

Scientific Talent Leaks Out of Funding Gaps

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Science of Science Funding

Wei Yang Tham

Joseph Staudt

Elisabeth Perlman

Stephanie Cheng

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Disclaimer

Any views expressed are those of the authors and not those of the U.S. Census Bureau. The Census Bureau has ensured appropriate access and use of confidential data and has reviewed these results for disclosure-avoidance protection (Project 7507193: CBDRB-FY21-CES009-002, CBDRB-FY22-CES008-003, CBDRB-FY22-CES007-008, CBDRB-FY23-CES008-002, CBDRB-FY23-0333).

Speed matters in science & innovation

Funding Delays Are Slowing Scientific Progress

It shouldn't take scientists 20 months to navigate the grant process

By Heidi Williams

**Future of innovation funding agency
in doubt as Ottawa delays
implementation until potentially after
election**

Research workforce depends on grants

Faculty on soft money

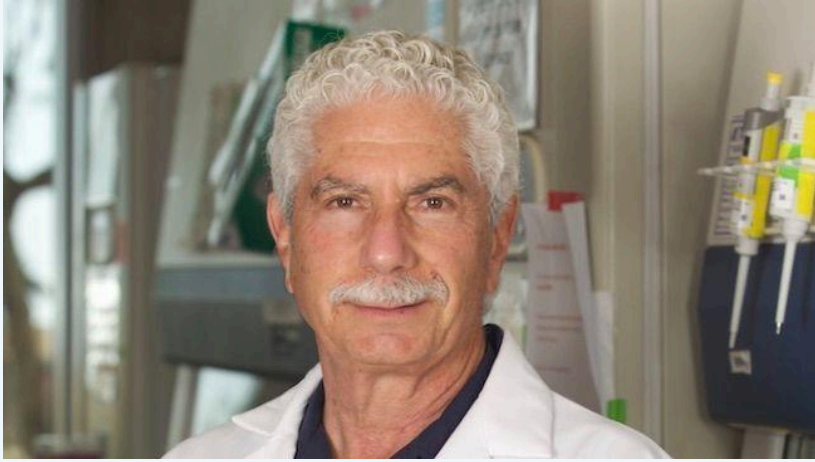
Trainees: Postdocs, graduate students

Undergrads, technicians, staff
scientists, lab managers

Funding process can be unpredictable

- US federal budgeting process (e.g. continuing resolutions, shutdowns)
- Grant application processing time
 - US: "8 to 20 months" to get an NIH award
 - Canada: "one to two years" to get CIHR funding

Even prominent researchers report being affected



The uncertainty that the NIH feels reflects itself in my willingness to hire

David Cheresh, cancer researcher at UC San Diego with over 80,000 citations

"...lost some really good people"

