UNIVERSITI UTARA MALAYSIA
PEPERIKSAAN SEMESTER DISEMBER SESI 1990/91

KOD KURSUS : EG3143 EKONOMEIRIK
TARIKH : 6 JUN 1991 (KHAMIS)
MASA : 9.00 - 11.30 PAGI (2 1/2 JAM)
TEMPAT : DKG 1/1

ARAHAN :

1. Kertas soalan ini mengandungi LIMA (5) soalan dalam TIGA (3) muka surat yang bercetak.
2. Anda dikehendaki memilih EMPAT (4) soalan sahaja untuk dijawab.

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NO. MATRIK : ____________________________
(dengan perkataan)

(dengan angka)

NO. KAD PENGENALAN : ________________

JANGAN BUKA SOALAN INI SEHINGGA DIBERI ARAHAN
1. The data of the following table are the OLS residuals of a simple regression model \( Y = b_0 + b_1 X + U \) where \( U \) is the error term satisfying the standard assumptions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Residuals ( e_t )</th>
<th>Year</th>
<th>Residuals ( e_t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>1.0</td>
<td>1960</td>
<td>-4.6</td>
</tr>
<tr>
<td>1951</td>
<td>-1.5</td>
<td>1961</td>
<td>-4.3</td>
</tr>
<tr>
<td>1952</td>
<td>-0.7</td>
<td>1962</td>
<td>1.9</td>
</tr>
<tr>
<td>1953</td>
<td>-1.3</td>
<td>1963</td>
<td>1.9</td>
</tr>
<tr>
<td>1954</td>
<td>-4.6</td>
<td>1964</td>
<td>2.9</td>
</tr>
<tr>
<td>1955</td>
<td>-0.3</td>
<td>1965</td>
<td>-2.6</td>
</tr>
<tr>
<td>1956</td>
<td>-3.1</td>
<td>1966</td>
<td>-2.3</td>
</tr>
<tr>
<td>1957</td>
<td>-5.5</td>
<td>1967</td>
<td>0.9</td>
</tr>
<tr>
<td>1958</td>
<td>-4.7</td>
<td>1968</td>
<td>1.4</td>
</tr>
<tr>
<td>1959</td>
<td>-1.3</td>
<td>1969</td>
<td>3.7</td>
</tr>
</tbody>
</table>

i. Calculate Durbin-Watson statistic \( d \) and test for autocorrelation. (12 marks)

ii. Use the data given above and estimate \( \hat{\sigma} \), where \( \hat{\sigma} \) is given by the first order autoregressive scheme. (5 marks)

\[
e_t = \frac{\hat{\sigma}}{\sqrt{1 + \rho}} e_{t-1} + \nu_t
\]

iii. Explain any method that you may propose to remove autocorrelation. (8 marks)
2 i. What is heteroscedasticity and what are its consequences? (5 marks)

ii. Explain Goldfeld and Quandt test for detection of heteroscedasticity. (12 marks)

iii. Discuss any appropriate method which will remove heteroscedasticity and transform the model so that least squares method can be applied. (8 marks)

3. Write notes on the following.

i. Multicollinearity in explanatory variables.

ii. Distributed Lag Models.

iii. The role of dummy variables in regression models. (25 marks)

4 i. Explain what simultaneous equation bias is and why it arises in trying to estimate structural form equations by OLS. (5 marks)

ii. Explain the concepts of exact-, over- and underidentification in a simultaneous equations model. (8 marks)

iii. Derive the reduced form coefficients of the behavioural equations of the simple Keynesian model of income determination.

\[
C + a_1 Y + U_t \\
I_t = b_1 Y_{t-1} + b_2 Y_t + U_t \\
Y_t = C_t + I_t + G_t
\]

where

\[
C_t = \text{Consumption} \\
Y_t = \text{Income} \\
I_t = \text{Investment} \\
G_t = \text{Autonomous Government Expenditure}
\]

\[
U_1 \text{ and } U_2 \text{ are error terms satisfying usual assumptions.}
\]

(12 marks)
5. In a study of the determination of prices of final output at factor cost in an imaginary country, the following results were obtained on the basis of annual data for the period 1951 - 1969.

\[
PF_t = 2.033 + 0.273W_t - 0.521X_t + 0.256M_t + 0.028M_{t-1} + 0.121PF_{t-1}
\]

\[
(0.992) (0.127) (0.099) (0.024) (0.039)
\]

\[R^2 = 0.984\]

\[d = 2.54\]

where \(PF_t\) = prices of final output at factor cost at time \(t\)

\(W_t\) = wages and salaries per employee at time \(t\)

\(X_t\) = gross domestic product per person employed at time \(t\)

\(M_t\) = import prices at time \(t\)

\(M_{t-1}\) = import prices lagged one year

\(PF_{t-1}\) = prices of final output at factor cost in the previous year.

(Figures in brackets are standard errors of regression coefficients).

Interpret the results using economic and statistical criteria.

(25 marks)