

# What Is the Impact of ECEC on Adult Earnings? Evidence from a Large Randomized Experiment

Danny Yagan  
Harvard University

5 July 2011

# Definitions

- K-3: “Kindergarten through grade 3”
- Teacher experience: The number of years a teacher has spent teaching
- Class size: small (15 students) vs. large (22 students)

# Research has left policy questions unanswered...

- What policymakers need to know:
  - How much money should they spend on ECEC?
  - Which aspects of ECEC should they focus on?
- Why research fails to provide definitive answers:
  - Very hard to measure outcomes we care about (e.g. earnings)
  - Evidence is usually only suggestive (correlation vs. causation)

# ...and even suggested ECEC may be irrelevant

- Experienced teachers and small classes raise K-3 test scores
- Experienced teachers and small classes *do not* raise grade 8 test scores (“fade out”)
- → Perhaps early childhood education has no long-lasting effects

# Solution: Large-scale experiment linked to earnings

- “How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project STAR,” forthcoming *Quarterly Journal of Economics*

By Raj Chetty, John N. Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Whitmore Schanzenbach, and Danny Yagan

# Solution: Large-scale experiment linked to earnings

- 1) Random assignment in the STAR education experiment
  - 12,000 children in grades K-3 at 79 schools in Tennessee, 1985-89
  - Students and teachers were randomly assigned to classrooms

# Solution: Large-scale experiment linked to earnings

- 1) Random assignment in the STAR education experiment
  - 12,000 children in grades K-3 at 79 schools in Tennessee, 1985-89
  - Students and teachers were randomly assigned to classrooms
  
- 2) We linked these students to their U.S. tax records
  - Exact measure of adult wage earnings, through age 27

