



Federal Grant Coverage of Females in STEM: Evidence from STARMETRICS Data linked to the 2010 Census

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Females are underrepresented in STEM

- Di Fabio et al (2008): Females represent 57 percent of undergraduate degrees awarded across all fields, but only:
 - 25.1 percent in Computer Science
 - 21.4 percent in Physics
 - 20.5 percent in Engineering
- Underrepresentation becomes increasingly more pronounced at the graduate, post-graduate, and faculty levels (NSF-NCSES, 2013)



Research questions

1. Do males' and females' average number of awards differ?
 - Do the differences change with the stage of one's career?
2. Does the amount of an award vary with the sex-composition of a faculty research team?
3. Are the differences in the distribution of male and female graduate students across federally funded research awards associated with differences in degree completion?



Data

- UMETRICS (1999-2014)
 - STARMETRICS
 - University Employee Payroll Data
 - 5 major research universities
 - Payees of federal research awards
 - ▶ NIH, NSF, USDA, DOE, NASA
 - 2014 ProQuest Dissertation Data
- 2010 Census
- Linked by Protected Identification Key (PIK)



Linking employee data to 2010 Census

- When DOB is not present in university data, use IRS W-2 records along with:
 - Employee name
 - Place of residence (within 200 mile radius of university)
 - Place of employment (university) for a given year

Presence of DOB improves PIK assignment

PIK rates by university for all employees, all years			
University	Number of Employees	Number of Employees Assigned a PIK	PIK Assignment Rate
DOB absent			
A	9,543	7,642	80.1
B	25,128	20,260	80.6
C	7,255	6,548	90.3
Subtotal	41,926	34,450	82.2
DOB present			
D	27,248	26,430	97.0
E	23,761	23,698	99.7
Subtotal	51,009	50,128	98.3
Total	92,935	84,578	91.0

Source: STARMETRICS Employee data processed by the Person Validation System.

Overall match rates

Results of matching employees to 2010 Census		
	Count	Percent
University employees with a PIK	84,578	100.0
Matched to 2010 Census	68,535	81.0
In Housing Unit	62,338	91.0
In Group Quarters	6,197	9.0

Source: STARMETRICS employee data (all years) linked to the 2010 Census

Demographic Characteristics

2010 Census characteristics of university employees, all years and occupations

	Matched employee data	QWI
Percent Female	47.7	50.0
Graduate Student	40.6	
Faculty	32.6	
Percent Black or African American Alone	3.1	6.0
Graduate Student	3.5	
Faculty	2.2	
Percent Hispanic	3.9	22.1
Graduate Student	4.9	
Faculty	3.0	

Source: STARMETRICS employee data linked to 2010 Census, Census QWI explorer (<http://qwiexplorer.ces.census.gov>) 2010Q2, states with STARMETRICS institutions

