

## i FIN3005 V21 front page

**Department of Economics**

**Examination paper for FIN3005 Makrofinans/Asset pricing**

**Examination date:** June 8, 2021

**Examination time (from-to):** 09:00 – 13:00

**Permitted examination support material:** A / All support material is allowed

**Academic contact during examination:** Knut Anton Mork

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**Technical support during examination:** NTNU Orakel support services

**Phone:** 73 59 16 00

If you experience technical problems during the exam, contact Orakel support services as soon as possible before the examination time expires. If you don't get through immediately, hold the line until your call is answered.

### OTHER INFORMATION

**Make your own assumptions:** If a question is unclear/vague, make your own assumptions and specify them in your answer. Only contact academic contact in case of errors or insufficiencies in the question set.

**Cheating/Plagiarism:** The exam is an individual, independent work. Examination aids are permitted, but make sure you follow any instructions regarding citations. During the exam it is not permitted to communicate with others about the exam questions, or distribute drafts for solutions. Such communication is regarded as cheating. All submitted answers will be subject to plagiarism control. [Read more about cheating and plagiarism here.](#)

**Citations:** No formal citation requirements.

**Notifications:** If there is a need to send a message to the candidates during the exam (e.g. if there is an error in the question set), this will be done by sending a notification in Inspira. A dialogue box will appear. You can re-read the notification by clicking the bell icon in the top right-hand corner of the screen. All candidates will also receive an SMS to ensure that nobody misses out on important information. Please keep your phone available during the exam.

**Weighting:** The questions are weighted as follows:

Question 1: 20 points

Question 2: 30 points

Question 3: 50 points.

### ABOUT SUBMISSION

**How to answer questions:** The answers to all questions must be put together as **one** pdf file to be uploaded at the end of the exam. You are free to do the writing in Word or another word processor. Formulae, graphs, and tables, if any, may be done by hand as long as you make them machine readable by scanning or photographing. You will likely find it convenient to insert such files into the word processing file before converting everything to the pdf format. While working on your answers, make sure to save your work regularly.

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The file types allowed are specified in the upload assignment(s).

**30 minutes** are added to the examination time to manage the sketches/calculations/files. The additional time is included in the remaining examination time shown in the top left-hand corner.

NB! You are responsible to ensure that the file(s) are correct and not corrupt/damaged. Check the file(s) you have uploaded by clicking "Download" when viewing the question. All files can be removed or replaced as long as the test is open.

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**Withdrawing from the exam:** If you become ill or wish to submit a blank test/withdraw from the exam for another reason, go to the menu in the top right-hand corner and click "Submit blank". This cannot be undone, even if the test is still open.

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# 1 FIN3005 V21 final exam

[FIN3005 Spring 2021 final exam](#)



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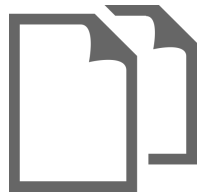
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Maximum marks: 10

# Question 1

Attached



## Answer all questions

### Question 1

Define and explain the following concepts:

- Dynamic programming and its use in finance
- The lognormal distribution and its use in finance
- Moral hazard and its role in credit rationing
- Collateralization and its implications in terms of systemic risk

### Question 2

Consider a person whose only revenue comes from the returns of one risky and one riskless asset. The person's preferences are represented recursively by the following equation:

$$V_t(A_t) = \max_{c_t, \omega_t} \left\{ 0.96\sqrt{c_t} + \frac{0.04}{\sqrt{\mathbb{E}_t \frac{1}{V_{t+1}(A_{t+1})}}} \right\}^2,$$

and the capital constraint is

$$A_{t+1} = R_{t+1}(A_t - c_t) \equiv [\omega_t R_{e,t+1} + (1 - \omega_t)R_f](A_t - c_t).$$

Here,  $V_t(A_t)$  is the value function giving the utility value of owning wealth  $A_t$ .  $c_t$  is current consumption,  $R_{e,t+1}$  and  $R_f$  the gross rate of return of the risky and the riskless asset, respectively,  $\omega_t$  the portfolio share of the risky asset,  $R_{t+1}$  the gross portfolio rate of return; and  $\mathbb{E}_t$  denotes expectations conditional on information available in period  $t$ .

- Give an interpretation of this person's preferences in terms of risk aversion and elasticity of intertemporal substitution. [Hint: Taking a square root of something is the same as raising it to the power of 1/2].
- Derive the Euler equation, show that it can be written as

$$\mathbb{E}_t \left( \frac{c_{t+1}/c_t}{0.9216R_{t+1}^2} \right) = 1,$$

and give an economic interpretation of this equation

- c. Derive the first-order equation for the risky-asset portfolio share, show that it can be written as

$$\mathbb{E}_t \left[ 5 \frac{c_{t+1}}{A_t - c_t} R_{t+1}^3 (R_{e,t+1} - R_f) \right] = 0,$$

and give this equation an economic interpretation.

### *Question 3*

Outline and critique three models that seek to explain the equity premium puzzle.