# Random assignment: Kindergarten experiment

Students enter Kindergarten



K teacher <10 yrs of experience



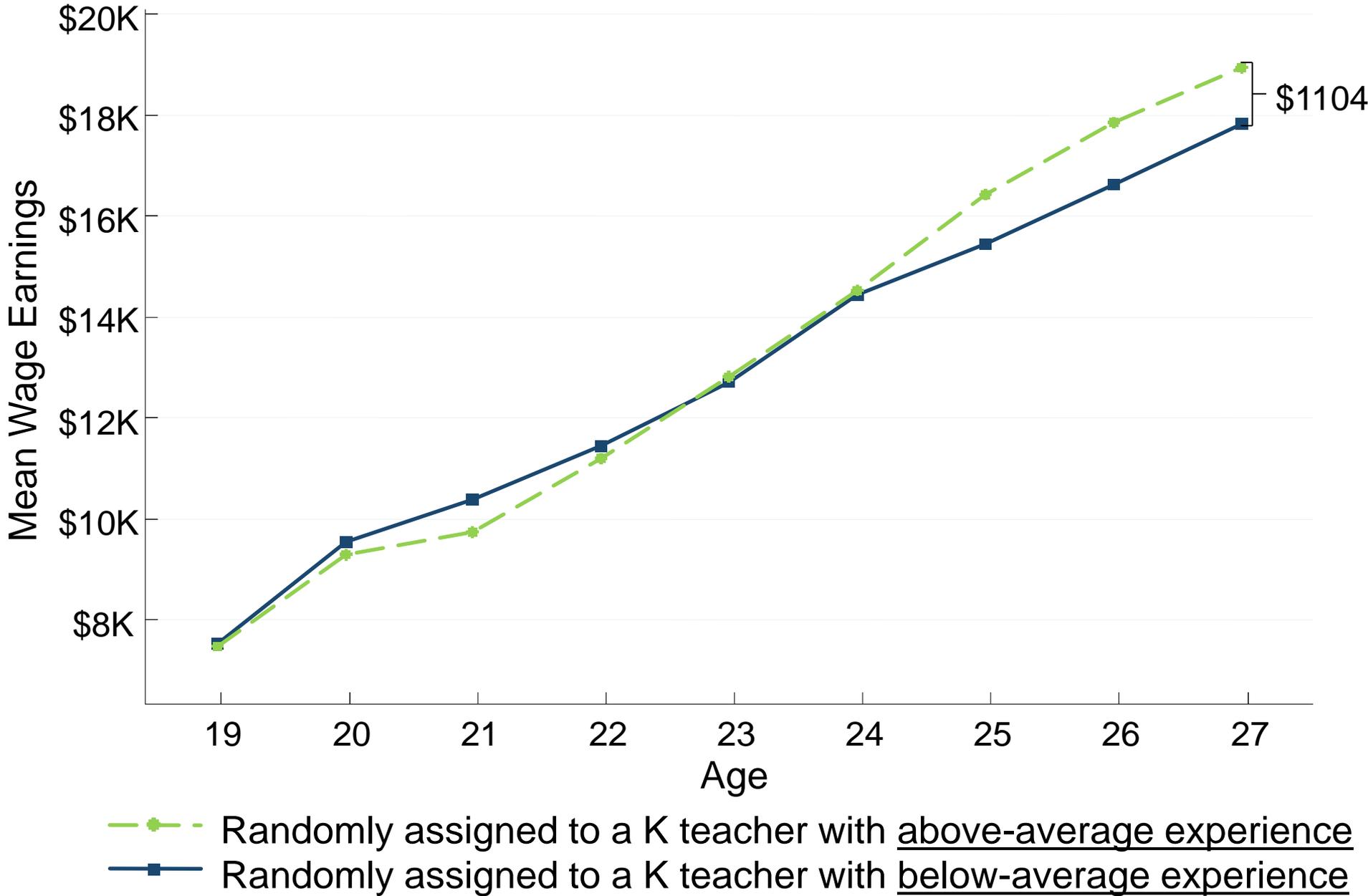
