Gender Differences in Field of Specialization and Placement Outcomes among Ph.D. in Economics

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Questions of Interest

- Do gender differences in field of specialization among recent (2010-2017) Ph.D. candidates account for gender disparities in job placement?
  - Academic vs. non-academic
  - Top-ranked schools vs. lower ranked schools
  - Research vs. non-research organizations/private sector employers

- We observe significant gender disparities in job placement, in particular a male advantage in placement as
  - Assistant-Professor positions in top 50 schools
  - Economist positions in Central Banks (CM) and Multilateral Development Banks (MDB), where publishing research is rewarded

Questions of Interest

- We observe significant gender differences in field of specialization consistent with
- Another case of “the importance of money vs. people” (Fortin, 2008)?
  - Men gravitating to fields pertaining to money (finance/business/monetary economics?
  - Women crowding into few traditionally-female fields (e.g., health, education, labor, development) with a high social contribution?
- And with a workplace climate/cultural issue?
  - Women averting some male-dominated fields (e.g., metrics, macroeconomics) ?
- We do not formally seek to explain the origin of those differences, but we provide suggestive evidence

Main Findings

- Our parsimonious set of variables
  - Fields of specialization, ranking of Ph.D. Institution (4 cat), long Ph.D. (7+ years)
  - can account for 28% to 67% of the gender gap in placement outcomes
- As a portion of the explained gap, gender differences in fields of specialization account for the entirety of the female under-representation in assistant-professor positions, outside of top 50 institutions
- For top 50 institutions, the applicants' PhD institution, in particular coming from a top 10 institution, has more explanatory power than their field of specialization.
  - Findings are consistent with notion that top institutions hire top applicants irrespective of field.

Literature - Context

- General concern about “Women in Economics: Stalled Progress” (Ginther and Kahn, 2004; Lundberg and Stearns, 2019),
  - Latter is one article among 18 in the book “Women in Economics”
  - Representation in the US is actually lower than in Europe (Auriol, Friebel, and Wilhelm, 2019)
- Boustan and Langan (2019) utilize CSWEP data on graduates of 88 PhD programs in the United States from 1994 to 2017, together with hand-collected faculty rosters data from PhD-granting economics departments.
  - They find that departments with better outcomes for women have more women faculty, facilitate advisor-student contact, provide collegial research seminars, and include senior faculty with increased awareness of gender issues.

Data

- Job Applicants
  - Close to 5,000 Economics Ph.D. graduates who sought employment on Econ Job Market (EJM) between 2010 and 2017
  - graduated from 82 North-American institutions ranked among the top 200 in the RePec Rankings

- Two sources of Fields of specialization
  - Applicants' name matched to the yearly December JEL list of Ph.D. graduates
  - Applicants' first self-declared field of specialization on their job application posted on the EJM website

