

**Fin 340 –Financial Management I**  
**Summer 2002**

Final Exam – Version A – Solutions

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*Tu-Th 11:00-12:15*

- 1) (4 points) Beehler Company common stock is currently trading at \$17.50 per share. The stock recently paid a dividend of \$3.33 per share, and this is expected to grow at a constant rate of 5 percent per year. If the company were to issues external equity, it would incur a 10 percent flotation cost.

- a) What is the cost of internal equity for Beehler Company?

$$k_s = \frac{D_1}{P_0} + g = \frac{3.33(1.05)}{17.50} + 0.05 = 0.20 + 0.05 = 25\% .$$

- b) What is the cost of external equity for Beehler Company?

$$k_e = \frac{D_1}{P_0(1-f)} + g = \frac{3.33(1.05)}{17.50(1-0.10)} + 0.05 = 0.222 + 0.050 = 27.2\% .$$

- 2) (3 points) Pett Manufacturing's 8.5 percent, semiannual coupon bonds are currently selling at \$925 and have 20 years remaining until maturity. Pett's current federal-plus-state tax rate is 35 percent. What is Pett's component cost of debt for purposes of calculating the WACC?

$$P/Y = 2, N = 40, PV = -925, PMT = 42.50, FV = 1,000 \Rightarrow I = 9.33\% .$$

$$\text{Thus, } (1 - t) k_d = (1 - 0.35) 9.33 = 6.07\% .$$

- 3) (2 points) LeCompte Limited's preferred stock with a \$15 annual dividend is currently trading at \$125 per share. What is LeCompte's component cost of preferred stock for purposes of calculating the WACC?

$$k_p = 15 / 125 = 12.00\% .$$

- 4) (4 points) Ross Marketing Group's stock currently sells for \$52 per share. Ross recently paid a dividend of \$4.75 per share, which was based on its dividend payout ratio of 75%. Ross' return on equity has been 16% for several years, and is expected to remain the same for the foreseeable future. What is Ross' component cost of inside equity (retained earnings) for purposes of calculating the WACC?

First, note that the growth rate of dividends can be estimated a

$$g = (1 - \text{DPR}) \times \text{ROE} = 0.25 \times 16 = 4\% .$$

$$\text{Thus, } k_s = \frac{4.75(1.04)}{52} + 0.04 = 13.5\% .$$

- 5) (8 points) The earnings, dividends, and stock price of Farmer Agricultural Equipment Corporation are expected to grow at 6 percent per year in the future. Farmer's common stock sells for \$108 per share and its last dividend was \$10 per share.

- a) Using the discounted cash flow approach, what is Farmer's cost of common equity? (Hint: Ignore flotation costs.)

$$k_s = \frac{10(1.06)}{108} + 0.06 = 15.81\%.$$

- b) If Farmer's beta is 2, the risk-free rate is 5.5 percent and the market risk premium is 6 percent, what will be the firm's cost of common equity using the CAPM approach?

$$k_s = 5.5 + 2(6) = 17.50\%.$$

- c) Farmer's 9.5% semi-annual coupon bonds with 10 years remaining until maturity are currently trading at \$935. If Farmer's common stock requires a 6 percent premium over its bonds, what will be the firm's cost of common equity using the own-bond-yield-plus-risk-premium approach?

$$P/Y = 2, N = 20, PV = -935, PMT = 47.50, FV = 1,000 \Rightarrow I = 10.57\%.$$

$$k_s = 10.57 + 6.00 = 16.57\%.$$

- d) On the basis of the results of parts a through c, what you would estimate Farmer's cost of common equity to be?

$$k_s = (15.81 + 17.50 + 16.57) / 3 = 16.63\%.$$

- 6) (6 points) Miles Travel Inc. is considering investing in a ticketing system that would cost \$1,000 and would produce a uniform incremental cash flow stream for 10 years, i.e., the cash flows are the same in years 1 through 10. The internal rate of return on this investment is 12 percent. Miles' cost of capital is 10 percent. What is the modified internal rate of return on this investment?