Measure earnings 20 yrs later

K teacher >10 yrs of experience

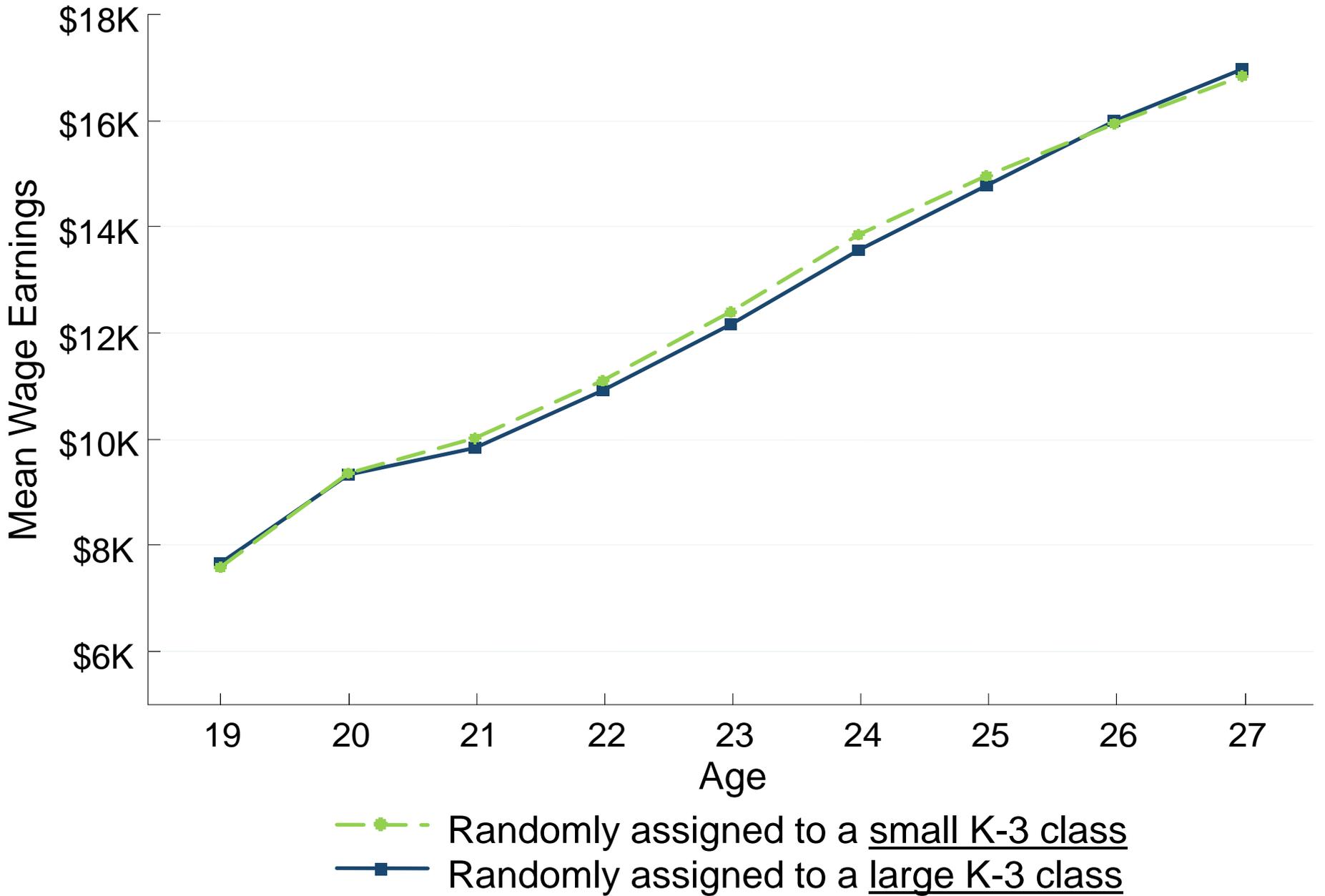


Measure earnings 20 yrs later

# The Causal Effect of Kindergarten Teachers