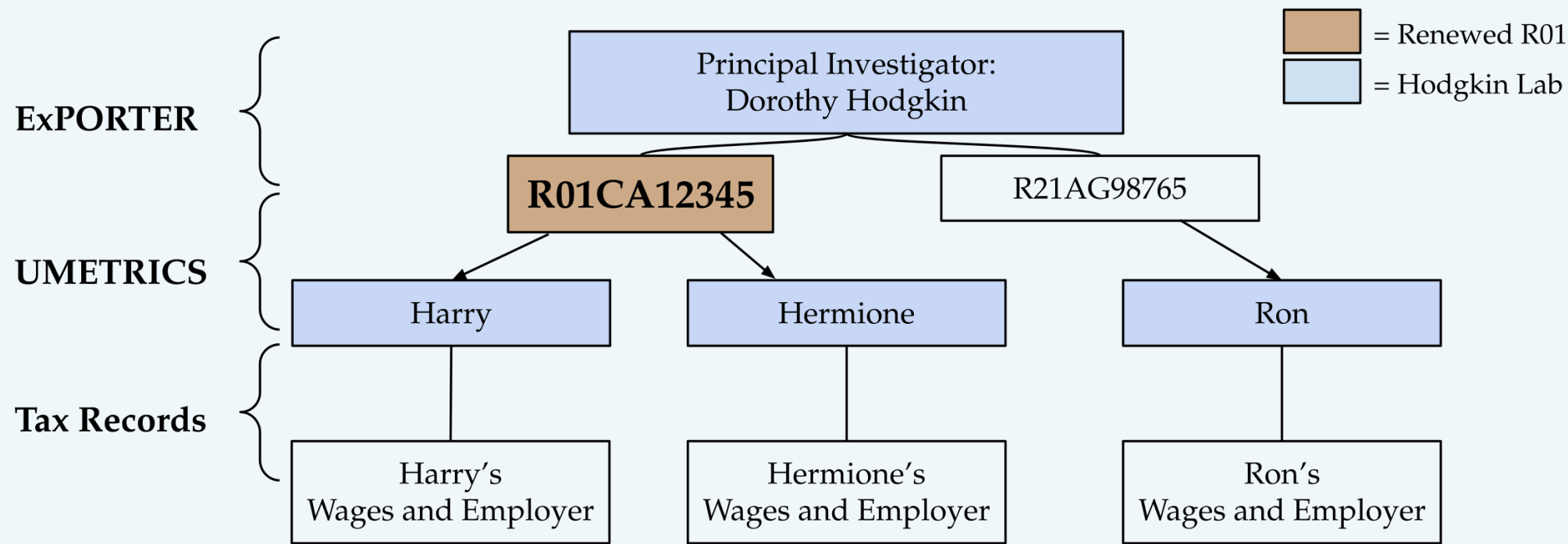
Interviews with six PIs

- **Question:** What consequences do funding interruptions/delays have for the research workforce?
- **Setting:** Renewal of R01 grants from the National Institutes of Health (NIH)
 - R01 grant: necessary to establish independent lab
 - Awarded in 4-5 year terms, then apply to renew
- **Approach:** How are labor market outcomes of lab members affected by a delay in R01 renewal?

Data

Goal: Follow grant funding to labor market outcomes

Grants → Personnel → US tax records



Outcome variables: placement & earnings

An employee can be placed in one of three sectors



Absent from US
tax data
"Nonemployed"



