# Appendices

# Appendix A

# Unit Root Test

## Appendix A-1: Unit Root Test- ADF Test of growth rate Thai Baht gold spot price 96.50% (At level-Trend and intercept)

Null Hypothesis: GL96 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=27)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -53.27998 | 0.0000 |
| Test critical values: | 1% level | -3.961482 | |
| | 5% level | -3.411491 | |
| | 10% level | -3.127605 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GL96)
Method: Least Squares
Date: 11/16/11 Time: 02:17
Sample (adjusted): 2 2670
Included observations: 2669 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GL96(-1) | -1.031400 | 0.019358 | -53.27998 | 0.0000 |
| C | 0.035681 | 0.035685 | 0.999895 | 0.3175 |
| @TREND(1) | 2.01E-05 | 2.32E-05 | 0.867630 | 0.3857 |

| | | | |
|---|---|---|---|
| R-squared | 0.515692 | Mean dependent var | -7.23E-05 |
| Adjusted R-squared | 0.515328 | S.D. dependent var | 1.323439 |
| S.E. of regression | 0.921357 | Akaike info criterion | 2.675184 |
| Sum squared resid | 2263.162 | Schwarz criterion | 2.681804 |
| Log likelihood | -3567.033 | Hannan-Quinn criter. | 2.677579 |
| F-statistic | 1419.378 | Durbin-Watson stat | 1.999329 |
| Prob(F-statistic) | 0.000000 | | |

## Appendix A- 2: Unit Root Test- PP Test of growth rate Thai Baht gold spot price 96.50% (At level-Trend and intercept)

Null Hypothesis: GL96 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West using Bartlett kernel)

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -53.25652 | 0.0000 |
| Test critical values: | 1% level | -3.961482 | |
| | 5% level | -3.411491 | |
| | 10% level | -3.127605 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.847944 |
| HAC corrected variance (Bartlett kernel) | 0.886930 |

Phillips-Perron Test Equation
Dependent Variable: D(GL96)
Method: Least Squares
Date: 11/16/11 Time: 02:19
Sample (adjusted): 2 2670
Included observations: 2669 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GL96(-1) | -1.031400 | 0.019358 | -53.27998 | 0.0000 |
| C | 0.035681 | 0.035685 | 0.999895 | 0.3175 |
| @TREND(1) | 2.01E-05 | 2.32E-05 | 0.867630 | 0.3857 |

| | | | |
|---|---|---|---|
| R-squared | 0.515692 | Mean dependent var | -7.23E-05 |
| Adjusted R-squared | 0.515328 | S.D. dependent var | 1.323439 |
| S.E. of regression | 0.921357 | Akaike info criterion | 2.675184 |
| Sum squared resid | 2263.162 | Schwarz criterion | 2.681804 |
| Log likelihood | -3567.033 | Hannan-Quinn criter. | 2.677579 |
| F-statistic | 1419.378 | Durbin-Watson stat | 1.999329 |
| Prob(F-statistic) | 0.000000 | | |

## Appendix A-3: Unit Root Test- ADF Test of growth rate Thai Baht gold spot price 99.99% (At level-Trend and intercept)

Null Hypothesis: GL99 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=27)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -53.27998 | 0.0000 |
| Test critical values: | 1% level | -3.961482 | |
| | 5% level | -3.411491 | |
| | 10% level | -3.127605 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GL99)
Method: Least Squares
Date: 11/16/11 Time: 02:23
Sample (adjusted): 2 2670
Included observations: 2669 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GL99(-1) | -1.031400 | 0.019358 | -53.27998 | 0.0000 |
| C | 0.035681 | 0.035685 | 0.999895 | 0.3175 |
| @TREND(1) | 2.01E-05 | 2.32E-05 | 0.867630 | 0.3857 |

| | | | |
|---|---|---|---|
| R-squared | 0.515692 | Mean dependent var | -7.23E-05 |
| Adjusted R-squared | 0.515328 | S.D. dependent var | 1.323439 |
| S.E. of regression | 0.921357 | Akaike info criterion | 2.675184 |
| Sum squared resid | 2263.162 | Schwarz criterion | 2.681804 |
| Log likelihood | -3567.033 | Hannan-Quinn criter. | 2.677579 |
| F-statistic | 1419.378 | Durbin-Watson stat | 1.999329 |
| Prob(F-statistic) | 0.000000 | | |

## Appendix A-4: Unit Root Test- PP Test of growth rate Thai Baht gold spot price 99.99% (At level-Trend and intercept)

Null Hypothesis: GL99 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West using Bartlett kernel)

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -53.25652 | 0.0000 |
| Test critical values: | 1% level | -3.961482 | |
| | 5% level | -3.411491 | |
| | 10% level | -3.127605 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 0.847944 |
| HAC corrected variance (Bartlett kernel) | 0.886930 |

Phillips-Perron Test Equation
Dependent Variable: D(GL99)
Method: Least Squares
Date: 11/16/11 Time: 02:26
Sample (adjusted): 2 2670
Included observations: 2669 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GL99(-1) | -1.031400 | 0.019358 | -53.27998 | 0.0000 |
| C | 0.035681 | 0.035685 | 0.999895 | 0.3175 |
| @TREND(1) | 2.01E-05 | 2.32E-05 | 0.867630 | 0.3857 |

| | | | |
|---|---|---|---|
| R-squared | 0.515692 | Mean dependent var | -7.23E-05 |
| Adjusted R-squared | 0.515328 | S.D. dependent var | 1.323439 |
| S.E. of regression | 0.921357 | Akaike info criterion | 2.675184 |
| Sum squared resid | 2263.162 | Schwarz criterion | 2.681804 |
| