Commentary

Title:

"How the Wage Gap is Calculated, Why it is Wrong, & What We Can Do About It"

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The Gender Wage Gap is the difference between the average male salary or wage and the average female salary or wage. Wage gaps can of course be calculated between any two groups, such as between whites and blacks, educated and the non-educated, etc. In this article we concentrate on the male/female wage gap, but the points made can be applied to any comparison of groups.

In the U.S. today women earn on average 81.2% of what men earn, leading to the oft-reported statistic that women earn 81 cents for every dollar earned by a man.[1] This data can also be restated as, "women earn 18.8% less than men." This difference, or gap, is then purported to be evidence of widespread discrimination in the labor market, often attributed to widespread systemic sexism – likewise, the black/white wage gap is attributed to systemic racism. In a previous article I argued that the gap was not due to systemic bias, but rather was the result of innocent factors that naturally lead to wage differences.[2]

How can wage gaps of this magnitude not be due to some kind of invidious distinction or discrimination? In order to make this argument clearer, we need to examine the calculation of the Wage Gap in order to see why it is such a misleading statistic. For example, consider the figures in Table 1 (which were constructed by the author for illustrative purposes), and assume that men and women within each profession are doing the same job with equal productivity.

Table 1:

Elementary School Teacher			Electrical Engineer		
1.	Female	$40,000	1.	Male	$90,000
2.	Female	$40,000	2.	Male	$90,000
3.	Female	$40,000	3.	Male	$90,000
4.	Female	$40,000	4.	Male	$90,000
5.	Female	$40,000	5.	Male	$90,000
6.	Female	$40,000	6.	Male	$90,000
7.	Female	$40,000	7.	Male	$90,000
8.	Male	$40,000	8.	Female	$90,000
9.	Male	$40,000	9.	Female	$90,000
10.	Male	$40,000	10.	Female	$90,000

As constructed, the average female salary is $55,000 (the average of the female teachers and female engineers), and the average male salary is $75,000 (the average of the male teachers and male engineers). The huge pay gap between men and women in this constructed example is 27%, or in other words, the women earn 73% of what the men earn, or approximately the same sized gap as existed in the U.S. in the mid 1980's.[3]

Would this huge wage gap be proof of discrimination against women in the labor market if it were actual data? In this example, all teachers earn the same salary and all engineers earn the same salary, irrespective of gender. Even though the men and women were paid exactly the same within each profession, a "gender wage gap" appears where one truly doesn't exist! This is due to

[1] United States Census Bureau, https://data.census.gov/cedsci/table?q=s2002&tid=ACSST1Y2018.S2002.

[2] See "Do Labor Markets Discriminate Against Women?" by Michael Patrono (https://coles.kennesaw.edu/econopp/docs/Patrono-Commentary.pdf).

[3] https://www.pewresearch.org/fact-tank/2019/03/22/gender-pay-gap-facts/.

the unequal numbers of men and women in the two different fields, and not to men and women getting paid different amounts for doing the same job. You would never know this from the lurid reporting on the wage gap, which implies that the gap between men and women's wages is for doing the same work. Unequal pay for the same work has actually been illegal since 1963 with the passage of the Equal Pay Act, and rarely happens.

Next consider the figures in Table 2 (which were, again, constructed by the author for illustrative purposes – continue to assume that men and women within each profession are doing the same job with equal productivity).

Table 2:

Elementary School Teacher	Electrical Engineer
1. Female $40,000	1. Male $90,000
2. Female $40,000	2. Male $90,000
3. Female $40,000	3. Male $90,000
4. Female $40,000	4. Male $90,000
5. Female $40,000	5. Male $90,000
6. Male $50,000	6. Female $80,000
7. Male $50,000	7. Female $80,000
8. Male $50,000	8. Female $80,000
9. Male $50,000	9. Female $80,000
10. Male $50,000	10. Female $80,000

In this example, the average wage for women was $60,000, and the average wage for men was $70,000. Using the methodology employed earlier, we see that women earn on average 86% of what men earn on average, generating a 14% wage gap.

