INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

6 October 2020 (am)

Subject SP9 – Enterprise Risk Management Specialist Principles

Time allowed: Three hours and fifteen minutes

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.

If you encounter any issues during the examination please contact the Examinations Team on T. 0044 (0) 1865 268 873.

1 PlainSailingCargo is a global shipping company based in the country of P-land. Its main business involves transporting goods around the world. PlainSailingCargo reports financial results using P-land's currency, the PFX. Although most of the staff and infrastructure are based in P-land, a material proportion of PlainSailingCargo's revenue and expenses is in relation to its business in the country of S-land, which is denominated in S-land's currency, the SFX. Fuel price is also denominated in the SFX.

The governments of P-land and S-land are currently re-negotiating their trading agreement. The new agreement might result in restrictions on services, including shipping. According to financial experts there is likely to be a significant movement in the exchange rate between the PFX and other currencies, including the SFX, once the terms of the new trading agreement become clear.

(i) Describe the potential downside and upside risks faced by PlainSailingCargo as a result of the renegotiation. [8]

PlainSailingCargo has hired a consultancy firm to provide advice in relation to its business plan and risk management, based on some of the likely scenarios arising from the negotiation.

(ii) Discuss the advantages and disadvantages to PlainSailingCargo of adopting this approach. [3]

Experts at the consultancy firm have put forward one scenario where the negotiations are unsuccessful and a significantly larger tariff of 50% is levied on the provision of services, including shipping, between the two countries for an indefinite period. They have predicted that this scenario has a 5% probability of occurring. PlainSailingCargo's CEO has responded with a statement that this scenario could never happen and has asked for it to be removed from the analysis.

(iii) Comment on the CEO's response. [5]

All of PlainSailingCargo's financial transactions are handled exclusively by PlainBank. PlainBank has conducted extensive modelling, and produced a distribution of the PFX-SFX exchange rate for the next financial year end.

(iv) Explain how PlainSailingCargo could reduce its direct and indirect currency risk exposure, including the tail risk exposure. [4]

PlainSailingCargo's finance director has proposed entering into derivative contracts with PlainBank, to manage PlainSailingCargo's exposure to day-to-day currency fluctuations. The contracts would cover all the currencies in which PlainSailingCargo trades across the globe.

(v) Describe the additional risks this action will introduce, setting out for each how that risk may be mitigated. [6]

(vi) Describe the benefits of PlainSailingCargo's risk function being involved in structuring and overseeing the derivative contracts. [2]

[Total 28]

2 (i) Explain the similarities between the Solvency II framework and the Basel II/III framework. [6]

(ii) Describe Solvency II's approach to risk measurement. [3]

The regulatory regime in L-Island is similar to Solvency II. LongLife is a life insurance company selling savings products, life insurance and critical illness policies on L-Island. It holds domestic assets that are a mix of corporate bonds, equities and corporate properties in local currency. LongLife's economic capital model uses stress tests aggregated using a correlation matrix.

The financial press has issued an economic summary of L-Island over the last quarter. An extract from the article is shown below.

"… Over the last quarter GDP has grown significantly, supported by high levels of employment and government investment. Credit spreads have reduced across the different sectors and ratings by 100 basis points on average. The domestic equity index has increased by 15.0% and the current level is expected to be maintained for the foreseeable future. Inflation has increased ahead of the government's 3.0% target to 3.5%. Property repossessions have decreased by 30.0% and the property price index has increased by 12.0%. …"

(iii) Explain the impact, including any approximate calculations, this will have on the recalculation of LongLife's solvency capital requirement, stating any assumptions you make. [11]

The risk function of LongLife has raised a concern around genetic testing. Recently there has been an increase in people on L-Island undertaking genetic tests to trace their ancestry. Part of the result from this testing indicates where people are more susceptible to critical illnesses, including critical illnesses covered by LongLife policies. If policyholders have the genetic tests they are not obligated to share the results with LongLife.

(iv) Explain, with reference to two distinct examples, the difference between adverse selection and moral hazard. [4]

(v) Explain how the genetic tests could impact LongLife. [4]

(vi) Propose actions LongLife could take to mitigate any risks arising from the availability of genetic testing, indicating any secondary risks arising from these actions. [5]

The Board at LongLife is pleased that the risk function is able to identify potential risks. However, it is about to review its ERM programme and would like to understand how ERM adds value as well as mitigating risks.

(vii) Explain how the components of an ERM programme can add value to LongLife. [9]

[Total 42]

3 ActuarInvest is an insurance company specialising in a particular type of investment product that pays out a lump sum on the policyholder's retirement date. The lump sum is linked to the return on the underlying assets, but is also subject to a guaranteed minimum amount. The investment performance of the underlying assets has been strong and the market value of assets is currently well above the value of the guarantee. These assets are currently invested 60% in global equities, 30% in domestic fixed income bonds and 10% in domestic cash.

The risk manager of ActuarInvest has proposed taking a long position in equity volatility, such that ActuarInvest would benefit from an increase in equity volatility, based on the following three beliefs:

- equity valuations look high
- implied volatility based on the price of global equity options is at a 10-year low
- extreme high values in equity volatility are highly correlated with extreme falls in equity values.

