FIN_200 Assignment #2

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Q1.

> You have been asked by the prospective directors of a shortly to be established business what is meant by ordinary shares, preference shares and debt capital. Further, you have been asked to provide a brief explanation of their relative advantages and disadvantages as sources of funds to expand the business. Write an essay to assist these managers. (300 words max)

Debt Capital is the capital to be raised by means of a loan. Due to its nature of being a loan, debt capital must be repaid prior to outgoing dividend payments.

Ordinary Shares enable the inaction of voting right. They are closest related to equity ownership, depending on the relative proportion to the company's equity. They must exist in minimum of one, due to relation of ownership. The reward and risk are non-fixed and bound to profits.

preference shares mostly pay out fix dividends prior to common stock holders in regular intervals. In cases synonymical to bankruptcy, paying out is prioritised. Commonly, there is no voting right to be invoked, dividend payments are fixed and call-ability is possible. Preferred shares can be uni-directionally converted into common stock.

In contrast

Ordinary shares	Preference shares
Voting rights	Dividends paid before issue of ordinary shares
May receive floating dividends	In case of bankruptcy paid first
In case of bankruptcy, payment not secure	Mostly fixed dividends
Directer relation to equity	Dividends paid in regular intervals
-> hence, splits possible	callability feature
	convertible

Due to the above reasons, preferred stock could be characterised as between the nature of bonds and common stock.

A to be established business should offer shares in general in order to raise finance for projects, expansion and operations. Debt capital, as its nature being a loan, should be utilised if equity restraint is the objective. If not the case, shares are often easier ways to raise finance for long-term prospects. Ordinary shares and the underlying payments of dividends being bound to profits, is a good method for management to offer to their clients and employees, as the prosperity of the

company is a significant factor in future dividends. Preference shares are for the masses, fixed dividends make management of such flatter and more features make them more attractive to common investors.

Q2.

Adam, a speculator, is convinced that the stock market will fall significantly in the forthcoming months. The current market index (14 August) level is 4954 (FTSE 100). He is investigating a strategy to exploit this market fall: sell five FTSE 100 Index futures on NYSE Liffe with a December expiry, current price 5086.

Extracts from the Financial Times

FTSE 100 Index Futures (LIFFE) £10 per full index point

	Open	Sett. Price
September	5069	5020
December	5128	5086

Assume: no transaction costs.

Required: For the derivative

(a) What would the profit (loss) be if the index rose to 5450 in December under the strategy?

(b) What would the profit (loss) be if the index fell to 4550 in December under the strategy?

a)
$$P = (5086 - 5450) * 5 * (10 * I_p) = -18,200 \tag{1}$$

There would be a loss of 18,200

b)
$$P = (5086 - 4550) * 5 * (10 * I_p) = 26,800 \tag{2}$$

There would be a profit of 26,800

Q3.

A buyer of a futures contract in Imaginationum with an underlying value of £400,000 on 1 August is required to deliver an initial margin of 7.5 per cent to the clearing house. This margin must be maintained as each day the counterparties in the futures are marked to market.

Required:

(a) Display a table showing the variation margin required to be paid by this buyer and the accumulated profit/loss balance on her margin account in the eight days following the purchase of the future.

(Assume that the maintenance margin is the same as the initial margin.)

Day	1	2	3	4	5	6	7	8
Value of Imaginationum (£000s)	390	410	370	450	420	400	360	410

(b) Explain what is meant by 'gearing returns' with reference to this example. (Hint: gearing has the same meaning as leverage, note how the returns in the Imaginationum are amplified in the futures contract and comment on it.) (75 words max)

(c) Compare forwards and futures markets and explain the coexistence of these two. (100 words max)

a)

Days	0	1	2	3	4	5	6	7	8
Value of Future (in thousands)	400	390	410	370	450	420	400	360	410
Seller proposition									
Initial Margin	30								
Variation Margin	0	10	-20	40	-80	30	20	40	-50
Accumulated profit/loss	0	10	-10	30	-50	-20	0	40	-10
Buyer position									
Initial Margin	30								
Variation Margin	0	-10	20	-40	80	-30	-20	-40	50
Accumulated profit/loss	0	-10	10	-30	50	20	0	-40	10

b)

