INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

16 April 2024 (am)

Subject SA7 – Investment and Finance
Specialist Advanced

Time allowed: Three hours and twenty minutes

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

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

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1 You are the investment advisor to the trustees of a pension fund.

At a recent trustee meeting, one of the trustees made the following statement after studying an equity investment course with a syllabus that was limited to the efficient markets hypothesis and the capital asset pricing model:

'Financial markets are efficient, and we should therefore only invest in passive and index-tracking equity funds, because consistently outperforming the market is impossible'.

(i) Describe the approach to investing suggested by this statement. [3]

(ii) Outline an alternative approach to investing in equity markets. [3]

As investment advisor, you are considering how to communicate the approach in part (ii) to the trustee.

(iii) Describe the challenges that you may encounter. [4]

The pension scheme trustees have decided to change the investment strategy to have a greater environmental, social and governance (ESG) focus and to invest in new start-up companies in the sustainable energy space.

(iv) Outline reasons why the trustees might have made this decision. [7]

You are interviewing three investment managers who have products in the ESG area.

(v) Outline what type of questions you would ask the investment managers and what you would look for in their answers that may show a capacity to produce above-average future investment performance. [13]

[Total 30]

2 The government of a country has only three bonds in issue, all of which are zero-coupon. The prices of these bonds at two different dates are given below:

Bond maturity date	*Bond price as at:*	
	31 December 2021	*31 December 2022*
31 December 2026	95	92
31 December 2031	85	77
31 December 2036	70	52

(i) Calculate the yields, at both dates, for each of the three bonds. [6]

(ii) Describe the change in yields over the period. [3]

(iii) Describe how you would use the yields in part (i) to construct a government bond yield curve. You should comment on the features you would expect in the yield curve, together with challenges in its construction. [5]

(iv) Discuss some of the complexities with hedging long-dated pension liabilities in this market using government bonds. Your answer should include consideration of other assets that could be used in the hedge portfolio, and some of their limitations. [9]

[Total 23]

3 In a developed economy, the market regulator has specified that investment funds need to set the assumptions used in investment projections based on historical 5-year average returns.

(i) Discuss the appropriateness of this approach.

[**Hint**: you may discuss the advantages and disadvantages, alternative approaches and the merits or otherwise of using historical returns over longer historical periods.] [8]

The developed economy has performed well economically in recent times due to increasing globalisation. However, due to recent geopolitical events, the investment strategy team have concluded that globalisation is likely to reverse over the medium to long term.

(ii) Discuss how this could impact:

(a) economic growth. [4]

(b) inflation. [4]

(c) equity returns. [4]

(d) bond returns. [4]

[Total 24]

4 The government of Actuaria, a developing country, is aiming to reduce the production of carbon dioxide. To this effect, it is considering introducing the implementation of a carbon trading system. Going forward, companies will be subject to restrictions that limit their carbon output to 80% of previous levels. Companies will be able to purchase, from a centralised market, carbon credits that permit additional production. Futures on carbon credits will also be sold and these will have a maximum maturity of 2 years.

(i) Describe, in your own words, the investment characteristics of commodities. [2]

(ii) Explain in detail the likely relationship between spot prices and futures prices of carbon credits.

[**Hint:** distinguish between commodities held for investment and those held for commerce and consider companies that sell carbon credits.] [7]

A speculator in the carbon market believes that they have identified an arbitrage opportunity based on the following details:

- Actuaria $/EUR exchange rate is 25.
- Spot carbon credit price is 10,000 EUR.
- 1-year futures carbon credit price is 300,000 Actuaria $.
- 1-year interest rate is 3% in Europe.

(iii) Using the numbers shown above:

(a) explain how an investor can profit from trading in the credit carbon markets (assuming the exchange rate stays unchanged). [4]

(b) calculate:

- the profit that can be made if the exchange rate stays unchanged.
- the exchange rate that would lead to a profit of zero.

[2]

(iv) Outline the key risk that would be beyond the manager's control when executing this trade. [2]

A broker has approached the speculator and indicated that due to an anticipated rise in the carbon credit prices in Actuaria, they are aware of companies that would be interested in entering into 20-year contracts to purchase carbon credits in bulk. The broker is seeking offers to supply carbon credits from firms or carbon credit dealers.

(v) Outline the considerations for the speculator when determining their offer price. [6]

[Total 23]

END OF PAPER