

Weekly Earnings and Gender Pay Gap within the United States

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Executive Summary

The gender pay gap has been a challenge for most, if not all, nations all over the world. In this project, regression analysis was used to model the weekly median pay for both male and female employees regardless of their age, marital status, ethnicity, union affiliation or education. The findings indicated that the median weekly pay for a male is higher as compared to that of women counterparts. Histograms generated from the data suggest that the female pay is fairly Gaussian as compared to the data for the male employees. The research supports the claim that there is indeed a gender pay gap and governments should work towards reducing it, especially for female employees in order to reduce dependency on welfare payments at old age. The research also showed that the following equation could be used to predict either of the gender's wages:

$$\text{Male weekly median earnings} = 1.3305 \times \text{Female weekly median earnings} - 82.247$$

Aim

The aim of this research is to establish to what extent is the gender pay gap within the US – what is the gap and how much more are men actually paid compared to women. Furthermore, this research also aims to produce a justifiable conclusion that there is a gender pay gap for employees regardless of their age, race or ethnicity, union affiliations, marital status, and education. The research will also produce a linear equation which shows the relationship between men and women wages.

Introduction

The wage disparity is the average disparity between the salary remuneration for male and female employees in any nation. There is a growing concern that globally, women are generally paid lower amounts of wages and salaries as compared to their fellow male counterparts performing similar roles. There have been several activist movements that call for equal pay and gender equality such as the #MeToo and #Time'sUp feminist movements¹. In the US alone, there

¹ (Carpenter)

has been continued efforts towards minimizing the pay gap difference between men and women, especially during 1980s to 1990s², which were the period of the second and third waves of Feminism within US³. The changes in selectivity in the labor force accompanied with labor market discrimination as well as the shift in demand are the likely reasons behind the slow convergence in the gender pay towards the 1990s. Fortunately, the research and meta-analysis conducted by Doris Weichselbaumer and Rudolf Winter-Ebmer regarding gender wage differential, indicated that the gender gap for most nations has changed from 65 % to 30 % in 2005⁴. This shows that although there is still an existing gender wage gap, improvements are also occurring. Although it is uncertain whether the improvements are caused by the growing number of social movements for Feminism and equal pay, it is evident that those two factors correlate with one another – the more social movements for equal pay, the lesser the wage gap.

In Europe, the wage gap typically widens towards the upper part of the wage distribution commonly referred to as the “glass ceiling”⁵. The term “glass ceiling” is commonly used to refer to the invisible barrier that prevents people – especially women – from moving up corporate hierarchy or achieving higher positions of power or authority, due to their demographics⁶. The authors of *“Is there a glass ceiling over Europe? Exploring the gender pay gap across the wage distribution”* asserted that the observed pay difference could be attributed to the difference in childcare provisions and also the wage settling organizations in the European Union. In a few cases, the wage gap widens at the bottom of the distribution; this commonly called the “sticky floor” effect. The “sticky floor” effect is defined as “the situation arising where otherwise identical men and women might be appointed to the same pay scale or rank, but the women are appointed at the bottom and men further up the scale”⁷. This means that although women and men are given the same rank and pay scale, men are more likely to advance in their ranks – thus receiving higher payment – compared to women. This would, in turn, cause the wage gap at the bottom of the distribution to significantly widen.

² (Blau and Kahn)

³ (Rampton)

⁴ (Weichselbaumer and Winter-Ebmer)

⁵ (Arulampalam, Booth and Bryan)

⁶ (Feminist Majority Foundation)

⁷ (Arulampalam, Booth and Bryan) (Booth, Francesconi and Frank)

The reason behind the observed lower pay especially for women could be individually instigated, or it could also be as a result of other innate and other external factors that lead to the observed anomaly. It is worthwhile noting that the gender gap is not desirable in any economy, especially from the public policy perspective. In other words, the gender pay gap is a huge problem that requires continued efforts towards reducing it. Whether the choice is personal or whether it is defined by the nature of the economy, gender pay gap reduces economic output which implies that most women, especially at old age, are likely to be highly dependent on welfare payments. In an effort to intervene and improve the issue of gender wage gap, the US congress passed the Equal Pay Act (EPA) in 1963 that prohibits gender discrimination in the payment of wages and salaries by employers⁸.