Gearing refers to the relative debt to equity capital. Leveraging is an investment strategy, in which the potential return is being increased by encapsulating means of financing. Leverage increase would be characterised as greater debt to equity ratio and hence indicates the sources of funds between shareholders and lenders. With 7.5% initial margin, 30,000$ 2.5% generation can be expected. Increase the underlying value leads to leverage. The initial outlay does not solely define return.

c)

Forwards is a contract between two parties, specifying the price for a certain asset on a future date. They are OTC instruments, and settlement can be enacted on cash or delivery basis. Thus, Implications are higher default risk, based on the nature of OTC instruments, the difficulty of availability, as well as customisation options.

Futures Is a contract, in which the future date and price are set, with the obligation to buy/sell an asset. They specify quality and quantity detail, are traded on a future exchange and utilise high relative leverage in comparison to stock and can be used in terms of hedging and/or speculation.

In contrast a forward is a private transaction, where a future isn't. Futures are regulated on a federal level, while forwards are nearly unregulated. Risk to default and thus implied credit risk only occurs in forwards.

Q4.

You hold 20,000 shares in ABC plc which are currently priced at 500p. ABC has developed a revolutionary flying machine. If trials prove successful the share price will rise significantly. If the government bans the use of the machine, following a trial failure, the share price will collapse. Required:

(a) Explain and illustrate how you could use the traded options market to hedge your position.

Further information (Hint: Go for Sept. puts with the 450 exercise price).

Current time: 30 January.

Traded option quotes on ABC plc on 30 January:

		Calls			Puts		
	Option	March	June	Sept.	March	June	Sept.
ABC plc	450	62	88	99	11	19	27
	500	30	50	70	30	42	57
	550	9	20	33	70	85	93

(b) What is meant by intrinsic value, time value, in-the-money, at-the-money and out-of-the-money?

Use the above table to illustrate.

a)

Alternatives enable the purchase and/or offering of a budgetary instrument at a later point in time. Security against rising operating costs is the result of such choice. A non-refundable premium, attracts guarantors to the exchanges. A put option refers to the offer of an asset, where as a call option refers to the request of purchase. Implications are, the expectations of the price increasing or falling, for respectively put and call option holders.

b)

Intrinsic Value is the value of an asset dependent upon the perception of its whole value. The whole value includes all tangible and/or intangible aspects of said asset incorporating quality and quantity, thus creating possible difference to the market value. Due to its nature, its often used for uncovering hidden investment opportunities.

Time Value (of money) implies a difference between present valuation and future, due to potential earning/loosing capacity. This capacity implicates the greater value of present time money over future money, due to possible exploitation of said potential.

In-The-Money relates to the difference between an option's call/put -, and thus strike-price and its market price. An option is in the money, if the call strike price is below or the put strike price above market price, not guaranteeing, rather indicating a reason of exercise and potential return, due to the cost of transaction.

Out-The-Money relates to In-The-Money in opposite, thus the call strike price is greater, while a put strike price is lower than current market price. Due to its nature, the underlying option inhibits extrinsic and/or time value, while not possessing any intrinsic value. Value will diminish as expiry closes in, any residual Out-Of-The-Money option after expiry has hence become worthless.

At-The-Money relates to Out-And-In-The-Money, in terms of being identical to current market price. Thus, no intrinsic value, but a potential time value can be implied. Frequency of trade enhances At-The-Money. In-Out-And-At-The-Money describe the relation between strike price and market price.

In terms of the above Illustration, call options at 450 are In-The-Money, at 550 they are Out-Of-Money, put options at 450 are Out-Of-Money, at 550 they're in. At 500 call and put options are At-The-Money.

Q5.

On 14 August British Biotech traded options were quoted on NYSE Liffe as follows:

|		Calls			Puts		
	Option	Sept.	Dec.	March	Sept.	Dec.	March
British Biotech	160	30½	40	53	7½	16½	23½
(177½)	180	20½	31	45½	16½	27	34½

Assume: No transaction costs.

Required:

(a) Imagine you write a December 180 put on 14 August. Draw a graph showing your profit and loss at share prices ranging from 100p to 250p.

(b) Draw a graph showing the buyer's profit and loss at the same share price range.

