

Unit 3



Subject: Actuarial Practice 1

Chapter: Unit 3

Category: Practice Questions

Q1. September 2019 – Paper 1 - Q3

- (i) State the principles of investment for a provider of benefits on future uncertain events. [3]

A charity has both short-term and long-term assets. The charity's fund managers are reviewing their investment strategy.

- (ii) Outline why the charity may need to review the appropriateness of its investment strategy. [4]

The charity's long-term assets are invested in an ethical equity fund and an ethical corporate bond fund. The performance of these two funds has been measured and the returns appear to be lower than those of similar funds.

- (iii) Suggest why the performance of the ethical funds might be out of line with similar funds. [4]

[Total 11]

Q2. September 2019 – Paper 1 – Q7

- (i) Outline the main factors that influence a financial institution's long-term investment strategy. [6]

The board of a university located in a particular city are concerned about the shortage of accommodation available for students. To address this, the board has proposed the construction of a new building which will accommodate approximately 200 students. The new building will be funded by private investors, whose funds will finance the construction and ongoing maintenance of the new building.

- (ii) Outline reasons why private investors would want to invest in the new building. [3]
- (iii) Contrast how the following potential investors would evaluate this proposal:

(a) A large defined benefit pension scheme.

(b) An individual who has recently inherited a significant sum. [4]

An alternative proposal being considered by the board is to encourage individual investors to purchase houses in the city to rent out to university students.

- (iv) Assess how this alternative proposal addresses the accommodation shortage. [4]

[Total 17]

Q3. April 2020 – Paper 2 – Q1

Background

Country B is well developed with sophisticated financial markets and financial institutions. A report has been produced by leading experts that concludes that climate change could have a material impact on financial markets and financial institutions in Country B.

The report also highlighted that to successfully manage the financial risks arising from climate change it will be necessary for all businesses in Country B to:

make changes to governance.

make changes to risk management.

use scenario analysis for risk identification and assessment.

A large insurance company in Country B, NEF Insurance, sells term assurance, annuities, property insurance, motor insurance and savings products. NEF Insurance is undertaking a project to assess how climate change could impact its operations, the investments it holds, and the products it sells to help determine any appropriate actions it should take.

NEF Insurance invests in a wide range of investments including equities, property, government and corporate bonds, loans secured on commercial property and loans secured on infrastructure.

The government of Country B has committed to an internationally agreed target of keeping global average temperature rise since pre-industrial times below 2°C. The government has, to date, announced three policy measures directed at reducing greenhouse gas emissions. These measures will affect people and businesses. These policy measures are:

requirements to improve the energy efficiency of commercial properties starting in 3 years. The minimum standards will be progressively strengthened over the following 10 years. Financial penalties and restrictions on use of properties will apply if the minimum standards are not met.

requirements for organisations to hold permits at least equal to the quantity of greenhouse gas emissions it actually emitted. To avoid financial penalties an organisation will need to purchase sufficient permits. The government will reduce the number of permits each year and introduce an emission trading system allowing organisations to buy and sell permits.

the sale of new petrol and diesel cars will be banned in 20 years. The board of NEF Insurance believe that the government's policy measures will have a wide-ranging impact on all aspects of their business.

Questions

- (i) Outline the factors that would impact the preference of investors for a particular asset class. [5]
- (ii) Discuss ways that the investments of NEF Insurance could be affected by climate change. [6]
- (iii) Describe the changes an insurance company may need to make to each of the following in response to climate change risks:
 - (a) governance
 - (b) risk management. [6]
- (iv) Discuss how climate change might affect NEF Insurance's business including its operations, the investments it holds and the products it sells. [10]
- (iv) Discuss how the actuarial control cycle can be used to assist companies preparing for climate change. [6]
- (v) Assess, for each of the government's policy measures, how that measure is expected to affect NEF Insurance. [10]

NEF Insurance has committed to undertaking the scenario analysis as recommended by the experts' report.

