Spring-2012 FINAL EXAM AGEC 424
(241 total points)

You must show logically correct work, including calculator inputs and outputs for all problems to receive credit. Show signs on calculator inputs. Differentiate calculator outputs from inputs.

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Industry median</th>
<th>AgBiz Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit margin (PM = ROS)</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>Total Asset Turnover</td>
<td>3 x</td>
<td>4 x</td>
</tr>
<tr>
<td>Debt ratio (TL/TA)</td>
<td>50%</td>
<td>20%</td>
</tr>
<tr>
<td>DSO (also called ACP)</td>
<td>32 days</td>
<td>20 days</td>
</tr>
<tr>
<td>ITO (COGS/inventory)</td>
<td>6 x (\frac{360}{9} = 60)</td>
<td>9 x (\frac{360}{9} = 40)</td>
</tr>
<tr>
<td>ROE</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Accounts payable deferral</td>
<td>20 days</td>
<td>20 days</td>
</tr>
</tbody>
</table>

Use the above data for questions 1-3.

1. (10 points) Construct the extended Du Pont equation for both AgBiz Inc. and for the industry. Then analyze each of the three components of the company's ROE in a side-by-side comparison to the industry (say something about each component).

   \[
   \text{ROS} \times \text{TAT} \times \text{EM} = \text{ROE}
   \]

   \[
   \text{Ag.B. } \quad \frac{1}{1.2} = \frac{1}{1.8} = 1.25
   \]

   \[
   \text{Ind. } \quad \frac{1}{1.5} = 2
   \]

   AgBiz and the industry have the same ROE, but get it very differently. AgBiz has a 20% higher ROS and 1.33 times higher TAT (their ROA is 24% vs 15% for the industry). The industry uses much more debt to ramp up its ROE, whereas AgBiz uses very little financial leverage (EM of 1.25 versus 2.0 for the ind.).

2. (10 points) Show a side by side comparison of the cash conversion cycle for AgBiz Inc. with the industry. Use the CCC to analyze working capital management for AgBiz Inc. in comparison to the industry (say something about each component).

   \[
   \text{ICP} + \text{DSO} - \text{AP} = \text{CCC}
   \]

   \[
   \text{Ag.B. } \quad 40 + 20 - 20 = 40 \text{ days}
   \]

   \[
   \text{Ind. } \quad 60 + 32 - 20 = 72 \text{ days}
   \]

   AgBiz has a much lower CCC (by 32 days) and therefore has much better working capital management. AgBiz has a 20 day shorter inventory conversion, 12 days fewer sales outstanding and the same AP deferral as the industry.

3. (3 points) Based on the data and information on this page point out any red flags or successes that you see for AgBiz Inc.

   AgBiz has good ROS, TAT, and working capital management.

   I do not see any red flags but perhaps the company has too little debt.
4. Critically evaluate the following statements made by groups during AGEC 424 term project presentations. Explain in a one or two sentences.

a. (2 points) My company has a debt ratio (TL/TA) of 1.08. 
   The company is bankrupt (E<0) or the ratio is wrong. Most likely the ratio is actually TL/E.

b. (2 points) My company has an equity multiplier of 2.5 and a debt ratio of 17%.
   These numbers are inconsistent and therefore one or both are wrong.
   \[
   \frac{1}{1.17} \neq 1.2 \neq 2.5
   \]

c. (2 points) My company has poor asset management. It has TAT = 0.82 and the industry average is 0.41.
   TAT twice the industry average is likely to be very good asset mgmt., not poor.

d. (2 points) Data for a given company for ITO and inventory conversion period show different information.
   The information content is exactly the same, only the units of measurement change. ITO measures inventory turns per year, ICP measures the days it takes to turn inventory.

5. The risk free rate and the market risk premium are given to you as 2% and 5%, respectively, for the term project.

a. (4 points) What are the required rates of returns for equity investors in company A with a beta of 0.5 and company B with a beta of 1.5? Show work
   \[
   K_A = 2 + 0.5(5) = 4.5% \\
   K_B = 2 + 1.5(5) = 9.5%
   \]

b. (2 points) Based on the data given what is K_m, the expected return on the market? Show work
   \[
   K_m - 2 = 5 \Rightarrow K_m = 7
   \]

c. (2 points) What is the economic factor making the required returns for companies A & B different than the market?
   Risk. A has less risk than the average stock & B has more risk than average

6. (6 points) You want to purchase a beach house for $220,000 funding as much of the cost as possible with a home mortgage loan. Banks are currently offering standard thirty year mortgages at 8% (monthly compounding). Unfortunately, you can only afford payments of $1,500 per month. How much cash will you need for a down payment in order to buy the home? (Round to the nearest dollar) Show work

\[
\begin{align*}
\text{PV} &= 204,425.24 = \text{Maximum loan you can afford} \\
\text{PV} &= 204,425.24 \\
\text{I} &= 8/12 \\
\text{Pmt} &= 1500 \\
\text{PV} &= 20
\end{align*}
\]
7. a. (7 points) What is the monthly payment on a 5-year car loan of $30,000 at 6.5% interest compounded monthly? **Show work**

\[ N = 60 \quad I = 6.5\% \quad PV = -30,000 \quad FV = 0 \quad i = 0.065 \frac{1}{12} \quad PMT = 586.98 \]

b. (13 points) Construct an amortization table below for the first 2 months of the loan.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30,000</td>
<td>586.98</td>
<td>162.50</td>
<td>424.48</td>
<td>29,575.52</td>
</tr>
<tr>
<td>2</td>
<td>29,575.52</td>
<td>586.98</td>
<td>160.20</td>
<td>426.78</td>
<td>29,148.74</td>
</tr>
</tbody>
</table>

\[ 30,000 \times 0.065/12 = 162.50 \]
\[ 29,575.52 \times 0.065/12 = 160.20 \]

8. (8 points) Smith Blaney is trying to sell my grandmother a semiannual, 10% coupon, $1000 face value bond with 12 years to maturity. Currently the market requires a 8% rate of return on bonds of this risk. What is this bond worth? **Show work**

\[ N = 24 \quad I = 8\% \quad PMT = 50 \quad FV = 1000 \quad PV = \frac{-1152.47}{1152.47} \]

9. Thompson Tires Inc. has an outstanding semiannual, 12% coupon, $1000 face value bond that is selling for $1185 and has 10 years to maturity.
   a. (8 points) What is the yield to maturity of this bond? **Show work**

\[ N = 20, \quad PV = -1185, \quad PMT = 60, \quad FV = 1000, \quad \frac{?}{4.569} \times 2 = 9.14\% \]

b. (4 points) What is the current yield of this bond? **Show work**

\[ CY = \frac{120}{1185} = 10.19\% \]

10. (8 points) Assume the Thompson Tires bond above is callable in 5 years with a $60 call premium. What is the YTC? **Show work**

\[ N = 10, \quad PV = -1185, \quad PMT = 60, \quad FV = 1060, \quad i = \frac{?}{4.19} \times 2 = 8.39\% \]

11. (8 points) Smith Blaney is back trying to sell Grandma a 10 year, callable, semiannual, $1000 face value, 10% coupon bond. It is callable in 1 year with a $100 call premium. If comparable bonds of this risk yield 5% and you expect this bond to be called, what is its value? **Show work**

\[ N = 2, \quad I = 5\% \quad PMT = 50, \quad FV = 1100, \quad PV = \frac{-1143.37}{1143.37} \]
12. (8 points) Frazier Manufacturing paid a dividend last year of $2, which is expected to grow at a constant rate of 5%. Frazier has a beta of 1.3. If the market is returning 11% and the risk-free rate is 4%, calculate the value of Frazier’s stock. **Show work**

\[ K_{Frazier} = 4 + 1.3(11 - 4) = 13.19\% \]

\[ P_0 = \frac{2(1.05)}{.132 - .05} = \$25.61 \]

13. (15 points) Genestek Inc. just paid a $5.00 dividend. Due to a new product about to be released, analysts expect the company to grow at a supernormal rate of 15% for three years. After that it is expected to grow at a normal rate of 4% indefinitely. Stocks similar to Genestek are currently earning shareholders a return of 12%.

a. The estimated selling price of the stock is: **Show work**

\[ D_0 = 5 \quad D_1 = 5.75 \quad D_2 = 6.61 \quad D_3 = 7.60 \quad D_4 = 7.91 \]

\[ P_3 = \frac{7.91855}{.12 - .04} = \$98.86 \]

\[ C_F_0 = 20 \]

\[ C_F_1 = 5.75 \]

\[ C_F_2 = 6.61 \]

\[ C_F_3 = 7.60 + 98.86 = 106.46 \]

\[ I = 12 \]

\[ \text{Compute } NPV = 90.18 \]

b. If everything goes as projected what will the price of the stock be one year from now, and what are the expected dividend and capital gains yield the first year assuming the stock is purchased for the price in part a. **Show work**

