

Question 1 (20 points)

(a) (5 points) What is the LIBOR rate and how is it determined? Are there any concerns with using it as a reference rate?

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(b) (5 points) What is one main drawback of a price weighted average approach in computing the stock index versus the value weighted index? Give an example of an index that is computed using the price weighted approach.

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(c) (5 points) In what situation would VaR or expected shortfall be a better measure of risk than standard deviation?

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(d) (5 points) Historically, has there been a positive relationship between volatility and average returns for large portfolios? What about for individual stocks? If there is no positive relationship, explain why.

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Question 2 (40 points)

Your employer offers two funds for your pension plan, a money market fund and an S&P 500 index fund. The money market fund holds 3-month Treasury bills, which currently offer a 3% safe return per year. The S&P 500 index fund offers an expected return of 10% per year with a standard deviation of 20%.

(a) (7 points) Consider portfolio A, which according to your level of risk aversion, requires an expected return of 8% per year. What should be the composition of Treasury bills and the S&P 500 index fund in this portfolio? What is the standard deviation of its returns? What is your level of risk aversion?

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(b) (6 points) What is the Sharpe ratio of Portfolio A? What does the Sharpe ratio represent? How is it related to the capital allocation line?

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(c) (7 points) Illustrate Portfolio A on a graph where you also plot the risk-free asset, the S&P 500 index fund, the capital allocation line and your indifference curve. Are you a relatively risk averse investor? Explain.

(d) (6 points) Now your employer adds an emerging-market fund to the two existing funds. The emerging-market fund offers an expected return of 10% per year, the same as the S&P 500 index fund, but with a standard deviation of 30%, higher than the S&P 500 index fund. Its correlation with the S&P500 index fund is 0. Would you consider including the emerging-market fund as part of your portfolio? Explain.

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(e) (7 points) Now consider portfolio B, which consists of 80% in the S&P index fund and 20% in the emerging-market fund. Calculate portfolio B's expected return and standard deviation. If you mix portfolio B with the money-market fund to achieve an expected return of 8%, is it better than Portfolio A? Explain.

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(f) (7 points) Is portfolio B the global minimum variance portfolio? If not, solve for the global minimum variance portfolio. Explain whether it is possible for this to be the perfect hedge portfolio.

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Question 3 (30 points)

In 1997, the rate of return on short-term government securities (perceived to be risk-free) was about 5%. Suppose the expected rate of return required by the market for a portfolio with a beta measure of 1 is 12%. According to the capital asset pricing model (CAPM):

(a) (7 points) What is the expected rate of return on the tangency portfolio? What about the expected rate of return on a stock with $\beta = 0$? If a stock has $\beta = 0$ does this mean that it has no risk?

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(b) (7 points) Suppose you consider buying a share of stock at \$40. The stock is expected to pay \$3 dividends next year and you expect it to sell then for \$41. The stock risk has been evaluated by $\beta = -.5$. Is the stock overpriced or underpriced and would you consider buying or selling the stock?

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(c) (8 points) Write out the equilibrium relation underlying CAPM. Describe in terms of the reward to risk ratio the intuition behind this equilibrium relationship. Why is it considered to be an equilibrium relationship?

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(d) (8 points) What is the two fund separation theorem? Does it imply that passive or active investing is best? Explain why the two fund separation may not hold in the real world.

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