

# Economics and the Postdoctoral Position

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FOBGAPT2

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# Economics Is about Incentives and Costs

- Incentives and costs have significant impact on number of postdoctoral scholars employed in United States

# Incentives from PI's Perspective to Engage Postdoctoral Researchers

- PI faces increased importance of
  - Specialization in research
  - Funding for research
  - Publications in grant review

# 1. Specialization

- Sole author is dinosaur when it comes to research
- Specialization means faculty increasingly look for individuals to work with them on research and to staff their labs



## 2. Importance of Funding

- Faculty increasingly under pressure to bring in funding for research
- Reflects importance of indirect cost recovery and salary buyout to university finances
- Pressure to bring in funding particularly acute for faculty in soft money positions— “funding or famine” to quote Stephen Quake

# 3. Importance of Publishing

- PIs under extreme pressure to be productive
- Publications play key role in grant review and grant success

# Staffing of Labs

- Increased importance of specialization, funding and publication leads PIs to seek clever individuals to staff labs and help in production of research
  - PIs on Federal grants spend 42% of research time in grant-related administration (Kean survey)
- Three groups to choose from:
  - graduate students
  - postdocs
  - staff scientists
- This is where costs begin to play a large role

# Costs of a Graduate Student

- Stipend between \$16,000 to \$28,000
  - Can cost an additional \$16,000 or more once tuition is included, depending upon limits set by funding agency and policies of university; one estimate puts total cost at \$51,000
- GRAs work approximately 1200 to 1500 hours per year
- Hourly rate as high as \$34.00 on some campuses before fringes; low of around \$21.00



# Cost of Postdoctoral Scholars

- NIH stipulated rate for FY 2016 was \$43,692 for NRSA first-year postdoctoral scholar; up from \$42,840 in 2015; \$39,264 in 2013.
  - Many institutions follow this rate for other postdocs
- Average postdoc reported working 2650 hours a year in life and physical sciences; 2550 in engineering and 2500 in math and computer sciences
- Hourly rate before fringes is currently about \$16.50 in the biomedical sciences

# Cost of Staff Scientist

- Start at approximately \$60,000
- Fringe benefits are significantly higher than those for a postdoc because they are treated as employees by university
- Hourly rate of approximately \$30.00 before fringes

# Cost Advantage Lies with Postdoctoral Scholar on Many Campuses

- Low salary and long hours of work mean postdoctoral scholars are about half as expensive as graduate student or staff scientist on many campuses
- Higher level of skill than graduate student
- Possibly more motivated than staff scientist
- Flexible period of commitment from PI's point of view
- Added benefit: some come with fellowships

# “Cost Advantage” Suggests a Closer Look at Why Postdoctoral Wages Are Low

# Salary Relative to Alternatives Is Low

- PhD in life sciences (2014 SED data)
  - Median salary starting in academe: \$61,000
  - Median salary starting in industry: \$87,000

# Starting Faculty Salaries Assistant Professors, Research Public Universities 2013-2014

- Biological and Biomedical: \$74,176

# Classmates without Graduate Training

- Classmates who did not get training beyond a BA were earning about \$49,911 in 2012, seven years after graduating; (Table 28

<http://www.census.gov/hhes/www/income/data/historical/people/>)

# Why So Low?



# Training Argument

- Low pay to postdoctoral scholars due to large training component of position
- Argument: training received portable to another position. ERGO: should be paid for by postdoctoral scholar in form of reduced wages;
  - low wages are down payment on a research career

