

# 14b. Exam + Q&A

Adv. Macro: Heterogenous Agent Models

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2024



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- 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

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  - Check documentation or **source code**



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- *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.

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- 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)



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- **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:
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- 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.

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  - **Build on:** Basic HANK (lecture 9) or HANK-SAM (lecture 12)