US Industry



US Academia

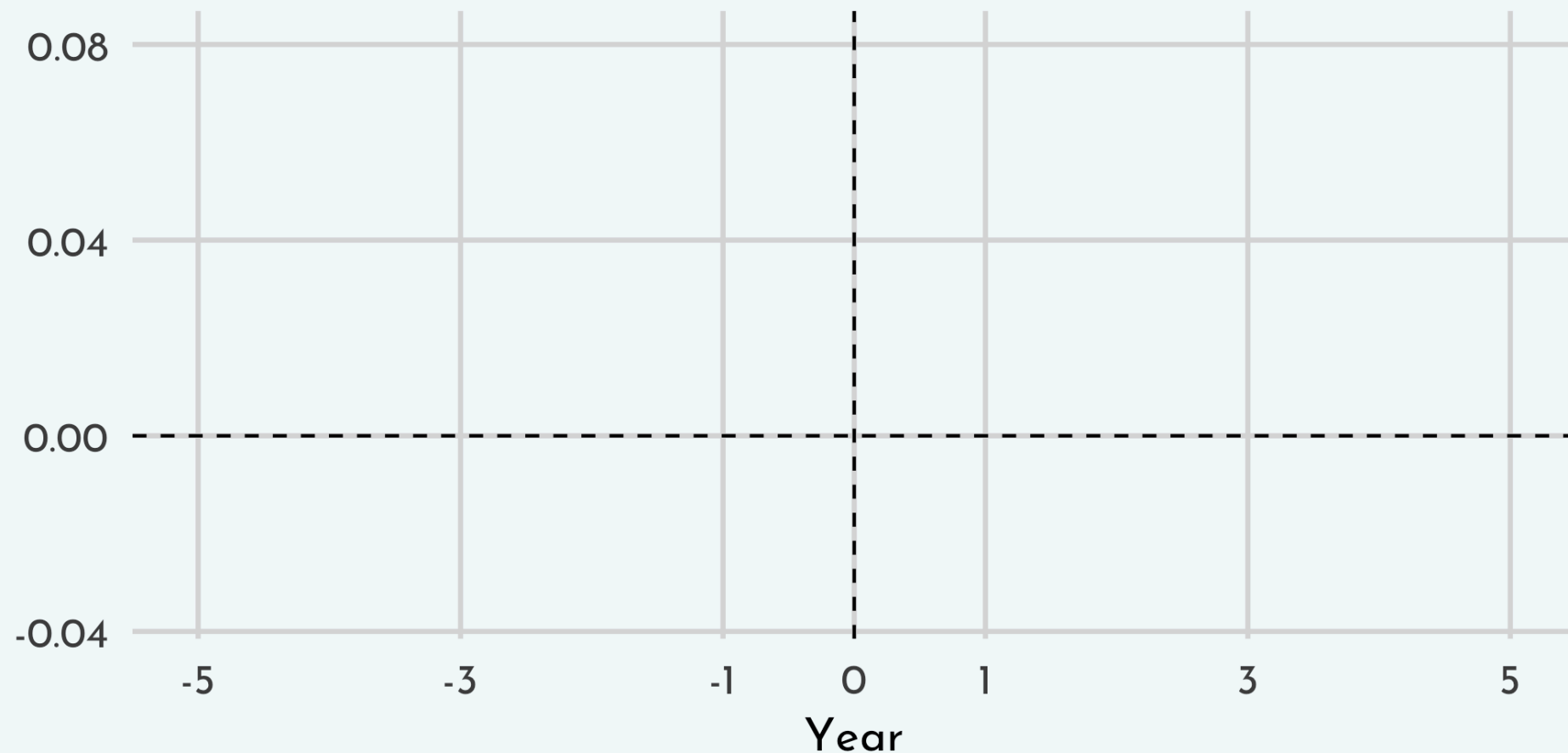
Results

Quick methods detour

- Compare people affected by delays against people not affected (difference-in-differences)
- **Treatment group:** Personnel in labs with a >30 day gap in renewal
- **Control group:** Personnel in labs renewed within 30 days
- All labs were funded eventually!

