

INSTITUTE OF CHARTERED SHIPBROKERS

2008 EXAMINATIONS

THURSDAY 1 MAY – AFTERNOON

FUNDAMENTALS OF FINANCE

Time allowed – Three hours

Answer FIVE questions. ALL questions carry equal marks

Calculators may be used

1. Casto Plc has been formed to undertake two investment opportunities. The risk and return characteristics of the two projects are as follows:

	A	B
Expected return	12%	20%
Risk	3%	7%

Casto is planning to invest 80% of its available funds into project A and 20% into project B. The directors feel that the correlation co-efficient between the returns of the projects is + 0.1.

- Calculate the returns from the proposed portfolio of Projects A and B.
- Calculate the risk of the portfolio.
- Make comments on your calculations for part (b) in the context of the risk reducing effects (if any) of diversification.
- Now assume the correlation coefficient between project A and project B is -1.0. How should Casto invest their funds in order to obtain a zero risk portfolio.

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2. Mr Hemming has savings of \$12,000. Of this amount he has invested \$6,000 in low risk government stocks which currently yield a return of 6%. The remainder has been invested in a portfolio of four different companies shares as follows:

Company	Expected Return	beta Shares	Value of Shareholding
Company A	7.6%	0.20	\$1,200
Company B	12.4%	0.80	\$1,200
Company C	15.6%	1.20	\$1,200
Company D	18.8%	1.60	\$2,400

- a) Calculate the expected return and beta value of Mr Hemming's savings portfolio.
 - b) Mr Hemming has decided that he wants an expected return of 12% on his savings portfolio. Show how he would achieve this by selling some of his Government Stock and investing the proceeds in the market portfolio.
 - c) If Mr Hemming were only to invest in Government stocks and the market portfolio, what savings portfolio would be required to give him an expected return of 10.32%
 - d) If Mr Hemming wants to choose between his existing savings portfolio as in a) above and the one suggested in c) above, which would you advise he chose and why.
3. XYZ Shipping, owners of dry bulk tonnage, are negotiating the renewal of a chartering contract for M/V Ariadne. Her current charterer (Grain Expo) is offering them a four year deal under the following terms. Starting in one month, XYZ will be receiving \$400,000 per month growing at a rate of 0.5% per month for the next 11 months (i.e. till month 12). Freight payments in the second year (months 13-24) will be \$500,000 at period 13, growing at a rate of 0.4% per month until period 24, followed by payments of \$600,000 at period 25 growing at a rate of 0.3% thereafter, until the end of the fourth year (period 48). Grain Impex, a rival charterer, is offering a flat fee of \$20,000,000 for a four year contract. If the ship-owners require a return of 10% per annum on their investments, which charterer is offering them a better deal?
4. a) In December 2003, Tankers Inc., signed a bareboat contract which guaranteed them total freight revenue of \$9,955,000 over a number of years, as follows: The guaranteed payments were \$875,000 for 2004, \$650,000 for 2005, \$800,000 in 2006, \$1 million in 2007, \$1 million in 2008 and \$300,000 in 2009. In addition, the contract called for \$5,330,000 in deferred money payable at the rate of \$240,000 per year from 2010 through 2016 and then \$125,000 a year from 2017

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through 2026. These payments are made on January 1, of each year. Assuming that the annual interest rate is 9%, what is the PV of these payments as of January 1, 2004? If instead the company was to receive these payments as an annual revenue at the beginning of each of the five years from 2005 through 2009, what would its equivalent annual revenue be?

b) Imagine an economy where there are only two risk factors, Factor 1 and Factor 2. Investments X, Y and Z have the following sensitivities to these two factors:

Investment	Factor 1	Factor 2
X	1.75	0.25
Y	-1.0	2.00
Z	2.0	1.00

We assume that the expected risk premium is 4 percent on factor 1 and 8 percent on factor 2.

- i. According to the APT what is the risk premium on each of the three stocks?
- ii. Suppose you buy \$200 of X and \$50 of Y and sell \$150 of Z. What is the sensitivity of your portfolio to each of the two factors? What is the expected risk premium?
- iii. Suppose now that X offered a risk premium of 8 percent, Y offered a premium of 14 percent and Z offered a premium of 16 percent. Devise a strategy that has zero sensitivity to each factor and that has a positive risk premium.

5. a) California Electronics expects to earn \$100 million per year in perpetuity if it does not undertake any new projects, The firm has an opportunity that requires an investment of \$15 million today and \$5 million in one year. The new investment will begin to generate additional annual earnings of \$10 million two years from today in perpetuity. The firm has 20 million shares of common stock outstanding, and the required rate of return on the stock is 15 percent:

- i. What is the share price of the stock if the firm does not undertake the new project?
- ii. What is the value of growth opportunities if the company undertakes the project?
- iii. What will the share price of the stock be if the firm undertakes the new project?

b) The Learjet of the Chief Executive is not fully utilised. You judge that its use by other officers would increase direct operating costs by \$20,000 a year and

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would save \$100,000 a year on airline bills. On the other hand, you believe that with the increased use the company will need to replace the jet at the end of three years rather than four. A new jet costs \$1.1 million and (at its current low rate of use) has a life of six years. Does it make economic sense to allow other officers to use the plane? Assume that the real opportunity cost of capital is 8% and all figures presented above are also in real terms.