ActuarInvest holds economic capital for equity market risk, but has no formal allowance for equity volatility risk within its ERM framework.

(i) Describe, with the aid of ONE of the diagrams below, how ActuarInvest could use options to take a long position in equity volatility. [3]

Diagram A

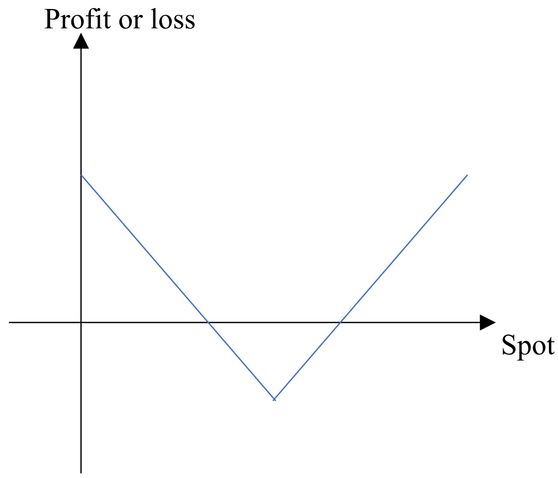


Diagram B

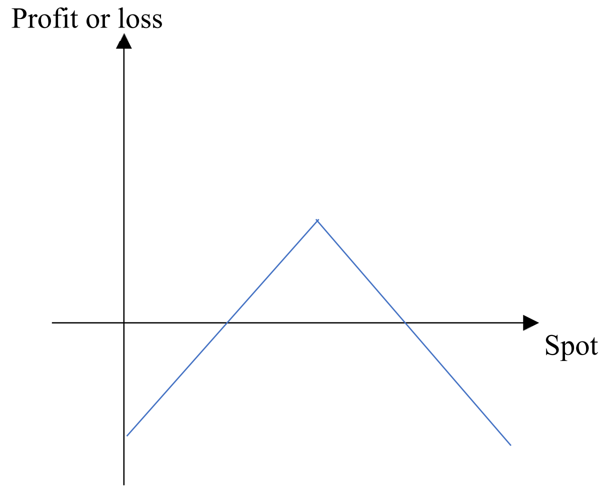


Diagram C

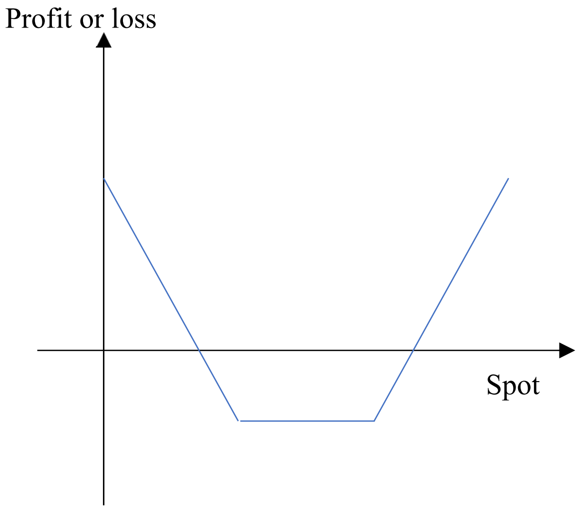
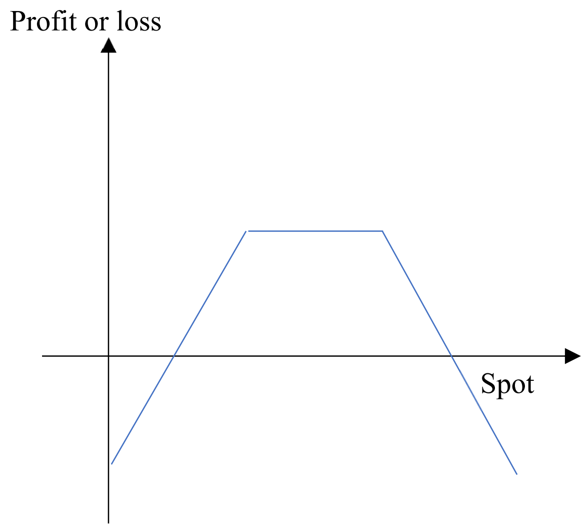


Diagram D



(ii) Discuss the likely objectives behind the risk manager's proposal, indicating how these might affect the structuring of the option trades. [5]

(iii) Describe the factors that will determine whether ActuarInvest is able to implement this hedging strategy. [4]

The risk manager has also suggested that ActuarInvest purchase over-the-counter put options on equity indices, and change the exposure according to the market levels.

(iv) Discuss the advantages and disadvantages of having a variable exposure based on the equity market levels. [4]

The risk manager also intends to fully incorporate the equity volatility risk into the ERM framework, including the economic capital model.

(v) Suggest how this may be achieved. [8]

(vi) Discuss the implications of this action on ActuarInvest's hedging strategy. [6]
[Total 30]

END OF PAPER