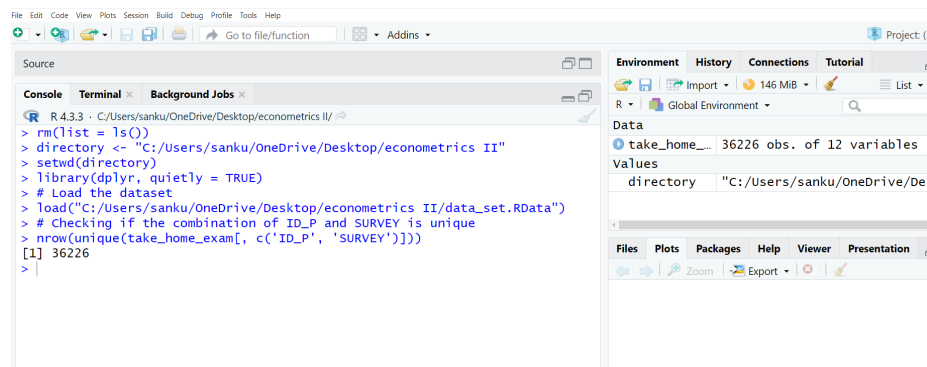# Econometrics Assignment

Sankul (220965)

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Question 1

The child id and wave number (survey year) is the unique identifier in our dataset. To confirm this using R we can use the unique function of R and find the number of unique combinations of these two variables.

Number of unique combinations

From the R output, we can verify that the number of unique combinations is indeed equal to the total number of observations.

Question 2

The mean of the binary/dummy variable widow is 0.03621 which means that the probability of finding a household headed by widow is 0.03621 so the rate of widowhood is 3.621 which looks pretty reasonable if we look at any other official stats of widowhood rates in India.

Table of summary stats

Question 3

To check that the households headed by widowed mothers are poorer or not, we can run a t test to find out if the difference in consumption expenditure per capita is statistically significant or not.

t test results

The t test results show that the p value is much less than the significance level (generally taken to be 0.05) which indicates that the difference is indeed statistically significant. Now that we know the difference in consumption expenditure per capita between widowed households and non - widowed households

is not 0, we can determine the sign by looking at the confidence interval which lies in the positive region, Therefore the non - widowed households are indeed richer compared to widowed households.

Question 4

Standardized years of education is a better measure than completed years of education because it accounts for the age of the child. Completed years of education may vary depending on the child's age, as older children will have had more time to complete their education. Standardized years of education adjusts for this age difference and allows for a more meaningful comparison across children of different ages.

Question 5

To study the association between widowhood and children's educational attainment, you can use a regression model that controls for relevant background characteristics of the household, such as:

- "hh_children": Number of children in the household

- "hh_assets": Household asset index (to capture household wealth)

- "hindu": Indicator for whether the religion is Hinduism or not

- "cons_capita": Household consumption expenditure per capita (a proxy for household wealth/income)

- "ln_cons" : Log consumption exp

Regression specifications : std_edu vs widow + other household control variables (as mentioned above)

Interpretation : First of all observe that the p value of the estimate of the coefficient of widow is much less than the significance level (0.05) indicating that there is a statistically significant positive relationship between being a widow and educational attainment. Specifically, being a widow is associated with an increase in educational attainment of 0.8041 units, on average. Using this result, we can also construct the confidence interval for the coefficient of widow to get a better understanding of the association between children's educational attainment and widowhood.

Regression Results

Question 6

To check if widowhood affects girls differently than it affects boys, We can use regression with dummy interactions. The idea is to run the regression of std_edu on widow + widow*girl. Now the coefficient of the widow*girl term reflects the difference in how widowhood affects girls and boys. If the coefficient of widow*girl term is statistically significant then we can indeed confirm that widowhood affects girls and boys differently.

Regression with dummy interactions

Regression specifications : std_edu vs widow + widow*girl

From the results of the regression, we can clearly see that the coefficient of widow*girl is indeed statistically significant (p value is less than significance level (0.05)). Now in order to determine the sign of the coefficient, we can find the confidence interval which comes out to lie in the positive region which indicates that widowhood leads to more educational attainment for girls as compared to boys. Therefore we can conclude that widowhood affects girls and boys differently and it affects girls more than it affects boys.