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# Labor Supply in Ageing Societies: A Behavioral Approach

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*IIASA and SUNY Stony Brook*

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20, 2017. Laxenburg, Austria



IIASA, International Institute for Applied Systems Analysis

# Involvement with IIASA

- YSSP 2015, World Population Program
- Ph.D. Candidate, SUNY Stony Brook (advisor: Prof. Warren Sanderson)
- Visiting Researcher (summer 2016), Wittgenstein Centre for Demography and Global Human Capital
- Research Assistant, Energy Program, IIASA

# Research Interests

- Economic Models of Behavior
  - Retirement
  - Household Labor Supply
  - Household Energy Access and Choices
- Policy Analysis and Forecasting

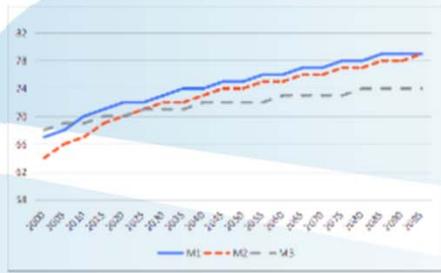
# Why Behavioral Models?

- Different to standard econometric models, we create theoretical models of individual behavior and use data to find parameters that would explain real life observations.
- The advantage of this approach is that having a model allow us to estimate behavioral responses to changes in the setup of the model  
(e.g. changes in prices, policy changes, etc. )

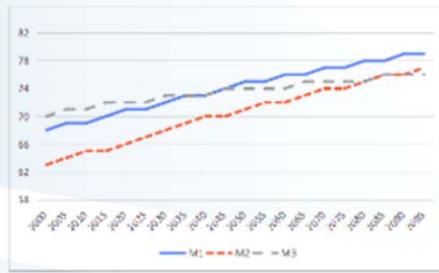
## Example:

# A Generalized Retirement Model under Evolving Demographics from Life Tables

- Individuals decide optimally when to retire in order to maximize lifetime utility
- Two stylized pension systems:
  - Defined Contribution (M1): individuals save a fraction of their wage and receive an annualized value of their savings as a pension
  - Defined Benefit (M2): individuals receive a percentage of their previous wage as a pension
- Two age measures:
  - Conventional Age
  - Prospective Age (Sanderson and Scherbov, 2007)