Next year: \[ C_F_0 = 0 \]

\[ C_F_1 = 6.61 \]

\[ C_F_2 = 106.46 \]

\[ I = 12 \]

\[ \text{Compute } NPV = 90.17 \]

14. (2 points) What is the market price per share of Whopie, Inc. if the firm had net income of $200,000, earnings per share of $2.70, total equity of $800,000, and a market to book value ratio of 1.5? **Show work**

\[ \frac{M}{10.80} = 1.5 \quad \frac{200,000}{\#5} = 2.7 \]

\[ \Rightarrow M = 1.5(10.80) = 16.20 \]

\[ \#5 = \frac{200,000}{74,074.07} = 10.80 \]

15. (2 points) Which of the following is not a short-term debt instrument?

a. Commercial paper
b. Common stock
c. Money market securities
d. Treasury bills

16. (2 points) Which of the following is a characteristic(s) of initial public offerings (IPOs)?

a. Very stable
b. General public can get involved right away
c. Institutions are the largest investors in IPOs
d. Secondary market transaction
17. (2 points) The term “red herring” relates to the:
   a. SEC’s approval of a stock offering from a company whose future is questionable.
   b. circulation of the company’s prospectus prior to approval by the SEC.
   c. document distributed to potential investors that is stamped “incomplete information.”
   d. SEC’s conditional approval of the prospectus.

18. (2 points) Interest rates are set by:
   a. the forces of supply and demand in the market for debt.
   b. the Federal Reserve, the nation’s central bank which regulates the banking industry.
   c. senior banking executives on the basis of the funds banks have available to lend.
   d. the president and his council of economic advisors.

19. (2 points) The increased volatility of longer term bonds in response to interest rate movements is reflected in the:
   a. pure interest rate.
   b. default risk premium.
   c. liquidity risk premium.
   d. maturity risk premium.

20. (2 points) The interest rates we observe on financial instruments are based on the following components:
   a. the real risk-free rate
   b. inflationary expectations
   c. risk premiums
   d. all the above
   e. none of the above

21. (2 points) A 30-year corporate bond pays a higher interest rate than a 30-year federal government bond. This is due to a higher _________ premium on the corporate bond.
   a. inflation
   b. default Risk
   c. maturity Risk
   d. both a & b
   e. all of the above

22. (2 points) Which of the following is not associated with federal government debt?
   a. Liquidity risk
   b. Default risk
   c. Maturity Risk
   d. Both a & b
   e. All of the above

23. (2 points) The yield curve is:
   a. inverted when short-term rates are higher than long-term rates.
   b. normal when it slopes upward to the right
   c. a plot of interest rates versus term, also called the term structure of interest rates.
   d. all of the above
24. (6 points) Carol Pasca just had her fifth birthday. As a birthday present, her uncle promised to contribute $300 per month to her education fund until she turns 18 and starts college. Carol’s parents estimate college will cost $2,500 per month for four years, but don’t think they’ll be able to save anything toward it for five years. How much will Carol’s parents need to contribute to the fund each month starting on her tenth birthday to pay for her college education? Assume the fund earns 6% compounded monthly. **Show work**

\[ \begin{align*}
\text{(1) Cost of college discounted to start of college} \\
N &= 48, \ I = 6/12, \ PMT = 2500, \ FV = 0, \ PV = ? \quad \text{(from parents)} \\
PV &= 106,450.79 \\
\text{(2) FV of uncle’s $1,800/mo} \\
N &= 13 \times 12 = 156, \ PMT = 300, \ PV = 0, \ FV = ? \quad \text{(left for parents)} \\
FV &= 70,634.20 \\
\text{(3) Parents:} \\
N &= 8 \times 12 = 96, \ I = 5, \ PV = 35,816.59, \ PMT = ? \quad \text{(parents)} \\
FV &= 291,600 \\
\text{Parents' monthly contribution} &= 291,600 \div 96 = 3,025 \\
\end{align*} \]

