**Assignment - 2**

**Modifying the Stata code to estimate an AR (2) and ARMA (2,1) model.**

**Course:** ECO489

**Section:** 01

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**Modifying the Stata code to estimate an AR (2) and ARMA (2,1) model.**

* **clear all**
* **quietly set obs 1000**
* **set seed 10101**
* **gen t=\_n**
* **tsset t**
* **scalar a = 0.48**
* **scalar b = 0.23 // modified b value from 0.83 to 0.23**
* **scalar c = 0.005**
* **scalar d = 0.014**

**// Generating rho value for lag 1 & 2**

* **gen rho1 = a+(b-a)\*runiform()**
* **gen rho2 = d+(a-b)\*runiform() // generating rho value for lag2**

**// Generating the error term**

* **gen s = c+(d-c)\*runiform()**
* **gen et = rnormal(0, s)**

**// Generating yt value for AR (2) model**

* **quietly gen yt2 = et in 1/2**
* **quietly replace yt2=rho1\*yt2[\_n-1]+rho2\*yt2[\_n-2]+et in 3/L**
* **ac yt2 //indicates MA (4)**

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* **pac yt2 //indicates AR (2)**

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There are several autocorrelations that are significantly non-zero. From the PACF plot we can observe that the current period is correlated with its own lag 1 and lag 2 and it indicates AR (2) model at 95% confidence brands.

**// Estimating ARMA (2,1) model**

* **arima yt2, arima(2,0,1)**

(setting optimization to BHHH)

Iteration 0: log likelihood = 3178.1963

Iteration 1: log likelihood = 3178.3359

Iteration 2: log likelihood = 3178.3411

Iteration 3: log likelihood = 3178.3415

Iteration 4: log likelihood = 3178.3415

(switching optimization to BFGS)

Iteration 5: log likelihood = 3178.3415

ARIMA regression

Sample: 1 thru 1000 Number of obs = 1000

Wald chi2(3) = 221.02

Log likelihood = 3178.342 Prob > chi2 = 0.0000

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| OPG

yt2 | Coefficient std. err. z P>|z| [95% conf. interval]

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yt2 |

\_cons | .0007313 .0006325 1.16 0.248 -.0005083 .0019709

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ARMA |

ar |

L1. | .3681615 .1771573 2.08 0.038 .0209396 .7153835

L2. | .1471481 .0750975 1.96 0.050 -.0000402 .2943364

|

ma |

L1. | -.0591123 .1800244 -0.33 0.743 -.4119535 .293729

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/sigma | .0100783 .0001885 53.48 0.000 .0097089 .0104476

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From the ARMA (2,1) model: At AR (2), both L1 and L2 is statistically significant at 5% significant level, which says that current period of yt2 is correlated with its own lag 1 & lag 2.

At MA (1), L1 is statistically insignificant at 95% confidential interval, which says that the current value is not linearly dependent on the current and previous unit error terms at 5% significance level.