Tutorial letter 201/1/2013

Investments: An Introduction

INV2601

Semester 1

Department of Finance, Risk Management and Banking

IMPORTANT INFORMATION:

This tutorial letter contains important information about your assignments and additional questions.

CONTENTS

Dear Student

1 EXAMINATION INFORMATION

The examination paper will consist of 40 multiple-choice questions. It is a two-hour examination paper for a total of 40 marks.

You will be tested on study units 1-15 (topic 5, SU 16 excluded).

Interest factor tables and a formula sheet will not be provided in the examination.

The examination questions will consist of both theory and calculations. The mark composition is as follows:

	Questions	Percentage
Theory	20	50
Calculations	20	50
Total	**40**	**100**

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2 SUGGESTED SOLUTIONS TO ASSIGNMENT 1

Question 1: Correct answer is option 1.

$$Expected\ return = E(R) = \sum_{i=1}^{n} k_i \times p_i$$

$$E_A = (0.2 \times 8) + (0.35 \times 14) + (0.45 \times 25)$$
$$= 1.60 + 4.90 + 11.25$$
$$= 17.75\%$$

$$Standard\ deviation\ (\sigma) = \sum_{i=1}^{n} p_{ki} \times (k_i - \bar{k}_i)^2$$

$$\sigma_A = \sqrt{0.2(8 - 17.75)^2 + 0.35(14 - 17.75)^2 + 0.45(25 - 17.75)^2}$$
$$= \sqrt{(0.2 \times 95.0625) + (0.35 \times 14.0625) + (0.45 \times 52.5625)}$$
$$= \sqrt{19.0125 + 4.9219 + 23.6531}$$
$$= \sqrt{47.5875}$$
$$= 6.90\%$$

Refer to Marx 2013:8–9.

Question 2: Correct answer is option 1.

$$CV = \frac{\delta}{E(R)}$$

$$CV_{(A)} = \frac{6.90}{17.75}$$
$$= 0.3887$$

$$CV_{(B)} = \frac{8.00}{15.00}$$
$$= 0.5333$$

A highly risk averse investor will prefer the share with the lower risk per unit of expected return as it has the lowest risk. In this case, he would prefer to invest in share A.

Refer to Marx 2013:10.

Question 3: Correct answer is option 2.
Options b and e are correct.

Options a, c and d are incorrect because, in well-functioning markets:

- have prices that **quickly** adjust to new information
- assets that can be bought and sold **quickly** at prices that are **close** to the previous transactions
- prices **do not change** much from one transaction to the next unless substantial information becomes available

Refer to Marx 2013:23–24.

Question 4: Correct answer is option 3.
The implication of the efficient market hypothesis (EMH) for technical analysis is that the use of historical trading information only should not enable the investor to generate abnormal returns, especially if risk and transaction costs are taken into consideration.

Options 1, 2 and 4 are incorrect because the implication for EMH are:

- fundamental analysis is that **above-average** rates of return can only be achieved if only one **has** access to reports of superior analysis
- portfolio management is that the equity portfolio manager **without** superior analysis, time and ability to do asset allocation, should set up an index fund

- fundamental analysis is that above-average rates of return can only be achieved if one is able to invest **before** the rest of the market realiszes there is a discrepancy between market value and intrinsic value

Refer to Marx 2013:34–35.

Question 5: Correct answer is option 4.

$$Required\ rate\ of\ return\ (k) = r_f + \beta(r_m - r_f)$$
$$= 5 + 1.2(8 - 5)$$
$$= 8.60\%$$

Refer to Marx 2013:38.

Question 6: Correct answer is option 1.

$$V_0 = \frac{E}{k}$$
$$= \frac{3.20}{0.086}$$
$$= R37.21$$

Refer to Marx 2013:68.

Question 7: Correct answer is option 4.

Step 1: Calculate the expected future cash flows:

$D_0 = 1.50$

$D_1 = 1.50(1.12) = 1.6800$

$D_2 = 1.68(1.12) = 1.8816$

$D_3 = 1.8816(1.20) = 2.2579$

$D_4 = 2.2579(1.04) = 2.3482$

$$P_3 = \frac{D_4}{k - g}$$
$$= \frac{2.3482}{0.10 - 0.04}$$
$$= R39.1367$$

Step 2: Calculate the intrinsic value:

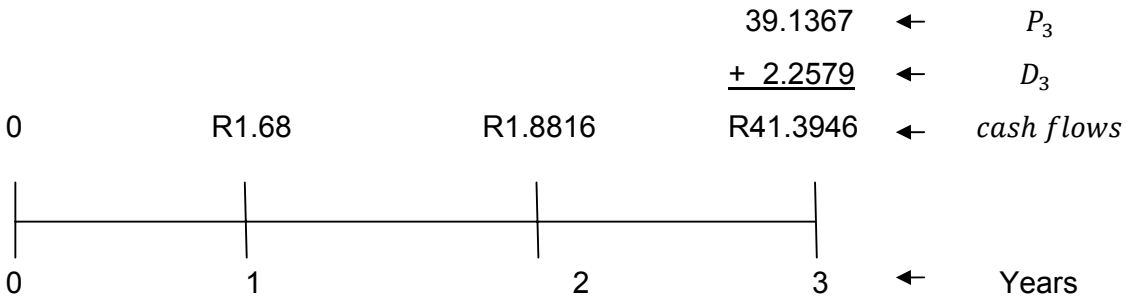
$$V_0 = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \frac{P_3}{(1+k)^3}$$

$$= \frac{1.68}{(1.10)^1} + \frac{1.8816}{(1.10)^2} + \frac{2.2579}{(1.10)^3} + \frac{39.1367}{(1.10)^3}$$

$$= 1.5273 + 1.5550 + 1.6964 + 29.4040$$

$$= R34.1827$$

OR



HP 10BII	
Input	**Function**
0	CF_0
1.68	CF_1
1.8816	CF_2
41.3946	CF_3
10%	I/YR
	NPV
	R34.18

Refer to Marx 2013:67–68.

Question 8: Correct answer is option 3.

Purchase additional government securities, reduce reserve requirements and lower the repo rate.

Refer to Marx 2013:79.

Question 9: Correct answer is option 2.

Cyclical shares are high-beta shares whose returns rise and fall sharply in bull and bear markets,; while **growth** companies have management capability and the opportunity to undertake investment projects that produces rates of return greater than their weighted average costs of capital.

Refer to Marx 2013:145–146.

Question 10: Correct answer is option 3.

$$Net\ profit = profit\ before\ tax - tax$$
$$= 5\ 000\ - 5\ 000(0.50)$$
$$= 5\ 000 - 2\ 500$$
$$= R2\ 500$$

$$ROE = \frac{net\ profit}{sales} \times \frac{sales}{total\ assets} \times \frac{total\ assets}{shareholder'\ equity}$$
$$= \frac{2\ 500}{55\ 000} \times \frac{55\ 000}{265\ 000} \times \frac{265\ 000}{155\ 000}$$
$$= 1.6129\%$$

$$OR$$

$$ROE = \frac{net\ profit}{shareholder'\ equity}$$
$$= \frac{2\ 500}{155\ 000}$$
$$= 1.6129\%$$

$$ROA = \frac{net\ profit}{sales} \times \frac{sales}{total\ assets}$$
$$= \frac{2\ 500}{55\ 000} \times \frac{55\ 000}{265\ 000}$$
$$= 0.9434\%$$

OR

$$ROA = \frac{net\ profit}{total\ assets}$$
$$= \frac{2\ 500}{265\ 000}$$
$$= 0.9434\%$$

$The\ ROE\ is\ greater\ than\ the\ ROA\ by\ (1.6129\ -\ 0.9434)\ 0.67\%.$

Refer to Marx 2013: 131–132 and 135.

3 SUGGESTED SOLUTIONS TO ASSIGNMENT 2

Question 1: Correct answer is option 4.

For a zero coupon bond, the lack of coupon payments before maturity eliminates **reinvestment** risk.

Refer to Marx 2013:209–211.

Question 2: Correct answer is option 3.

HP 10BII	
Input	**Function**
END mode	BEG/END
-1 547.68	PV
1 413.96	FV
24 (=12 × 2)	N
80 [=1 000 ×(0.16/2)]	PMT
	I/YR
	4.9742 × 2 =9.95%

Refer to Marx 2013:220.

Question 3: Correct answer is option 1.

$$Forward\ rate = \left(\frac{1.128^3}{1.094^2} - 1\right) \times 100$$
$$= \left(\frac{1.4352}{1.1968} - 1\right) \times 100$$
$$= (1.1992 - 1) \times 100$$
$$= 0..1992 \times 100$$
$$= 19.92\%$$

Refer to Marx 2013:223.

Question 4: Correct answer is option 3.

Segmented market theory

Refer to Marx 2013:224–225.

Question 5: Correct answer is option 2.

