Economic Impacts of Research Activities

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ARC, February 11, 2016

Collaborators

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- John Ham, NU Singapore
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- Mikko Packalen, Waterloo

IRIS

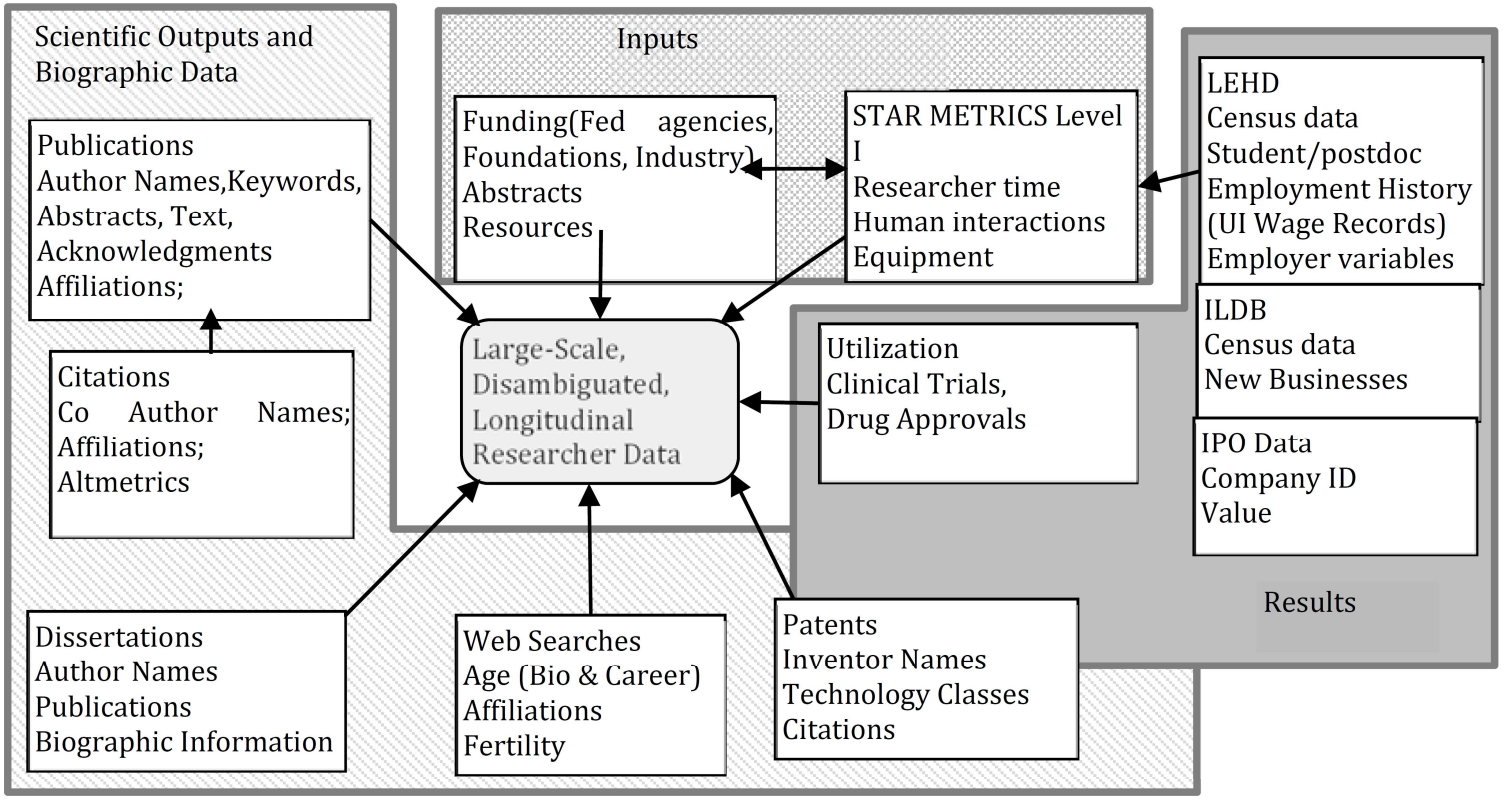
- Partnership with CIC and other Universities and Census
- Hub at the University of Michigan
- Nodes at OSU, NYU, and others planned