Does the fact that the wage gap of only 14% in Table 2 is smaller than the wage gap of 27% in Table 1 mean we are making progress on women's pay if we move from Table 1 to Table 2, or is it worse for women? We can see that even though the measured "wage gap" is falling, there is actually clear gender pay discrimination in Table 2, whereas there was none in Table 1. In Table 2 we have male and female teachers doing the same job, but the women are paid 20% less. Likewise, we have male and female engineers doing the same job, and the female engineers are paid 11% less. Women in both professions would have no trouble under current law bringing a civil rights lawsuit against their employers.

Since the methodology of calculating the wage gap cannot distinguish between Table 1 where there is no pay discrimination, and figure 2 where there clearly is, we see that the wage gap as reported is not a useful figure. No honest person could use this statistic alone to draw any meaningful conclusions about the degree of discrimination in our society. The wage gap statistic is a classic example of the saying "There are three kinds of lies: lies, damned lies, and statistics."

How could we get a more honest statistic than the current wage gap methodology uses? If we focused the calculation of the wage gap on the wages of men and women doing the same work under the same conditions, we would get a meaningful result. For example, if we used the data from Table 1 properly, and calculated the average wage of female teachers and compared it to the average wage of male teachers doing the same job, we would see that women made an average of $40,000 and the men also made and average of $40,000. No obvious discrimination here.

Likewise, if we compared the $90,000 average wage of female engineers with the $90,000 average wage of male engineers, we would again draw the conclusion that discrimination was not taking place since there would be no wage gap if we reformed our methodology.

However, if we applied this same reformed procedure to the data in Table 2, we would immediately see that the average wage of $40,000 for female teachers was significantly lower than the $50,000 average of the male teachers and that the average wage of $80,000 for the female engineers was lower than the $90,000 wage of the male engineers. Applying the wage gap methodology properly to men and women working in the same jobs would correctly detect discrimination, while applying the same methodology to men and women across the board without reference to their jobs would not. To make matters worse, it can be misused to actually impute pay discrimination where it does not exist.

It is possible to get correct inferences from statistics, but you have to apply the statistics properly. The proper comparison (which was easy to accomplish in my made-up examples) would require that we collect data from all jobs, and then compare only the ones where men and women are doing the same work. Since men and women often work in different occupations, or appear to work in the same occupation but under very different circumstances, this is almost impossible to do.[4]

As a fallback position, economists have tried to determine when we have properly compared apples to apples in the job market by using sophisticated statistical methods such as regression analysis to compare workers in different fields. When using these methods the analyst would compare men and women's wages overall, and then start accounting for level of education, number of hours worked, years of experience, type of college major, age, danger of the job, hours of overtime, the amount of required travel, and a plethora of other variables that could possibly justify why there might be differences in income between men and women (or between whites and minorities). As imperfect as these corrections to the data are, once these procedures are applied to the simple wage gap methodology that we have critiqued, we get a very different result. The gender wage gap that excites so many largely disappears.

If these flaws in the reported "wage gap" are so obvious, why does anyone use it? Three possible reasons immediately come to mind: (i) ignorance of simple arithmetic, (ii) deliberate manipulation of an argument (lying), and (iii) the cost and difficulty of using the proper measure. The first reason is easy to understand and more forgivable. Most people don't like math and don't thing mathematically, and this is often true of reporters. Because of this, many people just repeat the statistics that are bandied about in the media and on the Internet without realizing that they are making an inappropriate argument. Of course this is only forgivable if you don't know better. Anyone reading this article no longer has that excuse!

The second reason mentioned describes people who are fully aware of the dishonest nature of the data that they are repeating. Ideologues, hacks, and opportunists of all stripes fall into this category, where they know that what they are saying is false or misleading, but say it anyway. Not so forgivable.

The third reason is more difficult to deal with. As discussed earlier, the proper method of analysis would require that we collect data from all jobs, and then compare only the ones where men and women are doing the same work, or to employ sophisticated statistical techniques to

[4] Consider the occupation of truck driver. If one trucker drives over-the-road and is gone for long periods of time, but makes more than another trucker who drives a local route and is home every night, should we assume discrimination explains their different incomes or is there a different legitimate and obvious reason why one trucker earns more than the other?

adjust the data for relevant variables. Honest analysts can differ on the size of the remaining wage gap, if any. The final take-away, however, is that legitimate studies show that the gender wage gap, once corrected for appropriate differences in jobs, is much smaller than reported. The myth of the wage gap is overblown and should not be treated seriously.