	V_-	V_0	V_+
FV	1000	1000	1000
N	30	30 [=(15×2)]	30
I/YR	5.75 [=(12–0.50)/2]	6 [=12/2]	6.25 [=(12+0.50)/2]
PMT	40	40 [=(1000×0.08)/2]	40
COMP PV	752.5321	724.7034	698.4029

$$D = \frac{V_- - V_+}{2V_0(\frac{\Delta Y}{100})}$$
$$= \frac{752.5321 - 698.4029}{2(724.7034)(0.5/100)}$$
$$= \frac{54.1292}{7.2470}$$
$$= 7.47$$

NB: 100 basis points = 1%. Therefore 50 basis points = 0.50%

Refer to Marx 2013:225–226.

Question 6: Error in question

The question does not specify whether to take into account a 50 basis points increase or decrease, as this will result in different answers.

Refer to Marx 2013:226.

Question 7: Correct answer is option 4.

A putable bond experiences **positive** convexity, which means that at higher yields the price of the putable bond will be **higher** than that of an identical straight bond.

Refer to Marx 2013:228–229.

Question 8: Correct answer is option 3.

There is usually some default risk in the over-the-counter (OTC) contracts.

Options 1, 2 and 4 are incorrect because OTC contracts are:

- not marked to market
- are private transactions between two parties
- are illiquid and customised to the parties' needs

Refer to Marx 2013:236–237.

Question 9: Correct answer is option 3.

An increase in *volatility* leads to an **increase** in the value of a **call** option; while an increase in *spot price* leads to a **decrease** in the value of a **put** option.

Refer to Marx 2013:246–247.

Question 10: Correct answer is option 4.

$$Break\ even\ value = X + p$$
$$= 98 + 3$$
$$= R101$$

$$Profit = Market\ price - Break\ even\ value$$
$$= 115 - 101$$
$$= R14$$

Refer to Marx 2013:245-248.

Question 11: Correct answer is option 1.

$$Break\ even\ value = X - p$$
$$= 98 - 3$$
$$= R95$$

$$Profit = Break\ even\ value - Market\ price$$
$$= 95 - 80$$
$$= R15$$

Refer to Marx 2013:245–248.

Question 12: Correct answer is option 1.

Initiation of swap – actual exchange of principal (cash) denominated in different currencies.

During the life of the swap – periodic interest payments that are paid in full without netting.

Termination of swap – return of the principal.

Refer to Marx 2013:257–258.

Question 13: Correct answer is option 2.

Put-call parity:

$$S + p = c + \frac{X}{(1+r)^t}$$
$$S + 1.50 = 2.00 + \frac{45}{(1.09)^{0.75}}$$
$$S = 2.00 + \frac{45}{(1.09)^{0.75}} - 1.50$$
$$S = R42.68$$

Refer to Marx 2013:249–250.

Question 14: Correct answer is option 4.

The portfolio with the lowest risk is one that is equally invested in shares Y and Z.

Correlation of share returns is between -1 and +1. The closer to -1 the correlation is, the more the returns of the two shares tend to move exactly opposite to each other. Therefore, the highly diversified the portfolio will result in lower risk.

Refer to Marx 2013:276–277.

Question 15: Correct answer is option 4.

$$Sharpe = \frac{r_p - r_f}{\sigma_p}$$
$$= \frac{8 - 3}{\sqrt{25}}$$
$$= 1.00$$

$$Jensen\ (\alpha) = r_p - [r_f + \beta_p(r_m - r_f)]$$
$$= 8 - [3 + 0.8(6 - 3)]$$
$$= 8 - 5.40$$
$$= 2.60\%$$

Refer to Marx 2013:294–296.

4 SUGGESTED SOLUTIONS TO SELF-ASSESSMENT QUESTIONS

Question 1: Correct answer is option 1.

$$Annual\ HPR = HPR^{1/N}$$

$$1.0574 = HPR^{1/4}$$

$$HPR = 1.0574^4$$

$$HPR = 1.2501$$

$$HPR = \frac{Ending\ value}{Beginning\ value}$$

$$1.2501 = \frac{1\,000}{Beginning\ value}$$

$$Beginning\ value = \frac{1\,000}{1.2501}$$

$$= R799.94$$

Refer to Marx 2013: 7.

Question 2: Correct answer is option 1.

To predict past market movements

Refer to Marx 2013:28–29.

Question 3: Correct answer is option 2

Equal

A risk-free asset is an asset with zero variance which has zero correlation with all other risky assets and produces a risk-free rate of return. It is an asset with a standard deviation of zero because its expected return will equal its actual return.

Refer to Marx 2013: 3.5

Question 4: Correct answer is option 3.

(i) Systematic (ii) unsystematic

Refer to Marx 2013: 6 and 36.