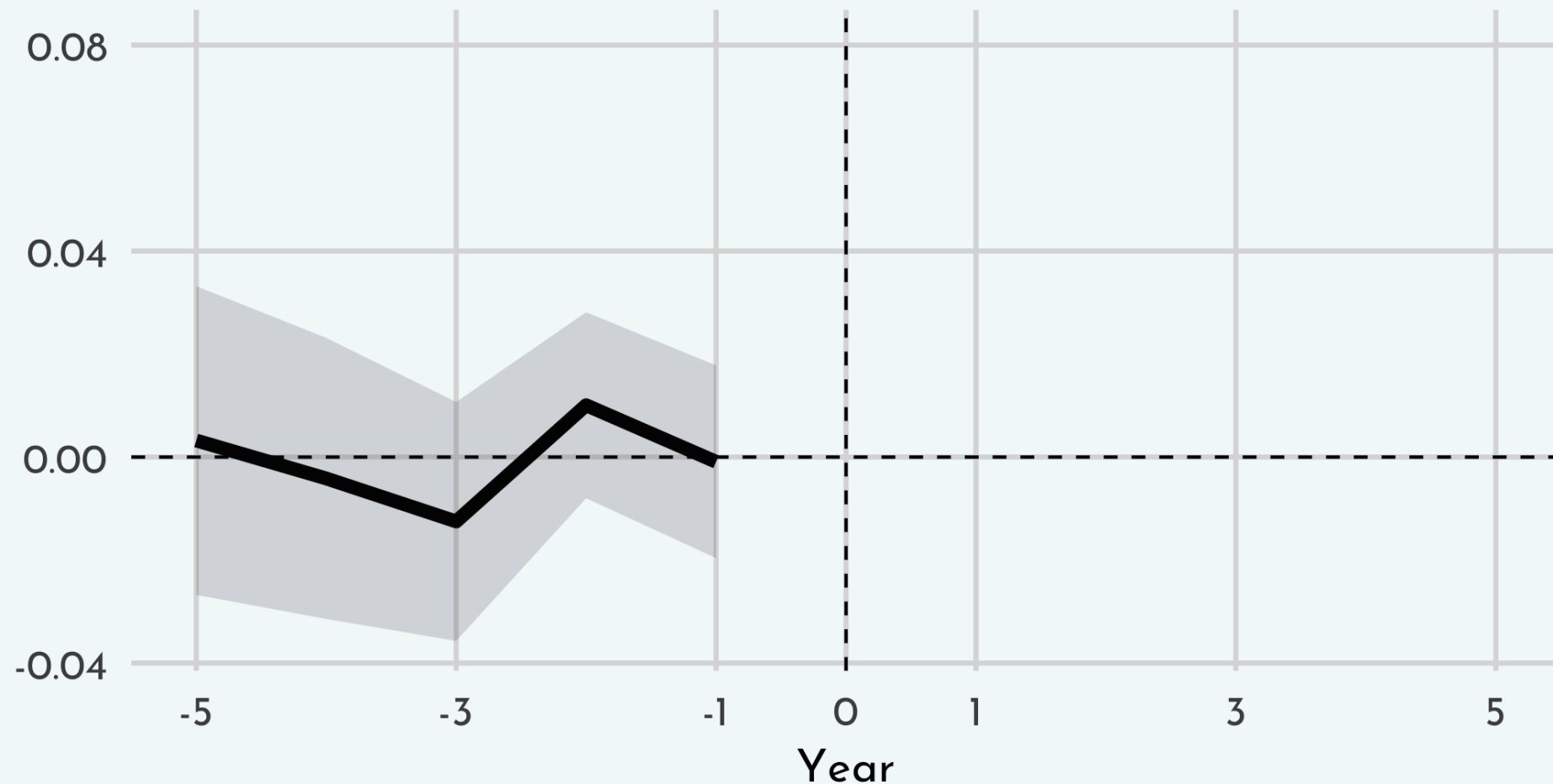
Funding delay at Year 0

Difference in probability of being Nonemployed



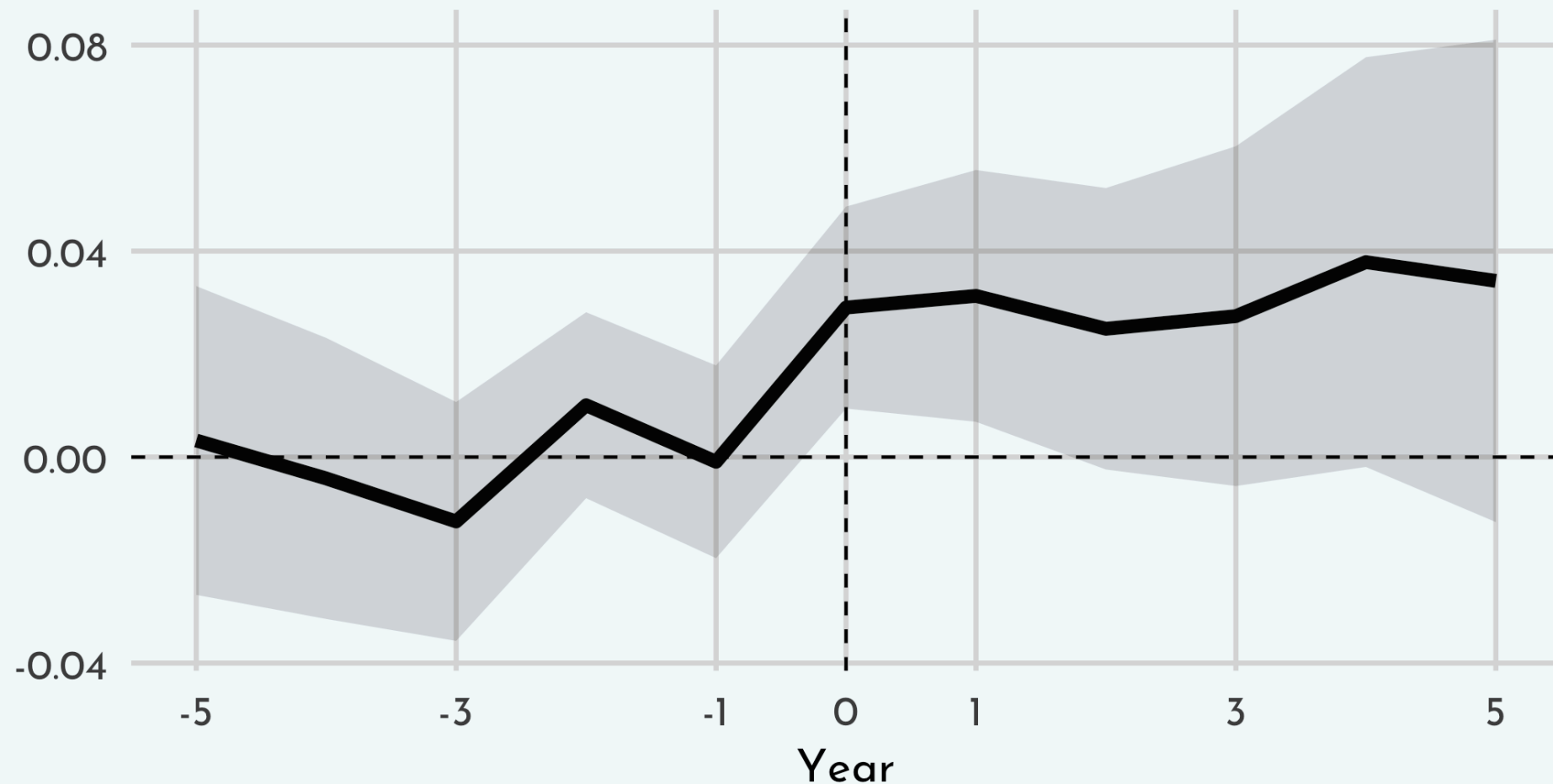
Delayed and non-delayed personnel have similar outcomes before delay