First, calculate the size of the uniform cash flow stream:  $P/Y = 1, N = 10, I = 12, PV = -1,000, FV = 0 \Rightarrow PMT = 176.98$ .

Next, calculate the future value of this annuity at the 10 percent cost of capital:  $I = 10, PV = 0 \Rightarrow FV = -2,820.67$ .

Finally, compute the MIRR given the \$1,000 required initial investment:  $PV = 1,000, PMT = 0 \Rightarrow I = 10.93\%$ .

- 7) (3 points) Dr. D Computer Consultants is considering replacing its computer server. The new equipment would cost Dr. D \$35,000, including installation costs. Annual operating costs associated with the new server are expected to be \$5,000, as opposed to \$15,000 with their existing server. Both the new server and the existing server have a 5 year useful life and will have no salvage value at that time. Dr. D's weighted average cost of capital is 12 percent. Should Dr. D replace its server?

The first thing to note here is that this project generates no direct revenues. Instead, it produces a cost savings. The annual cost savings is \$10,000.

The internal rate of return on this investment is  $P/Y = 1$ ,  $N = 5$ ,  $PV = -35,000$ ,  $PMT = 10,000$ ,  $FV = 0 \Rightarrow I = 13.20\%$ . Since this is greater than Dr. D's cost of capital, the investment is a good one.

Alternatively, you can calculate the present value of the cost savings:  $P/Y = 1$ ,  $N = 5$ ,  $I = 12$ ,  $PMT = 10,000$ ,  $FV = 0 \Rightarrow PV = -\$36,048$ . Since the present value of the cost savings is greater than the cost of the server (\$35,000), Dr. D should make the investment.

- 8) (4 points) Who or what is king in finance? What are the three most important things to remember about this king?

Cash is king.

More is better than less. Sooner is better than later. Certain is better than uncertain.

- 9) (3 points) What is meant by “non-normal” cash flows? What problem can arise when the cash flows associated with a project are non-normal?

Non-normal cash flows occur when the sign of the cash flows changes more than once. A typical example is a project that requires a large up-front investment and then also involves shutdown costs.

When project cash flows are non-normal, then a unique solution may not exist for the internal rate of return. In this case, it is necessary either to calculate the MIRR of the project or to use the NPV method to evaluate the investment opportunity.

10) (33 points) DeSilva Worldwide Enterprises' common stock currently sells for \$160 per share. Its latest dividend was \$32.50 per share; this is expected to grow by 3% per year for the indefinite future.

DeSilva's 12 percent semiannual coupon bonds are currently trading at par; they have 8 years remaining until maturity.

DeSilva preferred stock pays an annual dividend of \$12 and currently trades at \$110 per share.

DeSilva's marginal tax rate is 40 percent, and its capital structure consists of 50 percent common stock, 40 percent debt, and 10 percent preferred stock. The risk-free rate is currently 3.50 percent and the average return on the market as a whole is 10.00 percent. DeSilva's beta is 3.50. When using the bond-yield-plus-risk-premium approach, DeSilva assumes that its common equity requires a 12.50 percent risk premium over its own bonds.

DeSilva needs to open a new production facility, and is considering two different locations in Asia: Rangaloo and West Nietvam. The incremental cash flows associated with each alternative are as follows (in thousands):

<u>Year</u>	<u>Rangaloo</u>	<u>W. Nietvam</u>
0	(40,000)	(33,000)
1	2,250	17,500
2	5,550	15,000
3	30,500	12,500
4	40,500	7,500

These two locations are mutually exclusive, so one and only one will be chosen.

a) (2 points) What is DeSilva's component cost of debt?

The component cost of debt is simply 12%, because the bond's are trading at par.

b) (2 points) What is DeSilva's component cost of preferred stock?

The component cost of preferred stock is  $120 / 110 = 10.91\%$ .

c) (8 points) What is DeSilva's component cost of equity? (Hint: In calculating the cost of DeSilva's equity, take the average of the values calculated based on the discounted cash flow, CAPM, and own-bond-yield-plus-risk-premium approaches. Ignore flotation costs.)