(c) Compare your answers for (a) and (b) and comment (100 words max).

a) & b)

Seller

0

100   153   180   250
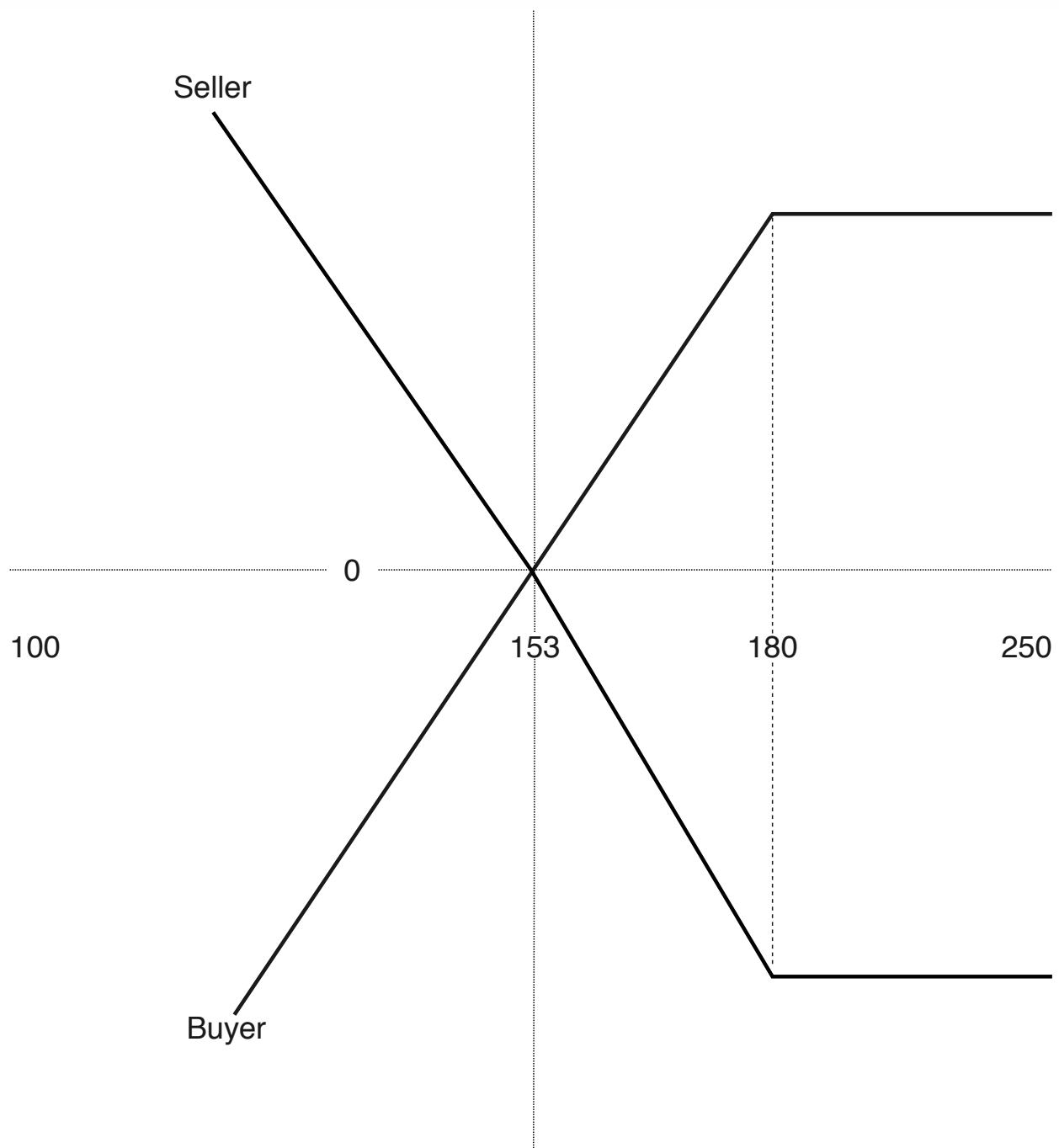
Buyer

c)

The first part, from left to right, in the graph, shows how from prices ranging from 100 two 250p are in disequilibrium. At this price, the interest for buyer and seller are unequal. Next, at 153, the exercise price, is where both parties break even. The next section illustrates a similar behaviour to the first one, in which either of both parties will profit or make a loss. Expectations for the buyer are above current market price, where as seller's is below. lastly, the completion of exercise of the option isn't guaranteed and hence the non-refundable premium can be seen either gain.

