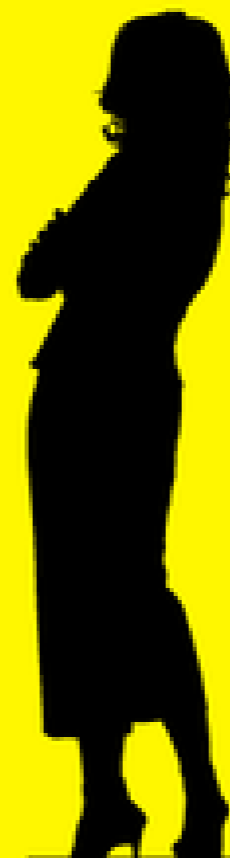


Pay Equity and Undergraduate Work Experiences

Todd J. Foley & Emily Frazier
University of Cincinnati



MIND THE GAP

Warm Up Activity

On the paper in-front of you, write down the answer to this question:

In my experience, what are factors that contribute to people in the same position making different salaries? (Please write down three or four ideas).

Presentation Outline

- Introductions
- History and Complexity
- Overview of Existing Research
- Results
- Discussions



History and Complexity

- 1963 - Equal Pay Act
- 1984 - Women earned the majority of bachelors degrees in the US
- 2011 - 60.9% of mothers of children aged three and under were in the workforce
- Occupational segregation has been declining (Blau, Brummund, and Liu 2013) but still exists (Hegwisch and Hartmann 2014)
- Measurement - Hourly Earnings (Lips 2013)

Existing Research

- CEOs of non-profits paid less in both salaries and bonuses (Mesch and Rooney 2004)
- In publicly held companies women are paid less than men (Adams et al. 2007)
- Women faculty are paid less than their male counterparts in both traditional “female” fields and STEM (Travis et al. 2009)
- Women can expect to be paid 7% less than men one year after graduation (Corbett and Hill 2012)

Our Study

- Research Questions and Hypotheses
- Methodology
- Results
- Limitations
- Discussion + Implications

Examination of hourly wages of female and male engineering co-op students

RESEARCH QUESTIONS

1. Is there a difference between female and male hourly wages for engineering students in a mandatory co-op program?
2. Are the results simply because of region? i.e. is this phenomenon relegated only to Cincinnati or to the State?
3. Is there still a difference when examining profession, major, or co-op term number?
4. If we control for Location, Citizenship, Ethnicity, GPA and credits earned are we still able to predict a significant variance in hourly wage for Females and Males?

Examination of hourly wages of female and male engineering co-op students

HYPOTHESES

- NULL - Female Engineering Co-op Students will earn less than male engineering co-op students
- Female Engineering Co-op Students will earn more than male engineering co-op students

WHAT DO YOU THINK?

Methodology

- Data Collection
 - Wages reported by students within internal system
 - Spring 2014 - Spring 2017 (semesters)
 - US Currency only
 - Hourly rates only
 - Any other type of rate listed was converted to hourly (unless the rate seemed inaccurate)

Methodology

- Data Analysis
 - T-Tests
 - Research Question #1 + #2
 - Research Question #3

Results

Sex	N	%
Male	8232	84.4
Female	1516	15.6

Profession Groupings	N	%
Buildings	1556	16
Manufacturing	5935	60.9
Computing	2257	23.2

Major	N	%
Architectural Engineering	278	2.9
Aerospace Engineering	732	7.5
Biomedical Engineering	785	8.1
Civil Engineering	722	7.4
Chemical Engineering	1199	12.3
Construction Management	556	5.7
Computer Engineering	535	5.5
Computer Science	676	6.9
Electrical Engineering	776	8
Electrical Engineering Tech.	158	1.6
Information Technology	1046	10.7
Mechanical Engineering	1658	17
Mechanical Engineering Tech.	627	6.4

Co-op #	N	%
1	2910	29.8
2	2105	21.6
3	2074	21.3
4	1614	16.6
5	1045	10.7

Race/Ethnicity	N	%
American Indian/Native American	4	0
Asian/Asian American	294	3
Black/African American	247	2.5
Hispanic/Latina/o American	190	1.9
Multiracial	226	2.3
White/Caucasian	8162	83.7

Ohio	N	%
Out of State	2416	24.8
Ohio	7325	75.1

Cincinnati Region	N	%
Outside Cincinnati	3761	38.6
Cincinnati Region	5988	61.4

Citizenship	N	%
Non-US Citizen	345	3.5
US Citizen	9404	96.5

Table 1

Range, Mean, Standard Deviation, Count, and Scale for All Continuous Variables

Dependent variable	Measure	Min	Max	Mean	Std	N
Hourly Wage	\$5.83 to \$45.00	5.83	45	17.16	3.88	9748