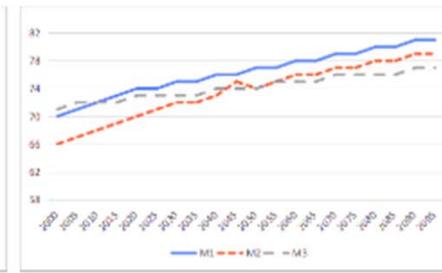
(a) Canada Male



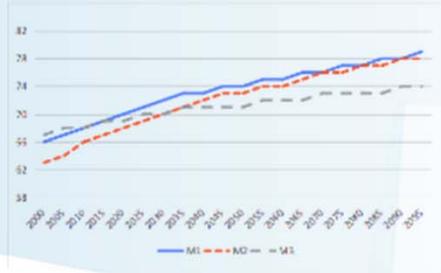
(b) Canada Female



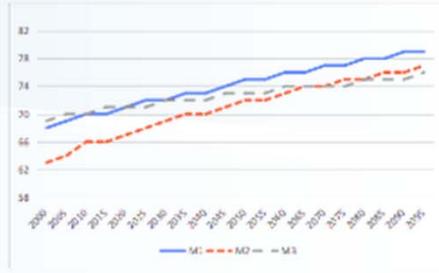
(c) France Male



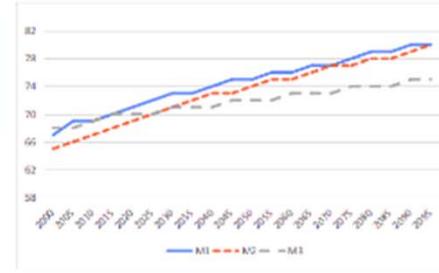
(d) France Female



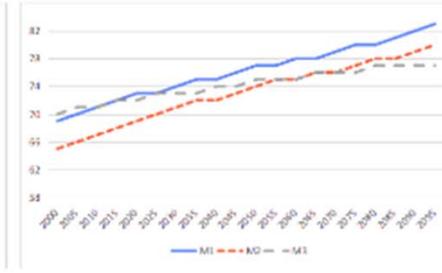
(e) Germany Male



(f) Germany Female



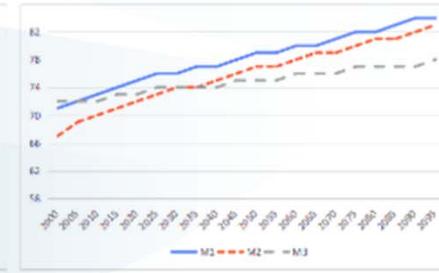
(g) Italy Male



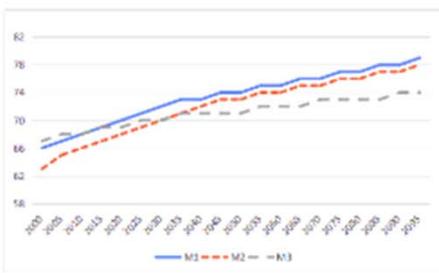
(h) Italy Female



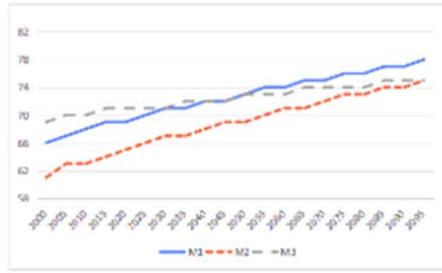
(i) Japan Male



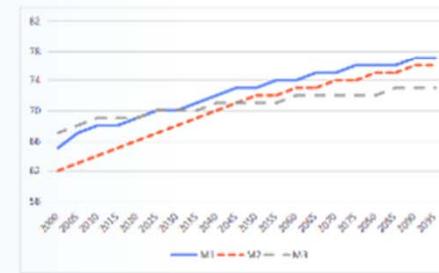
(j) Japan Female



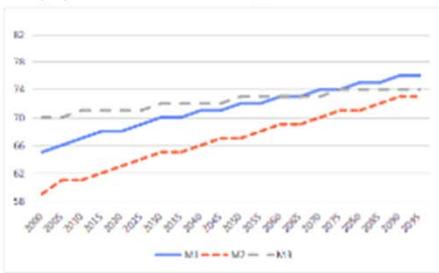
(k) United Kingdom Male



(l) United Kingdom Female



(m) United States Male



(n) United States Female

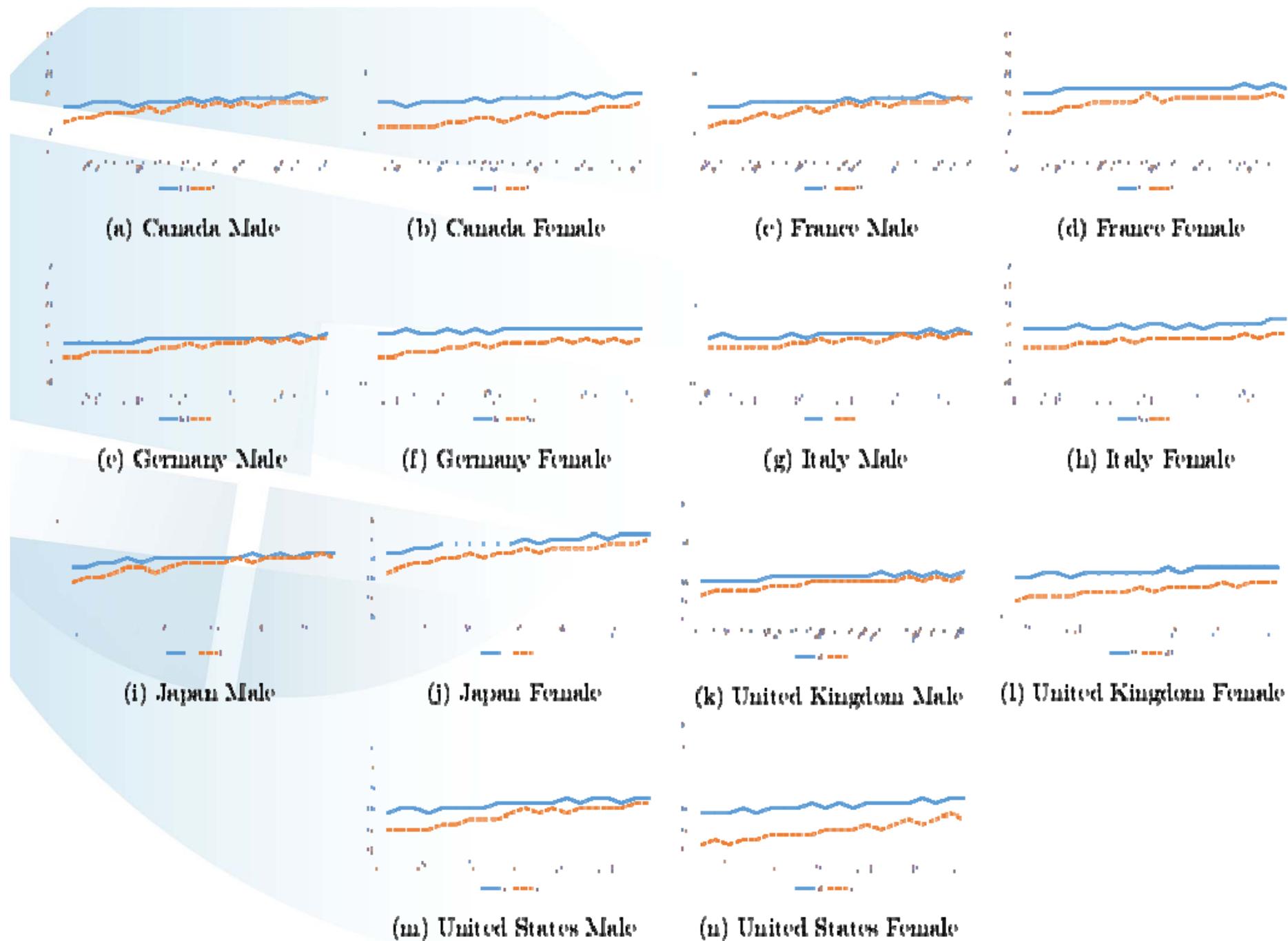


Figure 2: Forecasted Prospective Retirement Age by Country and Gender

## **Example:**

# **A Generalized Retirement Model under Evolving Demographics from Life Tables**

- Main Takeaways:
  - Optimizing individuals should delay their retirement as life expectancy increases
  - However, in terms of prospective age, the retirement age only slightly increases

## Example:

# The Effect of Labor Market Frictions on Retirement Benefits

- The labor market history of individuals affect retirement benefits:
  - On defined contribution systems, it depends directly on how much they contributed to the system.
  - On defined benefit systems, the history of wages, usually in levels, is what determines pension outcomes.
- Individuals in the labor market receive job offers depending on their ability, education level, experience and ageing profile.
- They will accept their offer if it is better than their current wage, if working, or than staying unemployed or out of the labor force, if not working.
- The opposing forces of experience and ageing creates life cycle profile of earnings with rapid growth at the early years and slow decline at later ages.