25. (3 points) A firm has EBIT of $3.6M and debt of $15M on which it pays 8% interest. What is its Degree of Financial Leverage (DFL)? **Show work**

\[ \begin{align*}
a. \ & 1.0 \\
b. \ & 1.4 \\
c. \ & 1.5 \\
d. \ & 1.6 \\
\end{align*} \]

26. (3 points) Harris Inc. has EBIT of $1,500 and debt of $5,000 on which it pays 12% interest. Its EPS is currently $2.35 per share. Management anticipates a difficult period ahead and fears EBIT could decline by as much as 20%. What will the new EPS be if that happens? **Show work**

\[ \begin{align*}
a. \ & 1.88 \\
b. \ & 1.41 \\
c. \ & 1.57 \\
d. \ & Can’t tell from the information given \\
\end{align*} \]

27. (3 points) Illinois Tool Company’s (ITC) fixed operating costs are $1,260,000 and its variable cost ratio (i.e., variable costs as a fraction of sales) is 0.70. The firm’s debt consists of a $6,000,000 bond issue (par value), which pays a coupon rate of 9%. Sales are $9 million per year. What is ITC’s degree of financial leverage? **Show work**

\[ \begin{align*}
a. \ & 1.20 \\
b. \ & 1.875 \\
c. \ & 3.0 \\
d. \ & 1.60 \\
\end{align*} \]
28. (3 points) A firm has a product that sells for $25. The direct cost of manufacturing the product is $15 per unit. The product’s contribution margin is: **Show work**

a. $10  

b. $40  
c. $60  
d. $70

\[
\frac{25 - 15}{25} = 40\% 
\]

29. (6 points) Assume the following facts about a firm that sells just one product:

- Selling price per unit = $24.00
- Variable costs per unit = $18.00
- Total monthly fixed costs = $2,500

What is the firm’s monthly breakeven volume in units? **Show work**

- a. 417 units  
b. 1,250 units  
c. 5,000 units  
d. 1,667 units

\[
\frac{2,500}{24 - 18} = 416.67 
\]

30. (2 points) If a firm’s degree of operating leverage is 8, what percentage change in sales revenue is required to double the firm’s EBIT? **Show work**

- a. 100%  
b. 8%  
c. 12.5%  
d. none of the above

\[
8 \times \% \Delta = 100\% \quad \text{increase} 
\]

\[
\% \Delta = \frac{100\%}{8} = 12.5\% 
\]

31. (2 points) Illinois Tool Company’s (ITC) degree of total leverage (DTL) is 3.00 at a sales volume of $9 million. Determine ITC’s percentage change in earnings per share (EPS) if forecasted sales increase by 20 percent to $10,800,000. **Show work**

- a. 60%  
b. 50%  
c. 32%  
d. none of the above

\[
3 \times (20) = 60\% 
\]

32. (2 points) Kermit’s Hardware’s (KH) fixed operating costs are $20.8 million and its variable cost ratio is 0.30. The firm has $10 million in bonds outstanding with a coupon interest rate of 9%. KH has 200,000 shares of common stock outstanding. The firm has revenues of $32.2 million and its marginal tax rate is 40%. Compute KH’s degree of total leverage. **Show work**

- a. 26.8  
b. 5.5  
c. 29.1  
d. 4.7

\[
\text{GM} = 32.2 \times (0.7) = 22.54 
\]

\[
\text{EBIT} = 22.54 - 20.8 = 1.74 
\]

\[
\text{EBIT} - I = 1.74 - (0.09) = 1.84 
\]

\[
\text{DOL} = \frac{22.54}{1.74} = 12.95 
\]

\[
\text{DFL} = \frac{1.74}{0.09} = 20.77 
\]

\[
\text{DTL} = 12.95 \times 2.07 = 26.83 
\]

\[
\text{DTL} = 12.95 \times 2.07 = 26.8 
\]
34. (2 points) A firm’s degree of financial leverage is 2 and the degree of operating leverage is 2.5. What is their degree of total leverage? Show work
a. 6.0
b. 4.5
\[ 2 \times 2.5 = 5 \]
c. 5.0
d. none of the above

35. (2 points) Stocks that have high financial rewards are generally accompanied by:
   a. high dividend payments.
   b. low dividend payments because of internally generated growth.
   c. high risk.
   d. all of the above
   C

36. (2 points) The underlying principles of portfolio theory include:
   a. diversifying business-specific risk away.
   b. basing decisions on stocks’ risk/return characteristics in a portfolio context rather than on a stand-alone basis.
   c. getting the highest available return for the amount of risk the investor is comfortable with.
   D all of the above

37. (2 points) Market risk:
   a. is the degree to which a stock’s return moves with the market’s return.
   b. is caused by things that affect specific companies or industries.
   c. can be diversified away.
   A
   d. is the chance of losing money in the stock market.

