

Introducing the Econ-ARK: Economics “Algorithmic Repository and toolKit”

Minicourse by Chris Carroll and Matt White at
Goethe University
SAFE

May 28-29, 2018

Goal: Tool like DYNARE for Models With Heterogeneity

State-of-the-art set of tools for:

- ① Solving dynamic stochastic optimization problems
 - 'Hard' Bellman problems with uncertainty, 'kinks,' nonconvexities
- ② Simulate behavior of populations of agents
- ③ Finding equilibria for markets/economies populated by such agents

Who Has Produced It?

Name	TLA	Affiliation
<i>Christopher D Carroll</i>	CDC	JHU, CFPB
<i>David C Low</i>	DCL	CFPB
<i>Nathan M Palmer</i>	NMP	OFR
<i>Matthew N White</i>	MNW	UDel, CFPB
<i>Alex Kaufman</i>	ABK	CFPB → Princeton

Nothing herein may be interpreted as reflecting opinions of

- CFPB - United States Consumer Financial Protection Bureau
- JHU - Johns Hopkins University
- IMF - International Monetary Fund
- OFR - Office of Financial Research, U.S. Treasury
- UDel - University of Delaware

Just Received Big Grant from Alfred P. Sloan Foundation!

Three Years

- Hire Programmers, RA's, Open Source Project Managers, etc etc

What Is It Good For?

- Heterogeneous Agent Macro Models
 - Original name: **H**eterogeneous **A**gent **R**esources and tool**K**it
 - HARK!
- Structural Micro Models (e.g., labor, health)
- IO models with equilibrium between consumer agents and firm agents

Why: Goals

Make it *much* easier:

- To get started doing structural Heterogeneous Agent modeling
- To teach (with hands-on, problem-set-assignable exercises)
- To *compare* models to each other
- To add new capabilities
- To mix-and-match components/modules/agent types

Remove the excuse 'Structural model was not worth the effort'

How: Github+Python=Gutenberg

Suite of powerful modern tools developed by software engineers:

- Almost-Automatic Integrated Documentation
- Robust Built-In Testing
- Continuous Integration
- Version Control
- Object-Oriented Programming (Python!)
- Integrated Development Environments
- Apache License
- ...

Where Is It?

Browse without installing:

- Browse on our webpage at econ-ark.org
- Browse our code at <http://github.com/econ-ark>
- Browse our talks at <http://github.com/econ-ark/PARK>

Install 'econ-ark' on your computer:

- If you don't have Python 2.7 on your computer, get either:
 - Python 2.7 only
 - [On Mac or Linux](#) to download and install it
 - [On Windows](#)
 - [Anaconda](#) which adds many packages useful for scientific computing
- Make sure you have [pip](#) installed
- Install the 'econ-ark' package:
 - `pip install econ-ark`

Run notebooks on your own computer:

- Install [Jupyter](#)

Run our demonstration notebooks using [MyBinder](#)

References I

- BLANCHARD, OLIVIER (2016): "Do DSGE Models Have a Future?," Discussion paper, Petersen Institute for International Economics, Available at <https://piie.com/system/files/documents/pb16-11.pdf>.
- COEURE, BENOIT (2013): "The relevance of household-level data for monetary policy and financial stability analysis," .
- HALDANE, ANDY (2016): "The Dappled World," Discussion paper, Bank of England, Available at <http://www.bankofengland.co.uk/publications/Pages/speeches/2016/937.aspx>.
- SUMMERS, LAWRENCE H. (2011): "Larry Summers and Martin Wolf on New Economic Thinking," *Financial Times interview*, <http://larrysummers.com/commentary/speeches/brenton-woods-speech/>.
- YELLEN, JANET (2016): "Macroeconomic Research After the Crisis," Available at <https://www.federalreserve.gov/newsevents/speech/yellen20161014a.htm>.