

i Candidate instructions

ECON4830 – Economic Dynamics and Uncertainty - Postponed exam – Open book, home exam

Exam date and time: Wednesday, 13 January, 2021 from 09.00 – 14.00 (five hours)

Language: The examination text is given in English. You should submit your response in English.

Guidelines: Problems 1 and 2 are **to be answered in INSPERA**. For Problem 3 applies: This problem requires calculations and should be uploaded to Inspera in pdf format – **only one pdf**. It is your responsibility that the submitted document/photo/scan is legible. You can scroll back and forth in the problem set.

You should familiarize yourself with the rules that apply to [the use of sources and citations](#).

The answers to your exams are not expected to meet the formal requirements for references and citations in the fall 2020 exam. However, you should make references by indicating the source in the text. Creating a bibliography is not required. Whether you choose to do so, or not has no impact on your grade. The purpose of a reference is that the examiner should be able to look up the source him/herself, either to read it or to evaluate your interpretation. If you are referring to a limited part of the source, the reference should indicate which part of the source you refer to by using page numbers. If you are quoting directly from a source, follow the normal citation practice – with quotations marks and references to the source.

The exam lasts for only five hours. We recommend that you use the available time to work on the problem set, as well as allocate time to scan attachments with graphs and/or equations.

The problem set: The problem set consists of three questions, with several sub-questions. They count as indicated.

Note: You can resize question 3 by clicking on the three dots on the right, hold and pull to the right. Similarly for the three dots at the bottom, click, hold and pull down. Then the text will be larger. Or you can download the pdf file to your own device by using the link to the right (recommended).

Digital hand drawings/graphs/equations: You will find information about options for hand drawings on this website: <https://www.uio.no/english/studies/examinations/submissions/options-for-hand-drawings.html>

Submission in Inspera

- Read more about exam and submission in Inspera.
<https://www.uio.no/english/studies/examinations/submissions/>.
- Remember: It is your responsibility to upload the **correct version of the correct answer!** (Check that this is the right answer.) Be sure to allocate enough time to upload your answers.
- When your answer is uploaded, you will see that the exam is uploaded and saved.
- To submit your answer, please see https://www.uio.no/english/studies/examinations/submissions/submit_answer/. You can either choose the “submit now” or the “Automatic submission”.
- You can make changes in your exam until the deadline.
- If you have questions during the exam, or if you have technical problems, you must **immediately** send an email from your UiO-address to hjemmeeksamen@sv.uio.no. Write the course code in the subject field.
- If any information is given to all candidates during the exam, this information will be posted **e-mail** (for postponed exams).
- If you have questions before the exam day or after you have submitted your exam, please contact post@econ.uio.no.
- You will find your answer under «Archives» (please check that this is the right answer by opening the file).
- Send an e-mail **immediately** to hjemmeeksamen@sv.uio.no if you do not see your submission, or if the file is not correct. Please attach your exam answer to the email.

Do you need technical support, or do you have any questions during the exam?

Please send an e-mail, titled “ECON4830” To hjemmeeksamen@sv.uio.no from your university email.

Grading: The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.

1 Problem 1

Asset Pricing (30%)

Write an essay comprehensively explaining the underlying concept and critically discussing the following statement: "There is only one unique beta for a given asset."

Fill in your answer here

Maximum marks: 30

2 Problem 2

Numeric Dynamic Programming (30%)

Given a Bellman equation and an infinite planning horizon, explain in detail how you would solve the problem using continuous function approximation. How does the approach differ if the time horizon is finite?

Fill in your answer here

Maximum marks: 30

3 Problem 3

[Problem 3 - 40%](#)

Maximum marks: 40

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3. Consumption, investment, leisure (40%).

A decision maker derives utility from consumption and leisure $u(c, l) = \log(c^{a_1} l^{a_2})$. She discounts the future with discount factor β and has an infinite planning horizon. She maximizes utility over consumption and leisure subject to her asset stock evolving as

$$A_{t+1} = A_t^\alpha (1 - l_t^{\gamma_1})^{\gamma_2} - c_t. \quad (1)$$

Solve the dynamic programming problem. Assume an interior solution. Solve the problem as general as possible. If you feel required to constrain the problem state assumption and reason.

Once you solved the problem, answer the following additional question. How would the Bellman equation and the result change if the (complete) right hand side of equation (1), i.e. investment, was hit by an iid distributed shock ϵ_t in every period.