1. we need to divide the individuals randomly into two groups:

Treatment group

Control group

This experiment is not feasible as it involves cost and resources.

Conducting such experiment is not ethical because it is harmful as participant has to go through interventions with IQ that could harm them

1. The variable 'u' might contain factors such as experience, skills, personality traits, and other unobserved characteristics that could affect wages. These factors are likely to be correlated with IQ as they can influence both an individual's IQ score and their wage.
2. data will not uncover the causal effect of IQ if there are other factors that affect wage and are correlated with IQ, but are not included in the regression.

|  |  |
| --- | --- |
| Average | 928.6972 |
| min | 115 |
| max | 3078 |

1. wage

IQ

|  |  |
| --- | --- |
| Average | 101.0045 |
| min | 50 |
|  |  |
| max | 145 |

1. Image on whatsapp
2. Correlation coefficient for Wages and IQ is 0.37, which indicates the moderate positive linear relationship between Wages and IQ and this is expected as shown in the Q5 scatter plot.
3. **wageˆ = -44.65 + 9.63 IQi**
4. βˆ0 -If the IQ score is 0, then the predicted wage is **-44.65**
5. βˆ1 - 1 unit increase in IQ score is associated with a $9.63 increase in predicted wage

**8** The null hypothesis is that IQ is not linearly associated with wage, which can be stated as *H*0:β1​=0. The alternative hypothesis is that IQ is linearly associated with wage, which can be stated as *H*1: β1​ ≠ 0.

9 As per the test , the pval is 1.6E-30 which is less than the significance level at 5%, hence we will reject the Null hypothesis

10, **wage^ = -270.20 + 6.37 IQi + 41.15 edui , the coeffcient of IQ on wages changes.** education variable can give more convincing causal effect of IQ on wage

11 education

|  |  |
| --- | --- |
| Average | 13.47458 |
| Min | 9 |
| Max | 18 |

12 **wage^ = -270.20 + 6.37 IQi + 41.15 edui**

If the IQ score and years of education are 0, then the predicted wage is -270.20.

**βˆ1 :** – Keeping the education fixed, a one unit increase in IQ is associated with $6.37 increase in predicted wage

**βˆ2** i - Keeping the IQ fixed, a one unit increase in edu is associated with $41.15 increase in predicted wage.

13:  **wage^ = -270.20 + 6.37 IQi + 41.15 edui**

**wage= -44.65 + 9.63 IQi**

**edu = 5.4 + 0.079 IQi**

That is, βˆ1 = 6.37, βˆ2 = 41.15, β˜1 = 9.63, δ˜1 = 0.079.

Then

**9.63≈ 6.37 + 41.15(0.079)**

14

**wage^ = -270.20 + 6.37 IQi + 41.15 edui**

**wage^ = -270.20 + 6.37 \* 99 + 41.15 \* 12**

**wage^ = -270.20 + 630.63 + 493.8**

**= 854.23**

Underpaid.