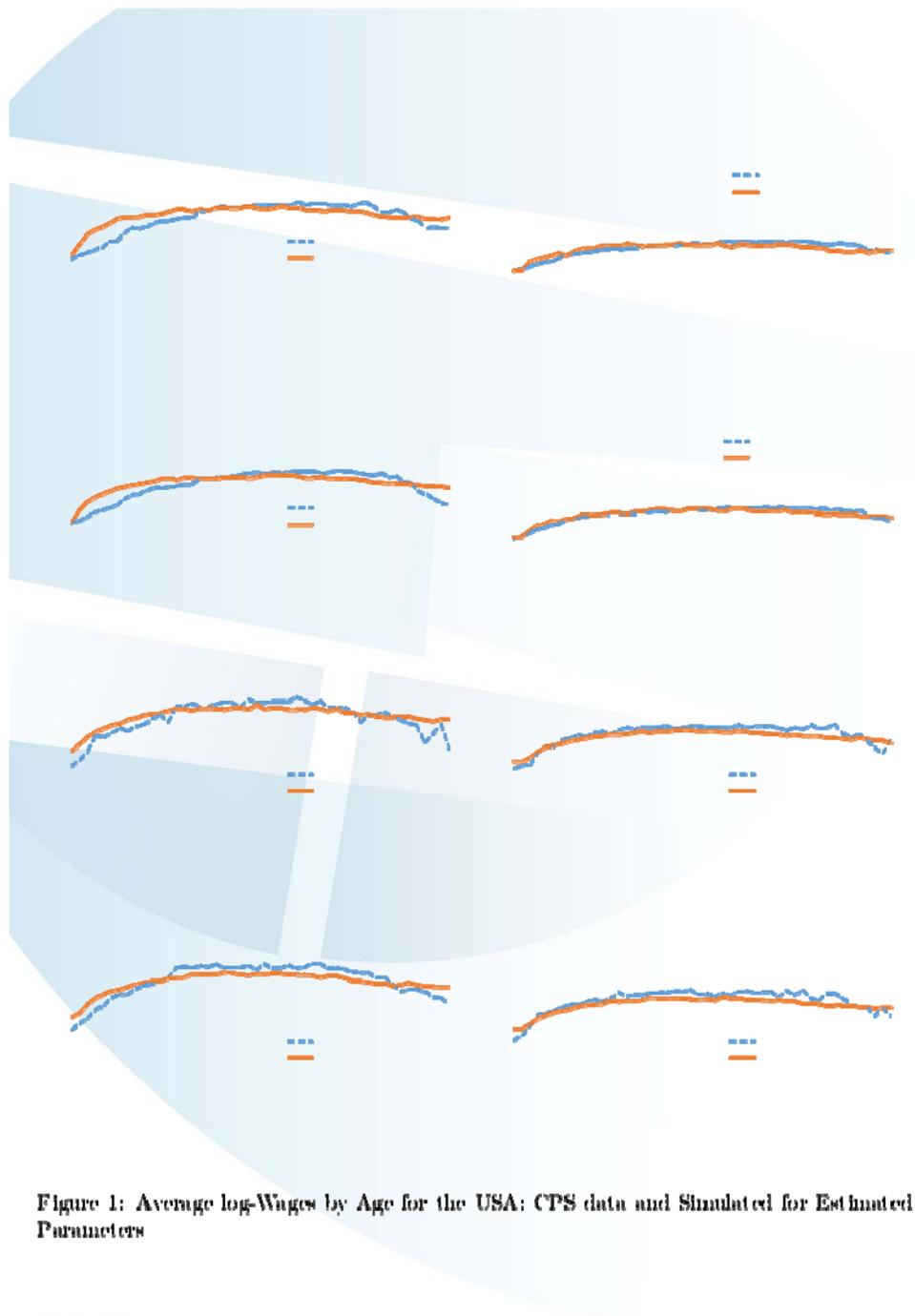


Figure 1: Average log-Wages by Age for the USA: CPS data and Simulated for Estimated Parameters

