Inequality, Household Behavior and the Macroeconomy

Julia

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Two questions

- ChatGPT and such: see Academic integrity section in 'General information' on Canvas
- Thursday plan: class as scheduled, your bus will come earlier (MECON)

Why Julia?

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Pros:

- Matches the performance of the fastest languages (C-family, Fortran),
- ... not being impossible to learn well without spending one's whole life with programming.
- Nice, logical syntax

Cons: Young and not so widespread, so

- Somewhat harder to find help online than with more popular languages
- Fewer user-written packages are available
- Less likely to be asked for in a job advertisement

Do you want to know more about Julia?

- Read the bold and fun public announcement of the creation of Julia from 2012: `https://julialang.org/blog/2012/02/why-we-created-julia/`
- or this quite up-to-date blog post discussing the advantages and disadvantages of Julia: `https://www.matecdev.com/posts/julia-worth-learning.html`

Is Julia an obscure language?

Not really, at least in academia, data science and machine learning:

- Julia is what everybody in macroeconomics is switching to nowadays (if they have time to learn a new language)
- New York FED already rewrote their macro models from Matlab to Julia in 2015.
- Datacamp has recently started courses on Julia (this means something as they offer courses for money).

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But somewhat yes:

- Outside of the above-mentioned fields Julia is basically unknown.
- There are many better measures, but just an example:
  - 668501 people have downloaded the Julia extension of VS Code
  - Comparable number for Python is 117 million (Python is from the late 80s and grew fastest in the 2010s)

Plan for this week

Next two classes will be a mix of:

- Basics of programming (Most of it will look intuitive, but some stuff might be fairly confusing)
- Numerical methods for:
  - solving equations
  - maximizing functions
  - interpolating functions
  - integration

Third class will be on working with data, and starting some empirics for this course!

Learning to code

These intro classes are aimed at you if you haven't done any programming before

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Keep in mind while learning to code:

- Contrary to stereotypes, coding is a very learnable skill for everyone (practice $>$ talent)
- Programming can be very frustrating regardless of experience: Coding sometimes involves being stuck and feeling confused for very long.
- But it can also be satisfying when things work!

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- Programming can be very frustrating regardless of experience: Coding sometimes involves being stuck and feeling confused for very long.
- But it can also be satisfying when things work!
- It's normal to constantly forget function names and syntax all the time. I still cannot program without an open browser.
- Julia is an easy language to learn, but still pretty deep. You won't become a pro just from one course.

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- Most things we'll learn apply to other languages as well.
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Learning to code vs. learning Julia

- Most things we'll learn apply to other languages as well.
- When not, I'll let you know.
- We want code that does the job. But it is also good if
  - it is easy to read
  - and it is fast.
- We'll discuss good coding style over the course. This is important for any language.
- Performance tips are typically more Julia-specific, so we'll cover only the basics.

Files we will use

Two kinds of files to run Julia code:

Julia scripts (.jl files)

- Mainly contains code
- Can add comments, but no text formatting
- Generally one should work in these files

Jupyter notebooks (.ipynb files)

- Can mix code with formatted text
- Useful for teaching and learning
- Hard to organize more complicated code efficiently
- Rarely a bit buggy/laggy
- Some things work a bit differently (or just don't)

In this course we'll learn both.

Where to find help?

- The documentation is complete and detailed, but often not easy to understand (`https://docs.julialang.org/en/v1/manual/getting-started/`)
- Many good tutorials online. QuantEcon is among the best (`https://julia.quantecon.org/intro.html`)
- When using Google, write 'julialang', not 'julia'
- If you want help on a specific function within Julia, write ?functionname in the command line.