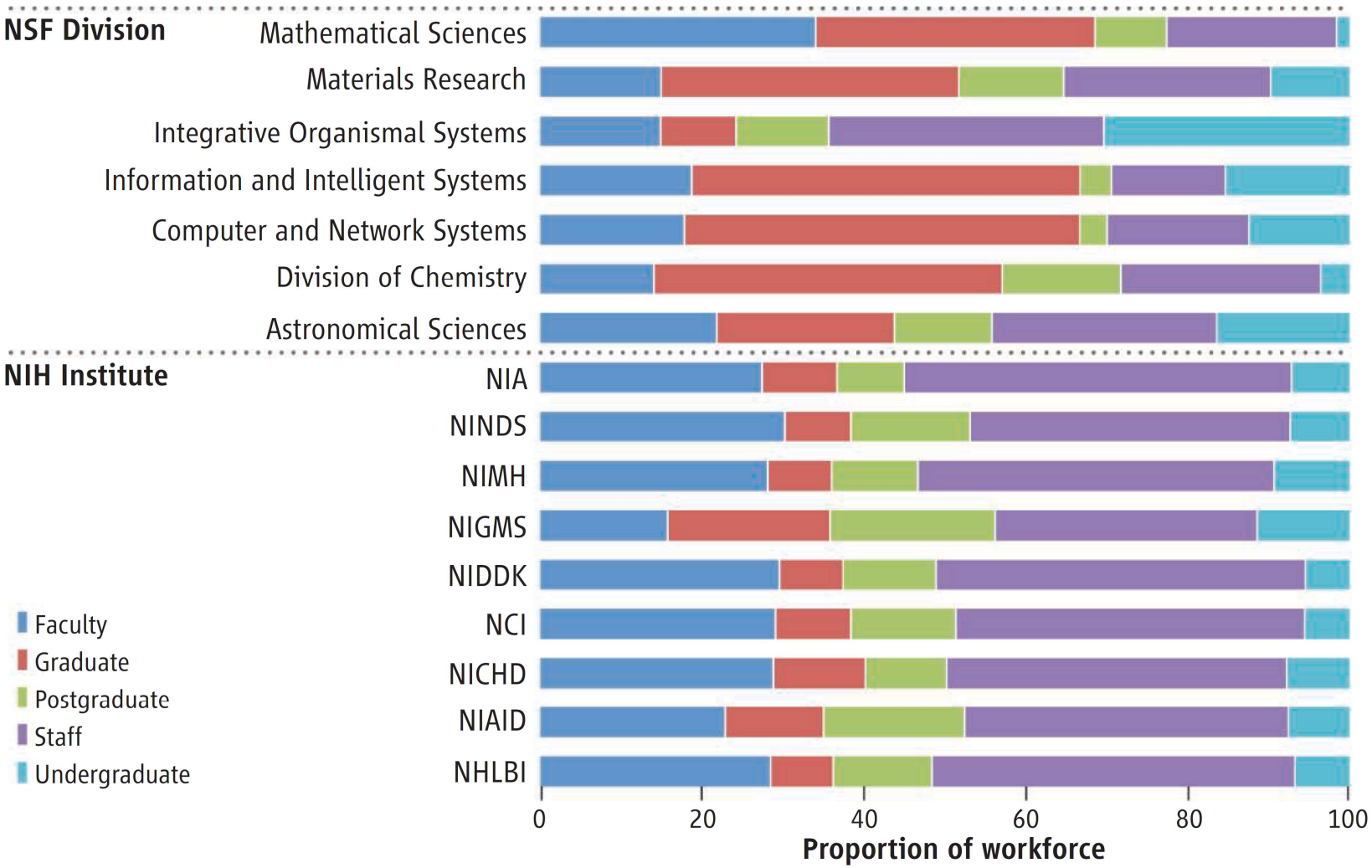
- Infrastructure supported by Sloan and Kauffman
- Support for related projects from NIA, NSF, SBA, USDA, USPTO

Accomplishments

- Policy article in *Science*, 2014
- Overview in *Research Policy*, 2015
  - Together lay out data
- Research article in *Science*, 2015
  - Placements / initial career outcomes
- Gender piece in *Am. Econ. Rev. P&P*, 2016
- Research article under review on vendors

Data Architecture





Differences in workforce composition in projects funded by NSF divisions and NIH institutes. NIA, National Institute on Aging; NINDS, National Institute of Neurological Disorders and Stroke; NIMH, National Institute of Mental Health; NIDDK, National Institute of Diabetes and Digestive and Kidney Diseases; NICHD, Eunice Kennedy Shriver National Institute of Child Health and Human Development; NIAID, National Institute of Allergy and Infectious Diseases; NHLBI, National Heart, Lung, and Blood Institute. (See SM.)

