Sample/practice exam 2 May 2018, questions

Investments (Lancaster University)

2019 EXAMINATIONS (MOCK)

PART II **(SECOND AND FINAL YEAR)**

ACCOUNTING AND FINANCE

AcF 321 **INVESTMENTS**

(2 hours + 15 minutes reading time)

Answer any **THREE** questions.

For each question please write your answers in a separate booklet.

The use of standard calculators with scientific, and standard arithmetic and statistical functions, is permitted.

QUESTION 1

ANSWER ALL PARTS OF THE QUESTION

a. Explain three ways of estimating the market risk premium

[8 marks]

b. Explain the main differences between Open-end and Closed-end funds

[8 marks]

c. How many shares would you need to hold in a portfolio to have an annual volatility of no more than 22%, assuming that volatility of all stocks is 30%, that covariance between the stocks is 4%, that stock betas are all equal to 1, and that idiosyncratic risk uncorrelated across stocks)?

[7 marks]

d. An investor can invest in two risky assets 1 and 2, and the risk-free asset. The risk-free rate is 5%, the expected returns on the risky assets are $\mu_1 = 0.15$, $\mu_2 = 0.2$, and their variance-covariance matrix is as follows:

$$\begin{pmatrix} \sigma_{11} & \sigma_{12} \\ \sigma_{21} & \sigma_{22} \end{pmatrix} = \begin{pmatrix} 0.3 & 0.2 \\ 0.2 & 0.3 \end{pmatrix}$$

Required:

a. Compute the *Sharpe ratio* for the following four portfolios: (100 % in risky asset 1,0% in risky asset 2); (25%,75%); (50%,50%); and (0%,100%).

[6 marks]

b. Pretend that asset 2 is the market portfolio. Verify whether the Capital Asset Pricing Model holds if asset 2 is indeed the market portfolio.

[4 marks]

QUESTION 2

ANSWER ALL PARTS OF THE QUESTION

a. Explain the Roll Critique

[7 marks]

b. Describe the Chen, Roll and Ross model. Explain how you would test if the factors considered in the model are priced.

[9 marks]

c. You are working for an investment house that believes in the APT. They use a four factor model, as in Chen, Roll and Ross. They have constructed four portfolios that are maximally correlated with each of the four factors (unexpected changes in inflation, slope of the term structure, corporate risk premium and output). They have estimated factor betas for a number of shares, and you are particularly interested in three of the shares (A, B and C). Their betas are given below:

Share	*Factor 1*	*Factor 2*	*Factor 3*	*Factor 4*
A	+0.5	+1.4	-0.2	+1.0
B	-0.8	+2.0	+0.5	+0.7
C	+3.1	+0.2	-1.6	+1.6

(i) Given that the risk free rate is 5% and the risk premium on the four factors is estimated at 2.0%, 1.0%, 1.5% and 1.0%, what is the expected return on each of the shares?

[2 marks]

(ii) What are the betas of a portfolio that is invested two thirds in B and one third in C? What is its expected return? How does the portfolio differ from one that is invested fully in A?

[3 marks]

d. Mr Entrepreneur's entire wealth of £50m consists of shares in the company he founded. He is not happy holding such an undiversified portfolio, but is unwilling to sell any of his shares because he does not want to lose control of the company. A friend suggests that he could diversify by borrowing some money from the bank against the security of his shares and invest it in the stock market. In this way he would have a much more diversified portfolio. The bank is ready to lend him up to £25m. Can he reduce his total risk by doing as his friend suggests? Explain carefully.

[6 marks]

e. Suppose that there are many stocks in the security market and that the characteristics of Stocks A and B are given as follows

Stock	Expected Return	Standard Deviation
A	10%	5%
B	15%	10%
	Correlation = -1	

Suppose that it is possible to borrow at the risk-free rate, r_f. What must be the value of the risk-free rate?

[6 marks]

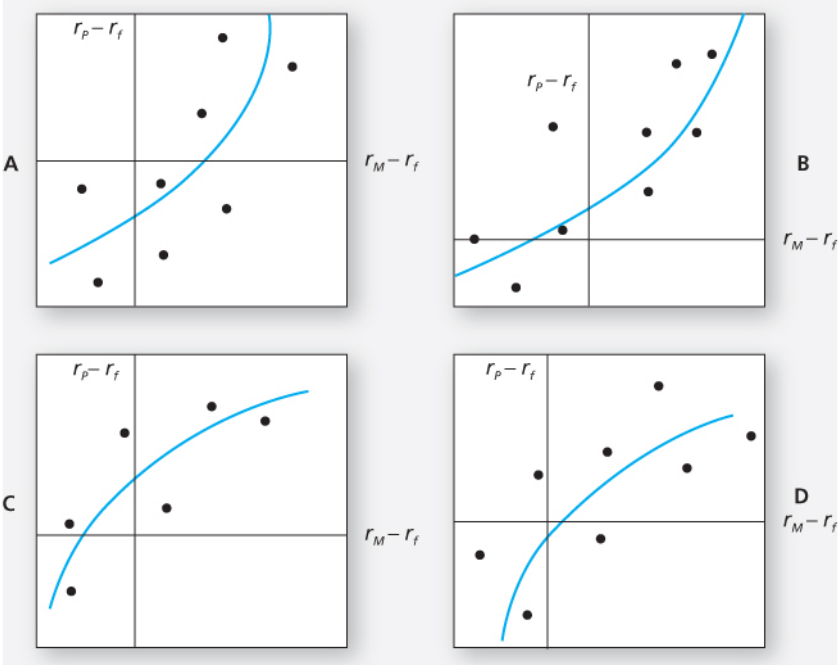
QUESTION 3

ANSWER ALL PARTS OF THE QUESTION

a. Discuss the different market frictions that create 'limits to arbitrage'