Wage Comparison

Table 3
t-test Results for Mean Wage between Female and Male Participants

	Coded 1	Coded 0	<i>t</i> -value	<i>df</i>	<i>p</i> (two-tailed)
	<i>Female</i>	<i>Male</i>			
Wage	17.58	17.08	4.583	9746	< .000

p* < 0.05; *p* < 0.01; ****p* < .001

Wage Comparison

Table 4

t-test Results for Mean Wage between Various Locations

	Coded 1	Coded 0	<i>t</i> -value	<i>df</i>	<i>p</i> (two-tailed)
	<i>Cincinnati</i>	<i>Non-Cincinnati</i>			
Wage	16.45	18.29	-21.685	6145.267	< .000
	<i>Ohio</i>	<i>Out-of-State</i>			
	16.67	18.63	-19.172	3348.858	< .000

p* < 0.05; *p* < 0.01; ****p* < .001

Wage Comparison

Table 5

t-test Results for Mean Wage between Females and Males and Geographic Location

Variable		Female Mean	Male Mean	<i>t</i> -value	<i>df</i>	<i>p</i> (two-tailed)
Demographic Variables						
In State		17.02	16.61	3.348	1424.673	0.001
	<i>N</i>	<i>1104</i>	<i>6221</i>			
Out of State		19.07	18.55	2.073	2414	0.038
	<i>N</i>	<i>411</i>	<i>2005</i>			
Cincinnati Region		16.70	16.40	2.361	1189.976	0.018
	<i>N</i>	<i>921</i>	<i>5067</i>			
Beyond Cincinnati		18.93	18.17	3.803	3758	< .000
	<i>N</i>	<i>595</i>	<i>3165</i>			

Table 6
t-test Results for Mean Wage between Females and Males and Industry

Model	N	Mean	Female		Male		Sig.
			N	Mean	N	Mean	
Buildings	1556	15.42	243	15.40	1313	15.43	0.894
Manufacturing	5935	17.83	1032	18.25	4903	17.74	0.000 *
Computing	2257	16.59	241	16.90	2016	16.56	0.260

*. The mean difference is significant at the 0.05 level.

Table 7
t-test Results for Mean Wage between Females and Males and Major

Model	N	Mean	Female		Male		Sig.
			N	Mean	N	Mean	
Architectural Engineering	278	15.06	80	14.94	198	15.10	0.491
Aerospace Engineering	732	17.24	48	18.07	684	17.18	0.123
Biomedical Engineering	785	16.09	305	16.41	480	15.89	0.039 *
Civil Engineering	722	15.51	109	15.66	613	15.48	0.547
Chemical Engineering	1199	19.43	334	19.73	865	19.31	0.152
Construction Management	556	15.50	54	15.58	502	15.49	0.839
Computer Engineering	535	17.75	32	17.48	503	17.77	0.662
Computer Science	676	17.64	78	18.66	598	17.51	0.037 *
Electrical Engineering	776	18.15	60	18.81	716	18.09	0.138
Electrical Engineering Tech.	158	16.69	10	16.30	148	16.72	0.650
Information Technology	1046	15.33	131	15.71	915	15.28	0.290
Mechanical Engineering	1658	18.15	229	18.76	1429	18.05	0.012 *
Mechanical Engineering Tech.	627	16.66	46	16.98	581	16.63	0.336

*. The mean difference is significant at the 0.05 level.

Wage Comparison

Table 8

t-test Results for Mean Wage between Females and Males and Co-op Term Number

Model			Female		Male		<i>Sig.</i>
	<i>N</i>	<i>Mean</i>	<i>N</i>	<i>Mean</i>	<i>N</i>	<i>Mean</i>	
1	2910	15.83	478	16.20	2432	15.75	0.002 *
2	2105	16.71	342	17.17	1763	16.62	0.007 *
3	2074	17.55	309	18.22	1765	17.43	0.001 *
4	1614	18.48	232	18.79	1382	18.43	0.225 *
5	1045	18.96	155	19.63	890	18.84	0.083

*. The mean difference is significant at the 0.001 level.

Limitations

- Data are self-entry by the student
 - Subject to mistake
 - Students may be biased in answering
- Cannot control for Work Experience
- Cannot control for Quality of Resume or Interview
- Location is only as accurate as the company's HQ – this may not actually be where the student was
- Lose power when drilling down into the data

Discussion and Implications

- Why do these results show that female engineers make more than male engineers on co-op, but national trends suggest the opposite?
- What are the factors employers use to determine pay?
- How do we coach female engineers with salary negotiation, and future employment given these results?
- How could this change how we work with employers?
- How do we engage employers around these conversations?