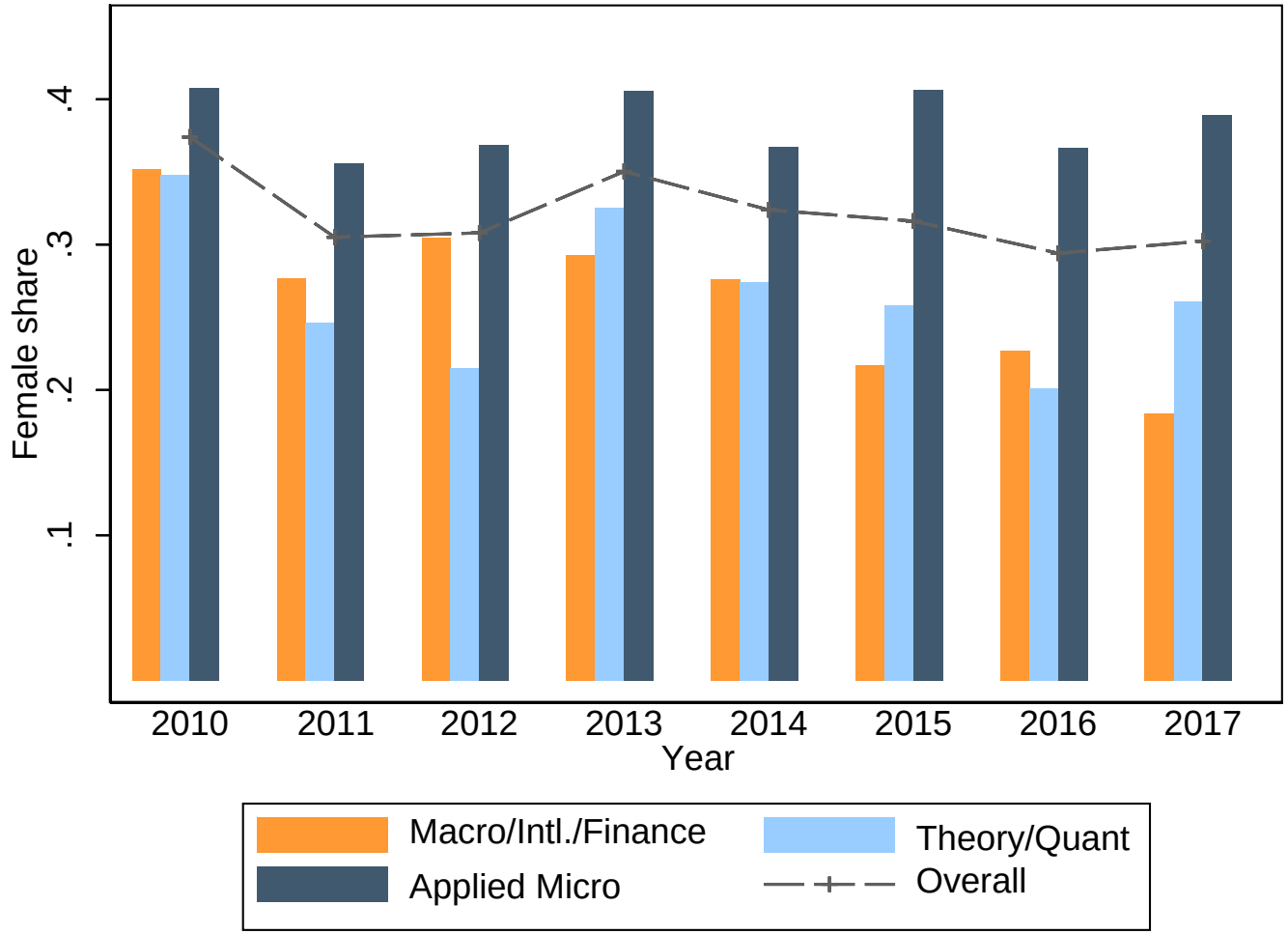
Data

- Placement outcomes
  - First permanent placement following Ph.D. studies (Fresh Ph.D.s)
  - from web search of Ph.D. graduates (CVs and employer's posting) and placement lists of 64 institutions on our list
  - Positions: assistant-professor (by various tiers of school rankings), teaching stream academic positions, post-docs, non-academic research positions, private sector economist, etc.
  - Employer: Institution, department, or employer

