Education and the gender wage gap

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Introduction

Better opportunities, higher income, a larger wealth of knowledge... These are just a few of the many reasons that 19 million Americans enroll in college annually. Women make up about 56 percent of that nineteen million, and that number is rising. So why is it that the number of women enrolling in college is increasing? It could be the fact that women are now more able to pursue careers that historically have been male dominated, such as science, engineering, and law. It could also be that simply men are more likely to work in jobs that do not require a college diploma, such as manual labor jobs like manufacturing and construction. With more women pursuing higher education, the question remains: does obtaining higher education in fact close the gender wage gap?

Literary Review

In 2016, the wage gap disparity between men and women as a whole narrowed to 81 cents on the dollar earned by a man, up from 57 cents on the dollar in 1975 (“ Women Can’t Win). As the age gap has become smaller and smaller, the number of women completing Associate’s, Bachelor’s, and Doctoral Degrees has risen. From 1970, the number of bachelor’s degrees obtained by women has increased from 43 percent to 57 percent in 2015 (“ Women Can’t Win”). Education has served as the main way for women to catch up to the earnings of men. Interestingly enough, the largest wage gaps exist in the highest paying fields. Over a lifetime, out of men and women who earn graduate degrees in business, women earn $1. 6 million less over

the course of their careers (“ Women Can’t Win”). One reason for this may be that women still take on the majority of caretaking for their children. Studies show that most widening in the wage gap occurs to college graduates in the first seven years after leaving college because that is when families are being formed and mothers must take time away from work (Goldin). As women’s family responsibility increases, women’s advances and wages fall farther behind.

There are many factors to consider beyond just level of education, but according to the article, “ The Gender Income Gap and the Role of Education,” there are four major factors that impact the gender income gap: choice of college major, skills measured by standardized tests, amount of education, and selectivity of the college attended. When considering these factors, it is important to remember that many college majors still show segregation (Bobbitt-Zeher). Women are often much more likely than men to major in fields that are less rewarded with higher incomes like childhood education and the humanities. In 2000-2001, women earned 20 percent of engineering degrees and 77 percent of education degrees (Bobbitt-Zeher).

When looking at skills measured by standardized tests, research has suggested that since the 1970’s, higher abilities and scores in STEM related majors have been predictive of higher future salaries. Male students have been dominant on these standardized tests, but the disparities between men and women are shrinking. One study found that the wage gap disappears between men and women with the highest math skills (Bobbitt-Zeher).

College selection can also play an important role in job opportunities, often the more prestigious the institution, the higher salaries expected in the future. Studies show that more prestigious and selective universities are less likely to offer degrees that are typically female dominated like childhood education, so depending on a female's major choice, she may attend a less selective institution.

The differences in the college majors chosen by males and females is critical to understanding the wage gap. More and more research suggest that women are more sensitive to negative feedback than men (Kugler). This research examines the likelihood that a woman would change majors in response to bad grades. In the article, " Choice of Majors: Are Women Really Different from Men?" their data shows twelve percent of students change majors, and of those that switch, sixty percent are female. The study finds that it does in fact take more than just negative feedback for a female to switch majors, but also low grades, gender composition of class, and external stereotyping signals (Kugler). When considering STEM majors that are more challenging, males may be more likely to persist and graduate than that of female peers.

After considering median lifetime earnings based on eight different education levels, it is evident women earn about a quarter less than men over a lifetime (Carnevale). As earning levels for men increase, women have to obtain more college to keep up. According to the data provided in the article, " The College Payoff: Education, Occupations, Lifetime Earnings," men with some college but no degree earn about the same as a woman with a Bachelor's Degree. Interestingly, Claudia Goldin, a Harvard economist,

suggests that men and women with identical degrees and experience are still paid unequally (“ Women Can’t Win”).

Data

My dependent variable, wage, comes from the Bureau of Labor Statistics article, “ More Education Still Means More Pay in 2014.” The study spans 35 years and compares median weekly earnings for men and women with varying levels of education. My first independent variable is gender, taken from the same article, one representing male and two representing females. My second independent variable is education from the same article. The levels of education represented are . 25 representing less than a high school diploma, . 5 representing a high school diploma, . 75 representing some college but no degree, and 1. 0 representing a bachelor’s degree. In my study, I included a total of 72 observations of weekly wages by education and gender from years 1979-2014.

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Wages	72	773.2777778	260.0615432	404	1465
Gender	72	1. 5	0. 5035088	1	2

		15			
Education	72	0. 61458 3333	0. 2781272 25	. 25	1

Dependent Variable: Wages

	(OLS) Unrestricted	(OLS) Restricted
Constant	638. 618***	533. 154***
	(35. 2748)	(57. 5992)
Gender	-240. 428***	-204. 792***
	(18. 7826)	(31. 2670)
Education	805. 913***	913. 578***
	(34. 0031)	(58. 3530)
Nobs	72	30
R 2	0. 909113	0. 911608

Note: Standard errors are in parentheses

Regression Specification:

Wages = 638. 618 – 240. 428 Gender + 805. 913 Education + u

Wages = 533. 154 – 204. 792 Gender + 913. 578 Education + u

Interpretation

I performed two separate regressions, one unrestricted, and one restricted to the years 2000-2014. In the unrestricted model, the coefficient gender shows that a one-unit change in gender (male to female), if education remains the same, causes a 240. 428 decrease in wages. The coefficient education shows that a one-unit change in education, if gender remains the same, causes an increase in median weekly wages by 805. 913. In the restricted model, the coefficient gender shows that a one-unit change in gender (male to female), if education remains the same, causes a 204. 792 decrease in wages. The coefficient education shows that a one-unit change in education, if gender remains the same, causes an increase in median weekly wages by 913. 578

When comparing the results of these two regressions, it is interesting to see that the margin for median weekly wages for females vs. males actually became smaller when looking at years 2000-2014 compared to 1979-2014 (approximately $35. 636 less per week). It is also interesting to see that completing more education raises median weekly wages substantially in 2000-2014 compared to 1979-2014 (approximately $107. 665 more per week).

A t-test of the OLS unrestricted regression was conducted to test if gender has an effect on wages. The null hypothesis is: Gender does not have an effect on wages. The alternate hypothesis is: Gender does have an effect on

wages. The Tcrit = +/-1. 9935 at a 95% confidence level. The Tstat = -240. 428/18. 7826 = -12. 8005707 and therefore, since the Tstat of gender is larger than the Tcrit, gender has a statistically significant effect on wages. The null hypothesis is rejected. Another t-test was conducted to see if education has an effect on wages. The null hypothesis is that education does not have an effect on wages. The alternate hypothesis is that education does have an effect on wages. The Tcrit remains the same. The Tstat = 805. 913/34. 0031 = 23. 7011625. Since the Tstat is greater than the Tcrit, education also has a statistically significant effect on wages. The null hypothesis is rejected.

A White's test was conducted on the unrestricted specification of the OLS regression to determine if heteroskedasticity is present in the regression model. The null hypothesis is: Heteroskedasticity in not present. The alternate hypothesis is: Heteroskedasticity is present. Because the p-value of 0. 050049602 is greater than the p-value of 0. 05, we fail to reject the null hypothesis and heteroskedasticity is not present at a 95% confidence interval.

Conclusion

After completing this study, it is clear there are many factors that affect the gender wage gap. That being said, there are many ways that this research can be expanded upon. One way would be recording more data on the wages of men and women with similar experience, test scores, family, and education levels. This data could provide more information on where the wage differences exist for men and women, and how big that gap is, if any,

for men and women with similar factors. More research can also be done to study college major choices of men and women to see if the number of women choosing STEM majors has shifted. As more women continue to pursue degrees that will result in higher paying careers, research should be done to see if the wage gap decreases. The amount of information that already exists on this topic is huge. The important thing will be to continue to collect this information as society advances. Understanding more of why and where the gender wage gap exists will bring us closer to equality.

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Year	Wages	Gender	Education
1979	1204	1	1
1979	562	2	0. 5
1980	732	1	0. 25
1980	795	2	1
1981	890	1	0. 5
1981	638	2	0. 75
1982	969	1	0. 75
1982	434	2	0. 25
1983	1172	1	1
1983	557	2	0. 5
1984	668	1	0. 25
1984	662	2	0. 75
1985	1239	1	1

1985	666	2	0. 75
1986	662	1	0. 25
1986	899	2	1
1987	992	1	0. 75
1987	427	2	0. 25
1988	1306	1	1
1988	573	2	0. 5
1989	954	1	0. 75
1989	426	2	0. 25
1990	953	1	0. 75
1990	940	2	1
1991	592	1	0. 25
1991	693	2	0. 75
1992	782	1	0. 5
1992	673	2	0. 75
1993	574	1	0. 25

1993	985	2	1
1994	927	1	0. 75
1994	555	2	0. 5
1995	782	1	0. 5
1995	659	2	0. 75
1996	537	1	0. 25
1996	549	2	0. 5
1997	1318	1	1
1997	404	2	0. 25
1998	933	1	0. 75
1998	1026	2	1
1999	824	1	0. 5
1999	575	2	0. 5
2000	950	1	0. 75
2000	418	2	0. 25
2001	1426	1	1

2001	695	2	0. 75
2002	812	1	0. 5
2002	428	2	0. 25
2003	552	1	0. 25
2003	1071	2	1
2004	954	1	0. 75
2004	612	2	0. 5
2005	790	1	0. 5
2005	712	2	0. 75
2006	550	1	0. 25
2006	1062	2	1
2007	925	1	0. 75
2007	421	2	0. 25
2008	780	1	0. 5
2008	691	2	0. 75
2009	1465	1	1

2009	422	2	0. 25
2010	917	1	0. 75
2010	1071	2	1
2011	514	1	0. 25
2011	679	2	0. 75
2012	758	1	0. 5
2012	578	2	0. 5
2013	508	1	0. 25
2013	407	2	0. 25
2014	751	1	0. 5
2014	1049	2	1
NOBS	72	72	72
Mean	773. 2777778	1. 5	0. 614583333
St. Dev.	260. 0615432	0. 503508815	0. 278127225
Minimu	404	1	0. 25

m			
Maximu m	1465	2	1