Exercise Set 1

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This first exercise set is meant to refresh relevant material from your earlier courses.

Read and try to solve the questions in exercises 1–3 on your own before your class meets during September 4–7. Prepare by reading up on the relevant concepts that you have learned in previous courses.

If you have questions you can always send them to your class teacher in advance. During the class, we will address the questions of you and your peers. Together, you will discuss methods and issues to solve the questions. We encourage you to study any remaining questions on your own hand after the class.

Exercise 0: Preparation

Get to know each other. We encourage you to organize yourself in study groups already before the lectures start, and to discuss questions and exchange notes.

a) Discuss how the classes are best organized, what you are expected to do, and how the classes will contribute to your learning.

b) Open the page *Creating and submitting MC questions* on Absalon and claim your identifier at peerwise.[1] Scroll through the functionalities to submit multiple choice (MC) questions. The discussion board is a great place to ask administrative (and finance-related) questions.

Exercise 1: Volatility

Stock prices can be quite volatile. In the Spring of 2019, the stock of Ørsted traded in the range of DKK 500 to 600. By January 2021, it reached over DKK 1300. Since then, it has come back to between DKK 500 and 600.

a) Can you find some data to document the evolution of this stock price?

b) Discuss the nature of the stock as a claim on future cash flows, and think of reasons why its price can change a lot over a short period of time.

[1] You can register at https://peerwise.cs.auckland.ac.nz/at/?ku_dk with Course ID 26104. The Identifier is your KU login ID (e.g., abc456).

Exercise 2: Arbitrage

Consider a safe asset with payoffs over the next four years. At the end of each of the four years, the asset will pay out 100 Dollars.

Like in the textbook's Example 6.1, suppose that there are zero-coupon bonds trading at this table's prices per 100 Dollar face value:

Maturity	1 Year	2 Years	3 Years	4 Years
Price	\$96.62	\$92.45	\$87.63	\$83.06

a) Find a combination of the four zero-coupon bonds that will provide a constant payout over the four years, and use this to determine the no-arbitrage price of the described asset.

b) Assume now the asset trades at a price below the no-arbitrage price you derived before. How could you exploit this arbitrage opportunity?

Exercise 3: Excel

You can use the "help" function in Excel if you need support to find the answer to this question.

During this course, we will use Excel to solve some problems. We will often need two of the most basic operations with matrices: multiplying two matrices, and inverting a matrix. Going forward, it is important that you are sure how this works. If your computer uses Excel in English, the functions are MMULT and MINVERSE. In Danish, instead, they are MPRODUKT and MINVERT.

Consider these two matrices,

$$A = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}, \quad B = \begin{bmatrix} 4 \\ 5 \end{bmatrix}.$$

a) Use Excel to find the inverse of matrix A.

b) Use Excel to find the matrix product AB.