



UNIVERSITY  
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School of Business

## WRITTEN EXAMINATION

Course Corporate Finance Management

Sub-course

Course code NA308G

Credits for written examination 5 hp

Date 2026-03-25

Examination time 14.15-19.30

Examination responsible Hans Mörner

Teachers concerned Hans Mörner, Joachim Samuelsson

Aid at the exam/appendices

Your calculator

Other

A dictionary provided by the school.

- Instructions
- Take a new sheet of paper for each teacher.
  - Take a new sheet of paper when starting a new question.
  - Write only on one side of the paper.
  - Write your name and personal ID No. on all pages you hand in.
  - Use page numbering.
  - Don't use a red pen.
  - Mark answered questions with a cross on the cover sheet.

Grade points

A	55–60	B	49–54
C	43–48	D	37–42
E	30–36	F	0–29

**Examination results should be made public within 18 working days**

*Good luck!*

Total number of pages .



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**Question 1**

**15 marks**

- a) What is the difference between a forward contract and a call option?
- b) Explain the valuation model Incremental rate of return.
- c) What is the difference between nominal rate of return and real rate of return?
- d) What is the coefficient of correlation and how is it used in portfolio theory?
- e) The net present value method is not affected by the company's choice of accounting method. What do we mean by that?

**Question 2**

**15 marks**

- a) A factory costs \$ 800,000. You estimate that it will produce an inflow after operating costs of \$170,000 a year for 10 years. If the opportunity cost of capital is 14%, what is the net present value of the factory?
- b) What will the factory be worth at the end of five years?
- c) For a company in financial stress the management can find incentives to take large risks. Explain in an example.



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**Question 3**

**15 marks**

Johnson Paint stock has an expected return of 19 % and a beta of 1.7, while Williamson Tire stock has an expected return of 14 % and a beta of 1.2. Assume that the CAPM holds.

- a) What do we measure by  $\beta$ ?
- b) Calculate the expected return on the market using the figures above?
- c) Calculate the risk-free rate in the example above?

**Question 4**

**15 marks**

- a) Black Scholes formula and binomial trees option valuation model assumes the same distribution of the stock price at maturity. What is the distribution and explain the idea behind it?
- b) When you combine risky assets in a portfolio you can combine them to get a front. Write down a portfolio of risky assets in a figure and draw the front and explain it and name the different parts of the front.
- c) Explain in text and in a figure to Modigliani Miller proposition 1 and 2 with taxes.



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## Formulas

- 1 The rate of return of an asset during the period from  $t$  to  $t+1$   $r = \frac{P_{t+1} - P_t}{P_t}$
- 2 Effective interest rate  $\left(1 + \frac{r}{m}\right)^m - 1$

Where  $m$  is the number of pay-outs of the interest rate during the period and  $r$  is the interest rate.

- 3 Euler constant  $e = 2.718281828$

### Present value and future value discretely compounded

- 4 Future value  $FV = C_0(1 + r)^T$
- 5 Present value  $PV = \frac{C_1}{(1+r)^T}$
- 6 Net present value for an investment that lasts for one period  
 $NPV = -C_0 + \frac{C_1}{1+r}$

### Present value and future value continuous compounded

Continuous paid interest rate

- 7 Future value  $FV = C_0 * e^{rT}$
- 8 Present value  $PV = C_T * e^{-rT}$
- $C$  is the amount

### Bond valuation

$C$  = coupon

$F$  = The face value.

$T$  = Time to maturity

$r$  = Risk adjusted discount rate.

9 
$$P = \frac{C}{1+r} + \frac{C}{(1+r)^2} + \dots + \frac{C}{(1+r)^T} + \frac{F}{(1+r)^T}$$

Zero coupon bond

10 
$$P = \frac{F}{(1+r)^T}$$

Perpetuity

The present value of an amount paid in perpetuity.



