



STRATHMORE INSTITUTE OF MATHEMATICAL SCIENCES
BACHELOR OF BUSINESS SCIENCE IN FINANCIAL ENGINEERING, FINANCIAL
ECONOMICS AND ACTUARIAL SCIENCE
END OF SEMESTER EXAMINATION
BSF 4234 ADVANCED PORTFOLIO MANAGEMENT

DATE: 6th December 2023

Time: 13:00 – 15:00

Instructions

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

QUESTION 1 (30 MARKS)

1. Discuss the role of behavioral finance in portfolio management, and provide examples of common behavioral biases that can impact investment decisions. (8 Marks)
2. A pension fund has a portfolio consisting of Asian equities and bonds with a Sharpe ratio of 0.30. It is considering adding Australian real estate (predicted Sharpe ratio of 0.18) to its portfolio, with a predicted correlation with the existing portfolio of 0.25. Using the criteria for adding a new asset class to a portfolio, should the fund include Australian real estate in its portfolio? Show your calculations. (5 marks)
3. An institution holds Portfolio K. The institution wants to use Portfolio L and Portfolio J to hedge its exposure to inflation. Specifically, it wants to combine K, L and J to reduce its inflation exposure to 0. Portfolios K, L and J are well diversified, so the manager can ignore the risk of individual assets and assume that the only source of uncertainty in the portfolio is the surprises in the two factors. The returns to the two portfolios are

$$R_K = 0.12 + 0.5 F_{inf} + 1.0 F_{gdp}$$

$$R_L = 0.11 + 1.5 F_{inf} + 2.5 F_{gdp}$$

$$R_L = 0.19 + 0.3 F_{inf} + 1.5 F_{gdp}$$

Calculate the weights and consequent strategy that a manager should have on K and L to achieve this goal given the analyst would like to hold 0.3 of portfolio J. What is the novel return equation given this adopted strategy. (5 marks)

4. You have been hired by a pension fund to manage a portfolio on behalf of their members.

The fund's investment policy statement (IPS) specifies a long-term investment horizon, a moderate risk tolerance, and a benchmark of the S&P 500 index. Develop a portfolio management strategy that aligns with the IPS, including asset allocation, diversification, and risk management techniques. Justify your strategy and explain how you will monitor and evaluate the portfolio's performance.

Required:

- a) Asset Allocation: Provide an asset allocation strategy that aligns with the fund's IPS, considering the investment horizon and risk tolerance. Justify your allocation strategy with relevant research and analysis. (4 marks)
- b) Diversification: Explain how you will achieve diversification within the portfolio, including the use of different asset classes and investment styles. (3 marks)
- c) Risk Management: Discuss your risk management techniques, including the use of derivatives, hedging, or other risk reduction strategies. (2 marks)
- d) Performance Evaluation: Describe how you will monitor and evaluate the portfolio's performance, including the use of performance benchmarks and performance attribution analysis. (3 marks)

QUESTION 2 (20 MARKS)

1. Define the following risks in portfolio management: (6 marks)

- i) Systematic risk
- ii) Unsystematic risk
- iii) Management risks
- iv) Marketability risk
- v) Purchasing Power risk
- vi) Funding risk

2. Clients' needs and circumstances change, and portfolio managers must respond to these changes to ensure that the portfolio reflects those changes. Discuss 4 other benefits that are realized by portfolio rebalancing. (8 Marks)

3. In portfolio risk measurement, VaR measure has received a number criticism. Explain 3 of these criticisms VaR is subjected to. (6 Marks)

QUESTION 3 (20 MARKS)

1. The portfolio management process is an integrated set of steps undertaken in a consistent manner to create and maintain an appropriate portfolio (combination of assets) to meet clients' stated goals. Evaluate the portfolio management process (10 Marks)
2. Explain the concept of dynamic asset allocation, and discuss its advantages and disadvantages. (5 Marks)
3. Compare and contrast the following investment styles (5 Marks)
 - a) Passive Style
 - b) Active Style
 - c) Value Style
 - d) Contrarian Style
 - e) Yield Style

QUESTION 4 (20 MARKS)

1. Explain the role of machine learning and artificial intelligence in portfolio management, and provide examples of how these technologies are being used in the industry. (8 Marks)
2. Discuss any 3 factors that each influence international market integration and market segmentation (6 Marks)
3. Given an investor with a risk aversion coefficient (λ) of 3, calculate the utility scores for two portfolios with the following characteristics:
Portfolio A: Expected Return: 8.2%, Standard Deviation: 12%
Portfolio B: Expected Return: 6.5%, Standard Deviation: 9%
 - a. Which portfolio would the investor prefer based on the utility maximization theory?

- b. If an investor desires a threshold level of return (R_L) of 6%, using the Safety-First Ratio, determine which of the portfolios above should be selected. (6 marks)

QUESTION 5 (20 MARKS)

2. You are an international portfolio manager at GlobInvest, evaluating investment strategies in two different equity markets - Market X (an emerging market) and Market Y (a developed market). There is ongoing debate about the degree of integration between these markets and the global market, and new factor premiums have been identified in recent analyses. The table below represents expected returns, standard deviations, correlation coefficients with the global market, beta against the global market, and estimated illiquidity premiums for Market X, Market Y, and the Global Market Index.

Market/Index	Expected Return	Standard Deviation	Correlation with Global Market	Illiquidity Premium	Degree of Market Integration
Market X	16%	30%	0.65	3%	70%
Market Y	11%	20%	0.85	1%	90%
Global Market	9%	18%	1.00	0%	

Additional data:

Risk-free rate: 2%

Global market premium: 5%

- Calculate the expected returns for Market X and Market Y. (4 marks)
- Using the provided data, calculate the covariance between Market A and Market B with respect to the global market. (4 marks)
- Compute the Sharpe ratios for Market X, Market Y, and the Global Market, using your findings above. (4 marks)
- Construct a global portfolio with 40% in Market X, 40% in Market Y, and 20% in the Global Market. Calculate the portfolio's expected return, standard deviation, and Sharpe ratio under this scenario of perfect integration. (4 marks)
- Discuss the role of alternative investments in portfolio management, and provide examples of alternative investments. (4 Marks)