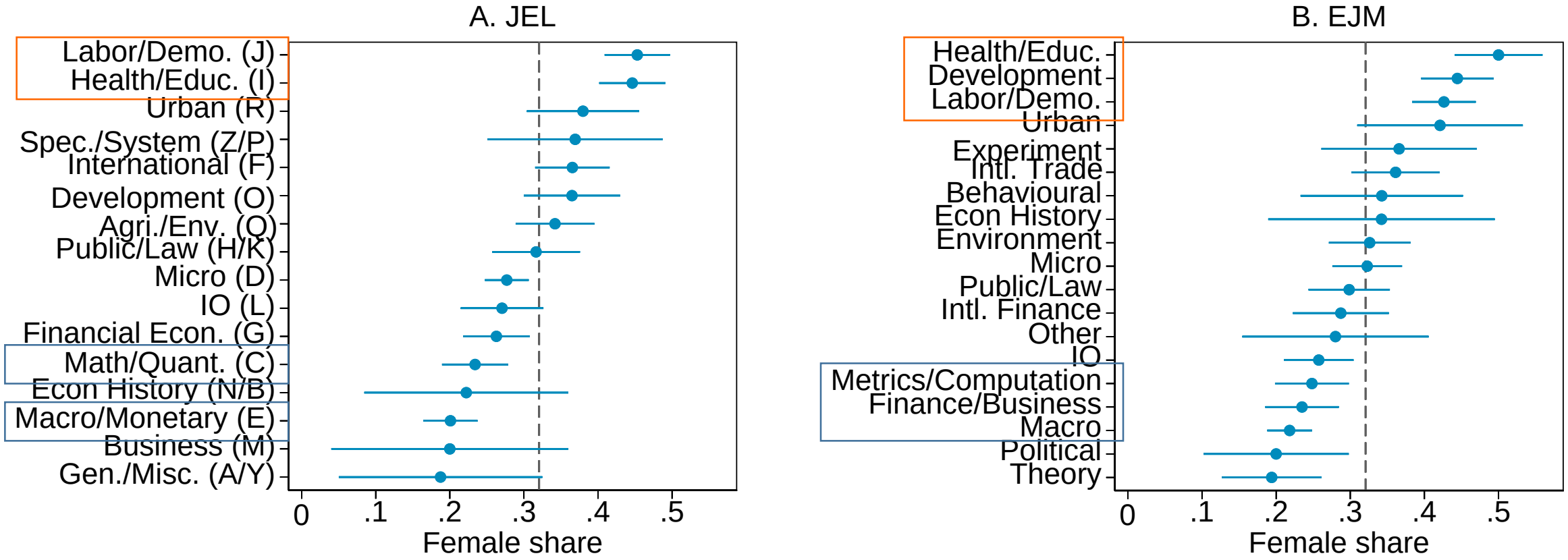
- Gender: either self-declared variable, or perceived gender as declared by others (she/her/hers), or using naming algorithms with non-gender-neutral names, or as assessed in photos

Concentration of Women across Major Areas

Overall 32.1% of applicants are female



Share of Women across Fields of Specialization: another case of the importance of money vs. people (Fortin, 2008)



Differences in Women's Responses to the AEA Climate Survey across Primary Field of Research

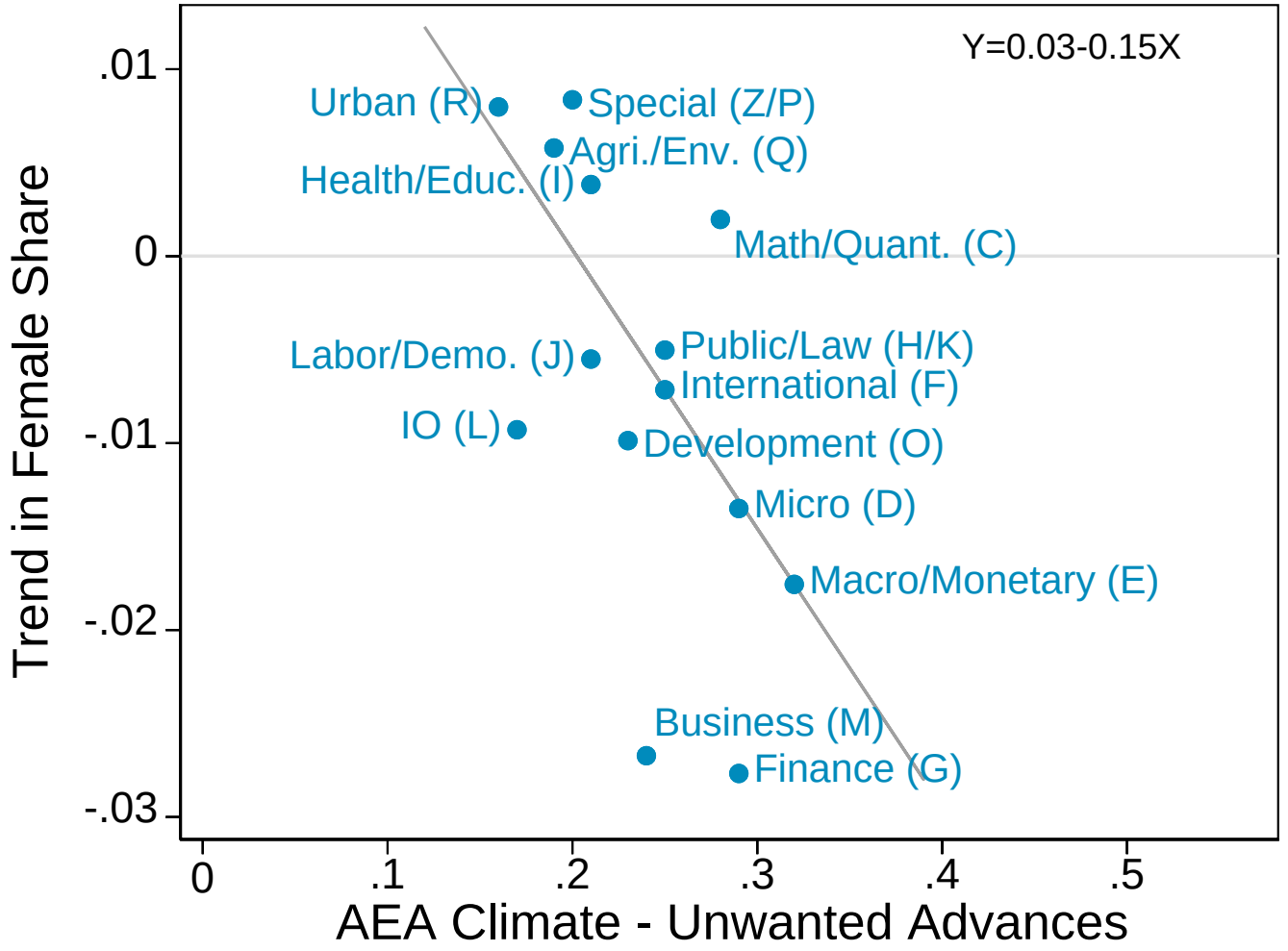
Table 12 (Extract)