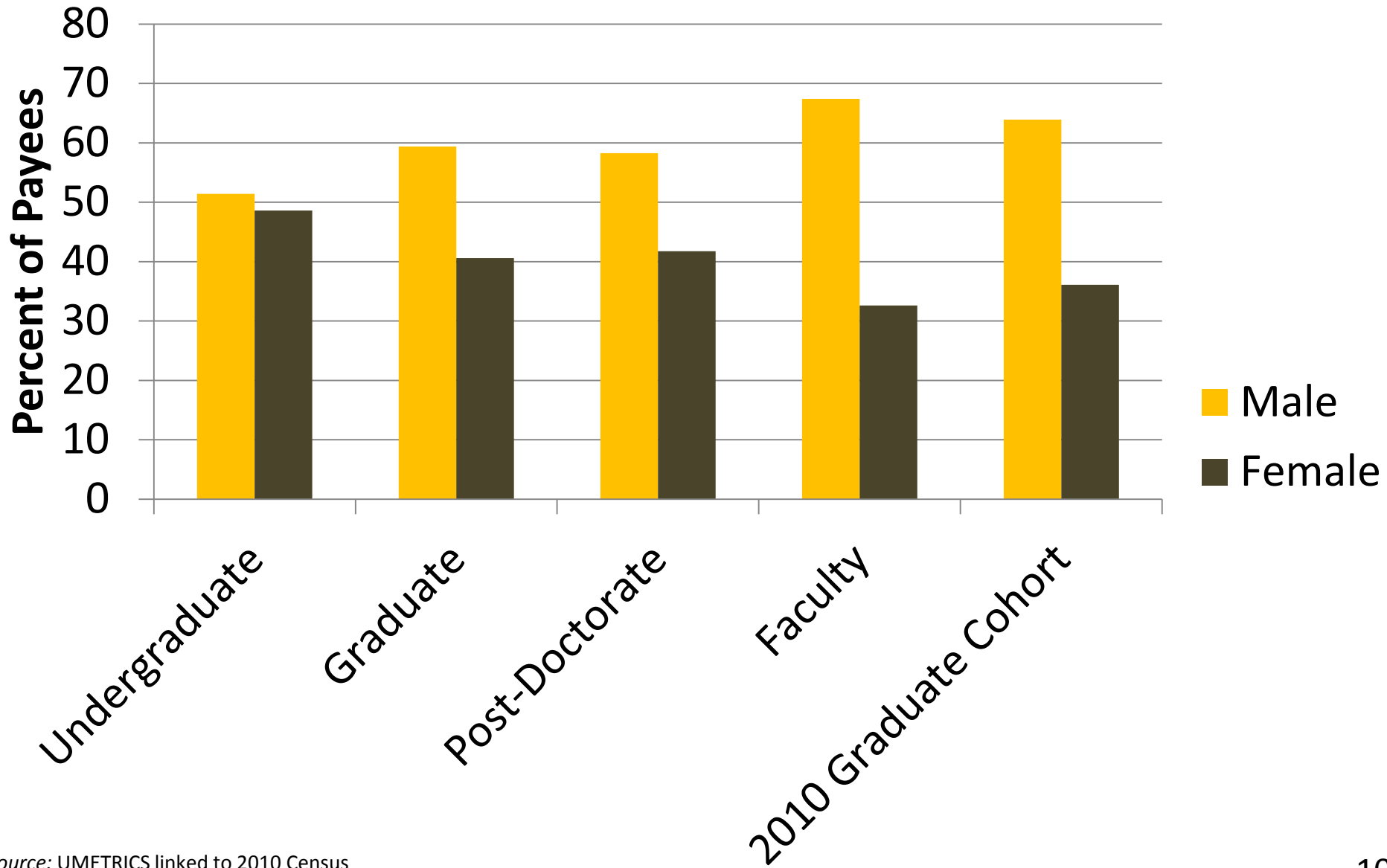


Additional restrictions for analysis

- Number of employees matched to Census: 68,535
- Keep only those who participated in federally funded research during 2008-2014
- Keep only researchers participating in NIH or NSF awards
- Universe after restrictions: 65,751