The cost of common equity must be calculated using each method.

– DCF:  $k_s = \frac{D_1}{P_0} + g = \frac{32.50(1.03)}{160} + 0.03 = 23.92\%$ .

– CAPM:  $k_s = k_{rf} + \beta_s(k_m - k_{rf}) = 0.035 + 3.50(0.100 - 0.035) = 26.25\%$ .

– BYPRP:  $k_s = 12.00 + 12.50 = 24.50\%$ .

Thus, the cost of common equity is  $k_s = (23.92 + 26.25 + 24.50) / 3 = 24.89\%$ .

- d) (3 points) What is DeSilva’s weighted average cost of capital (WACC)?

$$\text{The firm's WACC} = 0.40 \times 12.00 (1 - 0.40) + 0.10 \times 10.91 + 0.50 \times 24.89 = 16.42\%.$$

- e) (5 points) Calculate the payback period for each location. Which location is more desirable based on the payback method?

Rangaloo

<u>Year</u>	<u>Cash Flow</u>	<u>Cum. CF</u>
0	(\$40,000)	(\$40,000)
1	2,250	(37,750)
2	5,550	(32,200)
3	30,500	(1,700)
4	40,500	38,800

In the 4<sup>th</sup> year \$1.7 million in up-front costs must still be recovered. Thus, the payback period is  $3 + 1,700 / 40,500 = 3.04$  years.

W. Nietvam

<u>Year</u>	<u>Cash Flow</u>	<u>Cum. CF</u>
0	(\$33,000)	(\$33,000)
1	17,500	(15,500)
2	15,000	(500)
3	12,500	12,000
4	7,500	19,500

In the 3<sup>rd</sup> year \$500,000 in up-front costs must still be recovered. Thus, the payback period is  $2 + 500 / 12,500 = 2.04$  years.

Based on the payback method, W. Nietvam is the only acceptable location.

- f) (9 points) Calculate the net present value (NPV) and internal rate of return (IRR) for each location. Based on each method, which of location should DeSilva choose?

Rangaloo –  $CF_0 = -40, C_1 = 2.25, C_2 = 5.55, C_3 = 30.5, C_4 = 40.5,$   
 $I = 16.42 \Rightarrow NPV = \$7.40 \text{ million. IRR} = 22.60\%.$

W. Nietvam –  $CF_0 = -33, C_1 = 17.5, C_2 = 15, C_3 = 12.5, C_4 = 7.5,$   
 $I = 16.42 \Rightarrow NPV = \$5.10 \text{ million. IRR} = 25.14\%.$

Based on NPVs, DeSilva should choose Rangaloo. Based on IRR’s, DeSilva should choose W. Nietvam.

- g) (4 points) If you have done your calculations correctly, you should have a conflict between the IRR and NPV methods. When this occurs, which method is preferable? Explain why briefly.

Generally speaking, the NPV method is more reliable. It assumes that cash flows are reinvested at the firm’s overall weighted average cost of capital

rather than the project's internal rate of return. In most circumstances, this is more reasonable.

In addition, the NPV method focuses on the cash that will be generated by the project, rather than simply a rate of return. Since projects often cannot be replicated, it is the overall cash into the firm that matters most, not the rate of return earned on a small investment.

Multiple Choice & True/False Questions (2 points each)

- \_\_\_\_\_ 1. The weighted average cost of capital is used
- A. for short-term working capital management.
  - B. as a hurdle rate for making investment decisions.
  - C. as a discount rate for calculating net present values.
  - D. Both A and B.
  - E. BOTH B AND C.**
- \_\_\_\_\_ 2. Which of the following sources of financing is *not* typically included when calculating the weighted average cost of capital (WACC)?
- A. Long-term debt.
  - B. Preferred stock.
  - C. Retained earnings.
  - D. ACCOUNTS PAYABLE.**
  - E. All of the above are included when calculating WACC.
- \_\_\_\_\_ 3. The “pure-play” approach to risk adjustment involves
- A. directly estimating the beta risk of the project using scenario analysis.
  - B. FINDING A STAND-ALONE FIRM THAT MIRRORS THE PROPOSED PROJECT AND USING THAT FIRM'S WACC AS THE PROJECT COST OF CAPITAL.**
  - C. adjusting the standard deviation of the project's expected return.
  - D. making an ad-hoc adjustment to the firm's WACC based on the project's perceived riskiness.
  - E. acting in a theatrical production.
- \_\_\_\_\_ 4. The cost of new equity is \_\_\_\_\_ than the cost of retained earnings because of \_\_\_\_\_.
- A. higher; beta risk
  - B. HIGHER; FLOTATION COSTS**
  - C. lower; beta risk
  - D. lower; flotation costs
  - E. the same; the weighted average cost of capital

