UNIVERSITY
OF SKÖVDE

School of Business

WRITTEN EXAMINATION

Course Corporate Finance Management

Sub-course

Course code NA308G | Credits for written examination 5 hp

Date 2024-05-08 | Examination time 08.15-13.30

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 11

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Question 1 **15 marks**

a) When you calculate the value of a stock with a growing dividend you use the following formula $P = \frac{Div_1}{r-g}$. Why do you use next years dividend in the formula?

b) What does opportunity cost of capital stand for?

c) Give an example of a company in financial distress where the management has incentives towards taking large risks.

d) Describe and explain the different effect repurchase of stocks have on the share price and the effect dividend has on the share price.

e) Your portfolio contains two stocks that are negatively correlated. What does that imply for the risk and return of your portfolio?

Question 2 **15 marks**

A firm is considering two different alternative production methods. The opportunity cost is 10 percent. In the table below the costs of the two methods are presented. The machines are bought year 0 and they have additional yearly costs.

Year	Method 1 Costs	Method 2 Costs
0	900	800
1	20	80
2	20	80
3	20	80
4		80

a) Which one should be used? Calculate the equivalent annual cash flow to get the answer.

b) Calculate the NPV of the methods above.

c) Mr. Art Deco will be paid $100,000 one year ahead. The discount rate is 8 percent and the inflation rate is 4 percent. Calculate the real cash flow. Then you calculate the real discount rate and use it to calculate the present value.

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Question 3 **15 marks**

A firm has an equity beta of 1.29 and a debt-to-equity ratio of 1.0. The expected return on the market is 13 per cent and the risk-free interest rate is 7 per cent. The before tax cost of capital is seven per cent. The corporate tax rate is 35 per cent.

a) What is the firms' cost of equity?

b) What is the firms' average cost of capital?

c) What is the difference between the Capital Market Line and the Securities Market line?

Question 4 **15 marks**

Executive Chalk is financed solely by common stock and has outstanding 25 million shares with a market price of $10 a share. It now announces that it intends to issue $160 million of debt and to use the proceeds to buy back common stock.

a) How is the market price of the stock affected by the announcement?

b) How many shares can the company buy back with $160 million of new debt that is issued?

c) What is the debt ratio 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-$payout\ ratio$=$1 - \frac{DIV}{EPS}$

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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 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 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.

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