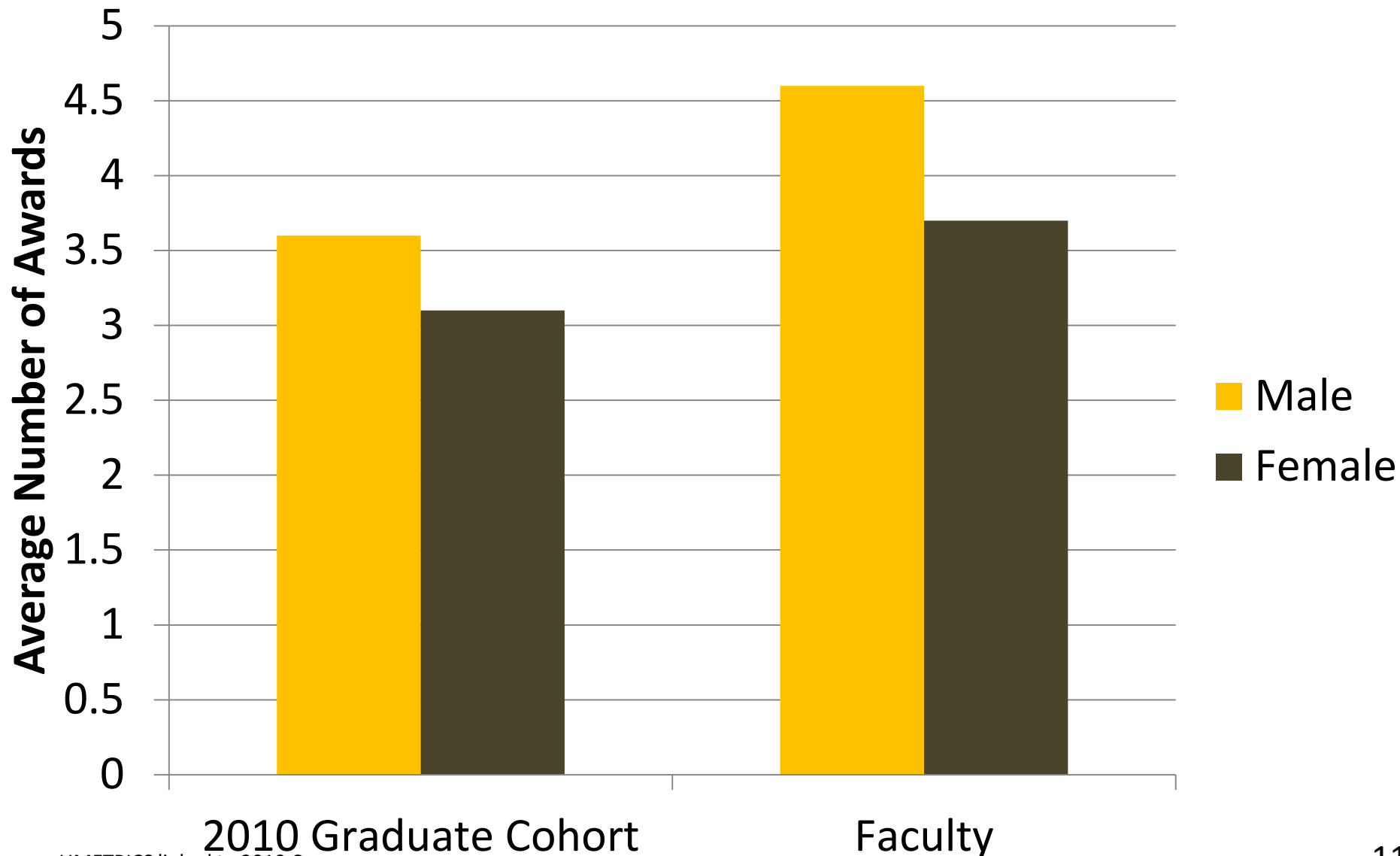


Attrition is evident among federal grant payees