Question 5: Correct answer is option 4.

$$\beta = \frac{Corr_{i,m} \times \sigma_i \times \sigma_m}{{\sigma_m}^2}$$
$$= \frac{0.45 \times 0.14 \times 0.06}{0.06^2}$$
$$= \frac{0.0038}{0.0036}$$
$$= 1.06$$

Refer to Marx 2013: 38.

Question 6: Correct answer is option 2.

The required rate of return of Brainchild Limited using the capital asset pricing model (CAPM):

$$k = r_f + \beta(r_m - r_f)$$
$$= 8 + 1.1(12 - 8)$$
$$= 12.40\%$$

The intrinsic value of Brainchild Limited using the constant growth model:

$$V_0 = \frac{D_1}{k - g}$$
$$= \frac{D_0(1 + g)}{k - g}$$
$$= \frac{2.00(1.05)}{0.124 - 0.05}$$
$$= \frac{2.10}{0.074}$$
$$= R28.38$$

Refer to Marx 2013:38, 65–66.

Question 7: Correct answer is option 2.

Step 1: Calculate the expected future cash flows:

$D_0 = 1.00$

$D_1 = 1.00(1.15) = 1.15$

$D_2 = 1.15(1.15) = 1.3225$

$D_3 = 1.3225(1.08) = 1.4283$

$D_4 = 1.4283(1.04) = 1.4854$

$$P_3 = \frac{D_4}{k - g}$$

$$= \frac{1.4854}{0.18 - 0.04}$$

$$= R10.61$$

Step 2: Calculate the intrinsic value:

$$V_0 = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \frac{P_3}{(1+k)^3}$$

$$= \frac{1.15}{(1.18)^1} + \frac{1.3225}{(1.18)^2} + \frac{1.4283}{(1.18)^3} + \frac{10.61}{(1.18)^3}$$

$$= 0.9746 + 0.9498 + 0.8693 + 6.4576$$

$$= R9.25$$

OR

HP 10BII	
Input	**Function**
End mode	BEG/END
0	CF_0
1.15	CF_1
1.3225	CF_2
12.0383 (=1.4283 +10.61) $NB: CF_3 = D_3 + P_3$	CF_3
18%	I/YR
	NPV
	R9.25

Refer to Marx 2013: 67–68.

Question 8: Correct answer is option 3.

$$g = Return\ on\ equity\ (ROE)\ \times Retention\ rate(RR)$$

$$ROE = net\ profit\ margin \times total\ asset\ turnover \times financial\ leverage$$
$$= 15 \times 2.0 \times 0.9$$
$$= 27\%$$

$$Retention\ rate\ (RR) = 1 - dividend\ payout\ (^{D}/_{E})$$
$$= 1 - 0.30$$
$$= 0.70$$

$$g = ROE\ \times RR$$
$$= 27\% \times 0.70$$
$$= 18.90\%$$

Refer to Marx 2013: 62 and 135.

Question 9: Correct answer is option 4.

(i) Defensive (ii) speculative

Refer to Marx 2013: 145–146.

Question 10: Correct answer is option 4.

Alternative 2 and 3

Refer to Marx 2013: 185–187 and 191–193

Question 11: Correct answer is option 4.

$$Total\ effect = \frac{V_- - V_+}{2V_0(\Delta y/100)} + [c\ (\frac{\Delta y}{100})^2 \times 100]$$

$$= 21.2 + [210(0.02^2) \times 100]$$

$$= 21.2 + 8.4$$

$$= 29.60\%$$

Refer to Marx 2013: 225–228.

Question 12: Correct answer is option 4

HP 10BII	
Input	**Function**
End mode	BEG/END
1 000	FV
-967.59	PV
80 (=1 000× 0.08)	PMT
4	N
	I/YR
	9.00%

Refer to Marx 2013: 219.

Question 13: Correct answer is option 2.

$$CY = \frac{coupon\ payment}{bond\ price}$$

$$= \frac{80}{967.59}$$

$$= 0.0827 \times 100$$

$$= 8.27\%$$

Refer to Marx 2013: 218–219.

Question 14: Correct answer is option 3.

	V_-	V_0	V_+
FV	1000	1000	1000
PMT	90	90 [(1000 × 0.18)÷2]	90
I/YR	3 [(7-1)÷2]	3.5 [7÷2]	4 [(7+1)÷2]
N	30	30	30
PV	2176.0265	2011.5625	1864.6017

$$Duration = \frac{V_- - V_+}{2V_0(\Delta y/100)}$$

$$= \frac{2\ 176.0265 - 1\ 864.6017}{2 \times 2011.5625 \times (1/100)}$$

$$= \frac{311.4248}{40.2313}$$

$$= 7.74$$

Refer to Marx 2013: 225–226.