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$$11 \quad PV = \frac{C}{r}$$

If we have a constant growth from next periods amount.

$$12 \quad PV = \frac{C_1}{r - g}$$

**Present value of an annuity.**

$$13 \quad PV = C \left[ \frac{1}{r} - \frac{1}{r*(1+r)^T} \right]$$

Present value of an annuity that lasts forever but starts at T years from now.

$$14 \quad PV = \frac{C}{r} * \frac{1}{1+r^T}$$

When the annuity increases with g.

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$$PV = C_1 \left[ \frac{1}{r-g} - \frac{1}{r-g} * \left( \frac{1+g}{1+r} \right)^T \right]$$

## Statistics

Average value.

$$16 \quad Mean = \bar{R} = \frac{(R_1 + R_2 + R_T)}{T}$$

Varians

sample

$$17 \quad Var = \frac{1}{N-1} [(R_1 - R)^2 + (R_2 - R)^2 + \dots + (R_T - R)^2]$$

Covarians

$$18 \quad Cov(R_A, R_B) = E(R_A - \bar{R}_A) * (R_B - \bar{R}_B)$$

Correlation



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$$19 \quad \rho_{AB} = \text{Corr}(R_A, R_B) = \frac{\text{Cov}(R_A, R_B)}{\sigma_A * \sigma_B}$$

### Stock valuation

Expected return of a stock

$$20 \quad \text{Expected\_Return} = r = \frac{\text{Div}_1 + P_1 - P_0}{P_0}$$

$$21 \quad \text{Expected\_Return} = r = \frac{(P_1 - P_0) * (1 - T_C) + \text{Div}_1(1 - T_{\text{Div}})}{P_0}$$

Stock price

$$22 \quad p_0 = \frac{\text{Div}_1}{r} = \frac{\text{EPS}_1}{r} \quad \text{if Div=EPS}$$

Div = Dividend

P = Price

In case you have a dividend tax.

$$23 \quad \text{PV of dividend year 1} = \frac{(1 - T)\text{Div}_1}{(1 + r)^T}$$

For a constant growing firm

$$24 \quad P = \frac{\text{Div}_1}{r - g}$$

In case we calculate the investment as side effect and earnings equals dividend.

$$25 \quad p_0 = \frac{\text{EPS}_1}{r} + \text{PVGO}$$

In case there is a growth in the earnings per share.

$$26 \quad p_0 = \frac{\text{EPS}_1}{r - g} + \text{PVGO}$$

$$27 \quad \frac{\text{Price per share}}{\text{EPS}} = \frac{1}{r} + \frac{\text{PVGO}}{\text{EPS}}$$

$$28 \quad \frac{\text{Price}}{\text{Earnings}} \cdot \text{Earnings} = \text{Price}$$

$$29 \quad \text{Plowback ratio} = 1 - \text{payout ratio} = 1 - \frac{\text{DIV}}{\text{EPS}}$$

Where does r comes from



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$$30 \quad r = \frac{Div}{P_0} + g$$

Book value of return

$$31 \quad \text{Book value of return} = \frac{\text{Book income}}{\text{Book assets}}$$

*Earnings per share*

$$32 \quad \text{EPS} = \frac{\text{Earnings}}{\text{Total number of Shares}}$$

$$33 \quad \text{Shares} = \frac{\text{Total firm value}}{\text{Price per share}}$$

$$34 \quad \text{Debt ratio} = \frac{D}{D+E}$$

## Portfolio

### Valuation of a portfolio with two risky assets.

The risk as variance

$$35 \quad \sigma_p^2 = x_a^2 \sigma_a^2 + x_b^2 \sigma_b^2 + 2x_a x_b \rho_{ab} \sigma_a \sigma_b$$

Expected return

$$36 \quad E[r_p] = x_a * E[r_a] + x_b * E[r_b]$$

$x$  = the portfolio weight

$\sigma$  = the standard deviation

$\rho$  = the correlation

## Risk and cost of capital

### Security Market Line



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$$37 \quad \text{Sharpe\_Ratio} = \frac{\text{Risk\_premium}}{\text{Std\_dev}} = \frac{r - r_f}{\sigma}$$

