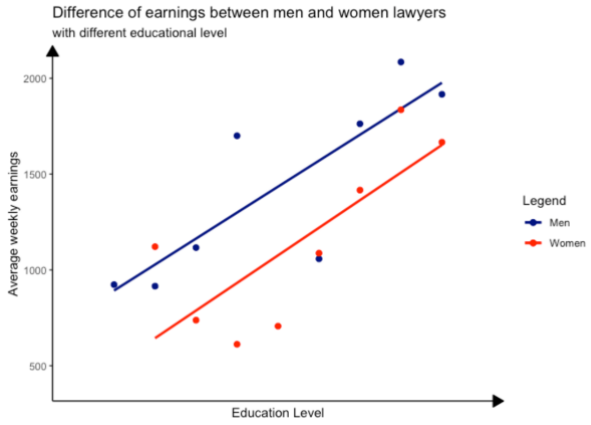
Documentation of assignment_1

Analysis:

1. Unconditional pay gap between men and women

We can see that the difference in unconditional weekly gender pay gap between men and women lawyers is **$298 on average in 1027 observations**.

2. Viewing relationship between educational level and earnings for men and women



From the regression line in the plot from the markdown html, we can see that **men lawyers have higher earnings than women lawyers on all the education levels**, while the average earning of lawyers of both genders tend to **increase with higher education qualification**. We prove the upward sloping regression line by finding that the **correlation coefficient between educational level and average earnings of men lawyers is 0.78 and women lawyers is 0.80**. So, we can conclude that educational level and average earning for both men and women lawyers has a strong **positive correlation**, and the slope of regression line should be **upward sloping**, which aligns with the plot.

3. Finding the β0 and β1 to know how the expected earning change depending on educational level

We would like to find out the actual regression coefficients β0 and β1 when the average weekly earnings (y) being the dependent variable and educational level (x) being the independent variable.

From the markdown html, we can see the **β0, β1 and Standard Error of E(y|x) for men lawyers are $-4406.09, $138.91 and $176.52 respectively**. This implies that the y-intercept when x = 0 is expected to be $-4406.09, and with every 1 increase in x, y is expected to increase by $138.91. While the SE is $176.52, with a 95CI, we would expect any weekly earnings of random samples chosen will fall within $±353.04 (taking ±2 SE) away from the sample mean/regression line.

For women lawyers, we can see the **β0, β1 and Standard Error of E(y|x) for women lawyers are $-4704.99, $138.97 and $172.22 respectively**. This implies that the y-intercept when x = 0 is expected to be $-4704.99, and with every 1 increase in x, y is expected to increase by $138.97. While the SE is $172.22, with a 95CI, we would expect any weekly earnings of random samples chosen will fall within $±344.44 (taking ±2 SE) away from the sample mean/regression line.

Conclusion:

The difference of β1 between men lawyers and women lawyers is similar (only 0.04% difference), so we can expect that the wage gap between men and women lawyers is **not likely to be closed by receiving more education**. And as the slope of regression line of men and women is similar, the sample difference of the **weekly earnings between men and women is expected to be close to the difference between the β0 of men and women, which is $298.9, throughout all educational levels.**