Question 15: Correct answer is option 2.

Call option

Refer to Marx 2013: 245.

Question 16: Correct answer is option 2.

Interest rate swap

Refer to Marx 2013: 256–257.

Question 17: Correct answer is option 1.

$X = 35 - 3 = 32$

Refer to Marx 2013: 248.

Question 18: Correct answer is option 3.

$$delta = \frac{f^+ - f^-}{S^+ - S^-}$$
$$= \frac{12 - 2}{85 - 75}$$
$$= 1.0$$

$$f^+ = S^+ - X$$
$$= 85 - 73$$
$$= 12$$

$$f^- = S^- - X; MAX\ 0$$
$$= 75 - 73 = 2$$

$S^+ = 80 + 5 = 85$

$S^- = 80 - 5 = 75$

Refer to Marx 2013: 248–249.

Question 19: Correct answer is option 4.

$$Forward\ rate = \left(\frac{1.08^2}{1.06^1} - 1\right) \times 100$$
$$= \left(\frac{1.1664}{1.06} - 1\right) \times 100$$
$$= 10.04\%$$

Refer to Marx 2013: 223.

Question 20: Correct answer is option 4.

$$Expected\ rate\ of\ return = \bar{k} = \sum_{i=1}^{n} P_i \times k_i$$

$$\bar{k}_A = 0.5(12) + 0.25(10) + 0.25(8)$$
$$= 6 + 2.5 + 2$$
$$= 10.5\%$$

$$Standard\ deviation\ (\sigma) = \sqrt{\sum_{n=1}^{n} P_{ki} \times (k_i - \bar{k}_i)^2}$$

$$\sigma_A = \sqrt{0.5(12 - 10.5)^2 + 0.25(10 - 10.5)^2 + 0.25(8 - 10.5)^2}$$
$$= \sqrt{1.1250 + 0.0625 + 1.5625}$$
$$= \sqrt{2.75}$$
$$= 1.66\%$$

Refer to Marx 2013: 278.

Question 21: Correct answer is option 2.

$$Correlation = \frac{Covariance}{\sigma_A \times \sigma_B}$$
$$= \frac{1.3}{1.66 \times 1.23}$$
$$= 0.64$$

Refer to Marx 2013: 276–277.

Question 22: Correct answer is option 2.

$Portfolio\ standard\ deviation\ (\delta_P)$:

$$= \sqrt{[w_A{}^2 \times \delta_A{}^2] + [w_B{}^2 \times \delta_B{}^2] + [2 \times w_A \times w_B \times r_{AB} \times \delta_A \times \delta_B]}$$

$$= \sqrt{(0.5^2 \times 1.66^2) + (0.5^2 \times 1.23^2) + (2 \times 0.5 \times 0.5 \times 0.64 \times 1.66 \times 1.23)}$$

$$= \sqrt{(0.6889) + (0.3782) + (0.6534)}$$

$$= \sqrt{1.7205}$$

$$= 1.31\%$$

Refer to Marx 2013: 278.

Question 23: Correct answer is option 3.

$$Sharpe = \frac{r_p - r_f}{\sigma_p}$$

$$= \frac{8 - 3}{3}$$

$$= 1.67$$

Refer to Marx 2013: 295.

Question 24: Correct answer is option 1.

$$Jensen\ (\alpha) = r_p - [r_f + \beta_p(r_m - r_f)]$$

$$= 11 - [3 + 1(9 - 3)]$$

$$= 2.00$$

Refer to Marx 2013: 295–296.

Question 25: Correct answer is option 2.

$$Treynor = \frac{r_p - r_f}{\beta_p}$$
$$= \frac{14 - 3}{1.1}$$
$$= 10.00$$

Refer to Marx 2013: 294.

Please note that there are additional assessment questions (and solutions) from (questions 26–60) on myUnisa in the additional resources section.

5 CONCLUDING REMARKS

Go through your assignments and compare your answers and, more importantly, how you got to your answers, to the proposed solutions. This is a very important component of the learning process and will help to improve your understanding of the study material.

As you prepare for the exam, ensure that you have done all the assessment questions in the textbook and study guide from each chapter in order to cement your understanding of the concepts that are covered. Additional sSelf- assessment questions have also been uploaded on myUnisa.

Best wishes,

Ms Josephine Njuguna
DEPARTMENT OF FINANCE, RISK MANAGEMENT AND BANKING