Further research had also indicated that in each nation, women are always at the bottom of the so-called wage distribution⁹. Although there are laws such as the Equal Pay Act, some cases suggest that inequality in gender gap pay to be molded by the government, as state influences the class position for women in society hence leads to the observed variance in wage distribution¹⁰.

Regardless of social movements and laws, there are still continuous assertions that there is a wide gender pay gap between for most nations, especially in the US. Therefore, a closer analysis of data and statistics regarding gender, labor and wages, in the US, would need to be conducted in order to conclude and verify the aforementioned claims as well as to what extent does it also apply to the US. The median weekly earnings for both male and female employees will be used to prove or disapprove the claim.

Methodology

The data used in this work will be acquired from the publications, data and statistics provided by US Department of Labor (www.bls.gov)¹¹. The data will show the median usual weekly earnings of full-time wage and salary workers, by selected characteristics, 2017 annual averages. Data processing tools such as Microsoft Excel will be used to organize and process the

⁸ (US Equal Employment Opportunity Commission)

⁹ (Mandel and Shalev)

¹⁰ (Mandel and Shalev)

¹¹ (US Bureau of Labor Statistics)

data and statistics gathered as well as to produce visual presentations of those data. Data analysis tool on Microsoft Excel will be used to produce the regression and histograms statistics.

Results and Data Presentation

Table 1: Descriptive statistics on the data

<i>Women Median weekly earnings</i>		<i>Men Median weekly earnings</i>	
Mean	745.43	Mean	909.57
Standard Error	30.98	Standard Error	42.45
Median	766.50	Median	929.00
Mode	810.00	Mode	996.00
Standard Deviation	163.94	Standard Deviation	224.60
Sample Variance	26877.44	Sample Variance	50445.37
Kurtosis	0.30	Kurtosis	0.46
Skewness	-0.13	Skewness	0.04
Range	729.00	Range	1022.00
Minimum	402.00	Minimum	459.00
Maximum	1131.00	Maximum	1481.00
Sum	20872.00	Sum	25468.00
Count	28.00	Count	28.00

From the descriptive statistics above (Table 1), it is evident that the average median weekly earnings for a male are higher than the average median weekly earnings for the female regardless of the age, ethnicity, marital status, union affiliation or even education level. It can be seen that the mean, median and mode for the men's median weekly earnings are higher than the women's. The minimum and maximum for the men's median weekly earnings are also higher than the women's.

Regressing the male median salary against the female median salary weekly earnings the regression model is as shown in Figure 1.

