Y) = 4\% + 1.15[12.5\% - 4\%] = 13.78 > 13.50\%$$

$$E(R_Z) = 4\% + 1.30[12.5\% - 4\%] = 15.05 < 15.35\%$$

$$\text{Calculating the reward-to-risk ratio: } RTR = \frac{E(R_i) - R_F}{\beta_i}$$

$$\text{Market} = \frac{12.5 - 4}{1} = 8.5\%$$

$$\text{Stock X} = \frac{10.80 - 4}{0.8} = 8.5\%$$

$$\text{Stock Y} = \frac{13.5 - 4}{1.15} = 8.26\%$$

$$\text{Stock Z} = \frac{15.35 - 4}{1.30} = 8.73\%$$

In an efficient market, all assets lie on the SML and have the same reward-to-risk ratio. By definition, the market will fall on the SML. In this example, Stock X lies on the SML since its expected return is the same as that predicted by CAPM and is correctly priced. Stock Y has an expected return lower than that given by the CAPM and its reward-to-risk ratio is lower than the market, therefore it is overpriced and its price will fall until the expected return is commensurate with its level of risk. Stock Z has an expected return higher than that given by the CAPM and its reward-to-risk ratio is higher than the market, therefore it is underpriced and its price should rise until the expected return is commensurate with its level of risk.

Problem #5

The NPV is:

$$\text{NPV} = -\$3,900,000 + \$700,000(\text{PVIFA}_{13\%,14})$$

$$\text{NPV} = \$511,741.65$$

Problem #6

If the project is expanded, the NPV of cash flows will be:

$$\text{PV}_1 \text{ of expansion} = -\$1,500,000 + \$1,025,000(\text{PVIFA}_{13\%,13})$$

$$\text{PV}_1 \text{ of expansion} = \$4,774,856.81$$

The company may not expand. The PV_1 of not expanding is:

$$\text{PV}_1 \text{ of not expanding} = \$700,000(\text{PVIFA}_{13\%,13})$$

$$\text{PV}_1 \text{ of not expanding} = \$4,285,268.06$$

So, the NPV with expansion is:

$$\text{NPV} = -\$3,900,000 + \$700,000/1.13 + [.40(\$4,774,856.81) + .60(\$4,285,268.06)]/1.13$$

$$\text{NPV} = \$685,047.40$$

So, the value of the option to expand is:

$$\text{Option to expand} = \$685,047.40 - 511,741.65$$

$$\text{Option to expand} = \$173,305.75$$

Problem #7

ICO		w/ floatation
Equipment	(\$25,000,000)	(\$26,241,209)
Inventory	(\$500,000)	(\$500,000)
Total	(\$25,500,000)	(\$26,741,209)

	Weights	Floatation
Debt	40%	5%
Equity	60%	7%
RE financing	35%	
Floatation costs	4.73%	

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6-17</u>
Sales (w/ computer)	\$11,610,000	\$13,545,000	\$14,835,000	\$16,125,000	\$14,190,000	
Sales (stand-alone)	2,535,000	2,535,000	2,535,000	2,535,000	2,535,000	
Lost sales	0	0	(2,400,000)	(2,400,000)	(2,400,000)	(2,400,000)
Total sales	\$14,145,000	\$16,080,000	\$14,970,000	\$16,260,000	\$14,325,000	(\$2,400,000)
VC						
New	(\$3,570,000)	(\$4,080,000)	(\$4,420,000)	(\$4,760,000)	(\$4,250,000)	
Lost comp. VC	0	0	960,000	960,000	960,000	960,000
Total VC	(\$3,570,000)	(\$4,080,000)	(\$3,460,000)	(\$3,800,000)	(\$3,290,000)	\$960,000
Sales	\$14,145,000	\$16,080,000	\$14,970,000	\$16,260,000	\$14,325,000	(\$2,400,000)
VC	(3,570,000)	(4,080,000)	(3,460,000)	(3,800,000)	(3,290,000)	960,000
FC	(700,000)	(700,000)	(700,000)	(700,000)	(700,000)	0
Depreciation	(3,572,500)	(6,122,500)	(4,372,500)	(3,122,500)	(2,232,500)	0
EBT	\$6,302,500	\$5,177,500	\$6,437,500	\$8,637,500	\$8,102,500	(\$1,440,000)
Tax	(2,205,875)	(1,812,125)	(2,253,125)	(3,023,125)	(2,835,875)	504,000
NI	\$4,096,625	\$3,365,375	\$4,184,375	\$5,614,375	\$5,266,625	(\$936,000)
+Depreciation	3,572,500	6,122,500	4,372,500	3,122,500	2,232,500	0
OCF	\$7,669,125	\$9,487,875	\$8,556,875	\$8,736,875	\$7,499,125	(\$936,000)
NWC	(\$50,000)	(\$50,000)	(\$50,000)	(\$50,000)	\$700,000	
Capital spending					\$5,852,125	
Total CF	\$7,619,125	\$9,437,875	\$8,506,875	\$8,686,875	\$14,051,250	(\$936,000)

Salvage CF	Market value	\$6,000,000	Book value	\$5,577,500
	Taxes	(\$147,875)		
	Aftertax CF	\$5,852,125		

Cash Flows	t	CF
	0	(\$27,152,452)
	1	\$7,619,125
	2	\$9,437,875
	3	\$8,506,875
	4	\$8,686,875
	5	\$14,051,250
	6	(\$936,000)
	7	(\$936,000)
	8	(\$936,000)
	9	(\$936,000)
	10	(\$936,000)
	11	(\$936,000)
	12	(\$936,000)
	13	(\$936,000)
	14	(\$936,000)
	15	(\$936,000)
	16	(\$936,000)
	17	(\$936,000)

Payback	3.18 yrs.
NPV	\$2,825,044.18
IRR	-10.43%;17.86%

You should accept the project since the NPV is positive. You cannot use IRR in this situation since the cash flows change sign resulting in multiple IRRs.