Zolas et. al. 2015

Table 1. Postgraduation employment of UMETRICS doctoral recipients who were paid by research grants and left the university between 2010 and 2012. The national workforce distribution is calculated from all employment in all establishments covered by the Census's LBD between 2010 and 2012.

	Doctoral recipients placed in sector (%)				
	Industry		Academia	Government	All
Locale and small	R&D firms	Non-R&D firms			
Placed within sector	17.0	21.7	57.1	4.1	100.0
National sample (*M*)	10.8	75.0	10.7	3.5	100.0
Of those in sector, percent placed:					
Within 50 miles	10.1	23.5	8.9	18.2	12.7
Within state	16.6	36.0	18.0	25.8	22.0

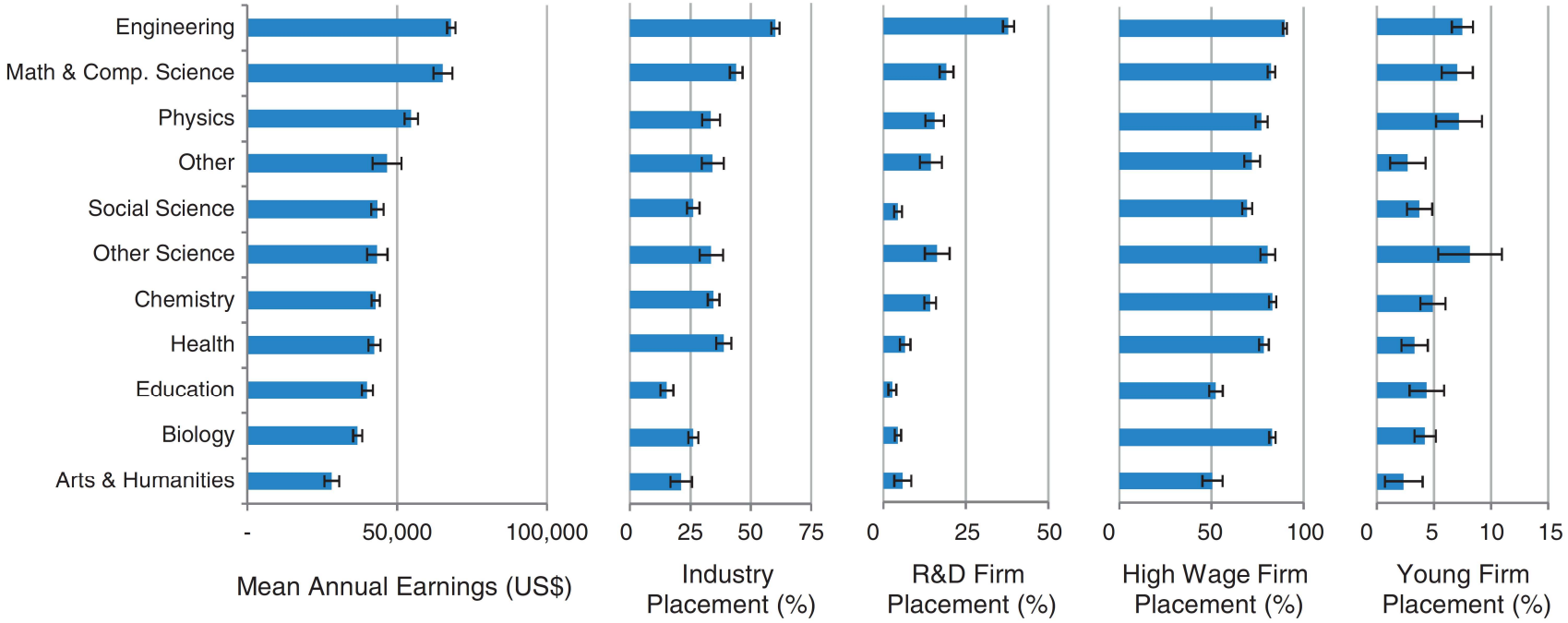


Fig. 3. The annual earnings and placement of doctoral recipients supported by grants vary by field. Young firm are defined to be those <5 years old. High–payroll per worker establishments are defined as those with a payroll per worker above the median for the establishments within their six-digit industry. Mean annual earnings are stated as U.S.$1 ×1000. Means and standard errors for each variable.

