Examples for test requirements: Intermediate Econometrics exam (Part I)

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1. The following output on log of working hours (*lhours*) was obtained using data on 428 women:

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Linear regression                               Number of obs     =        428
                                                F(5, 422)         =      16.66
                                                Prob > F          =     0.0000
                                                R-squared         =     0.1820
                                                Root MSE          =     .88151
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lhours	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
exper	.0822754	.0212002	3.88	0.000	.0406043	.1239465
expersq	-.0016311	.0005785	-2.82	0.005	-.0027682	-.000494
educ	-.0675349	.0205523	-3.29	0.001	-.1079325	-.0271372
huswage	-.07884	.0157677	-5.00	0.000	-.109833	-.0478471
faminc	.000031	8.38e-06	3.71	0.000	.0000146	.0000475
_cons	6.852952	.266564	25.71	0.000	6.328993	7.37691

where *exper* and *expersq* = are experience and squared experience, *educ*=years of schooling, *huswage* = husband's hourly wage, *faminc* = family income.

a) Test the hypothesis that all slope coefficients are jointly equal to zero. (2 marks)
b) At the 5% significance level, test the hypothesis that the coefficient on *exper* is significantly different from zero. (2 marks)
c) Interpret the coefficients on the variable family income and husband's hourly wage. (2 marks)
d) By including dummies for young child in the family (*kidslt6* =1 if respondent has a child under 6 years old) and leaving in the urban area (*city*=1 if female respondent lives in city) a model is estimated as:

Linear regression

Number of obs	= 428
F(7, 420)	= 13.45
Prob > F	= 0.0000
R-squared	= 0.2082
Root MSE	= .86935

lhours	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
exper	.0768884	.0205078	3.75	0.000	.0365777	.1171991
expersq	-.0015813	.0005685	-2.78	0.006	-.0026987	-.0004638
educ	-.0548801	.0203352	-2.70	0.007	-.0948516	-.0149086
huswage	-.0792644	.0160618	-4.93	0.000	-.110836	-.0476928
faminc	.0000291	8.20e-06	3.55	0.000	.000013	.0000452
city	.0081688	.0941364	0.09	0.931	-.1768685	.193206
kidslt6	-.4145643	.1471281	-2.82	0.005	-.7037636	-.1253651
_cons	6.854355	.26714	25.66	0.000	6.329257	7.379453

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Test this model against the baseline equation, being careful to specify the null hypothesis being tested.

(4 marks)

e) Why is there no dummy variable for female respondents that live outside city areas?

(2 marks)

f) Would you reject or fail to reject null hypothesis on first order autocorrelation (Durbin-Watson test = 1.32)? (2 marks)

g) Some authors have suggested using father education (*fatheduc*) as an instrument for education **in wage equation**. Discuss weather or not such a variable would be a valid instrument.

(2 marks)

h) Consider the following auxiliary regression:

Source	SS	df	MS
Model	765.465719	1	765.465719
Residual	3144.57412	751	4.18718259
Total	3910.03984	752	5.19952106

Number of obs	= 753
F(1, 751)	= 182.81
Prob > F	= 0.0000
R-squared	= 0.1958
Adj R-squared	= 0.1947
Root MSE	= 2.0463

educ	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
fatheduc	.2824277	.0208884	13.52	0.000	.2414211	.3234343
_cons	9.799013	.1985373	49.36	0.000	9.409259	10.18877

Is the instrument used relevant? (2 marks)

i) Explain the J-test and way it cannot be conducted here. Propose an explicit solution. (4 marks)

j) Define and describe how and/or why each of the following is used in econometrics

a) White standard errors

b) Newey-West standard errors. (4 marks)