Difference in probability of being nonemployed



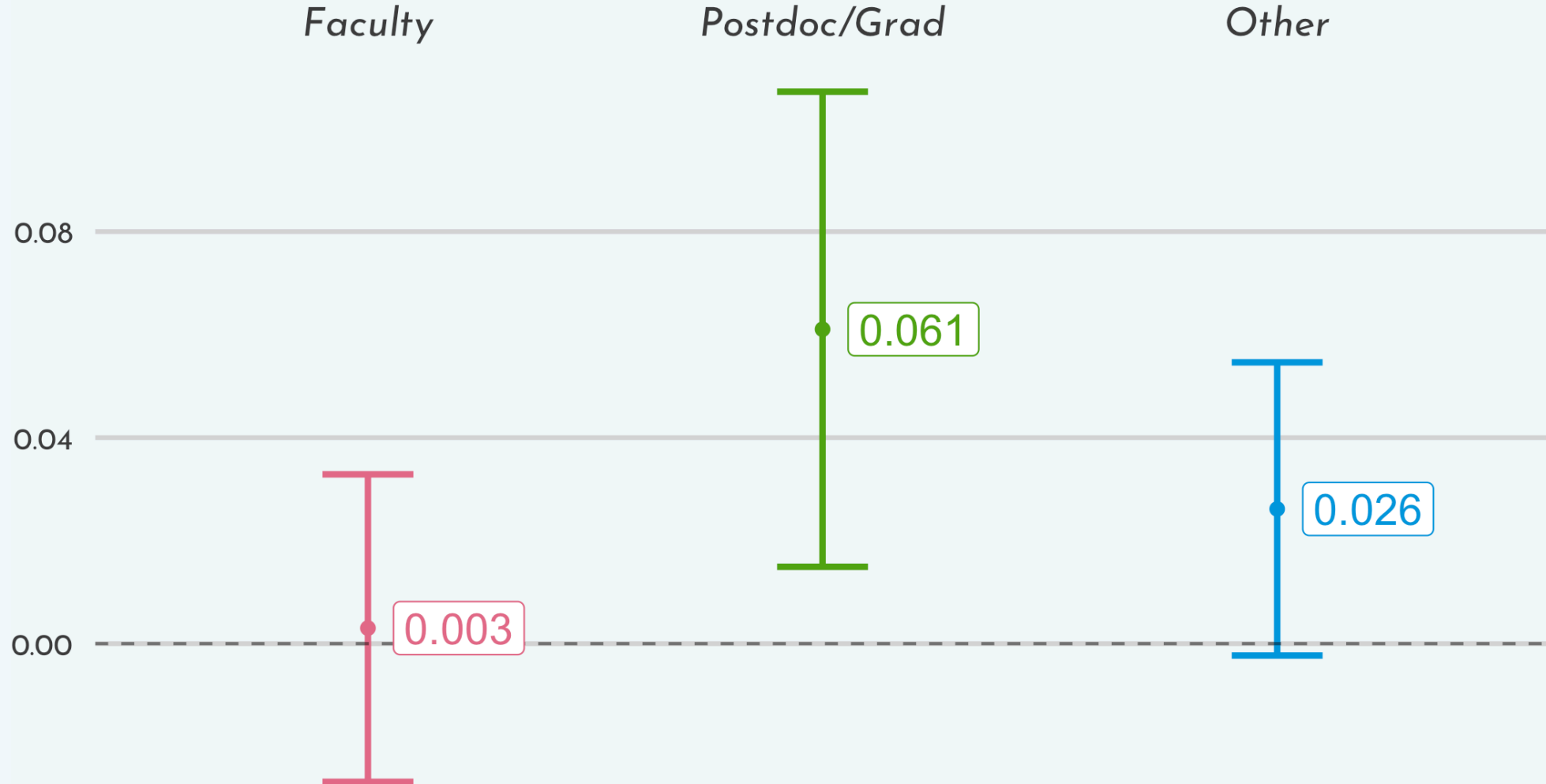
Delayed personnel are 3pp more likely to be nonemployed after delay

Difference in probability of being nonemployed



Trainees experience largest increase in nonemployment

Difference in probability of being nonemployed



Where do personnel go?

- Nonemployed = Not in tax data
 - Not working but still in the US
 - Left the US
- Link to 2020 US Decennial Census
- >50% of effect is associated with not appearing in the 2020 Census
- Trainees (postdocs & grad students) experience largest increase in US departures
 - Also less likely to be publishing