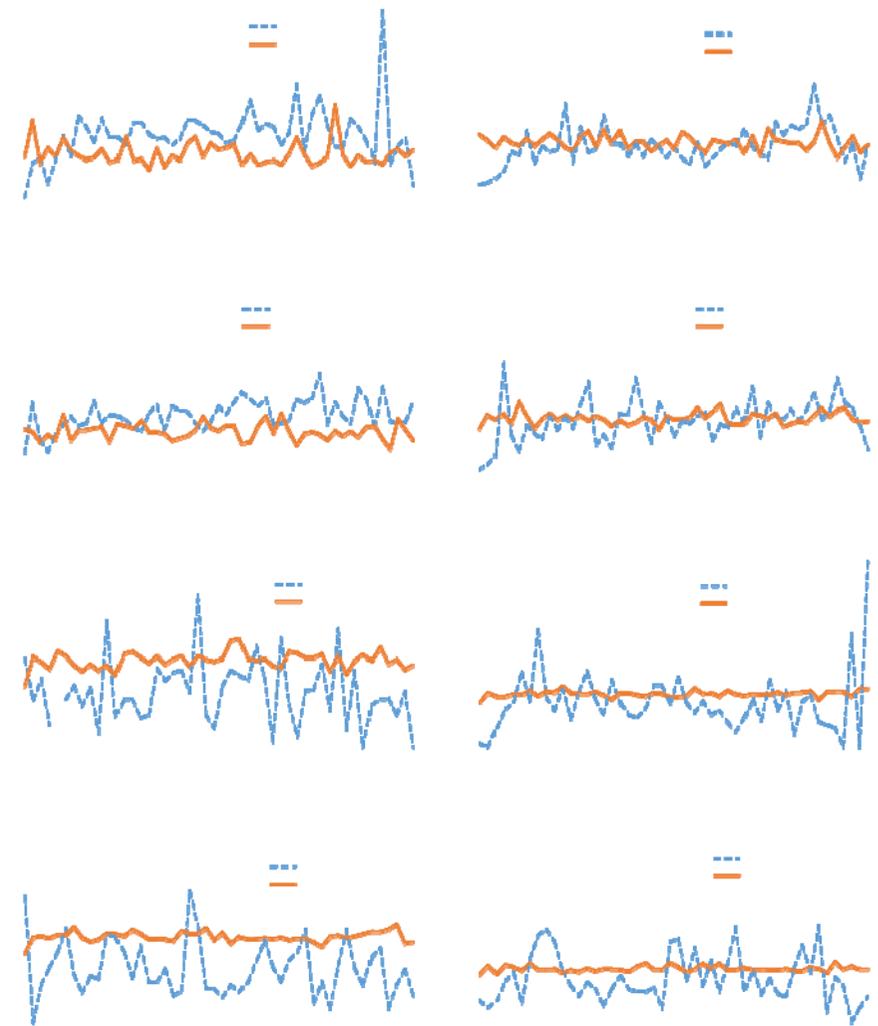


Figure 2: Average Weeks of Unemployment by Age for the USA: CPS data and Simulated for Estimated Parameters