# Validity of Training Argument

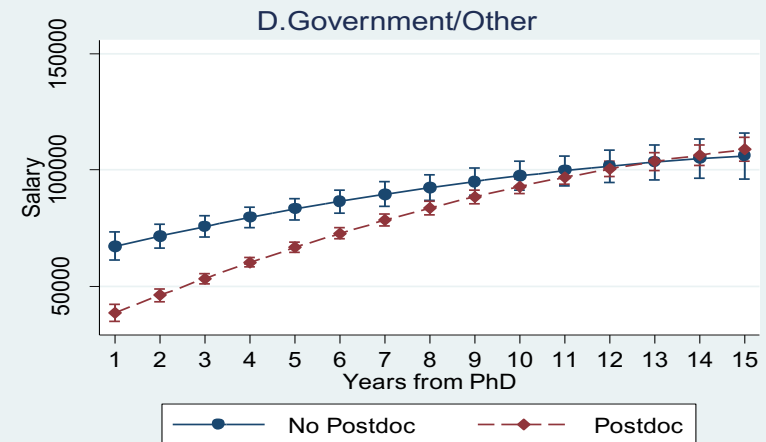
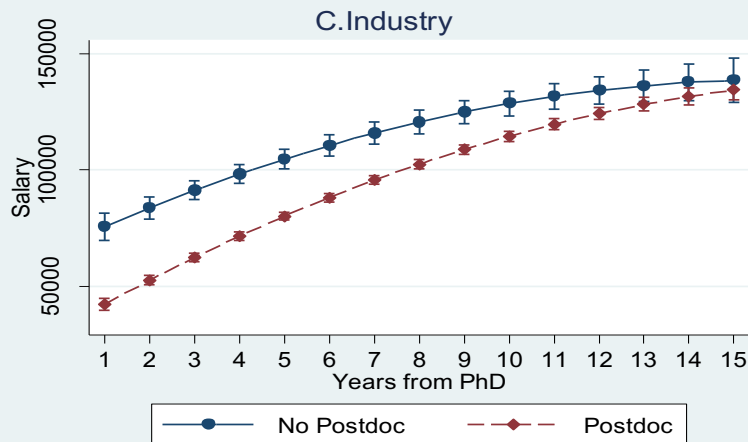
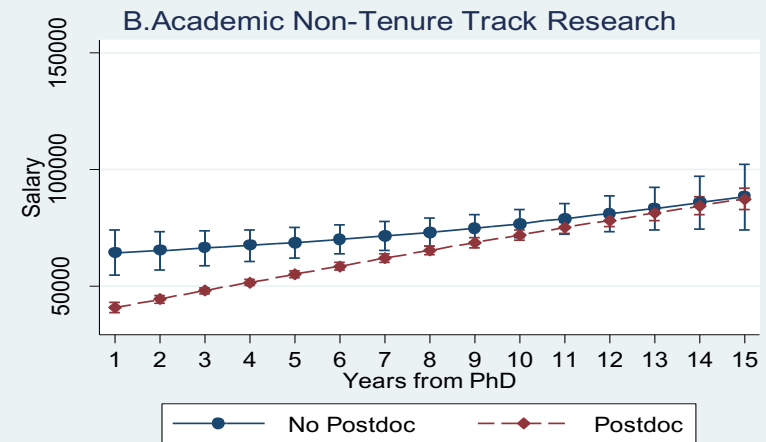
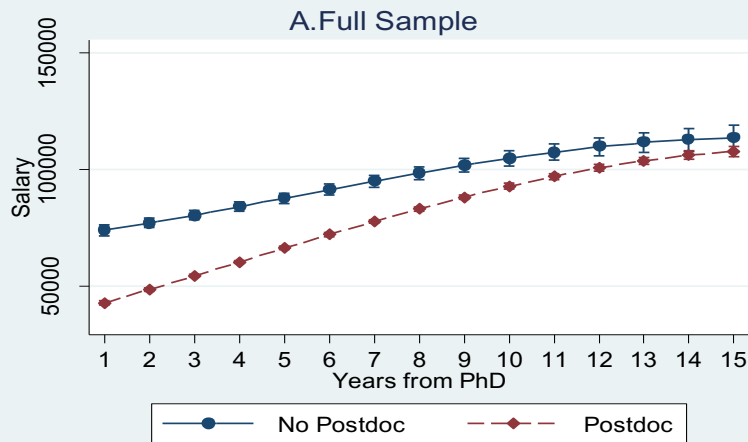
- Definitely strong training component in many postdoctoral positions
  - But in some labs training component is minimal and postdoctoral scholars are relied on for routine procedures
  - Over postdoc career, training component diminishes
- High cost of training
  - Classmates who did not get training beyond a BA were earning about \$49,911 in 2012, seven years after graduating; (Table 28 <http://www.census.gov/hhes/www/income/data/historical/people/>)
  - Approximately **\$25.00** per hour
  - Compare this to **\$16.50**. A high cost of training!
  - Especially when many of the skills learned may not be transferable into a non-research position—likely outcome for many
  - Most recent data for PhDs in biomedical sciences in US finds approximately 25% working in non-academic, non-research positions; 5% out of labor force or unemployed six to ten years after receiving PhD

# Training Does Not Appear to Pay Off

Kahn & Ginther

*Nature Biotechnology*

# Effect of Postdoc on Earnings



Postdocs earn less on average than non-postdocs in all sectors. They only catch up to non-postdocs in non-tenure track academia and government..

