EXAMINATION

01 June 2020 (am)

Subject F105 — Finance and Investment Fellowship Principles

Time allowed: Three hours and fifteen minutes

INSTRUCTIONS TO THE CANDIDATE

1. *Enter your candidate number as required in your examination answer.*

2. *Questions are only available in Moodle and may not be printed.*

3. *You are required to submit all of your answers in this Moodle learning platform only. You MAY NOT use any other computer program (e.g. MS Word or Excel) during the examination.*

4. *You are strongly encouraged to use the first 15 minutes as reading time only, however, you may commence answering the paper whenever you are ready.*

5. *Mark allocations are shown in brackets.*

6. *Attempt all nine (9) questions.*

7. *Show calculations where this is appropriate. You may use blank paper to carry out rough work calculations. You may use an electronic calculator from the approved list.*

8. *You may return to your answers to review and amend during the allotted examination time. Once you are happy with your answers you need to* ***Finish all and Submit*** *your work. Once you have submitted you will not be able to make any more changes to your answers.*

9. *It is the candidate's responsibility to ensure that all work is submitted BEFORE the end of the allotted examination time. Take this into account when planning your review and submission.*

Note: Answers will be saved automatically during the examination. However, the Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.

END OF INSTRUCTIONS

QUESTION 1

i. Describe "quantitative easing".

[2]

As a result of quantitative easing, a developed country that has been in recession is starting to show signs of economic growth.

ii. Explain how quantitative easing can lead to economic growth.

[1]

iii. Explain how expected economic growth is likely to impact the market values of local equities and local corporate bonds.

[3]

The sale of equity investments in the country attracts capital gains tax.

iv. Outline briefly how an investor may be able to use derivative instruments to defer the payment of capital gains tax in an equity portfolio, stating any limitations that might apply.

[2]

[Total 8]

QUESTION 2

i. Define the role of the trustees of a pension fund as specified by trust law.

[2]

The government of a developing country has experienced a steady decline in investor demand for its debt issues. In a bid to increase demand for its bonds, the government will be introducing a requirement that all local pension funds must have at least 10% of their assets invested in bonds issued by the government with a term to maturity exceeding three years.

ii. Outline the steps that the trustees of a defined benefit pension fund, whose strategic benchmark currently excludes government bonds, will need to take in response to this regulation.

[5]

An active bond fund manager relies on anomaly switching to enhance returns. In particular, the manager uses yield differences between bonds, and between bonds and the yield curve, to identify under-/overvalued stocks.

iii. Discuss how the introduction of the above requirement might impact the fund manager.

[5]

[Total 12]

PLEASE TURN OVER

QUESTION 3

The price of a 1-year European call option on a zero-coupon risk-free bond, which currently has 6 years to maturity and a nominal value of R5 million, needs to be calculated. The following information is given:

- The annual effective 1-year and 6-year risk-free spot yields are 3% p.a. and 4% p.a. respectively;
- The forward yield volatility is assumed to be 11% p.a.;
- The strike price is R4 million.

You are also given the following bookwork formulae:

- Price of a European call option: $C= P(0,T) [F_0\ \Phi(d_1)- X\ \Phi(d_2)]$
- Forward bond price volatility: $\sigma = D^*\ y_0^*\ \sigma_y$

Give the values for the following (without needing to show your workings):

i. The forward bond price, F_0.

[1]

ii. The initial forward yield on the bond underlying the option, y_0

[1]

iii. The modified duration of the forward bond underlying the option, D.

[1]

iv. The forward bond price volatility, σ.

[1]

v. The value for d_1

[2]

vi. The value for d_2

[1]

[Total 7]

QUESTION 4

i. Discuss different approaches that a bond fund manager might adopt to replicate the performance of a broad local market bond index.

[3]

The trustees of a charitable trust are reviewing the trust's bond investments.

ii. Explain the issues that the trustees should consider when deciding whether to invest in bonds on an active or passive basis.

[5]

[Total 8]

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QUESTION 5

i. List the four component indices, and their weights, that constitute the Short Term Fixed Interest (STeFI) Composite index used in South Africa.

[2]

The central bank of a developing country is reviewing the method of deriving its published and widely-used benchmark index for short-term interest rates (the 3-month Bank Offered Rate or BOR). The three-month BOR is calculated daily and is based on an average of interest rates offered by the two largest commercial banks in the country on 3-month Negotiable Certificates of Deposit issued by them for large deposits.

ii. List four types of likely users of the 3-month BOR and for each outline briefly how the benchmark might be used.

[4]

iii. Discuss four possible deficiencies in the method of deriving the 3-month BOR, and for each deficiency suggest how the derivation could be improved.

[6]

[Total 12]

QUESTION 6

An unlisted company in a developing country has just completed the final phase of its experimental wind-powered electricity generation plant. In this final phase the company has shown that over the last year it generated a significant amount of electricity and successfully transferred it to the national electricity supplier for distribution to users. As a result, the national electricity supplier has now given its approval for the company to roll out more, and bigger, wind power plants elsewhere in the country. The national energy supplier will pay the company an agreed tariff per unit of power generated.

The company has been funded by private debt and equity to date, and it intends to raise the capital needed for expansion by issuing additional shares in the company, to be listed on the local stock exchange. This will be the first independent power producer to be listed in the country.

You are an investment analyst for a large fund manager that has been invited to participate in the initial public offering of shares, and you have been asked to assess the fundamental value of the company.

i. Outline the information and investigations needed to enable you to estimate the company's future cashflows and earnings.

[8]

ii. Explain the key difficulties you may encounter in determining a fundamental value for the company's equity.

[4]

[Total 12]

PLEASE TURN OVER

QUESTION 7

i. Outline briefly three approaches that could be used to assess relative portfolio performance.

[3]

You have been asked to assess the performance of a bond fund manager, and have been given the information below for 2018 of actual time-weighted returns per half-year. You ascertain that the manager opted to split his funds as follows on 1 January 2018: 70% cash, 20% Fixed-interest (1-5 years) and 10% Fixed-interest (5+ years), while the benchmark weights were 50%, 30% and 20% respectively. Neither the fund nor the benchmark are re-balancing during the year.

	H1	**H2**
Fund returns		
Cash	4.0%	4.0%
Fixed-interest (1-5 years)	5.0%	6.0%
Fixed-interest (5+ years)	3.0%	11.0%
Benchmark returns		
Cash	3.9%	3.9%
Fixed-interest (1-5 years)	4.9%	5.5%
Fixed-interest (5+ years)	3.0%	10.5%

ii. Calculate the fund and benchmark returns for 2018, and show the split of over/under-performance between the following components, commenting on the results:

- Sector/duration selection decisions
- Stock selection decisions.

[5]

[Total 8]

QUESTION 8

You are an actuary employed by a large mature defined benefits pension scheme which now only has pensioner members. The pensions paid by the scheme are guaranteed to increase annually at the consumer price index (CPI) rate. You have been asked to review the appropriateness of the investments underlying the scheme's liability in respect of the pensioners, using actuarial techniques.

i. Define "Liability Hedging" and list two practical problems to its implementation.

[2]

ii. Describe "Liability Driven Investment" and list the two key risks faced by the scheme that it addresses.

[2]

PLEASE TURN OVER

You perform a stochastic asset-liability modelling (ALM) exercise in order to determine a suitable investment portfolio for the pensioner liability.

iii. State two scheme objectives that a suitable portfolio should meet.

[2]

When you attempt to construct this portfolio, you are unable to find bonds of sufficiently long duration.

iv. Explain briefly how derivatives could be used to resolve this difficulty.

[2]

A trustee asks you about risks associated with the ALM exercise.

v. Outline three risks in the development and use of a stochastic ALM, and steps that can be taken to mitigate these risks.

[4]

[Total 12]

QUESTION 9

i. Define private debt.

[1]

Trident Fisheries is an unlisted South African company funded by a combination of equity and debt. They own a fleet of fishing vessels and a fish processing plant that cleans, processes and packages fish for domestic and international consumption. The company would like to expand their operations over the next five years, and you have been asked to assist the CFO with financial planning to assess the firm's requirements for capital over the next five years.

ii. Outline briefly the main considerations and steps in drafting a financial plan for Trident.

[4]

Trident Fisheries has decided to issue private debt to fund the purchase of several new fishing vessels.

iii. Outline a key advantage for Trident choosing to fund itself by issuing private debt rather than public debt.

[1]

iv. Outline briefly the information that might be included in the prospectus for the private debt issuance.

[4]

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A summary of Trident's financial statements prior to the private debt issue (on 1 Jan 2020) is shown below, together with projections for 2020.

	2018 *R million*	2019 *R million*	2020 *R million* *Projected*
Income Statement			
Sales	115	90	125
Variable costs	15	16	21
Fixed costs	45	50	70
Interest	5	5	15
Tax	10	4	4
Net profit	40	15	15
Balance Sheet (31 December)			
Fixed assets	150	160	270
Net current assets	50	55	60
Total assets	200	215	330
Short term debt	60	60	70
Long term debt	-	-	100
Shareholder funds	140	155	160
Total debt and equity	200	215	330

A fund manager is assessing whether to participate in the private debt issue.

v. Calculate four appropriate accounting ratios from the above information to assess the attractiveness of the debt issue, stating any assumptions made, and comment briefly on the ratios.

[6]

vi. Explain how Trident can use futures contracts to remove the uncertainty regarding the price it receives (in local currency) for its exports, outlining difficulties it may encounter.

[5]

[Total 21]

END OF PAPER

