UNIVERSITY
OF SKÖVDE

School of Business

WRITTEN EXAMINATION

Course Corporate Finance Management

Sub-course

Course code FÖ338G

Credits for written examination 7,5

Date 2025-01-13

Examination time 08.15-12.30

Examination responsible Hans Mörner

Teachers concerned Hans Mörner, Joachim Samuelsson

Aid at the exam/appendices

Your calculator

Other

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 10

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Question 1 15 marks

a) What does growing perpetuity means?

b) What is capital market line and what does it measure?

c) What is salvage value?

d) What does beta measure?

e) State the Modigliani Miller proposition two with and without corporate taxes and explain its meaning?

Question 2 15 marks

a) I bond has a face value of 100 SEK and a remaining lifetime of ten years. The coupon rate is 8 percent. The bond pays coupon once a year. The risk adjusted discount rate is 11 percent per year with interest rate payment once a year. What is the value of the bond?

b) What is the bond's duration?

c) What do we mean by inverted yield curve?

Question 3 15 marks

a) Assume you have two risky assets in your portfolio. You have 60 percent invested in asset A and 40 percent invested in asset B. The risk in asset A is measured to be σ=0.3 and in asset B the risk is measured to be σ=0.2 The correlation between them is -0.4. Calculate the risk and the expected return in the portfolio.

b) A company has earnings per share equal to 1 Eur. The retained earnings are 60 percent and the risk adjusted discount rate is 16 percent and the return on the retained earnings is 20 percent. Calculate the value of the stock. You start by calculating the cash cow value. That means that you calculate the value assuming that all profit is paid as dividend. Then calculate the net present value of the growth opportunity (NPVGO).

c) If you increase debt in a firm substantially, in the end, there will be a risk of financial distress. We have talked about three different financial distress costs. Name them and describe them.

Question 4 15 marks

1. Executive Cheese has issued debt with a market value of 100 million and has outstanding 15 million shares with a market price of 10 a share. It now announces that it intends to issue a further 60 million of debt and to use the proceeds to buy back common stock. Debtholders, seeing the extra risk, mark the value of the existing debt down to 70 million.

2. How is the market price of the stock affected by the announcement?
3. How many shares can the company buy back with the 60 million of new debt that it issues?
4. What is the market value of the firm (equity plus debt) after the change in capital structure?

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Formulas

The rate of return of an asset during the period from t to t+1 $$r = \frac{P_{t+1} - P_t}{P_t}$$

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.

Euler constant $e = 2.718281828$

Present value and future value discretely compounded

Future value $FV = C_0(1 + r)^T$

Present value $PV = \frac{C_1}{(1+r)^T}$

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

Future value $FV = C_0 * e^{rT}$

Present value $PV = C_T * e^{-rT}$

C is the amount

Bond valuation

C = coupon
N= The face value.
T = Time to maturity
r = Risk adjusted discount rate.

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

Zero coupon bond

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

Perpetuity

The present value of an amount played in perpetuity.

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

If we have a constant growth from next periods amount.

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

Present value of an annuity.

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

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

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

When the annuity increases with g.

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

Statistics

Average value.

$$Mean = \overline{R} = \frac{(R_1 + R_2 + R_T)}{T}$$

Varians

sample

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

Covarians

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

Correlation

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

Stock valuation

Expected return of a stock

$$Expected\_Return = r = \frac{Div_1 + P_1 - P_0}{P_0}$$

$$Expected\_Return = r = \frac{(P_1 - P_0) * (1 - T_C) + Div_1(1 - T_{Div})}{P_0}$$

Stock price

$p_0 = \frac{Div_1}{r} = \frac{EPS_1}{r}$ if Div=EPS

Div = Dividend
P = Price

In case you have a dividend tax.

$$PV\ of\ dividend\ year\ 1 = \frac{(1-T)Div_1}{(1+r)^T}$$

For a constant growing firm

$$P = \frac{Div_1}{r - g}$$

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

$$p_0 = \frac{EPS_1}{r} + PVGO$$

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

$$p_0 = \frac{EPS_1}{r - g} + PVGO$$

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

$$\frac{Price}{Earnings}' Earnings = Price$$

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

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Where does r comes from

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

Book value of return

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

Earnings per share

$$\text{EPS} = \frac{\text{Earings}}{\text{Total number of Shares}}$$

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

$$Debt\ ratio = \frac{D}{D+E}$$

Portfolio

Valuation of a portfolio with two risky assets.

The risk calculated as variance

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

Expected return

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

x = the portfolio weight
σ = the standard deviation
ρ = the correlation

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Risk and cost of capital

Security Market Line

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

The slope of the Security Market line is:

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

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

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

$$E[r_p] = r_f + Slope\ of\ SML * \sigma_p$$

Expected risk premium

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

Market return

$$r_m = r_f + Risk\_premium$$

Risk premium on an individual security

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

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

Duration

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

Start by calculating the value of the bond

D=Duration

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

$$D = \frac{t *_1 \frac{C}{1+r} + t_2 * \frac{C}{(1+r)^2} + \ldots + t_T \frac{C}{(1+r)^T} + t_T \frac{N}{(1+r)^T}}{\mathrm{P}}$$

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

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

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

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

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

Inflation

An approximation

$$r \approx R - i$$

An exact formula

$$r = \frac{R-i}{1+i}$$

Cost of equity capital and firm value

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

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

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

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

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

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

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$$V_L = V_u$$

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

$$V_L = V_u + T_C * D$$

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

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

Derivatives

Value of a forward contract

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

Options

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

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

The profit for the party who has sold the call option

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

The profit for the party who have bought the put option

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

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

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