ECONOMETRICS 2 MOCK EXAM (2017 RESIT)

a) SEE #87 FOR A SIMILAR QUESTION

b) SEE #87 FOR A SIMILAR QUESTION;

CLASSICAL ASSUMPTIONS:

FIG 6. DURBIN-WATSON $d = 2.010694$

$\frac{\sqrt{n}}{2}(d-2) \xrightarrow[n\to\infty]{d} N(0,1)$ FOR $H_0: d=2$, $H_1: \neq H_0$

0.18 ; ± 1.96 (95% 2-SIDED)

DNR $H_0: d=2$ (NO FIRST-ORDER AUTOCORRELATION); FOR CROSS-SECTIONAL DATA, THIS CAN SUGGEST "CORRECT" FUNCTIONAL FORM (RESET TEST PREFERRED).

FIG 7. JARQUE-BERA TEST FOR NORMALITY

$JB = \frac{n-k}{n} JB^E = \left(1-\frac{18}{1129}\right)(9.966410)$

$\xrightarrow[n\to\infty]{d} \chi^2(2) = 9.81 > \chi^2_{0.99}(2) = 9.21$

R H_0: NORMAL ERRORS (CAS)

SUGGESTING THAT INFERENCE (HYPOTHESIS TESTS) WILL NEED TO BE ASYMPTOTIC ($n\to\infty$)

FIG 8. WHITE'S nR^2 TEST FOR HETEROSCEDASTICITY

$nR^2 \xrightarrow[n\to\infty]{d} \chi^2(m)$; m = # EXPLANATORY VARIABLES (NOT CONSTANT) IN AUXILIARY.

190.84 [0.00] R H_0: HOMOSCEDASTICITY (PART OF CAS)

$\Rightarrow$ USE WHITE'S STANDARD ERRORS NOT OLS SES.

FIG 9. BREUSCH-PAGAN-GODFREY (BPG) TEST FOR HETEROSCEDASTICITY

22.69 [0.00] $= BPG \xrightarrow[n\to\infty]{d} \chi^2(m)$ R H_0: HOMOSCEDASTICITY (AGREES WITH WHITE'S nR^2 TEST)

c) EQ02 FIG 12. TIME DUMMIES GIVE THE (ESTIMATED) CHANGE IN KIDS, RELATIVE TO 1972 (THE OMITTED CATEGORY), HOLDING ALL OTHER EXPLANATORY VARIABLES CONSTANT.

Y82 $\hat{\beta}_{16} = -0.522484$, SIGNIFICANT AT 99%.

SO, IF IN 1982, KIDS ↓ 0.52 WITH RESPECT TO 1972; AND 100 WOMEN IN 1982 PREDICTED TO HAVE $x = 52$ FEWER CHILDREN, ON AVERAGE, THAN 100 WOMEN IN 1972.

SIGNS OF ESTIMATED COEFFICIENTS ON Y74...Y84 ALL < 0 (NOT ALL SIGNIFICANT THOUGH), SUGGESTING (?) THAT FERTILITY (KIDS) ↓ OVER TIME, AND SIGNIFICANTLY IN 1982 AND 1984.

FIG 5. (WEIGHTED) MEAN OF EDUC:

1972: $\frac{1}{156}[(1\times6)+(1\times7)+(13\times8)+\cdots+(1\times19)] = 12.2$ YEARS

1984: $\frac{1}{177}[(1\times6)+(2\times7)+\cdots+(4\times20)] = 13.3$ YEARS

AVERAGE EDUC ↑ OVER TIME.

d) EQ02. FIG 12. $H_0: \beta_4 = 1$, $H_1: \neq H_0$

$t = \frac{\hat{\beta}_4 - 1}{\widehat{se}(\hat{\beta}_4)} = \frac{1.075658-1}{0.201319} = 0.38$

WHITE'S S.ES $\xrightarrow[n\to\infty]{d} N(0,1)$; ± 1.96 (95% 2-SIDED)

DNR H_0; SO AGREE WITH STATEMENT.

e) EQ03 C EQ02 FIG 12, FIG 13.

$F = \left(\frac{\hat{u}_R'\hat{u}_R}{\hat{u}'\hat{u}} - 1\right)\left(\frac{n-k}{q}\right) \overset{H_0}{\sim} F(q, n-k)$ IF CAS.

ELSE $qF \xrightarrow[n\to\infty]{d} \chi^2(q)$; $q=6$, $n=1129$, $k=18$ (EQ02)

$6F = \left(\frac{\hat{u}_R'\hat{u}_R}{\hat{u}'\hat{u}} - 1\right)(1111) \xrightarrow[n\to\infty]{d} \chi^2(6)$

35.22 ; 2771.037 ; 2685.898 ; 99% 16.81

R $H_0: \beta_2 = \cdots = \beta_{17} = 0$ ($H_1: \neq H_0$) → DO NOT REDUCE EQ02 TO EQ03, SO DO NOT USE EQ03.

F IMPLICITLY ASSUMES $Var(u) = \sigma^2 I$ SO $\widehat{Var}(\hat{\beta}) = \hat{\sigma}^2(X'X)^{-1}$; HOWEVER, WHITE'S SES USED SO $\widehat{Var}(\hat{\beta}) = (X'X)^{-1}X'\hat{\Omega}X(X'X)^{-1}$; AND THE ABOVE F STATISTIC IS ONLY APPROXIMATE (NO OTHER RESULT AVAILABLE) IT DOES NOT CORRECT FOR HETEROSCEDASTICITY...

f) EQ02. FIG 12. $\frac{\partial \widehat{KIDS}}{\partial EDUC} = -0.128427$; $+4$; -0.513708 SIGNIFICANT AT 99% LEVEL

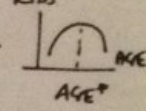
SO $\gamma = 51$ (FEWER CHILDREN, IF BLACK)

SIGNIFICANT AT 99% ↓

g) EQ02. FIG 12. $\frac{\partial \widehat{KIDS}}{\partial AGE} = 0.532135 - 2(0.005804) \times AGE$; NON-CONSTANT M.E.

$= 0$

TURNING POINT AGE* = 45.8 YEARS (IN-SAMPLE, AGE RANGE 35-54).



h) EQ02 C EQ04 (LATTER INCLUDES YEAR-EDUC INTERACTIONS) FIG 12, FIG 14

$H_0: \beta_{18} = \cdots = \beta_{23} = 0$ CAS FAIL SO $n\to\infty$ USED. $H_1: \neq H_0$

$6F = \left(\frac{\hat{u}_R'\hat{u}_R}{\hat{u}'\hat{u}} - 1\right)(1105) \xrightarrow{d} \chi^2(6)$

8.90 ; 2685.898 ; 2664.435 ; 90% 10.65

$q=6$, $n=1129$, $k=24$ (EQ04)

DNR H_0, SO REDUCE EQ04 TO EQ02 (NO TIME-EDUC INTERACTIONS)

BUT (SEE (e) ABOVE) WHITE'S SES USED SO THIS IS APPROXIMATE... SEE FIG 15 INSTEAD, WHICH CORRECTLY USES WHITE'S SES. IMMEDIATELY,

7.04 [0.32] $= W \xrightarrow[n\to\infty]{d} \chi^2(6)$ SO DNR H_0.

i) YOU WILL NOT SEE THIS "ESSAY" QUESTION ...