

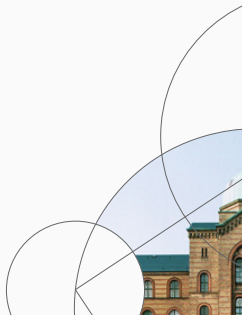


14b. Exam + Q&A

Adv. Macro: Heterogenous Agent Models

Nicolai Waldstrøm

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Exam

Exam info

- Portfolio part:
 - Ensure that assignments are in good shape
 - **Use the feedback you have received**
- Take-home part:
 - 36-hour take home
 - Solveable in 24 hours (hopefully less)
 - **Will not feature any significant coding**
 - Focus on how to solve and analyze model using GEModelTools
 - Analyze results using intuition from the lectures

Preparation for exam

- Go through lecture slides + course plan
 - Ensure that you have a good understanding of the various models
 - Buffer-stock model, HANC, NK, HANK, HANK-SAM, IHANK etc.
- **Redo exercises** - check with solutions in the github repo
- Ensure that you are comfortable with GEModelTools
 - Steady state (`model.find_ss()` \Rightarrow `model.ss`)
 - Jacobians (`model._compute_jac_hh()` \Rightarrow `model.jac_hh`,
`model.compute_jacs()` \Rightarrow `model.jac`)
 - Linear transition path (`model.find_IRFs()` \Rightarrow `model.IRF['x']`)
 - Non-linear transition path (`model.find_transition_path()` \Rightarrow `model.path.x`)
- Troubleshooting in GEModelTools
 - Check examples in notebook repo
(github.com/NumEconCopenhagen/GEModelToolsNotebooks)
 - Check documentation or **source code**

- *What was the motivation for linearization in Lecture 8? Was it to show that linearization to a first-order approximation gives the same result as aggregated uncertainty?*
 - Consider a model A without aggregate uncertainty and model B with aggregate uncertainty. If we linearize (i.e. do a first-order approximation) w.r.t aggregate shocks, the impulse responses to the two models are the **same**.
- *In the last lecture (Lecture 12), Jeppe used the `decompose` function in `GEModelTools`. What was the reason it couldn't be used in exercises for Lecture 11? And does it have something to do with linearization?*
 - Yes, the build in `decompose` function in `GEModelTools` (`decompose_hh_path`) only-works with non-linear solution (`find_transition_path()`). It would be easy to write a similar function `decompose` using the linear solution to the model, but currently it is not there.

- *What is the difference between the model with aggregate uncertainty and models that only include idiosyncratic uncertainty? More specifically, how do I identify aggregate uncertainty in a model, and what are the implications of having aggregate uncertainty?*
 - No aggregate uncertainty = perfect foresight. No expectations w.r.t aggregate variables (w_{t+1} , r_{t+1} etc.), only w.r.t micro level het. (e_{it+1})
 - Aggregate uncertainty \Rightarrow The value of aggregate shocks is unknown next period \Rightarrow Next-period endo. variables w_{t+1} , r_{t+1} are uncertain
- Implications of aggregate uncertainty:
 - Precautionary behavior w.r.t aggregates w , r
 - Non-linear business cycle simulation (ZLB etc.)
 - Needed to study large, once-in-a-lifetime shocks (e.g. financial crisis)

- **Q:** *In the literature, HANC is also referred to as the Standard Incomplete Market (SIM) model. I find it difficult to understand the concept of “incomplete markets.” Does it simply mean that risk is uninsurable such that agents instead must create a buffer by accumulating assets?*
- **A:** Consider a simple HH problem with two individuals A, B where idiosyncratic income e_i takes two values $[0, 1]$ and with $Ee_i = 0.5$. With *complete insurance markets* it is possible for agents to enter a state-contingent contract which fully insures against any risk:
 - Bond 1 B_1 pays 1 in state $e_A = 0$ and 0 if $e_A = 1$
 - Bond 2 B_2 pays 0 in state $e_A = 1$ and 1 if $e_A = 0$
- If agents are risk aversion utility maximization will imply that A and B exactly buy and trade bonds such that they perfectly insure **each other** against risk
 - A buys enough of bond B_1 so that when she is in a bad state she is compensated for the earnings loss buy B , and vice versa. Both A, B end up with exactly the same income and wealth ex-post.

- *What are your tips for writing about het-agent models for a master's thesis?*
 - Find a research question that interests you
 - Not specific to MA in het-agent macro
 - Find a paper that is closely related to the topic
- Prioritize finding a topic which is closely related to what we have seen in this course
 - This enables you to start from the code you have been given in this course
 - (or can find in GEModelToolsNotebooks)
- Example:
 - **Q:** Does automatic stabilizers reduce cyclical inequality?
 - **Paper:** McKay & Reis (2016) »The role of automatic stabilizers in the US business cycle«
 - **Build on:** Basic HANK (lecture 9) or HANK-SAM (lecture 12)