Asset Pricing Project Description

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Overview

- By the end of winter quarter, the cohort is expected to have solid mathematical and programming foundations to follow the numerical solutions to many classic macroeconomic models.
- We attempt to replicate a paper in the literature surrounding the equity premium puzzles, two of which will be covered in autumn quarter:
  - Huggett (1993), "The risk-free rate in heterogeneous-agent incomplete-insurance economies;"
  - Campbell and Cochrane (1999), "By Force of Habit: A Consumption-Based Explanation of Aggregate Stock Market Behavior;"

  or any paper voted most interesting by cohort members.
- We will prioritize replicating the numerical solution to the model, but depending on the number of cohort members remaing, we might simultaneously replicate the corresponding empirical results, or even multiple papers.

Objectives

During the replication process, cohort members will become

- Proficient with the essential tools of economic research, specifically Python, matplotlib and LaTeX;
- Comfortable with dissecting and solving a model whose mathematical language they might not understand;
- Familiar with numerical solution algorithms used outside of empirical research tasks.

Timeline

- Preparation (weeks 1-3)
  - Review of dynamic programming;
  - Practice with examples on the QuantEcon site.
- Replication (weeks 4-7)
  - Paper selection.
  - Breakdown of possible solution algorithms;
  - Testing and debugging.
- Presentation (weeks 8-9)
  - LaTeX and matplotlib crashcourse if needed.
  - Presentation and celebration if members still remain.

Outcome

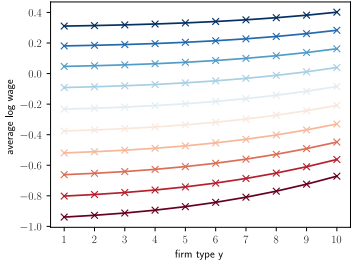
We expect the replication of a paper to include:

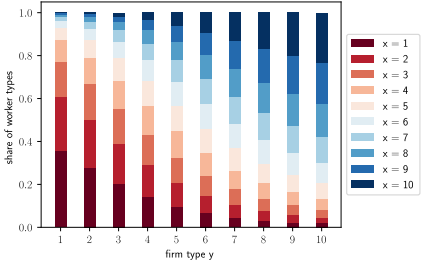
- A summary of its main results, including key equations, sample outputs and graphs;
- A breakdown of the algorithm for solving the model numerically;
- A replication of the selected results in the summary;
- A comparison of the replication results with the original paper.

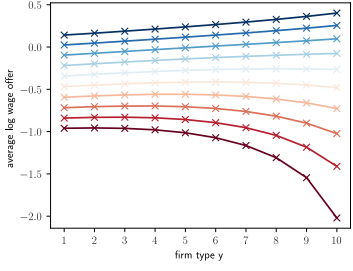
The result is a repository of codes and their sample calls such that

- Anyone with Python background can understand the algorithm;
- Anyone without Python background can produce and visualize the model's outputs;
- Parameters within the model can be modified, allowing us observe whether the economic patterns it predicts is consistent with economic intuition.

Outcome (contd.)







Discount factor $r = 0.05$

Worker bargaining power $\gamma = 0.3$

Arrival rate $\rho = 1$

Match end rate $\delta = 0.5$

Pareto shape parameter $\theta = 10$