Econometrics

- Final Exam -

Due: 11:59pm, August 25, Sunday, 2013

Part I

Collecting data from 250 individuals, you estimate the following relationship:

	Dependent Variable: ln(*Income*)		
Regressors	(1)	(2)	(3)
Educ	0.083	0.083	0.083
	(0.011)	(0.012)	(0.012)
Exper		0.033	0.033
		(0.006)	(0.006)
$Exper^2$		-0.0005	-0.0005
		(0.0001)	(0.0001)
Married			0.062
			(0.049)
Constant	0.84	0.84	0.84
	(0.14)	(0.16)	(0.16)
Summary Statistics			
SSR	49.1	40.3	34.9
R^2	0.200	0.340	0.430
$\overline{R}^2$	0.197	0.332	0.418

where *Income* is average hourly earnings in dollars, *Educ* is years of education, *Exper* is years of work experience, and *Married* is binary variable that takes 1 if a person is married, and 0 otherwise. The numbers in parenthesis are homoskedasticity-only standard errors.

(a) In terms of goodness of fit, which regression is the best? Explain.

(b) In Regression (1), what is the change in *Income* when *Educ* increases by 1 year?

(c) Using regression (3), find a predicted value of the log of income $\ln\left(\widehat{Income}_i\right)$, for a married worker whose years in education is 15 years, and whose years in work experience is 5 years.

(d) In regression (2), what is the (partial) effect on $\ln(Income_i)$ when *Exper* increases from 5.5 to 6 years?

(e) In Regression (2), are *Exper* and $Exper^2$ jointly statistically significant at the 1% level?

(f) Which regression is the best to predict incomes? Explain. To answer this question, conduct an additional hypothesis test at the 1% level.

Part II

To analyze the growth rate of money stock (M2). you estimate AR(1) and AR(2) for the sample period from 1971:Q1 to 2012:Q4. The results are as follows:

AR(1): $\widehat{\Delta Y_t} = 0.051 + 0.28\Delta Y_{t-1}$, $\overline{R}^2 = 0.74$, $SSR = 0.0219$, $T = 167$
- (0.018) (0.069)

AR(2): $\widehat{\Delta Y_t} = 0.005 + 0.26\Delta Y_{t-1} + 0.054\Delta Y_{t-2}$, $\overline{R}^2 = 0.72$, $SSR = 0.0218$, $T = 166$
- (0.001) (0.072) (0.072)

where Y is the growth rate of money stock in percent. The numbers in parenthesis are homoskedasticity-only standard errors.

(a) Using AR(1), if the actual value of ΔY in 2012:Q4 is 0.18%, find the predicted value of ΔY in 2013:Q1. If the actual value of ΔY in 2013:Q1 turns out to be 0.12%, what is a forecast error and a RMSFE?

(b) Calculate Akaike information criteria (AIC) for AR(1) and AR(2).

(c) Based on your results in (b), explain which AR(1) or AR(2) is the better to predict the growth rate of money stock.

Part-III Explain the questions as fully as possible.

(a) Explain one of internal threats using your own example.

(b) Explain how to choose an instrumental variable (Z) in 2-stage least square (2SLS) estimation.

Critical Values of t-statistic (two-sided)

	10%	5%	1%
Critical Value	1.64	1.96	2.58

Critical Values of F-statistic

Degrees of Freedom	10%	5%	1%
1	2.71	3.84	6.63
2	2.30	3.00	4.61
3	2.08	2.60	3.78
4	1.94	2.37	3.32