Sample:	Women only					
	Unwanted advances	Threatened with retaliation	Stalked	Attempted Assault	Assaulted	Other touching
Field:						
Agricultural and Natural Resource Economics / Environmental Economics	0.19	0.07	0.11	0.06	0.02	0.14
Business Administration/Business Economics	0.24	0.05	0.08	0.05	0.03	0.16
Economic Development, Innovation, Technical Change, and Growth	0.23	0.04	0.09	0.05	0.01	0.09
Economic History	0.23	0.03	0.26	0.05	0.05	0.23
Financial Economics	0.29	0.09	0.13	0.12	0.08	0.15
General Economics and Teaching	0.22	0.09	0.16	0.05	0.03	0.06
Health, Education and Welfare	0.21	0.05	0.06	0.03	0.02	0.11
Industrial Organization	0.17	0.07	0.13	0.04	0.01	0.15
International Economics	0.25	0.08	0.11	0.08	0.03	0.12
Labor and Demographic Economics	0.21	0.06	0.08	0.06	0.03	0.16
Macro and Monetary Economics	0.32	0.14	0.20	0.08	0.03	0.16
Mathematical and Quantitative Methods	0.28	0.09	0.16	0.09	0.03	0.06
Microeconomics	0.29	0.10	0.14	0.06	0.04	0.19
Public Economics	0.25	0.09	0.12	0.07	0.03	0.08
Urban Economics	0.16	0.14	0.06	0.03	0.03	0.14
Other	0.20	0.06	0.09	0.05	0.02	0.13

Unwanted advances: Another economist or economics student made unwanted attempts to establish a dating, romantic, or sexual relationship with you despite your efforts to discourage it

Source: AEA Climate Survey (2019)

Within-field Trend in Female Share is correlated with AEA Climate survey variable



Note: For clarity, the figure truncates Economic History and General/Teaching, whose female trends are 0.06 and 0.04 respectively; these are relatively sparse fields.

Gender Differences in the Distribution of Placement Outcomes (Proportions)

	(1) Asst Prof	(2) CB/MDB	(3) Lecturer	(4) Post-Doc	(5) Other (Non-Acad)
Male	49.921***	11.499***	8.640***	9.708***	20.484***
	(0.886)	(0.565)	(0.498)	(0.525)	(0.715)
Female	46.405***	8.921***	8.855***	11.784***	24.234***
	(1.287)	(0.736)	(0.733)	(0.832)	(1.106)
Difference:	3.517**	2.577***	-0.215	-2.076**	-3.751***
(Male - Female)	(1.563)	(0.928)	(0.886)	(0.984)	(1.317)
% of Overall	7.2%	24.1%	-2.5%	-20.0%	-17.3%

Note: Note: Sample comprises 4,685 applicants in 2010-17, including 3,183 males and 1,502 females. The percentage gender difference is computed with reference to the sample average. Robust standard errors in parentheses (* p<0.1, ** p<0.05, *** p<0.01).