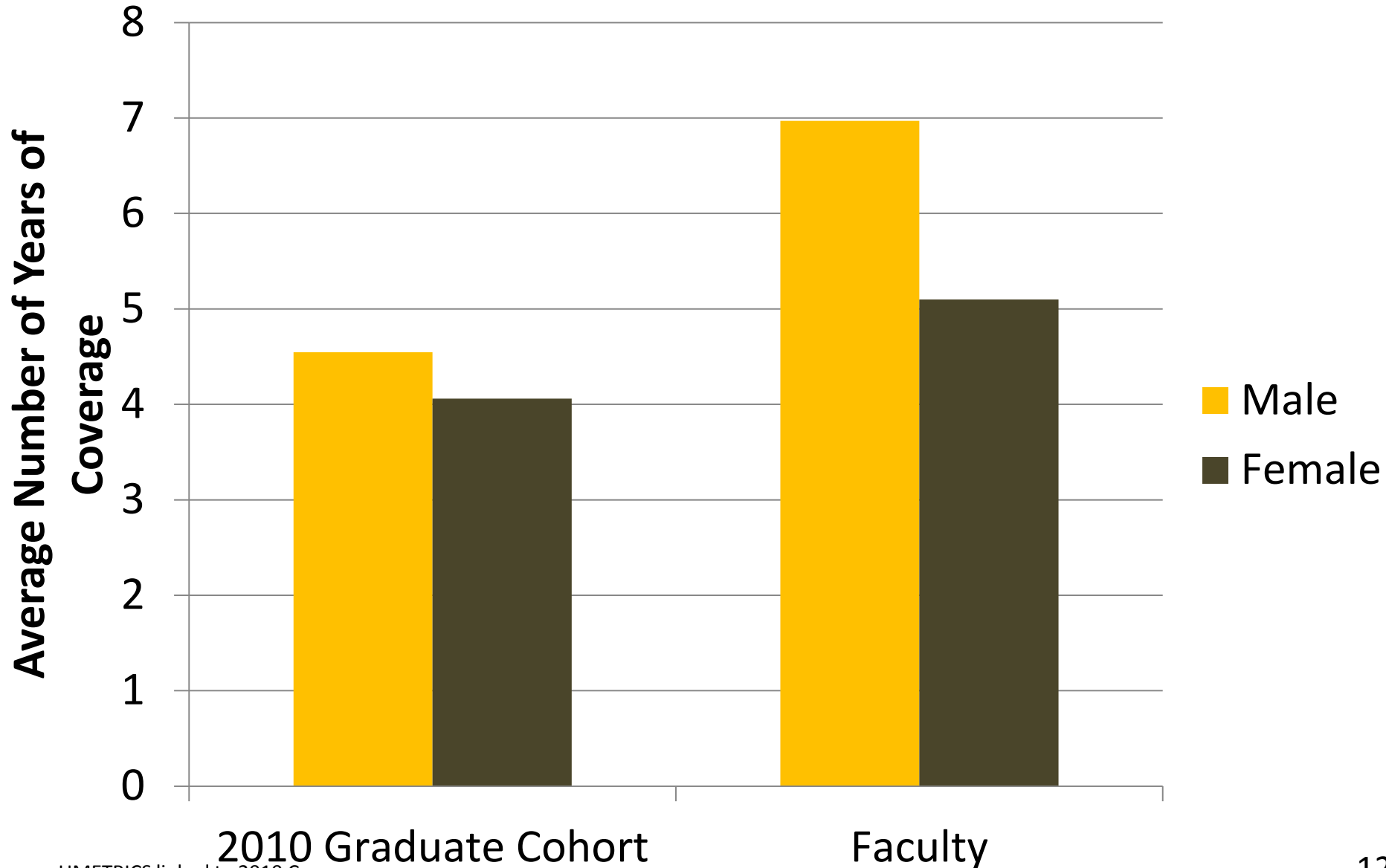


Source: UMETRICS linked to 2010 Census

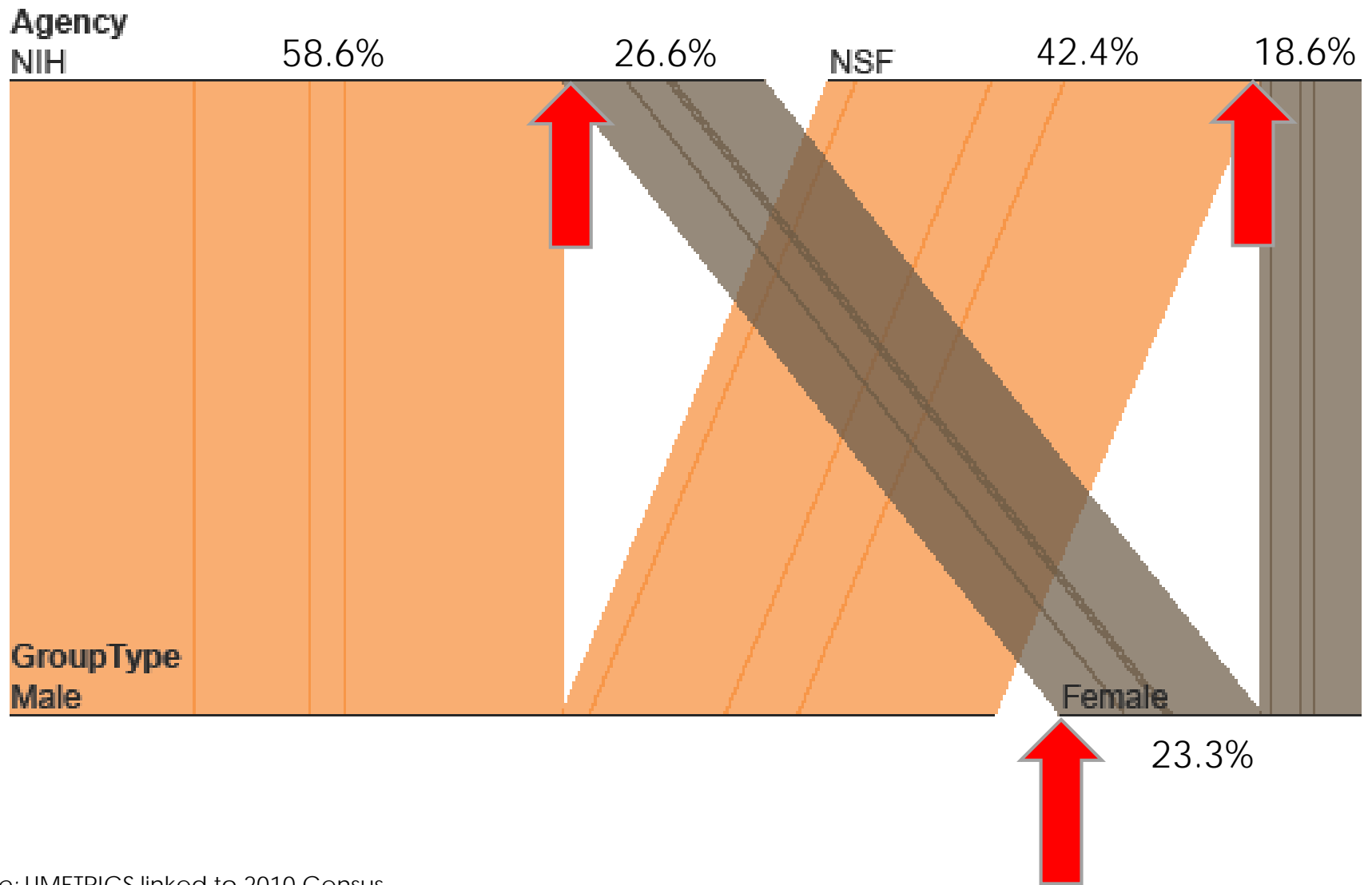
Females participate in fewer federally funded research projects (2008-2014)