Q6.

Summerville Inc. is considering an investment in one of two common stocks. Given the information that follows, which investment is better, based on the risk (as measured by the standard deviation) and return of each?

	COMMON STOCK A		COMMON STOCK B	
PROBABILITY	RETURN		PROBABILITY	RETURN
0.30	11%		0.20	−5%
0.40	15%		0.30	6%
0.30	19%		0.30	14%
			0.20	22%

Probability	Return	ERR	Step 2	Step 3
0.3	11	3.3	16	4.8
0.4	15	6	0	00
0.3	19	5.7	16	4.8
		15		**9.6**

Common Stock A

Total ERR: 15

Variance: 9.6

Deviation: 3.098%

Common Stock B

Total ERR: 9.4

Variance: 83.04

Deviation: 9.112%

Common Stock A is the better option

Q7.

(a) Given the holding-period returns shown here, compute the average returns and thestandard deviations for the Zemin Corporation and for the market.

MONTH	ZEMIN CORP.	MARKET
1	6%	4%
2	3	2
3	−1	1
4	−3	−2
5	5	2
6	0	2

(b) If Zemin's beta is 1.54 and the risk-free rate is 4 percent, what would be an appropriaterequired return for an investor owning Zemin? (Note: Because the returns of Zemin Corporation are based on monthly data, you will need to annualize the returns to make themcompatible with the risk-free rate. For simplicity, you can convert from monthly to yearlyreturns by multiplying the average monthly returns by 12.)

(c) How does Zemin's historical average return compare with the return you believe to be afair return, given the firm's systematic risk?

a)

Average holding period returns Zemin Corp.

$$\frac{(0.06 + 0.03 - 0.01 - 0.03 + 0.05 + 0)}{6} = 0.0167 = 1.67\% \qquad (3)$$

Average holding period return on the market

$$\frac{(0.04 + 0.02 + 0.01 - 0.02 + 0.02 + 0.02)}{6} = 0.015 = 1.5\% \qquad (4)$$

Standard Deviation for Zemin Corp.

$$(0.06 - 0.0167)^2 + (0.03 - 0.0167)^2 + ((-0.01) - 0.0167)^2 + ((-0.03) - 0.0167)^2 + (0.05 - 0.0176)^2 = 0.00599532 \approx 0.006 \quad (5)$$

$$\frac{0.005995}{6 - 1} = 0.001199 \qquad (6)$$

$$\sqrt{0.001199} = 0.0346266 \approx 00.00346 = 3.46\% \qquad (7)$$

Standard Deviation for the market

$$(0.04 - 0.015)^2 + (0.02 - 0.015)^2 + (0.01 - 0.015)^2 + ((-0.02) - 0.015)^2 + (0.02 - 0.015)^2 + (0.002 - 0.015)^2 = 0.00195 \quad (8)$$

$$\frac{0.00195}{6-1} = 0.00039 \tag{9}$$

$$\sqrt{0.00039} = 0.0197484 \approx 0.0197 = 1.97\% \tag{10}$$

b)

Zemin Corp.

$$\text{average monthly return (mean)} = \frac{0.06 + 0.03 - 0.01 - 0.03 + 0.05 + 0)}{6} = 0.0166667 \approx 0.0167 \tag{11}$$

$$\text{annualised returns} = 0.0167 * 12 = 0.2004 \tag{12}$$

Market

$$\text{average monthly return (mean)} = \frac{0.04 + 0.02 + 0.01 - 0.02 + 0.02 + 0.02)}{6} = 0.015 \tag{13}$$

$$\text{annualised returns} = 0.015 * 12 = 0.18 \tag{14}$$

Required rate of return

$$\text{Required rate of return} = \text{risk free} + \text{B} * (\text{risk premium}_m - \text{risk free}) \tag{15}$$

$$\text{Required rate of return} = 0.04 + 1.54 * (0.18 - 0.04) = 0.2556 = 25.56\% \tag{16}$$

c)

With 1.67% monthly average return, Zemin Corp. totals at 20.04% per year. As 25.56% is the required rate of return and Zemin Corp.'s rate of return being less, the investment does not have good return and implies greater risk.