Goldschlag, et. al., 2015

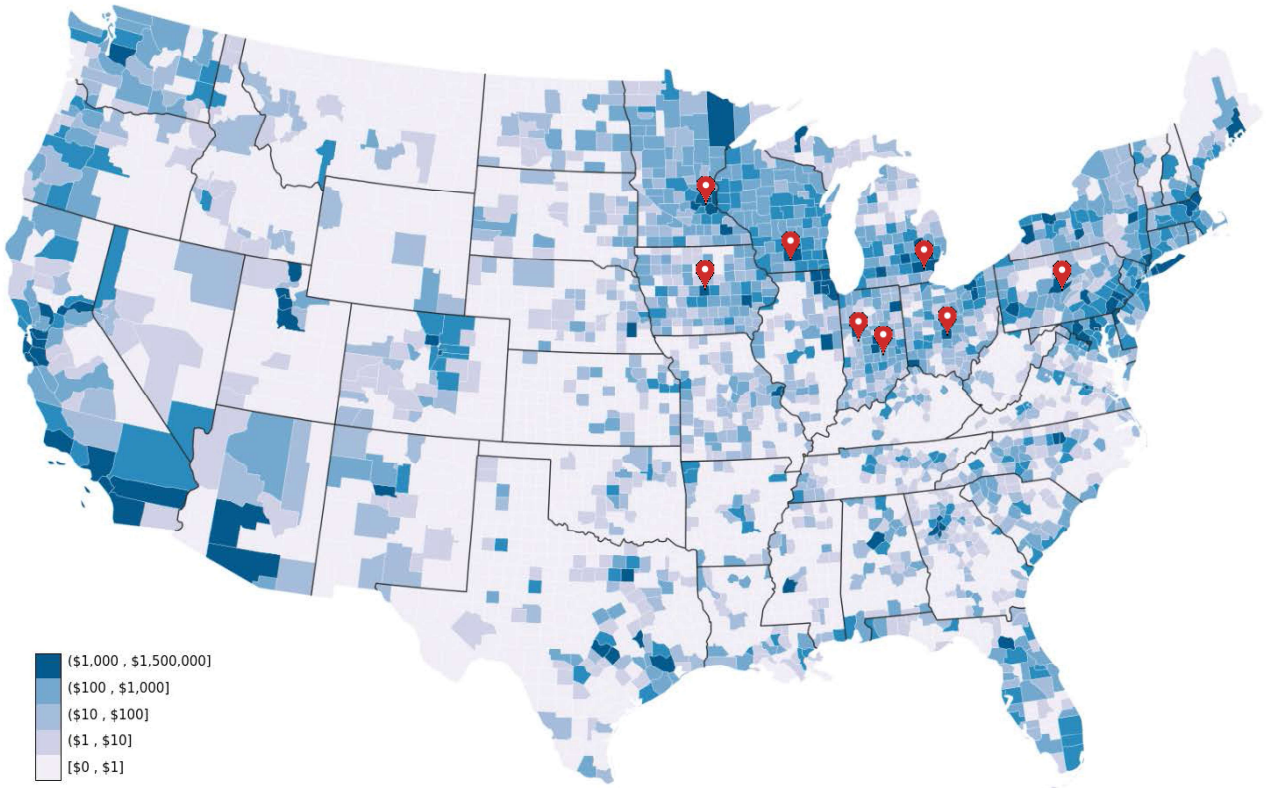


Figure 1a: The geographic distribution of vendor purchases in the US

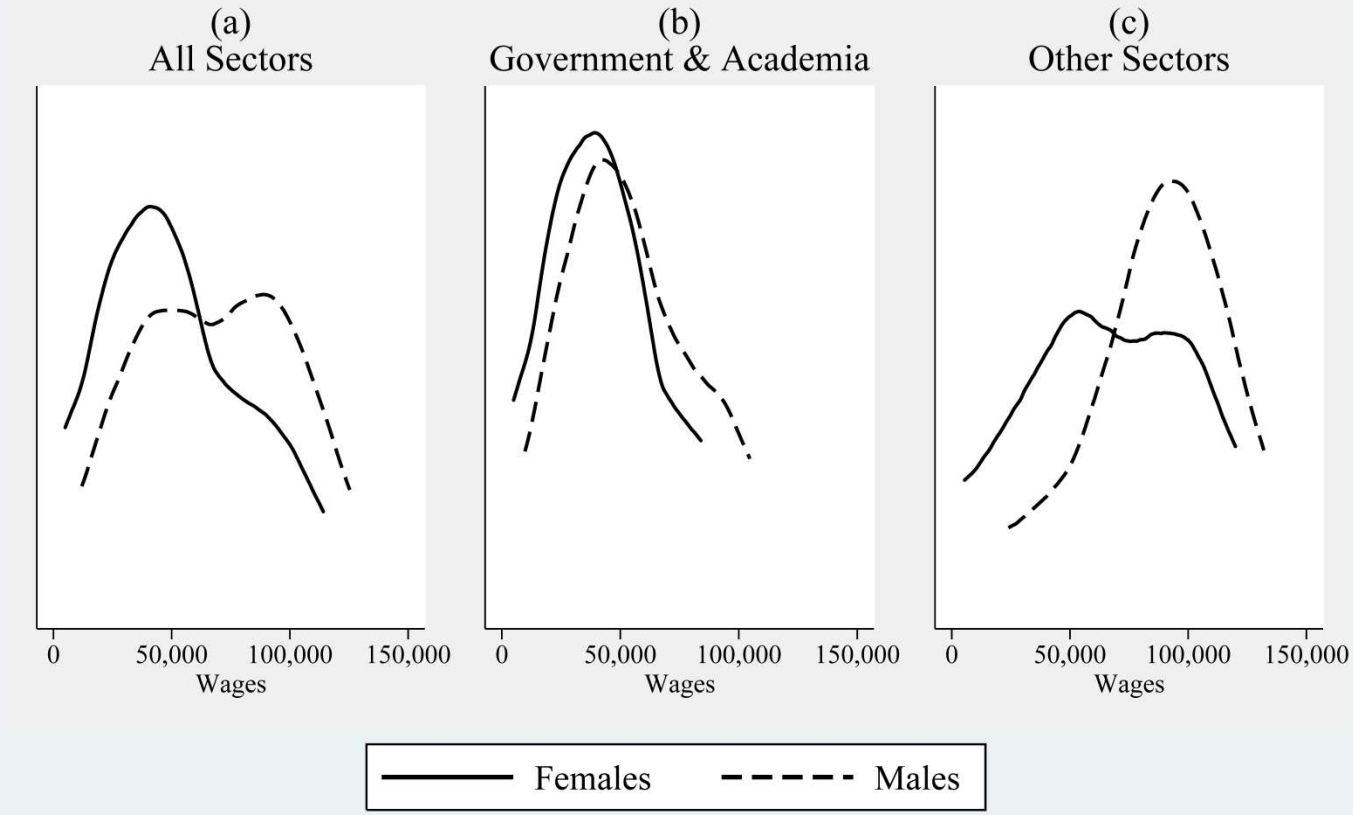
Networks for Vendors

Table 1: The probability that a purchase is made from a vendor in 2012						
	All Establishments			Establishments in R&D performing firms		
Purchase made in 2011	39.43***	34.55***		41.57***	36.28***	
	(0.0112)	(0.0121)		(0.0275)	(0.0297)	
Purchase made in 2010		14.88***			15.37***	
		(0.0140)			(0.0345)	
Purchase made on related grant			30.73***			32.59***
			(0.00956)			(0.0235)
Constant	0.0886***	0.0810***	0.0838***	0.127***	0.116***	0.120***
	(0.000394)	(0.000391)	(0.000398)	(0.00116)	(0.00115)	(0.00117)
Observations	76,070,722			12,711,182		
R-squared	0.140	0.153	0.120	0.154	0.167	0.133
The regressions include university-vendor indicators (fixed effects) to control for university contracts with specific vendors.						