The slope of the Security Market line is:

$$38 \quad \text{Slope of SML} = \frac{E[r_1] - E[r_2]}{\beta_1 - \beta_2}$$

$$39 \quad \beta = \frac{\sigma_{S,M}}{\sigma_M^2}$$

Calculate the expected return on an asset on the Security Market Line

$$40 \quad E[r_p] = r_f + \text{Slope of SML} * \sigma_p$$

Expected risk premium.

$$41 \quad r - r_f = \beta(r_m - r_f)$$

Market return

$$42 \quad r_m = r_f + \text{Risk\_premium}$$

Risk premium on individual security

$$43 \quad E(r_i) - r_f = \frac{\text{Cov}(r_i, r_M)}{\sigma_M^2} [E(r_M) - r_f] = \beta [E(r_M) - r_f]$$

$$44 \quad R^2 = \frac{\beta^2 \sigma_M^2}{\sigma^2} = \frac{\text{Explained\_variance}}{\text{Total\_variance}}$$

### Duration

How long time does it take to get your money back?

Start by calculating the value of the bond

D=Duration

$$45 \quad P = \frac{C}{1+r} + \frac{C}{(1+r)^2} + \dots + \frac{C}{(1+r)^T} + \frac{N}{(1+r)^T}$$

$$46 \quad D = \frac{t^*_1 \frac{C}{1+r} + t^*_2 \frac{C}{(1+r)^2} + \dots + t_r \frac{C}{(1+r)^T} + t_T \frac{N}{(1+r)^T}}{P}$$

P is the value of the bond and t is the time.



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To calculate the change of the price of a bond when the yield changes. You need the modified duration.

$$47 \quad D^* = \frac{D}{1+r}$$

Then you can calculate the change of the price of the bond. The price of the bond is called B

$$48 \quad \Delta B = -BD^* \Delta r$$

### Inflation

An approximation

$$49 \quad r_{real} \approx r_{nom} - i$$

An exact formula

$$50 \quad 1 + r_{nom} = (1 + r_{real}) * (1 + i)$$

### Cost of equity capital and firm value

CAPM

$$51 \quad E[r_E] = r_f + \beta * (E[r_m] - r_f)$$

$$52 \quad r_E = r_A + (D/E_L) * (r_A - r_D)$$

$$53 \quad r_E = r_A + \frac{D}{E} * (1 - T_C) * (r_A - r_D)$$

$$54 \quad r_{WACC} = r_D * \frac{D}{E+D} + r_E * \frac{E}{E+D}$$

$$55 \quad r_{WACC} = r_D * (1 - T_C) * \frac{D}{E+D} + r_E * \frac{E}{E+D}$$

$$56 \quad r_{WACC} = \frac{EBIT(1-T_C)}{E+D}$$

$$57 \quad V_L = V_u$$

$$58 \quad V_U = \frac{EBIT * (1 - T_C)}{r_A}$$

$$59 \quad V_L = V_u + T_C * D$$

$$60 \quad V_L = \frac{EBIT * (1 - T_C)}{r_A} + T_C * D$$

$$61 \quad PV_{Tax\ shield} = \frac{T_C * r_D * D}{r_D} = T_C * D$$



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## Derivatives

Value of a forward contract

$$62 \quad F = S_0 e^{(r^*T)}$$

Options

The Profit for the party who has bought the call option.

$$63 \quad Profit = \max(S_T - EX, 0) - c$$

The profit for the party who has sold the call option

$$64 \quad Profit = \min(EX - S_T, 0) + c$$

The profit for the party who have bought the put option

$$65 \quad Profit = \max(EX - S_T, 0) - p$$

The profit for the party who have sold the put option. The short position.

$$66 \quad Profit = \min(S_T - EX, 0) + p$$

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