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following aids can be used: pocket calculator, dictionary

mination questions:

A company has made an investment of €40,000, which is expected to yield benefits over a five-year period. Annual cash inflows €90,000 and annual cash outflows of €75,000 are expected, excluding taxes and the depreciation shelter. The tax rate is 30% and the cost of capital is 8%. The company uses straight-line depreciation.

- (a) Compute the NPV of the investment.
- (b) On investigation, you discover that no adjustments have been made for inflation or price-level changes. The data for the first year are correct, but after that, inflows are expected to increase at 4% per year, outflows are expected to increase at 6% per year, and the annual rate of inflation is expected to be about 6%. Reevaluate the NPV of the project in light of this information. (20%)

A firm wants to invest into one of the following machines:

	machine1	machine 2
investment	€50,000	€20,000
cash flow at the end of each year	20,000	12,000
life of machine	3 years	2 years

- (a) Machine 1 is only available today (at the end of three years it can be replaced by machine 2), whereas machine 2 can always be replaced by the same conditions. The cost of capital is 5%. (15%)
- (b) Which machine should the firm buy today? Why? (15%)

Consider a levered firm with €10 mio face value of debt outstanding, maturing in one year. The current market value of the firm is €25 mio. The riskless rate is 6% and the expected rate of return on the market is 12%. The systematic risk of the firm's assets is $\beta_{assets} = 1.5$, the debt beta is 0.15.

- (a) Determine the market value of the firm's debt and equity. (10%)
- (b) Determine the cost of debt and equity capital (assuming a world without taxes). (10%)

Explain the statements of the Modigliani-Miller theorems. What are the consequences of this theory? (10%)

- 5. The following table shows the correlations between the returns of three stocks A, B, C, their standard deviations and their expected returns.

	correlation			\bar{r}
	A	B	C	
A	1	0.78	0.11	14.9%
B		1	0.09	20.8%
C			1	16.3%
				12.5%

- (a) Determine the variance-covariance matrix.
- (b) Determine the expected return and the variance of an equally weighted portfolio.
- (c) In the following consider only stocks A and B (assume that short selling is allowed). Determine the minimum variance portfolio (portfolio weights, expected return, standard deviation). Determine the standard deviation of a portfolio with expected return (i) 10%, (ii) 15%. Are these two portfolios efficient? Explain! Draw these two portfolios, stocks A and B, and the minimum variance portfolio in the σ - \bar{r} -plane and sketch the set of feasible portfolios.
- (d) How does the set of efficient portfolios in (c) change if there is also a risk-free asset with return 5%? Show this in your graph! (25%)

- 6. The current price for 1-year (zero coupon) bond with €100 face value is 94.25. The current price for a 3-year bond with 12% annual coupon and €1000 face value is €1136.53. Dealers are currently offering to buy or sell a forward contract that specifies the purchase 1 year from now of a 1 year (zero coupon) bond with €100 face value for €93.46.

- (a) If the current date is $t = 0$, what are the expected 1 year spot rates for the periods $t = 1$ to $t = 2$ and $t = 2$ to $t = 3$?
- (b) What yield to maturity would have to be offered to sell each of the following current bond issues?
 - i. 2-year bond with 10% coupon
 - ii. 3-year zero-coupon bond

(20%)

Original Management VII