# Alternative Explanation Low Wages

- Not a “real” market
- Ample supply of domestically produced PhDs and large supply of PhDs educated abroad keep salaries low
- Postdoc pay set by NIH in biomedical sciences; many (though not all) campuses follow this for other fields

# Why Do Postdoctoral Scholars Take Position?

# Incentives from Their Point of View

- Interest in science
- Aspirations/optimism bias
- Career building/ “arms race component”
- Information (lack of)
- Lack of alternatives
- Hard to know when to leave

# Interest/Aspirations

- Postdoctoral scholars get satisfaction from engaging in research
- Most perceive chances/ability as being better than that of others in their field; “optimism bias”
  - (Sauermann and Roach find majority of students rate themselves as being more able than peers in the program)
- Postdoctoral position is logical step for those who want to get a research position—acquire skills and build resumé



# Career Building/Arms Race Component

- Publications
  - Academic market place highly competitive; need publications to be considered for an academic appointment
  - Essential to have more publications in pipeline before starting an academic career
- Funding
  - Must have preliminary data before beginning to apply for grants
  - Postdoctoral position used to set the stage for future research

# Information

- Information in short supply
- Many students receive minimal information about career options when they decide to go to graduate school or start their graduate training; PhDs are stressed over MA degrees
- Many doctoral programs offer few seminars or workshops that provide students with information on careers other than those in academia
- Postdoctoral position often first time information concerning jobs becomes available and is talked about; many postdoctoral fellows even then are isolated and only get information from their PI
- PhD programs rarely post job outcomes on their Web pages
- Many faculty resist students seeking information regarding alternative careers; faculty are misinformed

# Alternative Jobs Are in Short Supply

- Number of PhDs has increased
- Demand has slowed
  - Funding for research flat
  - State support declining
  - Restructuring of research in industry—example of pharma and large chemical research labs
- Probability of finding position has declined

# Hard to Know When to Leave

*“You invested so much you can’t stop, just like the War in Viet Nam.”*

Loren Williams, Professor of Chemistry and Biochemistry,  
Georgia Institute of Technology