- \_\_\_\_\_ 5. When considering independent projects, the firm should
- A. accept the project with the highest NPV.
  - B. ACCEPT ALL PROJECTS WITH A POSITIVE NPV.**
  - C. reject the project with the highest IRR.
  - D. reject any project with a positive IRR.
  - E. reject any project if its IRR is not equal to its MIRR.
- \_\_\_\_\_ 6. When considering mutually exclusive projects, the firm should
- A. ACCEPT THE PROJECT WITH THE HIGHEST NPV.**
  - B. accept all projects with a positive NPV.
  - C. reject the project with the highest IRR.
  - D. reject any project with a positive IRR.
  - E. reject any project if its IRR is not equal to its MIRR.
- \_\_\_\_\_ 7. The payback period is a useful decision rule because it
- A. takes into account the time value of money.
  - B. ignores cash flows after the payback period.
  - C. provides a precise estimate of a project's stand-alone risk.
  - D. IS EASY TO CALCULATE AND UNDERSTAND.**
  - E. always gives the same recommendation as the NPV method.
- \_\_\_\_\_ 8. A-Helm Inc. has already spent \$2 million evaluating a new production technology. It must now decide whether to expend an additional \$10 to implement this technology. Which of the following statements is most correct?
- A. The \$2 million expense must be included as a part of the up-front cost of this project when making a capital budgeting decision because the cost has already been incurred.
  - B. THE \$2 MILLION EXPENSE MUST BE IGNORED DURING THE CAPITAL BUDGETING DECISION BECAUSE IT IS A SUNK COST.**
  - C. The \$2 million expense will cause the project's cash flows to be non-normal.
  - D. The \$2 million expense is not relevant because it is not an incremental cash flow.
  - E. The \$2 million expense was a big waste of money; they should have thrown a really big party instead.

- \_\_\_\_\_ 9. The modified internal rate of return (MIRR) is more useful for capital budgeting decisions than the ordinary internal rate of return (IRR) because
- A. **THE MIRR ASSUMES CASH FLOWS ARE REINVESTED AT THE FIRM'S WACC.**
  - B. the MIRR is easier to calculate.
  - C. the IRR ignores the time value of money.
  - D. it never conflicts with the NPV method for ranking projects.
  - E. None of the above.
- \_\_\_\_\_ 10. The NPV and IRR methods can give different rankings of mutually exclusive projects when
- A. the size of the required investment differs between the projects.
  - B. the timing of the cash flows differs between the projects.
  - C. the payback period differs between the projects.
  - D. **BOTH A AND B.**
  - E. None of the above.
- \_\_\_\_\_ 11. True or **FALSE**: Assets that the firm already owns (such as buildings, land, or equipment) do not need to be included in the up-front costs when making capital budgeting decisions.
- \_\_\_\_\_ 12. True or **FALSE**: The weighted average cost of capital is adjusted to account for the taxes paid by the firm's investors.
- \_\_\_\_\_ 13. **TRUE** or False: The weighted average cost of capital is calculated using marginal, or market, costs.
- \_\_\_\_\_ 14. True or **FALSE**: The most relevant risk to consider when making capital budgeting decisions is within-firm, or corporate risk.
- \_\_\_\_\_ 15. True or **FALSE**: Inflation should be ignored when estimating cash flows for capital budgeting decisions because the WACC also ignores inflation.