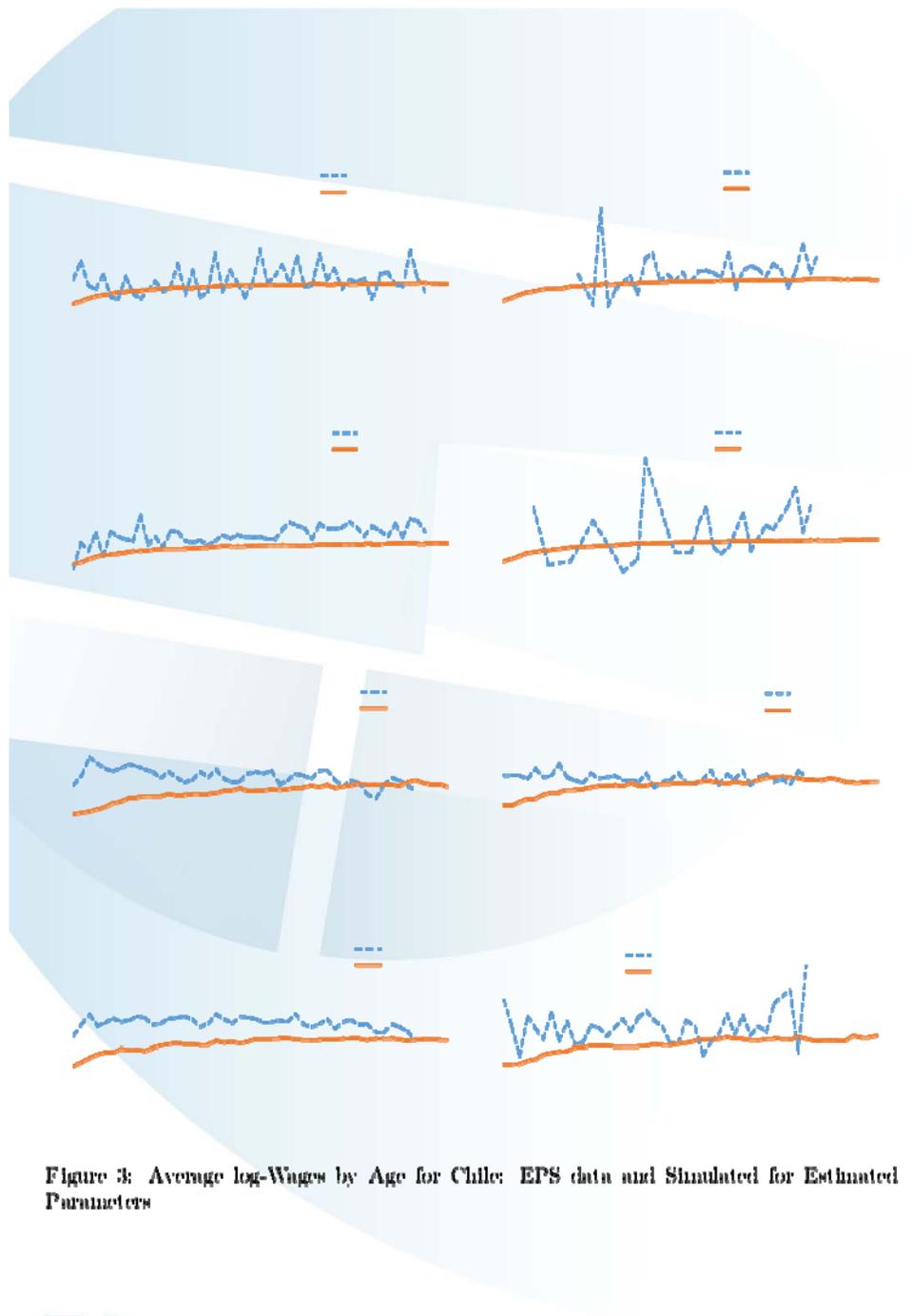


Figure 3: Average log-Wages by Age for Chile: EPS data and Simulated for Estimated Parameters

