

### ASSIGNMENT 3 – BUEC 333

Due: 9AM on Monday March 4, 2013 by email.

1. Illustrate how you transform the following model to estimate it through the Generalized Least Squares:

$$y_t = \beta_0 + \beta_1 x_{t-1} + \beta_2 x_{t-2} + u_t, \quad u_t = \rho u_{t-8} + \epsilon_t, \quad \epsilon_t \sim N(0, \sigma^2)$$

where  $\epsilon_t$  is a classical error term, distributed normally with zero mean and  $\sigma^2$  variance.

2. Illustrate how you transform the following model to estimate it through the Weighted Least Squares:

$$y_t = \beta_0 + \beta_1 x_t + \beta_2 z_t + u_t, \quad u_t \sim N(0, \sigma^2 z_t^3)$$

- 3.

$$\text{Consumption}_t = \alpha + \beta \text{Income}_t + \epsilon_t$$

where

$\epsilon_t = \rho_1 \epsilon_{t-1} + \rho_2 \epsilon_{t-2} + u_t$  and  $u_t$  are identically and independently distributed. Obtain the data for per capita consumption and per capita income for Canada for a duration of 10 years, monthly frequency and estimate the coefficients through the Generalized Least Squares. Any 10 year period is acceptable. Indicate your data source in your results. Fully display your regression results and discuss any model specification issues involved. (Please do not print the data with your results, only the regression results should be displayed.)

4. Design/simulate a linear regression model with two independent variables which are correlated. Illustrate the severity of the multicollinearity with Variance Inflation Factor (VIF) analysis. The number of observations should be 100 and make all necessary assumptions in your simulation environment when setting the parameters and choosing the distribution of the error term. Be complete in your analysis and the description of your results.