on Adult Wage Earnings



# The Causal Effect of K-3 Class Size on Adult Wage Earnings



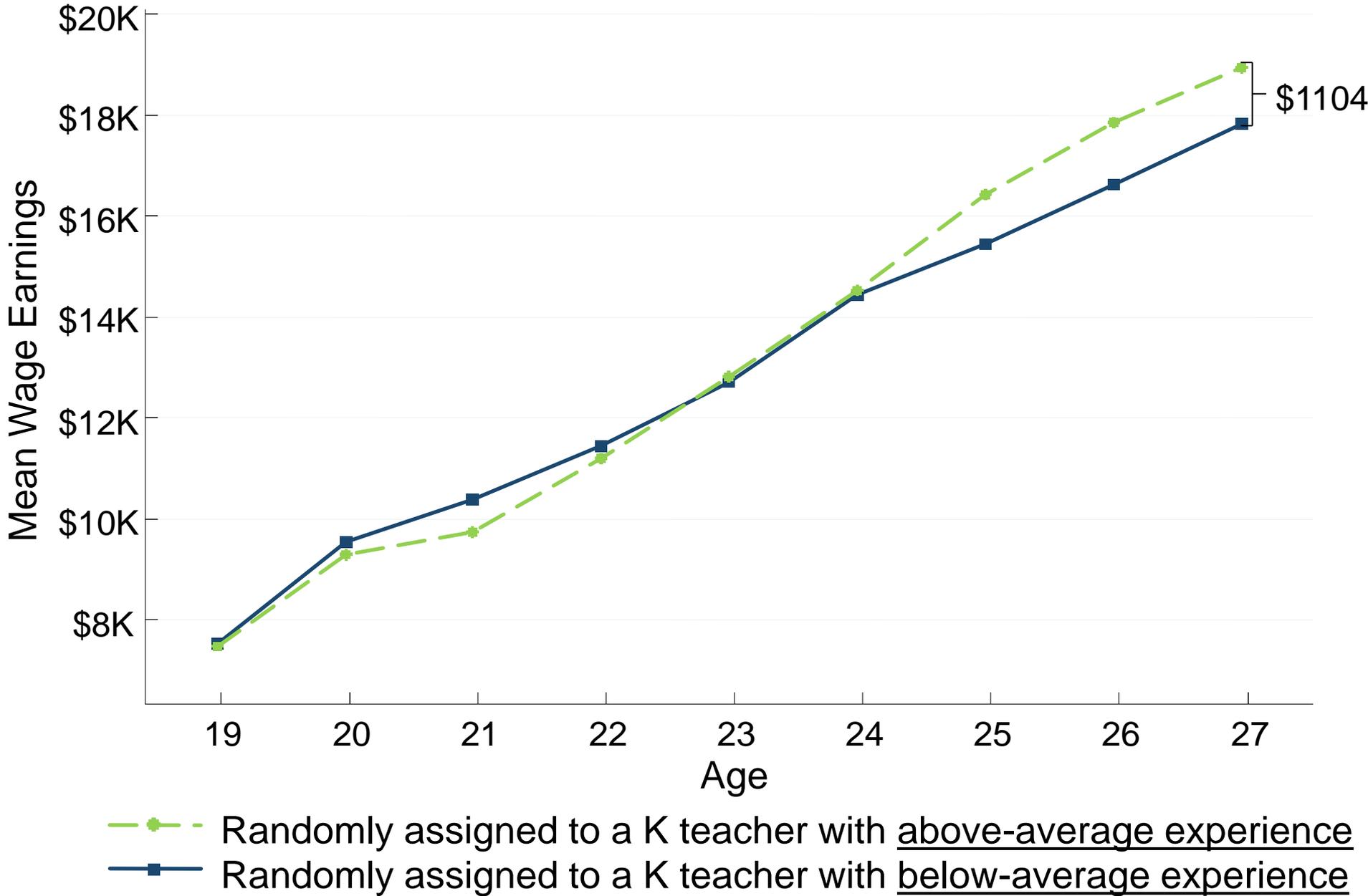
# Why does K-3 education matter?

