

School of Business

Course Corporate Finance Management

Sub-course

Course code FÖ338G

Credits for written examination 7,5

Date 2023-12-18

Examination time 08,15-12,30

Available teacher Hans Mörner

Available on phone number 0735341100

Between 09,00-10,00

Visiting the examination ☐ Yes, at
☒ No

Aids and other information for invigilators

Calculator ☒ Provided by the University
☒ Student's own calculator
☐ Not allowed

Writing paper ☐ Lined
☒ Squared

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WRITTEN EXAMINATION

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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!

Question 1

15 marks

- a) Explain what a zero-coupon bond means.
- b) Describe what the discounted payback method is?
- c) What is the Security Market Line?
- d) What is the difference between a forward contract and an option.
- e) State the Modigliani Miller proposition two and explain its meaning?

Question 2

15 marks

- a) I bond has a face value of 1000 SEK and a remaining lifetime of ten years. The coupon rate is 4 percent. The bond pays coupon two times a year. The risk adjusted discount rate is 6 percent per year with interest rate payment twice a year. What is the value of the bond?
- b) Why is a stock repurchase program more favourable compare to dividend when the ordinary income tax is higher than the capital gains tax?
- c) We expect a higher rate of return on a stock than on a bond. Explain why.

Question 3

15 marks

- a) Assume you have two risky assets in your portfolio. The correlation between them is -0.8.
What does that mean for your possibilities to diversify the risk?
- b) What does systematic or specific risk mean?
- c) What is a risk premium?

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) You want to buy a call option. The strike price is 100 kronor and you pay 5 kronor for the call. Use the formula $\text{Max}(S_T - X, 0) - c$ to calculate the profit or loss at different values of the underlying stock at the end of the life of the call option. Then you draw a figure to show the result.

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.

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.

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

Zero coupon bond

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

Perpetuity

The present value of an amount paid in perpetuity.

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

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.

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

Variances

sample

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

Covariances

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

Correlation

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

Stock valuation

Expected return of a stock

$$\text{Expected_Return} = r = \frac{\text{Div}_1 + P_1 - P_0}{P_0}$$

Stock price earnings per share and investment

Stock price

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

Div = Dividend

P = Price

For a constant growing firm

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

Div₁ = dividend in a year from now.

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

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

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

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

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

$$\frac{\text{Price}}{\text{Earnings}} = \frac{1}{r} + \frac{PVGO}{\text{EPS}}$$

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

Where does r comes from

$$r = \frac{Div_1}{P_0} + g$$

Book value of return

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

Earnings per share

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

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

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

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

x = the portfolio weight

σ = the standard deviation

ρ = the correlation

$$\text{The slope of the Security Market line is: } \text{Sharpe_Ratio} = \frac{\text{Risk_premium}}{\text{Std_dev}} = \frac{r - r_f}{\sigma}$$

Expected risk premium

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

Market return

$$r_m = r_f + \text{Risk_premium}$$

Risk premium on individual security

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

Risk and cost of capital

CAPM
$$r = r_f + \beta * (r_m - r_f)$$

After tax WACC

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

$$R^2 = \frac{\beta^2 \sigma_M^2}{\sigma^2} = \frac{\text{Explained_var i ance}}{\text{Total_var i ance}}$$

Duration

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

Start by calculating the value of the bond

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

$$D = \frac{t_1 * \frac{C}{1+r} + t_2 * \frac{C}{(1+r)^2} + \dots + t_T * \frac{C}{(1+r)^T} + t_T * \frac{N}{(1+r)^T}}{P}$$

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

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 capital and firm value

$$r_S = r_o + (B/S_L) * (r_o - r_B)$$

$$V_L = V_u + T_C * B$$