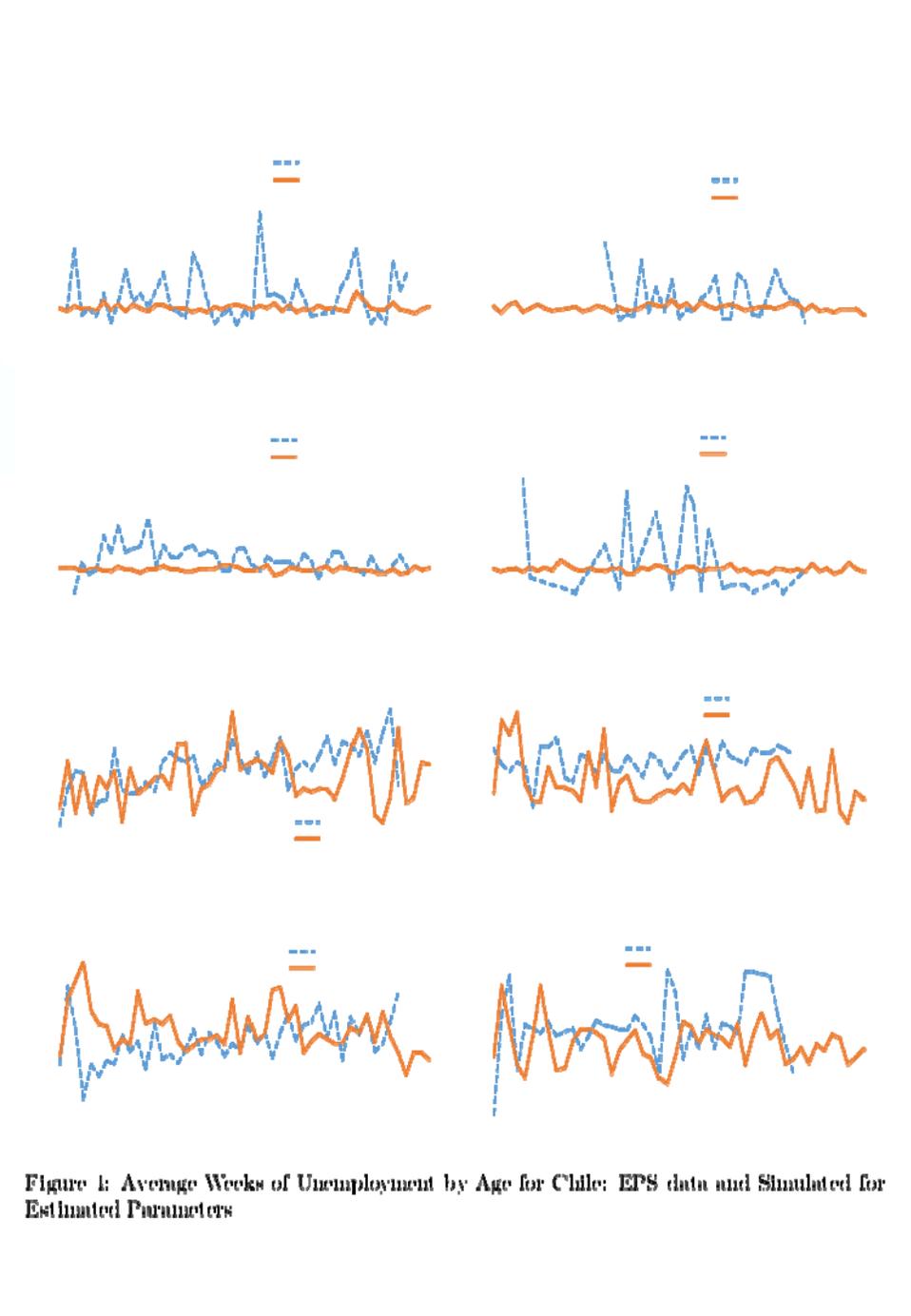
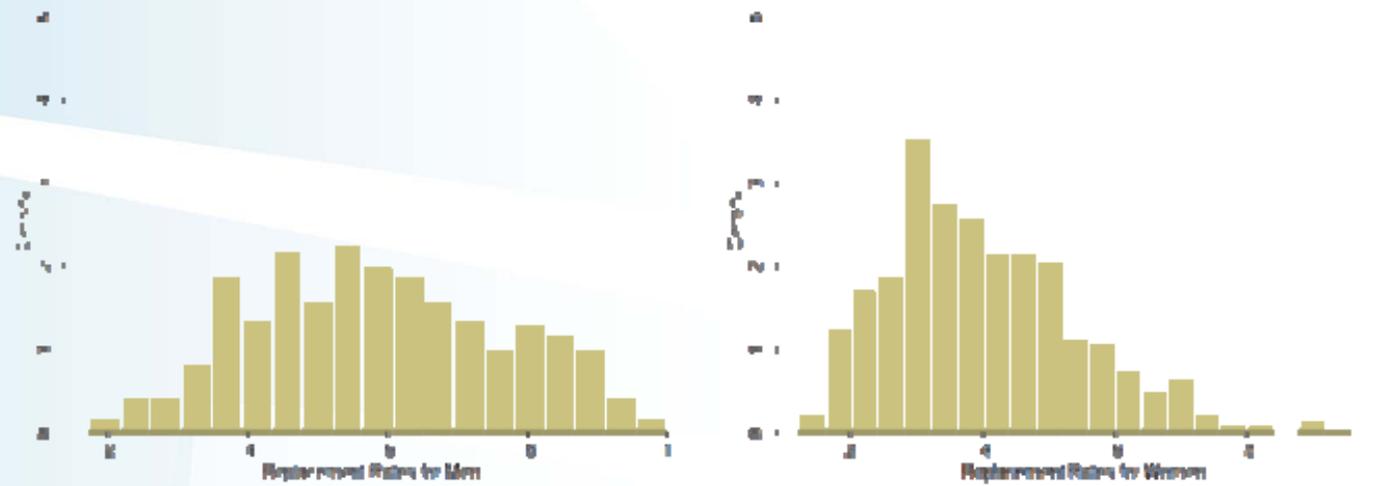
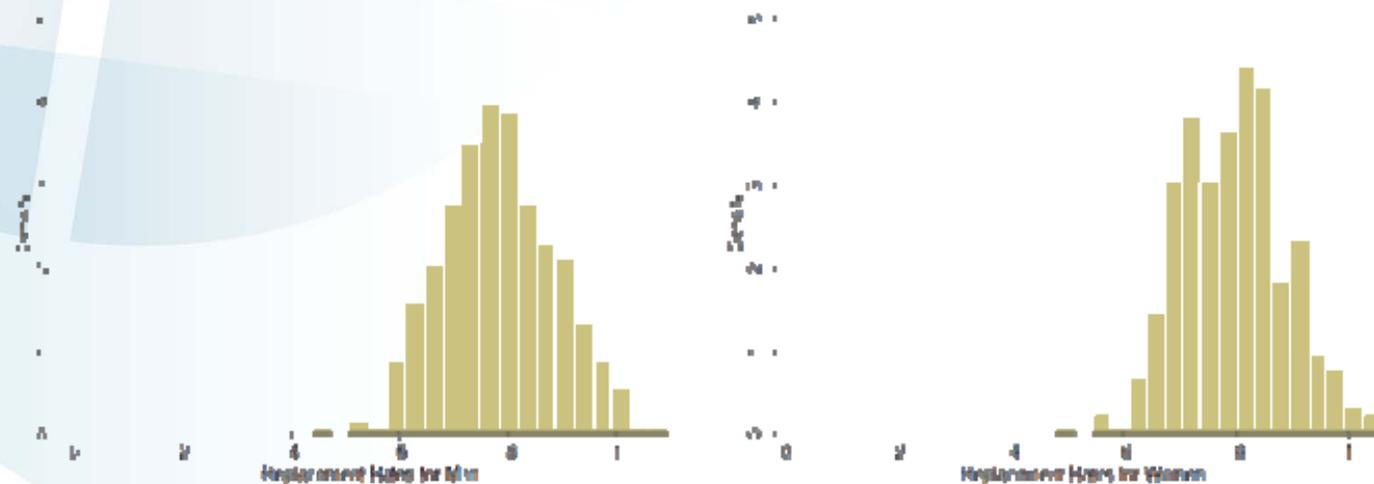


Figure 4: Average Weeks of Unemployment by Age for Chile: EPS data and Simulated for Estimated Parameters



**Figure 7: Chile: Simulated Replacement Rates if Individuals retire at the Earliest Retirement Age (60 for Women, 65 for Men).**



**Figure 8: Chile: Simulated Replacement Rates under the US Social Security System if Individuals retire at the Full Retirement Age (65)**

## Example:

# The Effect of Labor Market Frictions on Retirement Benefits

- Main Takeaways:
  - Defined benefit systems provide higher pensions on average (periods of unemployment matter!)
  - However, this is not consistent with the level of individual contributions, so the state must subsidize pensions