# Moving Forward

## Possible Solutions

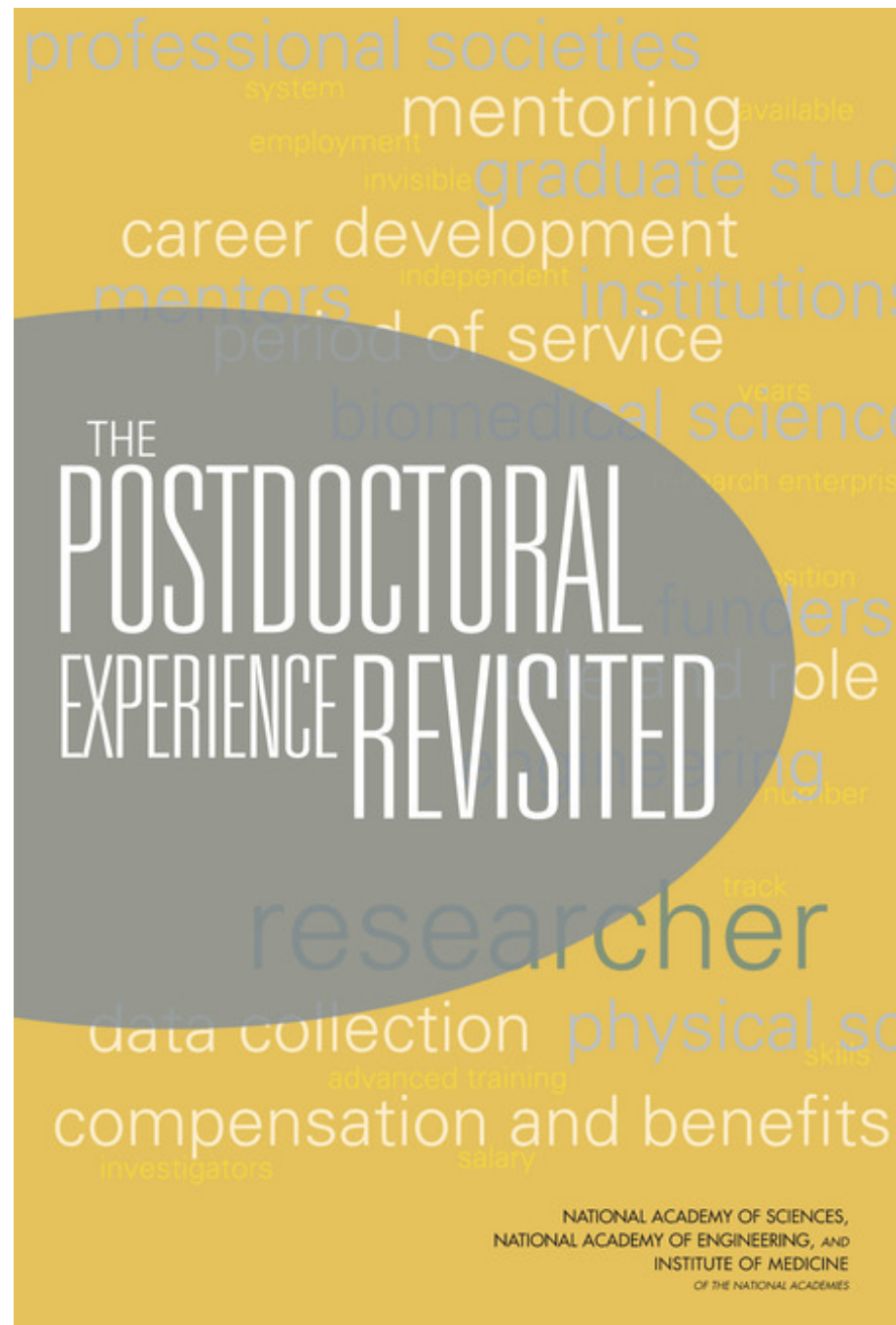
Cut Back Demand for Postdocs

Cut back Supply of Postdocs

## Cut Back Demand for Postdocs

- Discourage overreliance on postdocs—make costs reflect social cost
  - Raise salary and benefits significantly
- Encourage institutions and provide incentives for institutions to create more staff scientists positions

Focus on Salaries:  
One of 5 recommendation  
of the 2014 NAS Postdoctoral  
Report



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# Compensation\*

- “NIH should raise the NRSA postdoctoral starting salary to **\$50,000** (2014 dollars), and adjust it annually for inflation. Postdoctoral salaries should be appropriately higher where regional cost of living, disciplinary norms, and institutional or sector salary scales dictate higher salaries.”

\* Two of the committee members do not support the recommendation for a prescriptive “salary standard” based upon one particular field and funding agency.

# Salary Increase Recommendations

- Made for at least 16 years
- Little impact
- But as of last December 2016, salaries of postdoctoral researchers in the US were to have been raised on many campuses
- Why?
  - Not because of recommendations of committees
  - But because of change in federal law

# Exempt Employees

- Overtime pay (1.5 times hourly wage above 40 hours a week) not paid to **exempt employees**. To be exempt in past, had to earn more than \$23,660
- Most campuses paid at least this amount to postdocs
- But was to have changed: beginning December 2016 postdocs had to receive more than \$47,476 to be exempt
- Magically, universities were forced to either raise pay of postdoctoral fellows or carefully monitor hours
- Dept. of Labor said ruling also covers fellowship holders who are not employees
- NIH announced they would implement increase
- Federal judge issued an injunction delaying the increase in late November.
  - NIH went ahead and implemented;
  - [Future of Research](#) website shows that many universities that had announced they would raise salaries have stuck to recommendation although a number have rescinded the increase.

# Expected Effect

- Mandate came without funds: “Incidence” is on investigators and universities
  - Individual investigators fund (72%)
  - Departments: (45%)
  - Schools of Colleges (38%)
  - Other source (31%)
  - Centrally university (22%)
- No Federal pool of funds
- Should have long run effect of hiring fewer postdocs
- Make staff scientists relatively more attractive

Data are from Council on Governmental Relations Survey

# Take Note

- More funding would help but it does not address underlying issue of positive feedback in system
  - Increased funding is accompanied by increased training which is accompanied by increased demand for funding and postdocs; unstable system
- Need to address incentives that have allowed system to evolve to current situation

# Questions/Comments?

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