Gender Differences in the Distribution of Placement Outcomes (Proportions)

	(1) Asst Prof	(2) CB/MDB	(1) +(2) Research	(1)' +(2)' Top 50 Research	(3) Lecturer	(4) Post-Doc	(5) Other (Non-Acad)
Male	49.921***	11.499***	61.420***	15.269***	8.640***	9.708***	20.484***
	(0.886)	(0.565)	(0.863)	(0.638)	(0.498)	(0.525)	(0.715)
Female	46.405***	8.921***	55.326***	11.451***	8.855***	11.784***	24.234***
	(1.287)	(0.736)	(1.283)	(0.822)	(0.733)	(0.832)	(1.106)
Difference:	3.517**	2.577***	6.094***	3.817***	-0.215	-2.076**	-3.751***
(Male - Female)	(1.563)	(0.928)	(1.546)	(1.040)	(0.886)	(0.984)	(1.317)
% of Overall	7.2%	24.1%	10.2%	27.2%	-2.5%	-20.0%	-17.3%

Note: Note: Sample comprises 4,685 applicants in 2010-17, including 3,183 males and 1,502 females. The percentage gender difference is computed with reference to the sample average. Robust standard errors in parentheses (* p<0.1, ** p<0.05, *** p<0.01).

Gender Differences in "Quality" Indicators as Explanatory Variables

	(1)	(2)	(3)	(4)	(5)
		Ph.D. Institution			
	Ph.D 7 + years	Top 10	Top 12-50	Top 51-100	Top 100+
Male	0.101***	0.297***	0.321***	0.200***	0.182***
	(0.005)	(0.008)	(0.008)	(0.007)	(0.007)
Female	0.099***	0.233***	0.314***	0.221***	0.232***
	(0.008)	(0.011)	(0.012)	(0.011)	(0.011)
Difference:	0.002	0.064***	0.007	-0.021	-0.050***
(Male - Female)	(0.009)	(0.014)	(0.015)	(0.013)	(0.013)
% of Overall	2.0%	21.5%	2.2%	-10.5%	-27.5%

Note: Note: Sample comprises 4,685 applicants in 2010-17, including 3,183 males and 1,502 females. The percentage gender difference is computed with reference to the sample average. Robust standard errors in parentheses (* p<0.1, ** p<0.05, *** p<0.01).

Methodology: Regression-Compatible Oaxaca-Blinder Decomposition (Fortin, 2008)

- Estimate a pooled regression, where a female dummy F is thought to capture discrimination effects,

$$Y_i = \beta_0^* + \delta_f F + X_i' \beta^* + \varepsilon_i$$

leaving the returns (β_0^*, β^*) relatively 'uncontaminated'.

- Letting $\Delta\bar{X} = \bar{X}_M - \bar{X}_F$, we have

$$\overline{Y_M} - \overline{Y_F} = \Delta\bar{X}\hat{\beta}^* - \widehat{\delta_f}$$

  - The first term captures the impact of differences in the average characteristics of men and women, evaluated at the reference returns β^*
  - The last term corresponds to unexplained part.

