INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

25 September 2019 (pm)

Subject SP9 – Enterprise Risk Management Specialist Principles

Time allowed: Three hours and fifteen minutes

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
3. *Mark allocations are shown in brackets.*
4. *Attempt all questions, begin your answer to each question on a new page.*
5. *Candidates should show calculations where this is appropriate.*

Graph paper is NOT required for this paper.

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.

1 Fairweather Asset Management (FAM) specialises in investing in catastrophe bonds. Such bonds are typically issued by property-casualty insurers through dedicated special purpose vehicles (SPVs). If a pre-defined event occurs, such as an earthquake of a certain magnitude or a total insurance loss exceeding a particular monetary amount, there is a pre-specified pay-out from the relevant SPV to the insurer(s) involved. Consequently, the investors of the bond receive reduced coupon or even reduced principal from the SPV.

FAM is active in both buying bonds at the point of issuance and buying and selling bonds in the secondary market. It broadly follows a two-stage process:

- Filter the bond universe down to an investable universe, that is, the bonds that FAM would invest in ("Filtering Stage").
- Construct an investment portfolio using bonds in the investable universe ("Portfolio Construction Stage").

FAM then goes through the process regularly, taking advantage of new issuances and trading opportunistically. The current portfolio is dominated by exposure to hurricanes in Country A, as this is the most active area of the catastrophe bond market.

(i) List which factors FAM should consider in the Filtering Stage. [9]

(ii) Specify the key trade-offs FAM has to make in the Portfolio Construction Stage. [3]

To communicate more effectively to prospective investors, a risk actuary is hired by FAM to derive equivalent credit ratings for its largest holdings by market value, allowing for the default experience of corporate bonds of different ratings.

(iii) State the factors the actuary should consider when deriving the equivalent credit ratings. [6]

FAM currently uses a linear correlation model for aggregating catastrophe risk at the portfolio level. The risk actuary has proposed to use expected shortfall as the risk measure for potential losses from a catastrophe bond.

(iv) Discuss the pros and cons of using expected shortfall as the risk measure. [3]

(v) Comment on the appropriateness of FAM using linear correlation as a model for catastrophe risk aggregation. [5]

FAM is considering entering into the reinsurance market, where instead of buying catastrophe bonds, it will provide reinsurance to insurers directly. It expects to receive quarterly premium payments from the insurers and intends to process pay-outs within 45 days of when a pre-defined event occurs or a certain total loss trigger is breached.

(vi) Describe ways for FAM to manage counterparty risk with the proposed reinsurance arrangements. [4]

(vii) Describe the factors an insurer would consider to help it decide whether to enter into a reinsurance arrangement with FAM. [6]

A life insurer ("LifeCo") is considering appointing FAM to construct a portfolio of catastrophe bonds, as an investment for its surplus funds. To evaluate the attractiveness of the investment, LifeCo is considering constructing its own model to quantitatively assess the investment product.

(viii) Describe the steps the insurer should follow to set up such a model. [8]

(ix) Discuss LifeCo's decision to develop its own model. [7]

[Total 51]

2 Prosperous Insurance (PP) sells life insurance and long-term saving products; RedRev Insurance (RR) sells motor and mobile phone insurance. The two firms operate in the same country and share a significant number of customers. With the backing of shareholders on both sides, the two firms have decided to merge, forming Useful Insurance Group ("the Group"). The two entities will remain as separate business units but share certain functions.

The Board of the Group strongly values the benefits of enterprise risk management (ERM) and has decided to create a unified risk management function under the Chief Risk Officer (CRO) which covers activities of both entities.

(i) Outline the key benefits of ERM for the Group. [6]

(ii) Describe the role of the CRO and the risk management function. [6]

Prior to the merger, each entity had its own economic capital model. For risk monitoring purposes, PP has historically used probability of ruin as the main metric, while RR has historically used VaR as the main metric.

(iii) Describe the limitations of VaR as a metric for risk monitoring. [4]

The new risk management function has proposed to build a holistic economic capital model for the whole group from scratch, while keeping the legacy risk monitoring metrics.

(iv) Describe how the new capital model can be designed. [7]

(v) Suggest two methods for allocating capital. [2]

(vi) Comment on the practical issues of the Group using the capital allocation methods suggested in part (v). [2]

The Group is considering issuing corporate bonds and obtaining a credit rating from a rating agency.

(vii) Describe factors that will impact the rating agency's view on the strength of the ERM. [5]

To improve the capital position, the Group decides to reduce the equity risk exposure from the investment portfolio backing long-term saving products.

(viii) Describe how the equity risk reduction could be achieved. [3]

(ix) Describe the resulting impact on the Group's capital position. [2]

The Group has decided to reduce its exposure to liquidity risk.

(x) Describe how the liquidity risk reduction can be achieved. [5]

The Group also intends to migrate legacy pricing systems and databases onto the latest technology platform, to be hosted by an external party. Pricing systems are expected to be re-written and consolidated to facilitate potential new product launches in the future.

(xi) Outline the risks associated with such a migration exercise. [7]

[Total 49]

END OF PAPER