38. (2 points) Which of the following statements is false?
   a. \( \checkmark \) Beta is meaningful only if an investor holds a well-diversified portfolio.
   b. \( \checkmark \) You can completely eliminate risk if you hold a well diversified portfolio.
   c. \( \checkmark \) A portfolio composed of only one stock will not be well diversified.
   d. \( \checkmark \) A wise investor diversifies to capture the high average return of stocks while avoiding as much risk as possible.
   e. \( \checkmark \) All of the above statements are correct.

   Best answer is B
39. (9 points) Olsen Engineering is considering including two pieces of equipment, a truck and an overhead pulley system, in this year’s capital budget. The projects are independent. The cash outlay for the truck is $22,430, and for the pulley system it is $17,100. Each piece of equipment has an estimated life of five years. The annual after-tax cash flow expected to be provided by the truck is $7,500, and for the pulley it is $5,100. The firm’s required rate of return is 14 percent.

a. Compute the projects’ payback. Show work

\[
\text{Truck: } \frac{22430}{7500} = 2.99 \text{ years} \quad \text{Pulley: } \frac{17100}{5100} = 3.35 \text{ years}
\]

b. What are the net present value (NPV) and internal rate of return (IRR) of the projects and which would you choose if they are independent? Why? Show work

\[
\text{Truck: } \begin{align*}
\text{CF}_0 &= -22430 \\
\text{CF}_1 &= 7500 \\
\text{CF}_2 &= 7500 \\
I &= 14
\end{align*}
\]

\[
\text{Pulley: } \begin{align*}
\text{CF}_0 &= -17100 \\
\text{CF}_1 &= 5100 \\
\text{CF}_2 &= 5100 \\
\text{CF}_3 &= 5100 \\
I &= 14
\end{align*}
\]

Both should be accepted because NPV > 0

\[
\text{NPV} = 3318.81 \quad \text{IRR} = 20.95
\]

\[
\text{NPV} = 408.71
\]

Compute IRR = 14.99

c. Which would you choose if they were mutually exclusive? Why?

Select Truck, has greatest NPV

40. (8 points) Projected cash flows for two mutually exclusive projects are as follows (again, identify all calculator inputs and outputs):

<table>
<thead>
<tr>
<th>Year</th>
<th>Project A</th>
<th>Project B</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>CF A: ($150,000)</td>
<td>CF B: ($200,000)</td>
</tr>
<tr>
<td>1</td>
<td>$80,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>2</td>
<td>$60,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>3</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>4</td>
<td>$60,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>5</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>6</td>
<td>$53,000</td>
<td>$50,000</td>
</tr>
</tbody>
</table>

\[
\text{I} = 10 \\
\text{NPV} = 17195.68
\]

If the firm’s cost of capital is 10% and the equivalent annual annuity method is used to eliminate the disparity between the projects’ lives, which project should be undertaken? Why?

\[
\frac{A}{n} = 3 \quad I = 10 \\
PV = -9879.79 \\
PV = 0
\]

\[
\frac{B}{n} = 6 \\
I = 10 \\
PV = -12495.08 \\
FV = 0
\]

\[
\text{DAI} = 3948.26
\]

\[
\text{A has higher EAA and } 2 \text{ is best, but the } \\
\text{difference is very } \\
\text{small.}
\]
41. (40 points) Two years ago our company bought equipment for $2 million that has been depreciated straight line over a five-year life. The existing equipment has a current market value of $400,000 (but would be worth only $200,000 if kept 5 more years). More efficient equipment can be purchased today for $3 million and is expected to last 5 years (economic life), at which time its anticipated salvage value would be $500,000. However, the new equipment would be depreciated straight line over only four years to a zero salvage value. Our company would realize a $1,000,000 per year operating cost savings by replacing the old equipment with the new equipment. Also, our Net Working Capital requirement would decrease by $75,000 as soon as we bought the equipment, but would increase again when it is sold at the end of its economic life (5 years). Our marginal tax rate is 40% and the firm’s WACC is 10%. On the attached form identify the relevant cash flows for this project, NPV, IRR, Payback, and should the company make this replacement investment (state why)?

