# Introducing the Econ-ARK: Economics "Algorithmic Repository and toolKit"

Presentation by Chris Carroll at CEF Milan

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## Goals: Like DYNARE's, but for Models With Heterogeneity

Operationally (for now): More like STATA than DYNARE or HetSol

State-of-the-art tools for:

- Solving microeconomic dynamic stochastic optimization problems
  - 'Hard' Bellman problems with uncertainty, 'kinks,' nonconvexities
- Simulating populations of agents
  - Whether or not they are solving DSOP
  - Allows disciplined exploration of deviations from RE
- Finding equilibria for markets/economies populated by such agents
  - Definition of eqbm is user-specified
    - e.g.: Stock Price Equilibrates Shares bought = Shares sold
    - Expectations can be but need not be rational

Who, What, Why

### Who Has Produced It?

| Name                  | TLA | Affiliation          |
|-----------------------|-----|----------------------|
| Christopher D Carroll | CDC | JHU, CFPB            |
| David C Low           | DCL | CFPB                 |
| Nathan M Palmer       | NMP | OFR                  |
| Matthew N White       | MNW | UDel, CFPB           |
| Alex Kaufman          | ABK | $CFPB \to Princeton$ |

Nothing herein may be interpreted as reflecing 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

## Big Grant from Alfred P. Sloan Foundation!

#### Three Years

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

# Why: Goals

#### Make it *much* easier:

- To get started doing structural Heterogeneous Agent modeling
- To teach newcomers how to use such models
- 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'

### 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 <a href="http://github.com/econ-ark/PARK">http://github.com/econ-ark/PARK</a>
- Overview paper at http://github.com/econ-ark/PARK/SciPy2018.pdf
- Browse our live notebooks
- Browse our documentation

## Installing It On Your Local Computer

- You Need Python 2.7 (Python 3 target is July)
- If you don't have Python 2.7 on your computer, install either:
  - Anaconda2 adds many packages useful for scientific computing
  - 2 Python 2.7
    - On Mac or Linux to download and install it
    - On Windows
    - Install Jupyter
    - Make sure you have pip installed
  - Install the 'econ-ark' package:
    - pip install econ-ark
- Get our our demonstration notebooks from DemARK