Q8.

You are considering a project with an initial cash outlay of 100,000 and expected free cash flows of $23,000 at the end of each year for 6 years. The required rate of return for this project is 10 percent.

a. What is the project's payback period?

b. What is the project's discounted payback period?

c. What is the project's NPV ?

d. What is the project's PI ?

e. What is the project's IRR ?

f. What is the project's MIRR if the re-investment rate is 10 percent?

g. What is the project's MIRR if the re-investment rate is 12 percent?

a)

$$\text{Payback Period} = \frac{\text{initial investment}}{\text{Cash flow per year}} \qquad (17)$$

$$\text{Payback Period} = \frac{100,000}{23,000} = 4.3478 \approx 4.348 \qquad (18)$$

In the 5th year, the initial investment will be paid back.

b)

Year	CF (in thousands)	PVF	CF*PVF	Cumulative Discounted CF
0	-100	1	-100,000	-100,000
1	23	0.90909	20,909.09	-79,090.91
2	23	0.82645	19,008.26	-60,082.64
3	23	0.75131	17,280.24	-42,8002.40
4	23	0.68301	15,709.31	-27,093.09
5	23	0.62092	14,281.19	-12,811.90
6	23	0.56447	12,982.90	171.00

$$\text{discounted payback period} = \frac{-\ln\left(1 - \frac{\text{IO * discounted rate}}{\text{cash flow per year}}\right)}{\ln 1 + r} \qquad (19)$$

$$\text{discounted payback period} = \frac{-\ln\left(1 - \frac{100000 * 0.10}{23000}\right)}{\ln(1 + 0.10)} \qquad (20)$$

The Discounted Payback Period is 5.9868 years.

c)

Using:

Net present value	
Initial cash flow	-100000
Cash flow 1	23,000
Cash flow 2	23,000
Cash flow 3	23,000
Cash flow 4	23,000
Cash flow 5	23,000
Cash flow 6	23,000
Discount rate	10%

$$\text{NPV} = f_0 + \frac{f_1}{1+d} + \ldots + \frac{f_6}{(1+d)^6} \tag{21}$$

$$\text{NPV} = -100000 + \frac{23,000}{1+0.1} + \ldots + \frac{23,000}{(1+0.1)^6} \tag{22}$$

$$\text{NPV} = 170.996088\$ \approx 170.99\$ \tag{23}$$

Where

f_0 = initial cash flow

f_1 = cash flow 1

f_6 = cash flow 6

d = discount rate

d)

$$P_I = \frac{1}{V_i} * \left(\frac{f_1}{1+d} + \ldots + \frac{f_6}{(1+d)^6} \right) \tag{24}$$

$$P_I = \frac{1}{100,000} * \left(\frac{23,000}{1+10\%} + \ldots + \frac{23,000}{(1+10\%)^6} \right) = 1.002 \tag{25}$$

Where

$$f_1 = \text{cash flow 1}$$

$$f_6 = \text{cash flow 6}$$

$$P_I = \text{Profitability Index}$$

$$d = \text{discount rate}$$

$$V_I = \text{initial investment value}$$

e)

$$0 = f_0 + \frac{f_1}{1+IRR} + \ldots + \frac{f_6}{(1+IRR)^6} = 0.1006 = 10.06\% \tag{26}$$

Where

$$f_0 = \text{initial cash flow}$$

$$f_1 = \text{cash flow 1}$$

$$f_6 = \text{cash flow 6}$$

f & g)

Using **=MIRR(E2:E8,0.1,0.1)** with respectively 0.1 and 0.12 for difference in re-investment rate, results in:

year	FCF
IO	(100,000.00)
1.00	23,000.00
2.00	23,000.00
3.00	23,000.00
4.00	23,000.00
5.00	23,000.00
6.00	23,000.00
NPV	17099.608763%
MIRR_10%	10.031327%
MIRR_12%	10.961183%

Q9.