42. (4 points extra credit) Conestoga Ltd. has the following probability distribution of returns. Calculate Conestoga’s expected return, variance, standard deviation of return, and the return’s coefficient of variation. Show work.

<table>
<thead>
<tr>
<th>$K_i$ Return</th>
<th>$p_i$ Probability</th>
<th>$K_i\times p_i$</th>
<th>$K_i - \bar{K}$</th>
<th>$(K_i - \bar{K})^2$</th>
<th>$p_i \times (K_i - \bar{K})^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>4%</td>
<td>.20</td>
<td>.8</td>
<td>-7</td>
<td>49</td>
<td>9.8</td>
</tr>
<tr>
<td>12%</td>
<td>.50</td>
<td>6.0</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>14%</td>
<td>.30</td>
<td>4.2</td>
<td>3</td>
<td>9</td>
<td>2.2</td>
</tr>
</tbody>
</table>

\[ \bar{K} = 11.9 \]

\[ \sigma^2 = 13 \]

\[ \sigma = \sqrt{13} = 3.61 \]

\[ CV = \frac{3.61}{11} = 0.328 \]
### Worksheet for the capital budgeting question

**Initial Outlay**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>New Old</th>
<th>Dep. = 720,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old</td>
<td>3,600,000</td>
<td></td>
</tr>
<tr>
<td>New</td>
<td>4,000,000</td>
<td></td>
</tr>
<tr>
<td>Dep.</td>
<td>-2,165,000</td>
<td></td>
</tr>
<tr>
<td>NWC</td>
<td>+75,000</td>
<td></td>
</tr>
<tr>
<td>CFo</td>
<td>-2,245,000</td>
<td></td>
</tr>
</tbody>
</table>

**Depreciation** [initial basis = 3,600,000]

<table>
<thead>
<tr>
<th>Year</th>
<th>New</th>
<th>Old</th>
<th>A Dep.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>750,000</td>
<td>400,000</td>
<td>350,000</td>
</tr>
<tr>
<td>2</td>
<td>750,000</td>
<td>400,000</td>
<td>350,000</td>
</tr>
<tr>
<td>3</td>
<td>750,000</td>
<td>400,000</td>
<td>350,000</td>
</tr>
<tr>
<td>4</td>
<td>750,000</td>
<td>0</td>
<td>750,000</td>
</tr>
</tbody>
</table>

\[
\text{3,000,000} \div 4 = 750,000
\]

**Operating Cash Flow**

<table>
<thead>
<tr>
<th>Reduced Cost</th>
<th>1 - 3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000,000</td>
<td></td>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>

**EBT**

<table>
<thead>
<tr>
<th></th>
<th>1 - 3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>650,000</td>
<td></td>
<td>250,000</td>
<td>100,000</td>
</tr>
</tbody>
</table>

**EAT**

<table>
<thead>
<tr>
<th></th>
<th>1 - 3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>390,000</td>
<td></td>
<td>150,000</td>
<td>600,000</td>
</tr>
</tbody>
</table>

**Dep. add-back**

<table>
<thead>
<tr>
<th></th>
<th>1 - 3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>350,000</td>
<td></td>
<td>750,000</td>
<td>0</td>
</tr>
</tbody>
</table>

**OCF**

<table>
<thead>
<tr>
<th></th>
<th>1 - 3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>740,100</td>
<td></td>
<td>900,000</td>
<td>600,000</td>
</tr>
</tbody>
</table>

**Terminal CF**

<table>
<thead>
<tr>
<th></th>
<th>1 - 3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>500,000</td>
<td></td>
<td>200,000</td>
<td>0</td>
</tr>
</tbody>
</table>

**Timeline and calculator inputs/outputs and investment decision**

- **CF0**: -2,205,000
- **CF1**: 740,000
- **CF2**: 740,000
- **CF3**: 740,000
- **CF4**: 900,000
- **CF5**: 600,000 + 105,000 = 705,000

**Payback**

\[
\text{Payback} = \frac{2,205,000}{740} = 2.98 \text{ years}
\]

**Internal Rate of Return (IRR)**

- **Compute NPV** = 87,732.12
- **Compute IRR** = 21.84%

**Make investment**: NPV > 0