Economics 6352: Applied Econometrics

Southern Methodist University

Department of Economics

Midterm I

1. For the following cases, simply state (and do not explain) whether the OLS estimates will be biased or unbiased if (assuming the other standard assumptions hold):

   (a) An irrelevant variable is included in the model

   (b) A relevant variable is excluded from the model

   (c) A proxy variable is used instead of the true unobserved explanatory variable

   (d) There is measurement error in the dependent variable

   (e) There is measurement error in the independent variable

   (f) There is exogenous sample selection

   (g) There is endogenous sample selection

   (h) There is a stratified sample with respect to an explanatory variable

   (i) There is a stratified sample with respect to the endogenous variable

   (j) The independent variable is nonstationary

   (k) There is serial correlation in the errors

2. Do you argree or disagree with the following statements? Explain briefly.

   (a) The term "spurious regression" refers to a situation when, in doing regression analysis with time series data, the heteroskedasticity present is not accounted for in the model.

   (b) Consider the following finite distributed lag model:

   $$y_t = \alpha + \delta_0 z_t + \delta_1 z_{t-1} + \delta_2 z_{t-2} + \delta_3 z_{t-3} + u_t$$

   (1) The the value of the lag distribution at lag 3 can not be determined on the basis of the information given; and (2) the long-run effect for this model is $\frac{\delta_1+\delta_2+\delta_3}{\alpha}$.

   (c) Suppose the trend behavior of the "natural logarithm" of a time series is linear. The raw data (i.e., the data without computing the logarithm) follow an exponential trend.

3. The effects of inflation and deficits on interest rates is shown the in the table below. The variable $i3$ is the three-month T-bill rate, inf is the annual inflation rate based on the consumer price index (CPI), and def is the federal budget defitict as a percentage of GDP. The estimated equation is:

Dependent Variable: $i3$
Method: Least Squares
Date: 02/12/06 Time: 16:18
Sample: 1948 2003
Included observations: 56

Variable	Coefficient	Standard Error	t-Statistic	p-value
c	1.7332	0.4319	4.0125	0.0002
inf	0.6059	0.0821	7.3764	0.0000
def	0.5131	0.1184	4.3338	0.0001
R-squared	0.6021	Mean Dependent var		4.9082
Adjusted R-squared	0.5870	S.D. depdenent var		2.8682
S.E. of regression	1.8432	Akaike info criterion		4.1129
Log likelihood	-112.16	F-statistic		40.094
Durbin-Watson stat	0.7161	Prob(F-statistic)		0.0000

1. (a) Interpret the coefficients on the explanatory variables.

   (b) Is there any evidence to suggest that serial correlation is present in this model? If so, what evidence is there?

Now suppose you wanted to test for serial correlation and ran the following model:

Dependent Variable: $\widehat{u}_t$
Method: Least Squares
Date: 02/12/06 Time: 17:02
Sample: 1949 2003
Included observations: 55 after adjustments

Variable	Coefficient	Standard Error	t-Statistic	p-value
c	0.0153	0.1903	0.0805	0.9361
$\widehat{u}_{t-1}$	0.6225	0.1098	5.6686	0.0000
R-squared	0.3774	Mean Dependent var		0.0589
Adjusted R-squared	0.3657	S.D. depdenent var		1.7709
S.E. of regression	1.4104	Akaike info criterion		3.5614
Log likelihood	-95.937	F-statistic		32.133
Durbin-Watson stat	1.5927	Prob(F-statistic)		0.0000

1. c. Explain why the number of observations is now 55.

   d. Interpret the coefficient on the regressor.

   e. What is the conclusion of the above test?

   f. Give two reasons why a rejection of this test may not necessarily mean that serial correlation is present?