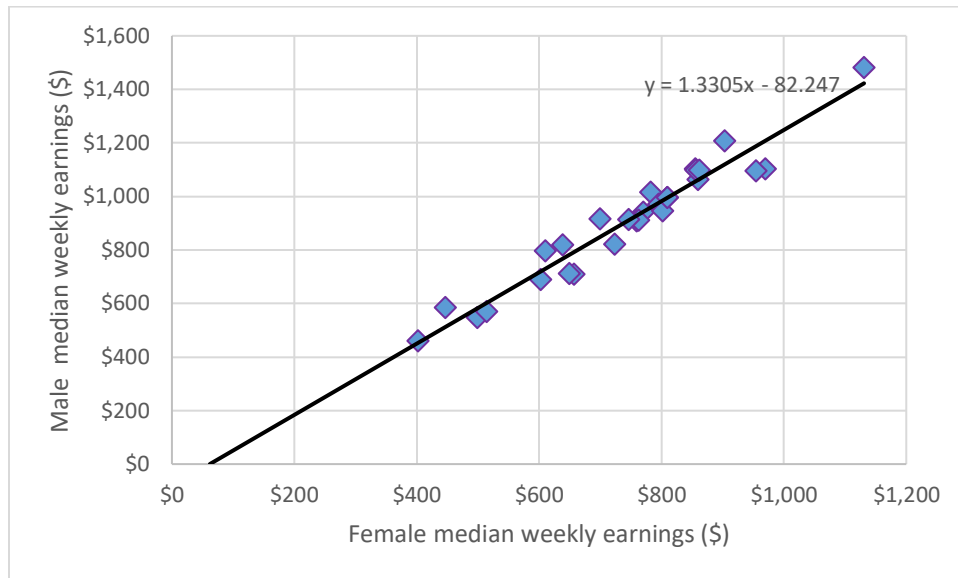


Figure 1: Regression graph between the male and female median weekly earnings

The male weekly earnings can be predicted from the female earnings for any given state using the regression equation:

$$y = 1.3305x - 82.247$$

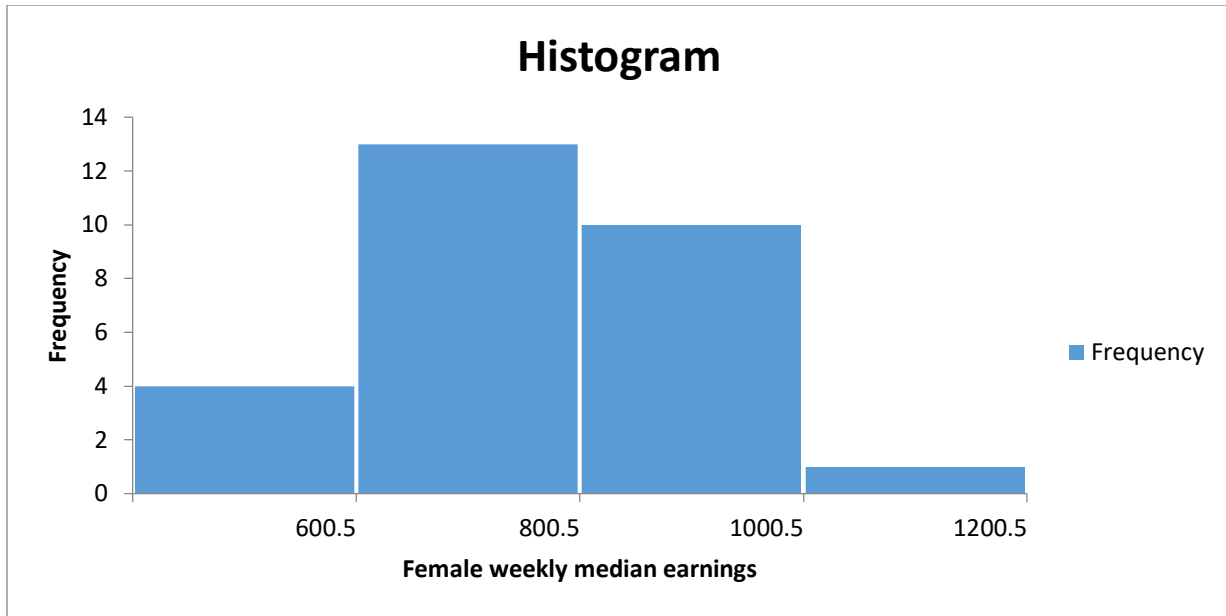


Figure 2: Distribution of female weekly median earnings

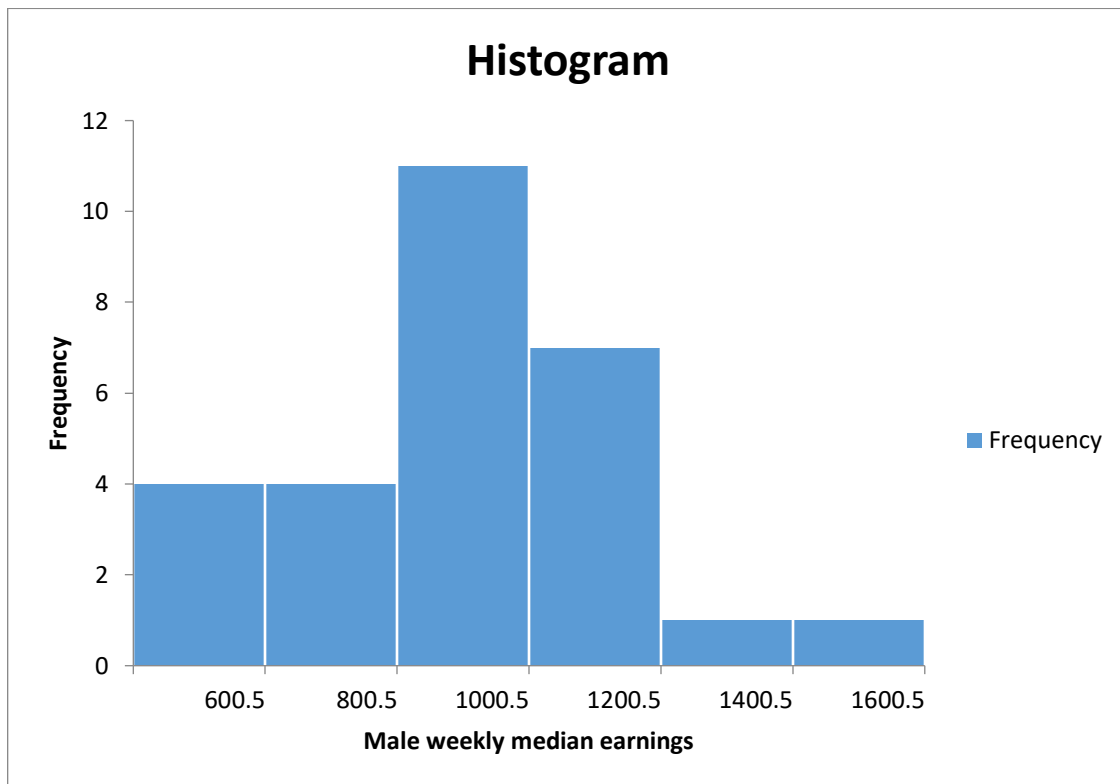


Figure 3: Distribution of male weekly median earnings

The histogram indicates that the data is normally distributed although with some element of skewness.

Analysis and Evaluation

The results of this analysis confirm that indeed there is a considerable pay gap between the male and female employees in most of the nations. The pay gap between male and female employees was modeled through simple linear regression. The women pay can be predicted using the regression equation:

$$\text{Male weekly median earnings} = 1.3305 \times \text{Female weekly median earnings} - 82.247$$

From the equation, the value -82.247 shows that if the female weekly median earning is zero then the male weekly median earnings is -82.247. This shows that in this regression equation the y-intercept has no meaningful meaning.

The slope value (1.3305) in Figure 1 shows that if the female weekly median earnings increase by \$1 then the male earnings will increase by \$ 1.3305, \$0.3305 more than female.

When all factors are held constant, the positive gradient of the regression equation suggests that the male weekly median pay is always higher than the female weekly earnings.

Whereas the histogram for female earnings, in Figure 2, suggests a nearly normal distribution, the male distribution is skewed as shown in Figure 3. This implies that the mean the median and the modal male pay is not the same. This observation can also be supported by the standard deviation for the male data which is bigger than that of their female counterparts regardless of their age, marital status, union affiliation or education. The huge standard deviation in the male weekly earnings also suggests that there is a considerable pay gap between male employees as compared to their female counterparts.

As the statistically data were collected from an official source – the US Department of Labor – it is very likely that the numbers used were accurate and uncorrupted. The background research regarding the topic was also mostly gathered from academic publications, therefore, the information found and mentioned within this research project is likely trustworthy. However,

some of the limitations of this research is that there is no guarantee that the numbers are completely accurate as some data points were not provided by the government or were estimations and not the exact data. Furthermore, there are also no guarantees that some human errors did not occur during the gathering and processing of the data – however, this is unlikely as the data were obtained either through the downloading of electronic files or through the method of copy-and-paste. Additionally, the calculations and data processing were all done by Microsoft Excel, which also lessens the possibility of human errors.