- Puzzle: How can K-3 education...
    - impact K-3 math and reading test scores
    - impact adult outcomes
    - but not impact grade 8 math and reading test scores?
  - Leading candidate explanation: *non-cognitive* skills
    - Ability to get along with others
    - Positive attitude
    - Discipline
- K-3 education *does* impact grade 8 non-cognitive test scores

# Policy recommendations

- 1) Do whatever it takes to hire and retain only the very best K-3 teachers – even if you have to pay them hundreds of thousands of dollars per year
- If teachers didn't matter, pay them very little and never force any to leave

# The Causal Effect of Kindergarten Teachers on Adult Wage Earnings



# Policy recommendations

- 1) **Do whatever it takes to hire and retain only the very best K-3 teachers – even if you have to pay them hundreds of thousands of dollars per year**
  - If teachers didn't matter, pay them very little and never force them to leave
  - But since they matter enormously, consider the opposite policy:
    - Pay teachers a lot, and
    - Allow only the very best teachers to remain
- Need to try different systems and measure the results

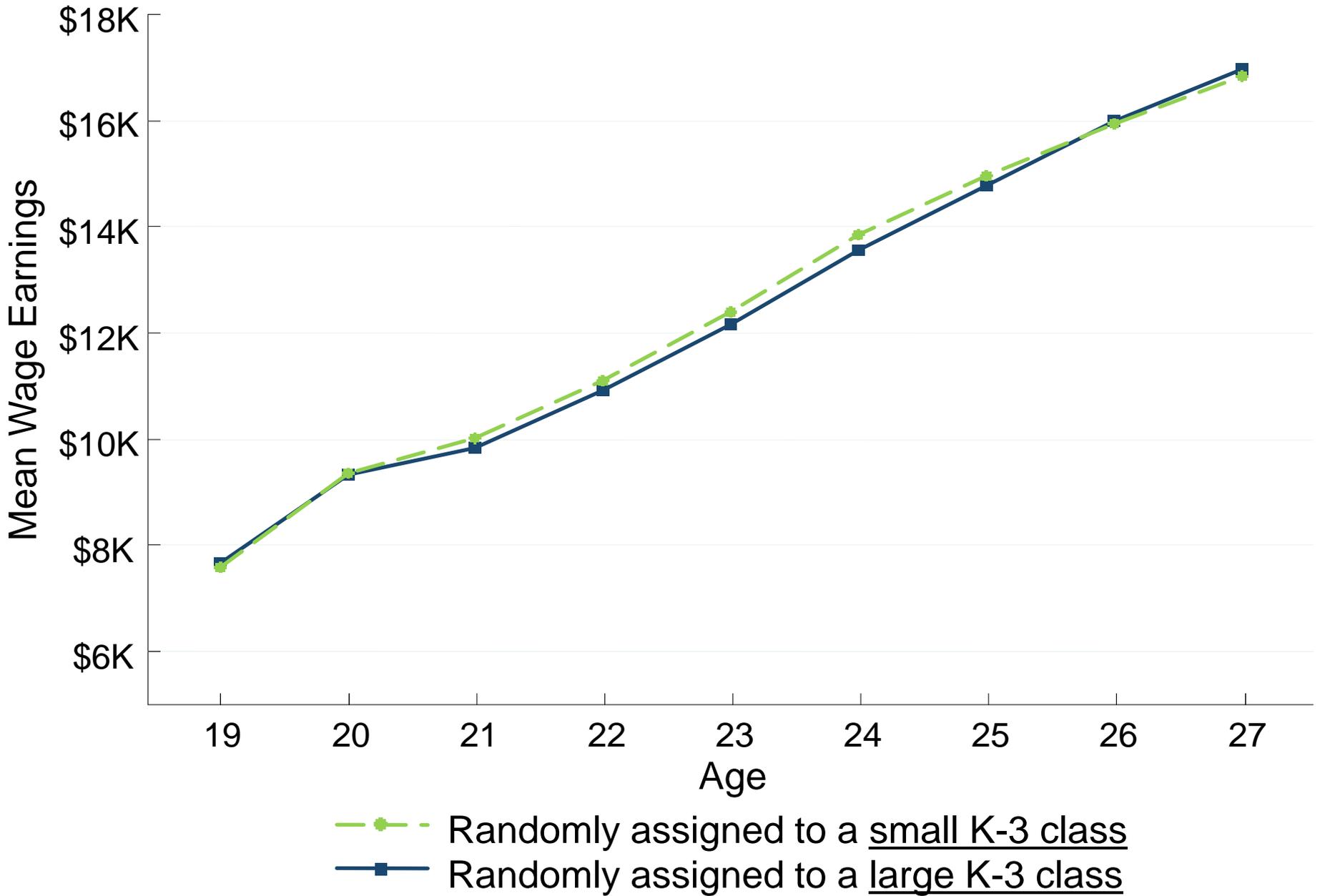
# Policy recommendations

- 1) Do whatever it takes to hire and retain only the very best K-3 teachers – even if you have to pay them hundreds of thousands of dollars per year
  
- 2) **Emphasize non-cognitive skills in K-3 curricula**
  - Ability to get along well with others, positive attitude, discipline

# Policy recommendations

- 1) Do whatever it takes to hire and retain only the very best K-3 teachers – even if you have to pay them hundreds of thousands of dollars per year
- 2) Emphasize non-cognitive skills in K-3 curricula
- 3) **Stop spending money to reduce class size**
  - Reducing class size is very expensive
  - But currently no evidence that it has long-lasting effects

# The Causal Effect of K-3 Class Size on Adult Wage Earnings



# Policy recommendations

- 1) Do whatever it takes to hire and retain only the very best K-3 teachers – even if you have to pay them hundreds of thousands of dollars per year
- 2) Emphasize non-cognitive skills in K-3 curricula
- 3) Stop spending money to reduce class size

# The next wave of ECEC research

- Enormous stakes at play
  - 1 SD better K-3 classroom → \$750,000 in additional lifetime earnings for a classroom of 20 students
- An agenda for every education ministry:
  - 1) Choose an important ECEC policy question
  - 2) Implement a large-scale randomized experiment
  - 3) Measure later-life outcomes using administrative records