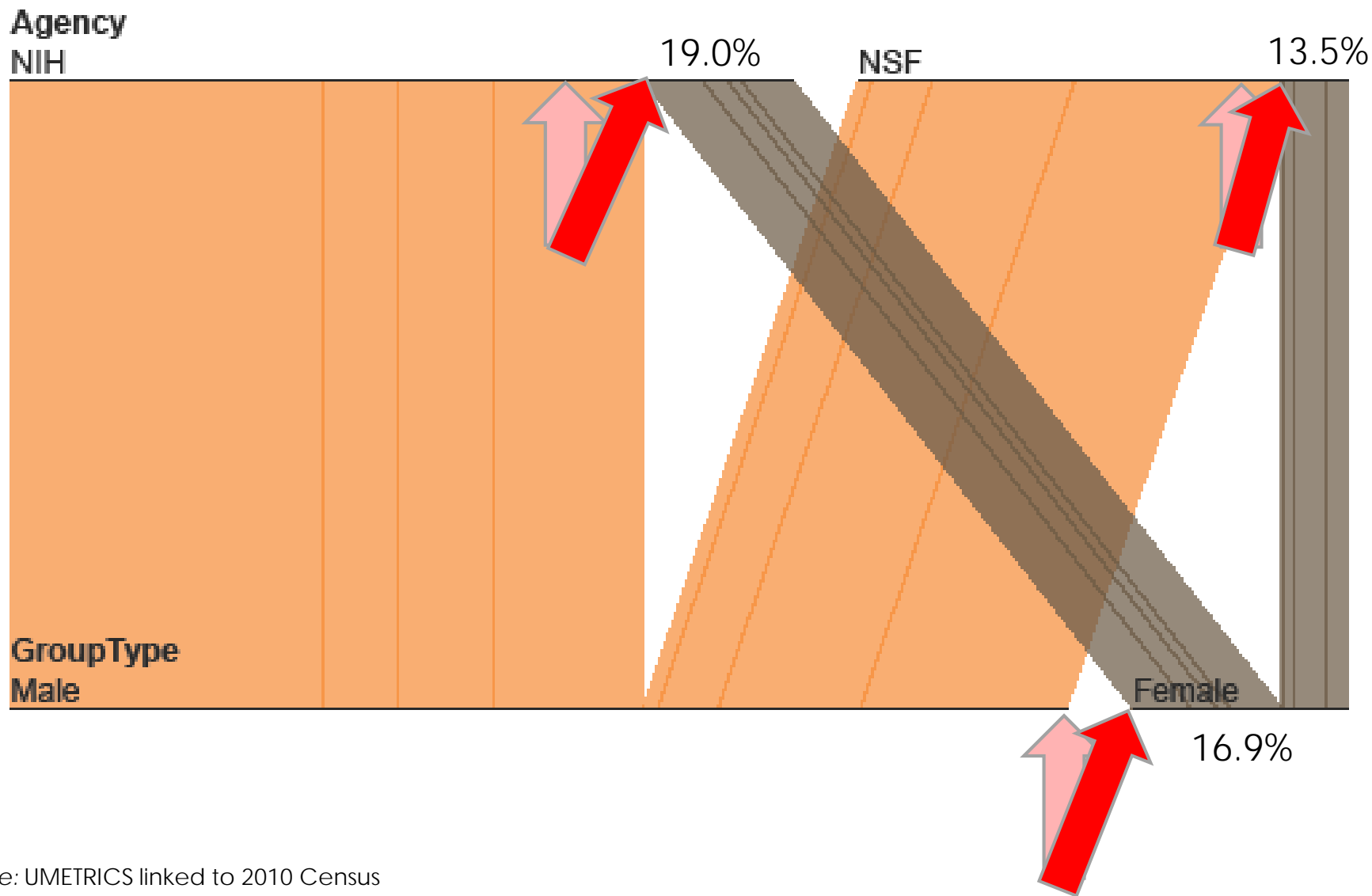
Females spend less time participating in federally funded research (2008-2014)