- (vi) Outline the non-financial risks that NEF Insurance should consider in their scenario analysis. [6]

A credit rating agency is making changes to its rating methodology for companies in Country B. It is proposing amending its rating methodology to include allowance for environmental, social and governance risks. A credit rating given by a credit rating agency is an indication of credit worthiness.

- (vii) Explain why a credit rating agency is making changes to its rating methodology. [4]

[Total 53]

Q4. April 2020 – Paper 2 – Q2

Background Country A is a developed country. In recent years there has been steady growth in the number of workers who are self-employed (i.e. people who work for themselves rather than being employed by a company) in Country A. The self-employed now make up 15% of the total workforce in Country A.

Research has shown that only 30% of the self-employed workers in Country A are actively saving for retirement. This compares with 75% of employed workers. The government in Country A has publicly expressed concern about the low levels of self-employed workers who are saving for retirement.

BBB is a large insurance company offering a wide range of products. It has seen sales and profits fall in all product lines over the last few years. BBB is considering a range of options to increase its future sales and profits.

One of the options being considered by BBB is to launch a simple unit-linked investment product. The product will allow individuals to invest in a range of unit-linked funds. BBB will target the product at self-employed workers with the aim of encouraging the self-employed to accumulate a fund during their working lives to save for their retirement. BBB believes that once an individual has bought the simple investment product, it will be able to sell other insurance products to the individual, which could further increase BBB's sales and profits.

Questions

- (i) Explain why the government of Country A is concerned about the number of self-employed workers not saving for retirement. [5]
- (ii) Discuss why the self-employed may not be saving for their retirement. [7]
- (iii) Propose possible actions the government could take to encourage self-employed workers to save adequately for their retirement. [5]
- (iv) Discuss the factors that will need to be considered in determining a suitable design for BBB's investment product. [9]
- (v) Discuss the types of investments that may be suitable for BBB's investment product. [5]
- (vi) List other possible insurance products that BBB might be able to sell to self-employed individuals. [5]
- (vii) Discuss the issues for BBB in pricing the products in part (vi). [7]
- (viii) Explain why it will be important for BBB to monitor the experience of this new business. [4]

[Total 47]

Q5. April 2020 – Paper 1 – Q5

- (i) Outline why a company needs capital. [3]

ABC is a mutual insurance company specialising in providing life cover to the over 50s. ABC has just decided to expand its product range, and is about to launch a mortgage protection product.

- (ii) Suggest possible reasons why ABC could require additional capital. [4]
- (ii) Propose, with reasons, possible actions ABC could take to improve their capital position. [4]

[Total 11]

Q6. April 2020 – Paper 1 – Q8

A wealthy individual has a large cash lump sum. He has asked an actuary to advise on how he might invest this sum to provide for himself and his family in retirement, and to be able to leave an amount as an inheritance.

- (i) Describe how the actuary would assess the individual's future liabilities. [4]
- (ii) Identify four key risks, from the viewpoint of the individual, which the actuary should consider when giving their advice. [2]
- (iii) Describe how each of the risks in (ii) might be mitigated. [6]

[Total 12]

Q7. April 2020 – Paper 1 – Q9

A bank sells a special mortgage product to prospective borrowers aged over 70. The product provides a loan secured on the accumulated equity in the borrower's home.

The borrower does not need to make any cash payments to the bank on the amount borrowed. Interest is added to the loan balance every month; a fixed, non-reviewable rate of interest is charged. The loan balance (including accumulated interest) has to be repaid when the borrower dies, moves into long-term care or sells the property.

- (i) Describe the risks the bank is exposed to with this product. [6]
- (ii) Propose, with reasons, actions the bank could take to manage the risks identified in (i). [8]

[Total 14]

Q8. September 2020 – Paper 1 – Q1

An insurance company only sells house insurance and motor insurance products. The company invests the premiums received on its insurance business in cash and short-term loans.