The Cowboy Hat Company of Stillwater, Oklahoma, is considering seven capital investment proposals for which the total funds available are limited to a maximum of $12 million. The projects are independent and have the following costs and profitability indexesassociated with them:

PROJECT	COST	PROFITABILITY INDEX
A	$4,000,000	1.18
B	3,000,000	1.08
C	5,000,000	1.33
D	6,000,000	1.31
E	4,000,000	1.19
F	6,000,000	1.20
G	4,000,000	1.18

a. Under strict capital rationing, which projects should be selected?

b. What problems are there with capital rationing?

a)

The highest profitability index is 1.33, equaling to 5,000,000$ in cost. The second highest profitability index is 1.31, at a cost of 6,000,000$. If profitability index is the measure by which projects would be chosen, relative to their cost, a total cost of 11,000,000$ would result in the realisation of project C and D.

b)

Capital rationing is a resource allocation strategy, in which restrictions on new projects/investments are placed. Imposing a greater cost of capital into investment consideration or ceiling certain aspects off, regarding budget. Rationing in nature implies prior lower-than-expected-returns or losses, hence aiming at lower bottom-lines, no over-investment and thus matching investment with expected return.

Due to its nature, rationing arises from external influences and reduce spending, potentially leading to shortages to finance future projects. Greater necessary returns of projects can thus lead to rationing and potential unrealised return.

Q10.

Destination Hotels currently owns an older hotel on the best beachfront property on Hilton Head Island, and it is considering either remodeling the hotel or tearing it down and building a new convention hotel, but because they both would occupy the same physicallocation, the company can only do one—that is, these are mutually exclusive projects. Both these projects have the same initial outlay of 1,000,000. The first project, since it is a remodel of an existing hotel, has an expected life of 8 years and will provide free cash flows of 250,000 at the end of each year for all 8 years. In addition, this project can be repeated at the end of 8 years at the same cost and with the same set of future cash flows. The proposed new convention hotel has an expected life of 16 years and will produce cash flows of 175,000 per year. The required rate of return on both of these projects is 10 percent. Calculate the NPV using replacement chains to compare these two projects.

Project 1

$$\text{NPV} = f_0 + \frac{f_1}{1+d} + \ldots + \frac{f_n}{(1+d)^n} \tag{27}$$

$$\text{NPV} = -1,000,000 + \frac{250,000}{1+0.1} + \ldots + \frac{250,000}{(1+0.1)^8} \tag{28}$$

$$\text{NPV} = 333,731.55 \tag{29}$$

Project 2

$$\text{NPV} = f_0 + \frac{f_1}{1+d} + \ldots + \frac{f_n}{(1+d)^n} \tag{30}$$

$$\text{NPV} = -1,000,000 + \frac{175,000}{1+0.1} + \ldots + \frac{175,000}{(1+0.1)^{11}} \tag{31}$$

$$\text{NPV} = 369,149.01 \tag{32}$$

In comparison, Project 2 is the better option, as its net-present-value is greater, the cash flow on the other hand is less, while the time period until expiration of the asset is greater. Depending on the objectives, Project 1 could be preferred as an investment.

Q11.

> Rib & Wings-R-Us is considering the purchase of a new smoker oven for cooking barbecue, ribs, and wings. It is looking at two different ovens. The first is a relativelystandard smoker and would cost 50,000, last for 8 years, and produce annual cash flows of 16,000 per year. The alternative is the deluxe, award-winning Smoke-alator, which costs 78,000 and, because of its patented humidity control, produces the "moistest, tastiest barbecue in the world." The Smoke-alator would last for 11 years and produce cash flows of 23,000 per year.
>
> Assuming a 10 percent required rate of return on both projects, compute their equivalent annual annuity (EAA).

Standard smoker

Use formula above to calculate NPV, as its necessary for computation of EAA.

NPV= 35,358.82

$$\text{EAA} = \frac{35,358.82 * 0.1}{1 - (1+0.1)^{-8}} = 6,627.80 \tag{33}$$

Smoke-alator

NPV= 71,386.40

$$\text{EAA} = \frac{71,386.40 * 0.1}{1 - (1 + 0.1)^{-11}} = 10,990.87 \tag{34}$$