Female faculty's share of awards

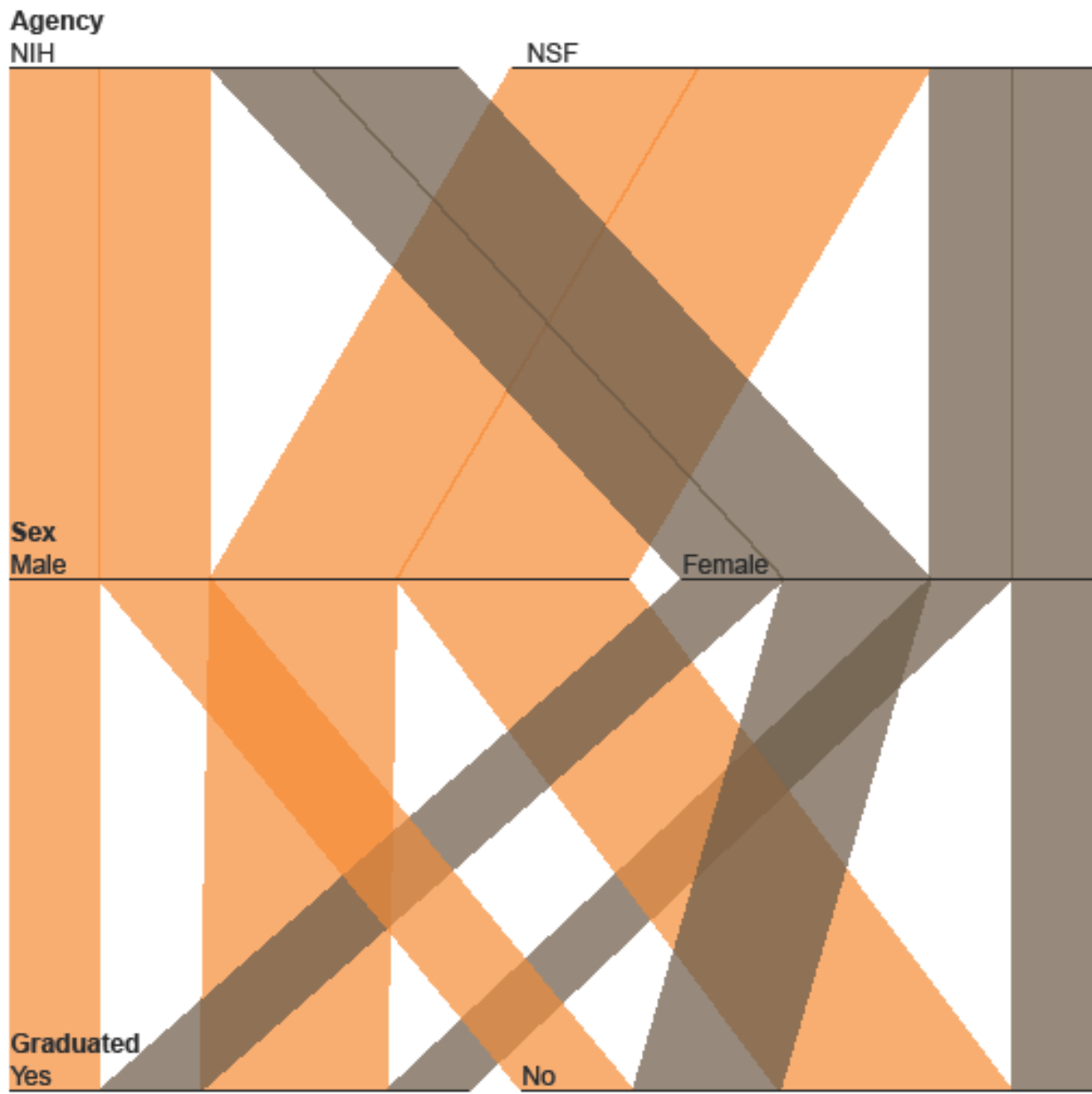


Female faculty's share of awards is larger than their share of award dollars



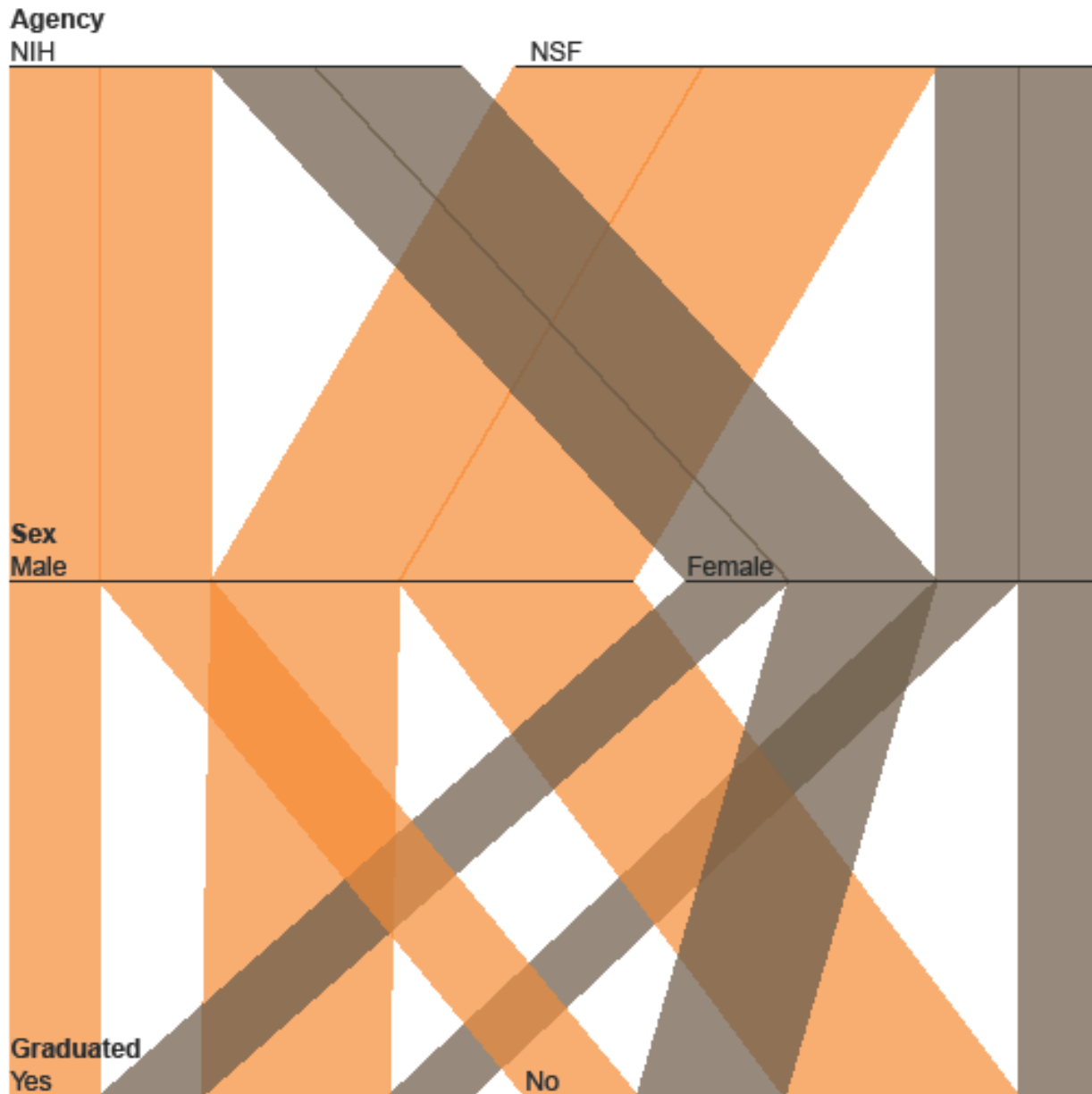


Award shares differ by agency, 2010 Cohort





But graduation rates appear unaffected



Summary

- Female researchers participate in fewer and shorter federally funded research projects than male researchers
 - These differences are larger for faculty researchers than for a cohort of graduate students
- Among faculty researchers working alone, female researchers receive a disproportionately small share of federal award dollars
- Among a synthetic cohort of graduate students, graduation rates do not appear to be related to amount or source of funding

Thank you!

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