Table 1. Training Environments of Male and Female Graduate Students Participating in STEM Research

		(1)		(2)	(3)	(4)	(6)	(7)	(8)
	(a)	(b)	(c)						
Dependent Variables ↓	Females	Males	Diff						
Share of Faculty that are Female	0.2	0.1	0.1***	0.1***	0.1***	0.1***	0.1***	0.1***	0.1*
	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Share of Graduate Students that are Female	0.1	0.1	0.0***	0.0***	0.0***	0.0	0.0	0.0	-0.0
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Ln Team Size	1.7	1.9	-0.2***	-0.2***	-0.2***	-0.1**	-0.1*	-0.1*	-0.1
	(0.04)	(0.03)	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.09)
Faculty to Student Ratio	0.9	0.6	0.3***	0.2***	0.2***	0.2***	0.1**	0.1*	0.3**
	(0.06)	(0.03)	(0.07)	(0.07)	(0.07)	(0.08)	(0.07)	(0.07)	(0.13)
Total Number of Awards	2.2	2.7	-0.5***	-0.3***	-0.3***	-0.2**	-0.2***	-0.2***	-0.1
	(0.07)	(0.06)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.15)
Number of Months Participating on the Award	21.0	21.6	-0.6	-1.1	-1.0	-1.0	-1.4*	-1.4*	-0.9
	(0.69)	(0.45)	(0.82)	(0.79)	(0.79)	(0.82)	(0.82)	(0.82)	(1.18)
Years from First Observation to Degree	3.2	3.2	-0.0	-0.1**	-0.1*	-0.1	-0.1**	-0.1**	0.0
	(0.08)	(0.06)	(0.10)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.10)
University, First Year Trend, Left-Censored				✓	✓	✓	✓	✓	✓
Race, Hispanic Origin, Age, Age-squared					✓		✓	✓	✓
Dissertation Topic						✓	✓	✓	✓
Funding Agency							✓	✓	✓
Married or Partnered, Children								✓	✓
Female x (Married or Partnered + Children)									✓
Observations	370	867	1,237	1,237	1,237	1,237	1,237	1,237	1,237

Earnings Distributions



Source: UMETRICS linked to 2010 Census, ProQuest, LEHD, W2, LBD, BR, and iLBD.
Note: Sample includes STEM students in the 2007−2010 graduating cohort. Wages are in 2012 dollars and are from one year following graduation or leaving the university payroll, whichever was later. The tails of the k−density plots and the bandwidth size are not displayed to satisfy confidentiality requirements.

Table 2. Labor Market Outcomes of Male and Female Graduate Students Participating in STEM Research

		(1)		(2)	(3)	(4)	(6)	(7)	(8)
	(a)	(b)	(c)						
Dependent Variables ↓	Females	Males	Diff						
Employed in Industry	0.40	0.5	-0.1***	-0.1***	-0.1***	-0.1	-0.1	-0.0	-0.0
	(.022)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
Ln Wage	10.50	10.9	-0.4***	-0.3***	-0.3***	-0.1**	-0.1*	-0.1*	0.0
	(.063)	(0.03)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.10)
Ln Wage (with Industry Controls)	10.40	10.7	-0.3***	-0.3***	-0.3***	-0.1*	-0.1	-0.1	0.0
	(.057)	(0.04)	(0.07)	(0.07)	(0.06)	(0.07)	(0.06)	(0.07)	(0.10)
University, First Year Trend, Left-Censored				✓	✓	✓	✓	✓	✓
Degree Year				✓	✓	✓	✓	✓	✓
Race, Hispanic Origin, Age, Age-squared					✓		✓	✓	✓
Dissertation Topic						✓	✓	✓	✓
Funding Agency							✓	✓	✓
Married or Partnered, Presence of Children								✓	✓
Female x (Married or Partnered + Children)									✓
Observations	318	731	1,049	1,049	1,049	1,049	1,049	1,049	1,049

Future Work

- Look at authorship on publications
- Identify best features of training environments
- Decisions to enter industry / entrepreneurship
- How networks affect outcomes