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Roll - ME22002.

Subject – Econometrics Assignments.

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# **Introduction:**

According to the given data set in the assignment questionnaire, the eminent macroeconomist Dr Pintu Paruie was right. There exists a problem of endogeneity within the given dataset. After applying Hausman’s test we discover the endogeneity. Then we explain the 2SLS method of regression, and then we test for relevancy and then we test for exogeneity.

For question 2 given data set and run the regression as specified. I also explain the significance of variables, R2, adjusted-R2, f test, t test. I then repeat the problem using analytical weights, on its own and also by controlling for the dummy variables. We then finally estimate a Poisson regression model before repeating all steps with robust standards error.

# **Solutions:**

Problem 1: PART a): Hausman test if H0: B-ols = B-2sls i.e., we see if the efficient estimator (B-ols) is equal to the consistent estimator (B-2sls). If H0 is not rejected B-ols Asymptotically tends towards B-2sls and as it is efficient and consistent, we will use the ols model.

Else, B-ols is not consistent and we must use B-2sls estimator. In this case H0 is rejected.

PART b): 2sls is 2-stage least squares regression using instrumental variable. First, regress endogenous variable with instruments and other independents then obtain y-hat estimated variable or u-hat estimated error term, then run regression using y-hat or using (endogenous variable – u\_hat). Process is done on do file.

PART c): Again, run 1st stage regression, then test of significance on the IV’s. Here z1 is significant at alpha- 5% and z2 at alpha – 1%. Both, are jointly significant through Chi test. They are thus relevant.

PART d): Exogeneity can be tested using J-test. First, estimate the error term of the 2sls regression then run regression on the error term estimate using IV’s and other independent variables. H0: coefficient of IV = 0; if H0 is not rejected then the IV are exogenous. Here, z1 and z2 are exogenous

[ Stata codes are in Do file- attached]

Problem 2: Part a) All variables except ‘fp’ are significant at alpha 1%. ‘fp’ significant at alpha 5%. Variance explained by ESS i.e., r-square is 0.5647, adjusted r-square is 0.5645 i.e., variance inflating factor is small. f-test shows unrestricted model Is significant. Educ\_female, age, fp have negative effect on dependent and others have positive effect.

Part b & c) Combined multiplier weight on its own decreases the p-value at which ‘fp’ is rejected to 0.023 but increases the significance of all other variables in regressing.

we have controlled using dummies such that we can only see the no. of children regressed on independent variables for women who are Hindu, tribal and from state 1. Here, all independent variables are significant except ‘fp’ which is now insignificant i.e., Hindu tribal women from state 1 are not affected by ‘fp’. We can run regression for women of any religion social group and state using this method of dummy variables.

Part d) poison regression model is used for a limited depended variable where the value of the dependent is equal to or greater than 0 and are integers. Here, it is appropriate as we cannot legally have percentages of a women. Then we can run the maximum likelihood estimator. The coefficients. Here, ‘fp’ is insignificant.

Part e)

F-test calculated value of regressions have reduced in and r-squared is equal to adjusted r-squared. Significance of fp is still questionable. Poisson does not change.