

## Week 11 Assignment

### Applied Econometrics

1. For the following regression equation;  
 $y_{it} = \beta_o x_{it} + a_i + v_{it}$  where  $i = 1, 2, \dots, n$  and  $t = 1, 2, \dots, T$  if  $x_{it}$  is correlated with past values of  $v_{it}$ , but not correlated with contemporaneous and future values  $v_{it}$  of then  $x_{it}$  is known as;
  - a. Exogenous Variable
  - b. Endogenous Variable
  - c. **Predetermined Variable**
  - d. Dependent Variable
  - e. Lagged Dependent Variable.
2. If for the following regression equation;  
 $y_{it} = \beta_o x_{it} + a_i + v_{it}$  where  $i = 1, 2, \dots, n$  and  $t = 1, 2, \dots, T$ ,  $x_{it}$  is correlated with past and contemporaneous values of  $v_{it}$ , but not correlated with future values  $v_{it}$  of then  $x_{it}$  is known as;
  - a. Exogenous Variable
  - b. **Predetermined Variable**
  - c. Dependent Variable
  - d. Lagged Dependent Variable.
  - e. **None of the above**
3. If for the following regression equation;  
 $y_{it} = \beta_o x_{it} + a_i + v_{it}$  where  $i = 1, 2, \dots, n$  and  $t = 1, 2, \dots, T$ ,  $x_{it}$  is uncorrelated with past, contemporaneous and future values of  $v_{it}$ , but may be correlated with  $a_i$  then  $x_{it}$  is known as;
  - a. **Exogenous Variable**
  - b. Predetermined Variable
  - c. Dependent Variable
  - d. Lagged Dependent Variable.
  - e. None of the above
4. The one-step GMM estimator is;
  - a.  **$\hat{\beta}_1 = \left( \Delta X' Z W_N^{-1} Z' \Delta X \right)^{-1} \Delta X' Z W_N^{-1} Z' \Delta Y$**
  - b.  $\hat{\beta}_1 = \left( \Delta X' Z W_N^{-1} Z' \Delta X \right) \Delta X' Z W_N^{-1} Z' \Delta Y$
  - c.  $\hat{\beta}_1 = \left( \Delta X Z W_N^{-1} Z' \Delta X \right)^{-1} \Delta X' Z W_N^{-1} Z' \Delta Y$
  - d.  $\hat{\beta}_1 = \left( \Delta X' Z W_N^{-1} Z' \Delta X \right)^{-1} \Delta X' Z W_N^{-1} Z'$
  - e.  $\hat{\beta}_1 = \left( \Delta X' Z W_N^{-1} Z' \Delta X \right)^{-1} \Delta X' Z Z' \Delta Y$

5. Standard Error of Two Step GMM Estimator has
  - a. Downward Bias for large sample
  - b. Downward Bias for small sample**
  - c. Upward Bias for large sample
  - d. Upward Bias for small sample
  - e. None of the above.

Answer the following question using abdata.dta.

Suppose, you want to find out the determinants of firm employment for 140 firms in UK, where firm employment is dependent upon previous year's employment for two successive years, wage, previous year's wage, capital, lag of capital for two successive years, actual output, lag of actual output for two successive years. The model is following,

$$n = \rho nL_1 + \beta_1 nL_2 + \beta_2 w + \beta_3 wL_1 + \beta_4 k + \beta_5 kL_1 + \beta_6 kL_2 + \beta_7 ys + \beta_8 ysL_1 + \beta_9 ysL_2 + \beta_{10} yr^* + u_i$$

6. Estimate the following model using First Difference approach considering lag of level ( $nL_2$ ) as the instrument for our endogenous variable *difference of  $nL_1$* . What will be the coefficient for the variable  $D. nL_1$  (last year employment)?
  - a. 1
  - b. 1.04
  - c. 0.73
  - d. 2.30**
  - e. 0.429
7. Estimate the following model using Arellano Bond Estimator while taking two lags for all the years and for all the variables. What will be the coefficient for the variable  $nL_1$  (last year employment)?
  - a. 0.73
  - b. 0.77**
  - c. 0.13
  - d. 0.23
  - e. -0.73