Decomposition Results: Field of Specialization

	(1) Asst Prof	(2) CB/MDB	(1) +(2) Research	(1)' +(2)' Top 50 Research	(3) Lecturer	(4) Post-Doc	(5) Other (Non-Acad)
Total Explained	1.304***	1.722***	3.026***	2.577***	-0.908***	-0.573**	-1.539***
	(0.462)	(0.335)	(0.504)	(0.430)	(0.260)	(0.281)	(0.412)
Research Field	1.352***	1.292***	2.643***	0.939***	-0.481**	-0.758***	-1.384***
	(0.419)	(0.311)	(0.461)	(0.260)	(0.219)	(0.256)	(0.374)
% Explained by Fields	104%	75%	87%	36%	53%	132%	90%
JEL Field[a]	1.058***	-0.135	0.923**	0.058	0.011	-0.222	-0.725**
	(0.409)	(0.245)	(0.391)	(0.253)	(0.212)	(0.211)	(0.341)
EJM Field[a]	0.293	1.426***	1.720***	0.881***	-0.492**	-0.535**	-0.660*
	(0.420)	(0.309)	(0.468)	(0.271)	(0.236)	(0.260)	(0.385)
Total Unexplained	2.213	0.855	3.068**	1.24	0.693	-1.503	-2.211*
	(1.586)	(0.913)	(1.554)	(1.012)	(0.914)	(0.992)	(1.318)

Note: Note: Sample comprises 4,685 applicants in 2010-17, including 3,183 males and 1,502 females. Also included Ph.D. Insitutions ranking, long Ph.D. and market year dummies. Robust standard errors in parentheses (* p<0.1, ** p<0.05, *** p<0.01). [a] sub-component of "Research Field".

Decomposition Results: Field of Specialization

	(1) Asst Prof	(2) CB/MDB	(1) +(2) Research	(1)' +(2)' Top 50 Research	(3) Lecturer	(4) Post-Doc	(5) Other (Non-Acad)
Total Explained	1.304***	1.722***	3.026***	2.577***	-0.908***	-0.573**	-1.539***
	(0.462)	(0.335)	(0.504)	(0.430)	(0.260)	(0.281)	(0.412)
Research Field	1.352***	1.292***	2.643***	0.939***	-0.481**	-0.758***	-1.384***
	(0.419)	(0.311)	(0.461)	(0.260)	(0.219)	(0.256)	(0.374)
% Explained by Fields	104%	75%	87%	36%	53%	132%	90%
JEL Math and Quant (C) [a]	0.737**	0.041	0.778**	0.105	-0.292	-0.175	-0.425
	(0.361)	(0.123)	(0.357)	(0.196)	(0.229)	(0.224)	(0.289)
EJM Macro-economics[a]	1.518*	1.633***	3.151***	1.676***	-0.489	-0.531	-2.124**
	(0.881)	(0.286)	(0.984)	(0.337)	(0.703)	(0.673)	(0.955)
Total Unexplained	2.213	0.855	3.068**	1.24	0.693	-1.503	-2.211*
	(1.586)	(0.913)	(1.554)	(1.012)	(0.914)	(0.992)	(1.318)

Note: Note: Sample comprises 4,685 applicants in 2010-17, including 3,183 males and 1,502 females. Omitted Field is Business. Also included Ph.D. Insitutions ranking, long Ph.D. and market year dummies. Robust standard errors in parentheses (* p<0.1, ** p<0.05, *** p<0.01). [a] sub-component of "Research Field".

Decomposition Results: "Quality Indicators"

	(1) Asst Prof	(2) CB/MDB	(1) +(2) Research	(1)' +(2)' Top 50 Research	(3) Lecturer	(4) Post-Doc	(5) Other (Non-Acad)
Total Explained	1.304***	1.722***	3.026***	2.577***	-0.908***	-0.573**	-1.539***
	(0.462)	(0.335)	(0.504)	(0.430)	(0.260)	(0.281)	(0.412)
PhD Institution	0.036	0.370***	0.406***	1.612***	-0.182**	0.125	-0.350***
	(0.144)	(0.116)	(0.145)	(0.318)	(0.083)	(0.097)	(0.130)
% Explained by Inst.	3%	21%	13%	63%	20%	-22%	23%
Top 10[b]	0.247*	-0.062	0.185	1.174***	-0.08	0.283***	-0.388***
	(0.132)	(0.081)	(0.123)	(0.267)	(0.069)	(0.096)	(0.127)
Top 101-200[b]	-0.096	0.300***	0.204*	0.323***	-0.106	-0.129*	0.025
	(0.108)	(0.097)	(0.116)	(0.098)	(0.069)	(0.071)	(0.090)
Total Unexplained	2.213	0.855	3.068**	1.240	0.693	-1.503	-2.211*
	(1.586)	(0.913)	(1.554)	(1.012)	(0.914)	(0.992)	(1.318)

Note: Sample comprises 4,685 applicants in 2010-17, including 3,183 males and 1,502 females. Ph.D. Institution (Top 12-50 omitted). Also included Field of specialization, long Ph.D. and market year dummies. Robust standard errors in parentheses (* p<0.1, ** p<0.05, *** p<0.01). [b] sub-component of "PhD Institution"

Decomposition Results: Still more to explain!