6. a) ICS Manufacturing Plc (ICSM) is a company that operates in the UK. It has traditionally raised capital in the UK market and therefore has substantial quantities of long-term Pound sterling denominated debt. More recently, ICSM was involved in a series of projects in Japan and as a result, the company will have substantial cash inflows in Japanese Yen over the next seven years. The following rates are quoted in the swap market as of March 15, 2004:

Years	Japanese Yen - ¥		Pound Sterling - £	
	Bid	Ask	Bid	Ask
1	0.07	0.10	4.52	4.54
2	0.16	0.18	4.63	4.67
3	0.28	0.30	4.74	4.78
4	0.42	0.44	4.80	4.86
5	0.57	0.60	4.84	4.89
6	0.73	0.76	4.88	4.92
7	0.89	0.92	4.90	4.95

- i. ICSM wants to use its long Japanese Yen position to pay-off some of its Sterling Pound denominated debt over a seven year period. Calculate the relevant annual swap payments on a 500 million Japanese Yen notional principal. Assume that the spot exchange rate as of 15 March 2004 is Yen 198.76 per Pound Sterling (¥ 198.76 /£)
- ii. A year has now passed since the initialisation of the swap above. Assume that on 16 March 2005, one year and one day following the commencement of the swap agreement, ICSM wishes to unwind its currency swap position. The current swap rates for Japanese Yen are now 0.88% - 0.9%, the current swap rates for Pound Sterling are 4.9% - 4.93% and the current spot exchange rate is ¥ 112.00 /£. What is the cost or profit to CM Plc from unwinding the swap?

b) Company A, an AAA-rated firm, wants a floating rate loan. The company has access to fixed-rate funds in the Eurodollar bond market at 10% and floating-rate funds at LIBOR + 0.25%. In contrast, company B which prefers a fixed-rate loan, has access to fixed-rate funds in the Eurodollar bond market at 11% and floating-rate funds at LIBOR + 0.75%.

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- i. Can companies A and B benefit from a swap transaction and if so, how?
- ii. Suppose that companies A and B eventually decide to enter into a swap agreement. The swap is arranged through Interm-Bank. Under the terms of the swap, Interm-Bank will get 4 basis points on the notional principal as a commission and the remaining cost savings will be split equally between banks A and B. Calculate the swap payments for companies A and B considering that the floating rate that will be paid from Company A to Company B through Interm-Bank will be the LIBOR rate. What is the effective cost of floating-rate borrowing for company A? What is the effective fixed-rate borrowing for company B?
- iii. In reality, would you expect company B to benefit more from the swap than company A and if so, why?

7. You have estimated the following spot interest rates in the market

Year	Spot Rate
1	$r_1 = 5.00\%$
2	$r_2 = 5.50\%$
3	$r_3 = 5.75\%$
4	$r_4 = 6.00\%$

- a) Estimate all the relevant forward rates
- b) Currently, there is a 5-year bond in the market with an annual coupon of 5%. The price of the bond is equal to its par value and the bond will mature in exactly five years time. Calculate the 5-year spot rate.

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8. You are a Director of a large shipping business. You have identified three investment projects that you have called the projects simply project A, B and C all costing 3,000 euros to initiate, having a life of three years with income arising at the end of the year, and the residual value of the assets being zero. Depreciation is on a straight line basis and amounts to 1,000 euros per year. Tax where applicable is at the rate of 50% and is charged and collected simultaneously at the end of each year. The details of earnings, depreciation, tax and profitability are given below:

Project years	2008 Euros	2009 Euros	2010 Euros
<i>Project A</i>			
Earnings	2,500	2,500	2,500
Depreciation	1,000	1,000	1,000
Profit before tax	1,500	1,500	1,500
Tax at 50%	750	750	750
Profit after tax	750	750	750
<i>Project B</i>			
Earnings	1,500	2,500	3,500
Depreciation	1,000	1,000	1,000
Profit before tax	500	1,500	2,500
Tax at 50%	250	750	1,250
Profit after tax	250	750	1,250
<i>Project C</i>			
Earnings	3,500	2,500	1,500
Depreciation	1,000	1,000	1,000
Profit before tax	2,500	1,500	500
Tax at 50%	1,250	750	250
Profit after tax	1,250	750	250

You are to produce a report to the board of directors showing for each project the payback period; the rate of return and the net present value of each project. Assume the cost of capital is 10%. Conclude in your report that on the assumption that each project is exclusive to your company which project, if any, you would recommend the company invest in.