Conclusion

In conclusion, the data gathered and processed suggests that there is, currently, still a wage gap between the male and female genders. It can be seen in Figure 2 and 3 that the highest frequency of male weekly median earnings is more than the highest frequency of female weekly median earnings. This provides a strong indication that most men are generally paid more than women. The wage gap was determined by the data analysis to be of approximately \$0.3305. These evidences show that although the government had intervened and tried to improve the gender wage gap – through the Equal Pay Act – it might not actually be working, thus, suggesting that external and individual forces are the main causations of the gender wage gap. The external and individual forces might include social rules and stereotypes, such as women choosing to work less than men in order to have more time to dedicate to caring for their homes and children, or women being raised and discouraged from pursuing education and training that might further their careers, preventing them from having higher paying jobs. The findings also show that:

$$\text{Male weekly median earnings} = 1.3305 \times \text{Female weekly median earnings} - 82.247$$

It is evident that even in the 21st century, there is a conspicuous difference in the male and female remunerations. The difference in gender pay can be attributed to individual decisions made by female employees, or external forces such as discrimination that is gender centered or believe that some jobs are more male-centered than female. The individual decisions and external forces might include social rules and stereotypes, such as women choosing to work less than men in order to have more time to dedicate to caring for their homes and children, or women being raised and discouraged from pursuing education and training that might further their careers, preventing them from having higher paying jobs. The findings of this research confirm that the gender pay gap is real and male employees are generally paid higher than their female counterparts in the US. An important long-term implication caused by wage gap, especially towards women at old age, is that it is likely to lead to high dependence on charity or welfare payments once most women reach retirement age.

Bibliography

- Arulampalam, Wiji, Alison L. Booth and Mark L. Bryan. "Is There a Glass Ceiling over Europe? Exploring the Gender Pay Gap across the Wages Distribution." *Discussion Paper Series* (2007).
- Blau, Francine D. and Lawrence M. Kahn. "The U.S. Gender Pay Gap in the 1990s: Slowing Convergence." *Industrial & Labor Relations Review* (2006): 44-66.
- Booth, Alison L., M. Francesconi and J. Frank. "A sticky floors model of promotion, pay and gender." *European Economic Review* (2003): 295-322.
- Carpenter, Julia. *CNN Money - #MeToo and #TimesUp have pushed 48% of companies to review pay policies*. 28 February 2018.
- Feminist Majority Foundation. *Empowering Women in Business*. 2014.
- Mandel, Hadas and Michael Shalev. "How Welfare States Shape the Gender Pay Gap: A Theoretical and Comparative Analysis." *Social Forces* (2009).
- Rampton, Martha. *Four Waves of Feminism*. 25 October 2015.
- US Bureau of Labor Statistics*. n.d.
- US Equal Employment Opportunity Commission. *Facts About Equal Pay and Compensation Discrimination*. n.d.
- Weichselbaumer, Doris and Rudolf Winter-Ebmer. "A META-ANALYSIS OF THE INTERNATIONAL GENDER WAGE GA." *Journal of Economic Surveys* (2005).

Appendix

Appendix 1: Data that was utilized in this research

Total, 16 years and older	\$770	\$941
16 to 24 years	499	547
16 to 19 years	402	459
20 to 24 years	514	570
25 years and older	810	996
25 to 34 years	724	821
35 to 44 years	860	1,062
45 to 54 years	855	1,103
55 to 64 years	856	1,098
65 years and older	782	1,016
Race and Hispanic or Latino Ethnicity		
White	795	971
Black or African American	657	710
Asian	903	1,207
Hispanic or Latino ethnicity	603	690
Marital Status		
Never married	649	711
Married, spouse present(1)	862	1,098
Widowed, divorced, or separated(2)	759	909
Widowed	763	910
Divorced	802	945
Separated(2)	639	819
Union Affiliation(3)		
Members of unions(4)	970	1,102
Represented by unions(5)	954	1,094
Not represented by a union	746	914
Educational Attainment		
Total, 25 years and older	810	996
Less than a high school diploma	447	584
High school graduates, no college	610	797

Some college or associate degree	700	917
Bachelor's degree and higher	1,131	1,481