Effect of funding delays on nonemployment are substantial

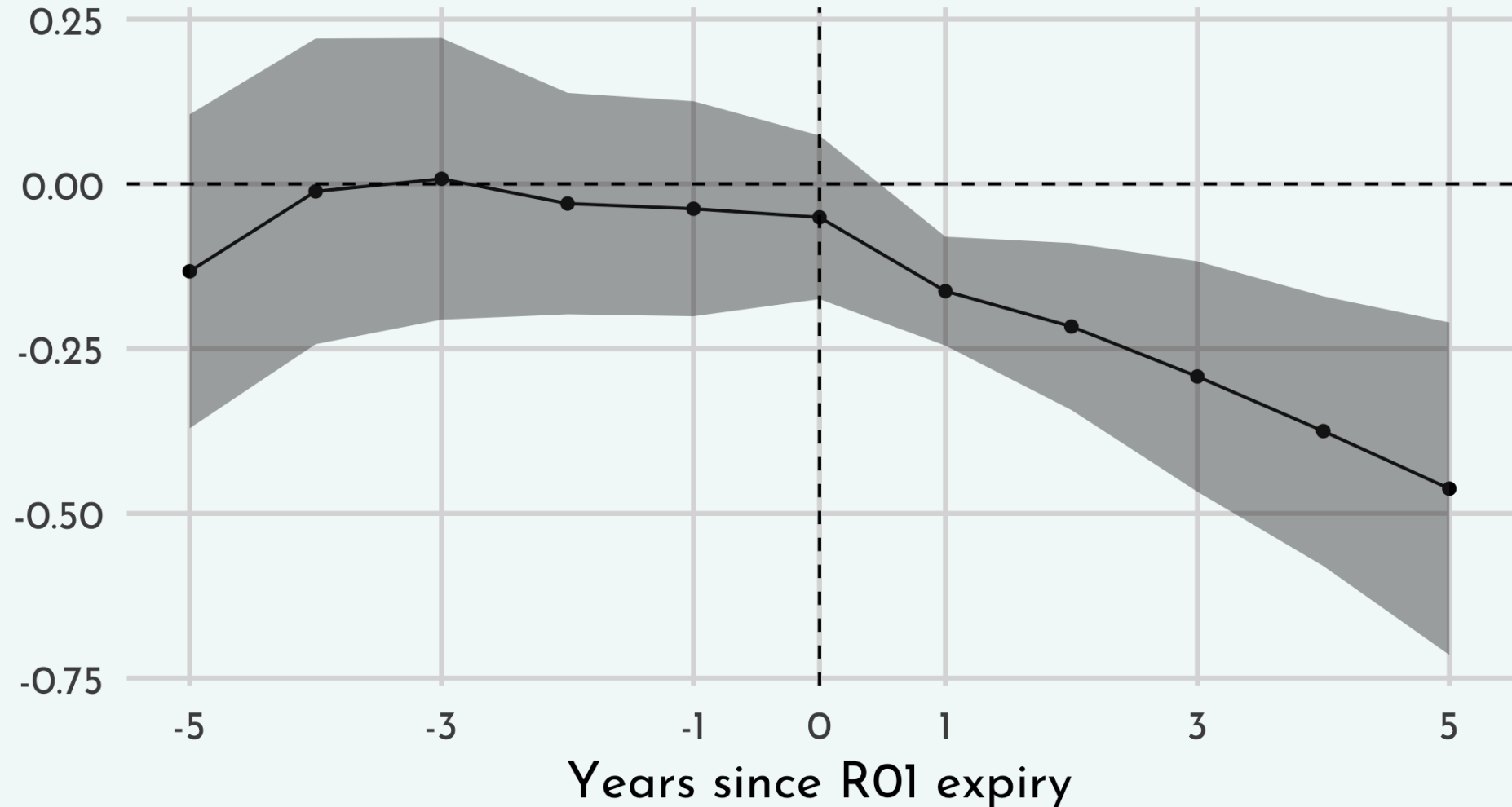
- Effect size: 1/3 of the motherhood nonemployment effect for biological sciences Ph.Ds (Cheng 2021)
- Account for 5% of all US nonemployment among research personnel in our sample
 - Comparable to effect of green card delays on stay rates for US doctorates (Khan and MacGarvie, 2020)

This is a highly-educated population. Maybe they're "fine"?