[6 marks]

b. Evaluate the market timing and security selection abilities of four managers whose performances are plotted in the accompanying diagrams.



[8 marks]

c. Consider the following the information regarding the performance of a money manager in a recent month. The table represents the actual return of each sector of the manager's portfolio in column 1, the fraction of the portfolio allocated to each sector in column 2, the benchmark or neutral sector allocation in column in 3 and the returns of sector indices in column 4.

	Actual Return	Actual Weight	Benchmark Weight	Index Return
Equity	2%	0.7	0.6	2.5% (S&P 500)
Bonds	1%	0.2	0.3	1.2 (Salomon Index)
Cash	0.50%	0.1	0.1	0.5

Required:

(i) Comment on the manager's performance

[2 marks]

(ii) What was the contribution of security selection to the manager's performance?

[4 marks]

(iii) What was the contribution of asset allocation to the performance? Confirm that the sum of selection and allocation contributions equals her total "excess" return.

[4 marks]

d. Consider the two (excess return, r_p-r_f) index-model regression results for stocks *AB* and *BC*. The risk-free rate over the period was 6%, and the market's average return was 14%. Performance is measured using an index model regression on excess returns. Which stock is the best choice under the following circumstances?

	Stock AB	Stock BC
Index Model regression estimates	$1\%+1.2(r_m-r_f)$	$2\%+.8(r_m-r_f)$
R-square	0.576	0.436
Residual standard deviation σ (e)	10.30%	19.10%
Standard deviation of excess returns	21.60%	24.90%

Required:

(i) This is the only risky asset to be held by the investor

[3 marks]

(ii) This stock will be mixed with the rest of the investor's portfolio, currently composed solely of holdings in the market index fund.

[3 marks]

(iii) This is one of many stocks that the investor is analyzing to form an actively managed stock portfolio

[3 marks]

QUESTION 4

ANSWER ALL PARTS OF THE QUESTION

a. Discuss the difference between Pure Expectation and Liquidity Preference hypotheses of the term-structure of interest rates

[6 marks]

b. Firm XYZ is required to make a $5M payment in 1 year and a $4M payment in 3 years. The yield curve is flat at 10% APR with semi-annual compounding. Firm XYZ wants to form a portfolio using 1-year and 4-year U.S. strips to fund the payments. How much of each strip must the portfolio contain for it to still be able to fund the payments after a shift in the yield curve?

[10 marks]

c. The current yield curve for default-free zero-coupon bonds are as follows:

Maturity (Years)	YTM (%)
1	10%
2	11%
3	12%

Required:

(i) What are the implied 1-year forward rates?

[3 marks]

(ii) Assume that the pure expectations hypothesis of the term structure is correct. If market expectations are accurate, what will be the pure yield curve next year?

[5 marks]

(iii) If you purchase a 2-year zero-coupon bond now, what is the expected total rate of return over the next year? What if you purchase a 3-year zero-coupon bond? Ignore taxes.

[5 marks]

(iv) What should be the current price of a 3-year maturity bond with a 12% coupon rate paid annually? If you purchased it at that price, what would your total expected rate of return be over the next year? Ignore taxes.

[4 marks]

QUESTION 5

ANSWER ALL PARTS OF THE QUESTION

a. Explain cross-hedging and the stack-and-roll strategies employed in risk management using futures.

[7 marks]

b. The S&P portfolio pays a dividend yield of 1% annually. Its current value is 1,300. The T-bill rate is 4%. Suppose the S&P futures price for delivery in 1 year is 1,330. Construct an arbitrage strategy to exploit the mispricing and show that your profits 1 year hence will equal the mispricing in the futures market.

[8 marks]

c. Discuss the performance of long-short strategies during the Quant crisis of 2007

[7 marks]

d. You manage an $11.5 million portfolio, currently all invested in equities, and believe that the market is on the verge of a big but short-lived downturn. Hence, you decide to temporarily hedge your equity holdings with S&P 500 index futures contracts.

Required:

i) Should you be hedging long or short? Why?

[2 marks]

ii) If your equity holdings are holdings are invested in a market-index fund, into how many contracts should you enter? The S&P 500 index is now at 1,150 and the contract multiplier is $250.

[3 marks]

iii) How does your answer to (ii) change if the beta of your portfolio is 0.6?

[2 marks]

(iv) Discuss one advantage and disadvantage of hedging the portfolio using S&P 500 index futures?

[4 marks]