- (i) Explain why the company currently invests in cash and short-term loans. [2]

It has been argued that the company could increase profits significantly by investing the premiums on its insurance business in more risky assets.

- (ii) Suggest, with reasons:

(a) two assets that may be suitable assets for the company.

b) two assets that would not be suitable assets for the company. [4]

[Total 6]

Q9. September 2020 – Paper 1 – Q8

- (i) Discuss the factors to be considered by an insurance company when deciding whether to use actual policy records or representative model points when using a financial model. [7]

An insurance company has recently completed a valuation of its liabilities for a particular class of business using its stochastic model. It has decided to review the accuracy of the results using actual policy records. The company has already checked the accuracy of the data, assumptions and formulae to be used.

- (ii) Discuss the reasons why the insurance company has used a stochastic model rather than a deterministic model. [8]
- (iii) Set out the remaining steps that could be taken to review the accuracy of the model's calculated result. [4]

[Total 19]

Q10. April 2021 – Paper 1 – Q3

An investor, who wishes to invest in insurance companies, is about to undertake an analysis before selecting which companies to invest in.

- (i) Outline why the analysis of insurance companies will differ from the analysis of other financial services companies. [3]
- (ii) Explain what comparing the following ratios could indicate when analysing insurance companies:
 - (a) Total of incurred claims and expenses to premium income
 - (b) Premium payments to reinsurance companies to gross premium income. [4]

[Total 7]

Q11. September 2021 – Paper 1 – Q7

An investment management firm is launching a new range of funds to be marketed as ethical investment funds.

- (i) Outline possible ethical criteria that the new range of funds will need to meet. [3]

One of the firm's directors has expressed a concern that ethical investment funds will always produce lower returns than investment funds without these restrictions. Therefore, the lower performance of the ethical investment funds risks damaging the firm's brand.

- (ii) Discuss whether ethical investment funds have lower expected returns than investment funds without these restrictions. [4]
- (iii) Propose how the firm could mitigate risks to its brand and profitability. [5]

[Total 12]

Q12. September 2021 – Paper 1 – Q9

A life insurance company in Country A sells annuities that are guaranteed to increase each year in line with an official price index that is published by the country's government.

- (i) Describe the factors a life insurance company needs to consider in selecting the investments to back the annuity liabilities. [4]

The government of Country A has decided to make changes to the official price index and create a new index.

- (ii) Suggest reasons for the government's decision. [3]
- (iii) Discuss how a life insurance company could be affected by the introduction of a new official price index. [5]

[Total 12]

Q13. September 2021 – Paper 1 – Q11

An insurance company has decided to replace its existing deterministic pricing, valuation and financial planning models with stochastic models.

- (i) Discuss why an insurance company may decide to use a stochastic model. [3]

The insurance company has purchased a commercially available pricing model and used the model to reprice its products. Following the repricing, sales volumes increased. Results now show that the repriced business is making a loss.

- (ii) Suggest reasons why using the new pricing model may have resulted in a loss on this business. [7]
- (iii) Discuss how different stakeholders could be affected by the company making losses. [5]

[Total 15]

Q14. April 2020 – Paper 1 – Q7

An actuary has been asked to price a new financial product for an insurance company, using a deterministic model. One of the assumptions in the pricing model is extremely uncertain.

Discuss how the actuary could approach setting this assumption. [13]

Q15. September 2022 – Paper 1 - Q2

The regulation of defined benefit schemes in a country requires that the assumptions used to determine the scheme's provisions for liabilities are the actuary's best estimate of future experience plus a margin for prudence.

Outline how sensitivity analysis can be used to determine the appropriate margin for prudence. [4]

Q16. September 2022 – Paper 1 – Q4

An investment management company only invests in domestic equities and has a target to outperform the return on the main domestic equity index over a rolling 3-year period.

- (i) Discuss how the systematic and diversifiable risks associated with the fund can be mitigated. [3]
- (ii) Describe the roles and responsibilities of various stakeholders in the risk management process at the investment management company. [3]

[Total 6]