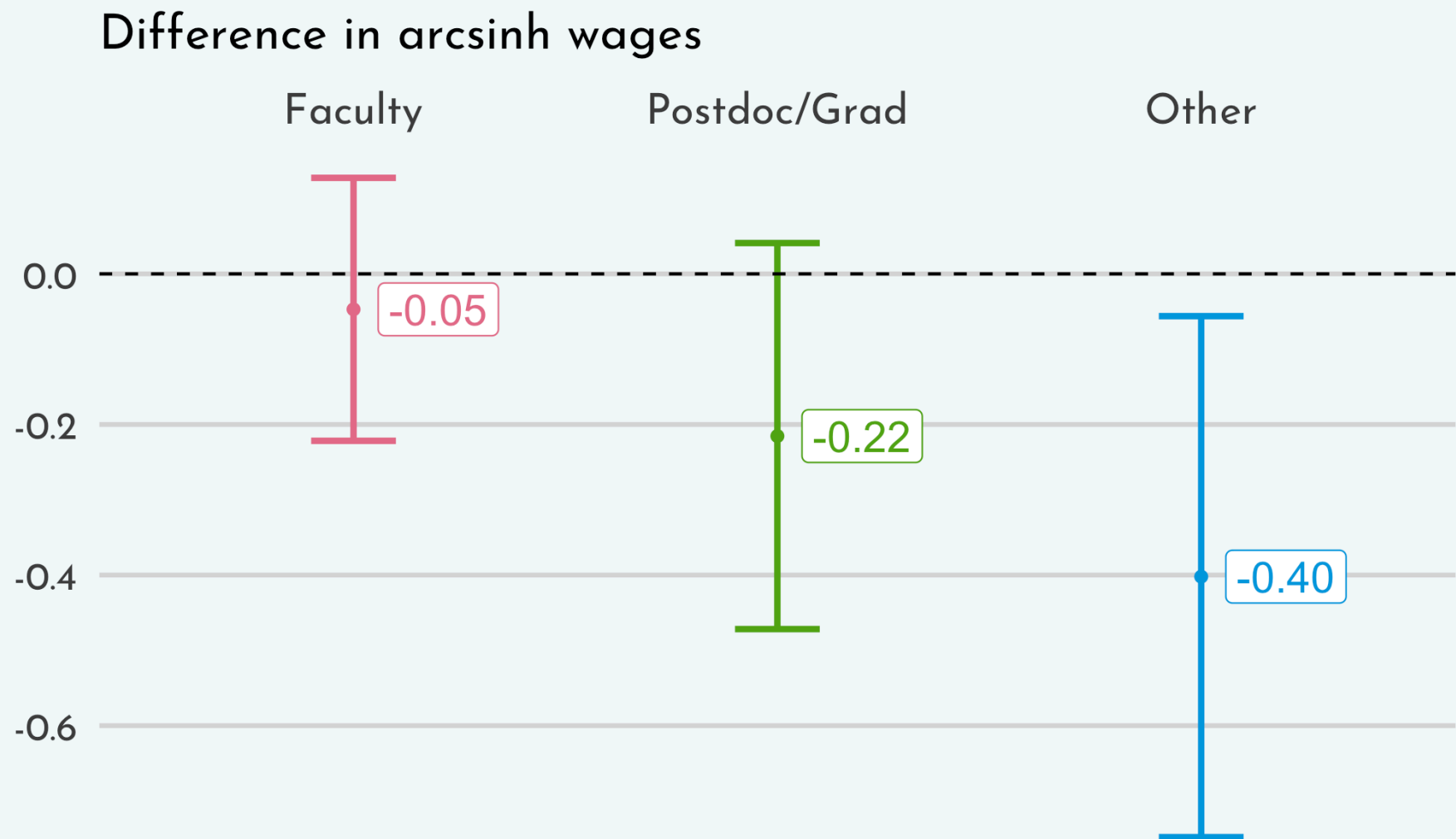
- Look at earnings of those paid in the US

Wages decrease by 20% after a delay

Difference in arcsinh wages



Wage decreases largest for non-faculty



Final Thoughts

- Early scientific careers are fragile
- Funding delays appear to be a significant source of inefficiency
- Can universities provide more insurance with bridge funding?