	(1)	(2)	(1) +(2)	(1)' +(2)'	(3)	(4)	(5)
	Asst Prof	CB/MDB	Research	Top 50 Research	Lecturer	Post-Doc	Other (Non-Acad)
Difference:	3.517**	2.577***	6.094***	3.817***	-0.215	-2.076**	-3.751***
(Male - Female)	(1.563)	(0.928)	(1.546)	(1.040)	(0.886)	(0.984)	(1.317)
Total Explained	1.304***	1.722***	3.026***	2.577***	-0.908***	-0.573**	-1.539***
	(0.462)	(0.335)	(0.504)	(0.430)	(0.260)	(0.281)	(0.412)
Total Unexplained	2.213	0.855	3.068**	1.24	0.693	-1.503	-2.211*
	(1.586)	(0.913)	(1.554)	(1.012)	(0.914)	(0.992)	(1.318)
% of Unexplained	63%	33%	50%	32%	–	72%	59%

Note: Note: Sample comprises 4,685 applicants in 2010-17, including 3,183 males and 1,502 females. Included are Fields of specialization, ranking of Ph.D. Institutions, long Ph.D. and market year dummies. Robust standard errors in parentheses (* p<0.1, ** p<0.05, *** p<0.01).

Decomposition Results: Robustness to Alternative Wage Structure

	(1)	(2)	(1) +(2)	(1)' +(2)'	(3)	(4)	(5)
	Asst Prof	CB/MDB	Research	Top 50 Research	Lecturer	Post-Doc	Other (Non-Acad)
Difference:	3.517**	2.577***	6.094***	3.817***	-0.215	-2.076**	-3.751***
(Male - Female)	(1.563)	(0.928)	(1.546)	(1.040)	(0.886)	(0.984)	(1.317)
Total Explained	1.304***	1.722***	3.026***	2.577***	-0.908***	-0.573**	-1.539***
(pooled coefficients)	(0.462)	(0.335)	(0.504)	(0.430)	(0.260)	(0.281)	(0.412)
Total Explained	1.217**	1.846***	3.063***	2.825***	-1.122***	-0.499	-1.380***
(male coefficients)	(0.547)	(0.382)	(0.571)	(0.488)	(0.318)	(0.316)	(0.468)
Total Explained	1.261	1.424**	2.685***	1.952***	-0.548	-0.516	-1.728**
(female coefficients)	(0.731)	(0.471)	(0.769)	(0.540)	(0.428)	(0.485)	(0.631)

Note: Note: Sample comprises 4,685 applicants in 2010-17, including 3,183 males and 1,502 females. Included are Fields of specialization, ranking of Ph.D. Institutions, long Ph.D. and market year dummies. Robust standard errors in parentheses (* p<0.1, ** p<0.05, *** p<0.01).

Summary

- Analysis of placement outcomes of Ph.D. applicants from Top 200 NA institutions on EJM reveal sizeable gender differences
  - Women are under-represented as assistant-professors, especially at top 50 and CB/MDB institutions, but not in teaching positions
  - Women are over-represented in positions outside of academia
- OB Decompositions show that
  - Fields of specialization account for the larger share (75%-132%) of the explained differences for positions outside of the top 50 institutions
  - For top 50 institutions, the ranking of the Ph.D. degree granting institutions account for 2/3 and the fields for 1/3 of the explained placement differences.
  - From 30% to 72% of the gender differences remain unexplained by our parsimonious specification

Going Forward

- Next step, use reference letters
  - We find gender differences in how candidates are described (e.g., women's letters are shorter)
  - but how much it impacts placement is still to be determined

- Lesson Learned
  - Much progress is needed to encourage women to specialize in macro-economics and related fields, at their peril?! Or to improve climate in these fields!
  - Another avenue would be to encourage more women to apply at more highly ranked Ph.D. programs, and to admit them

Thank you!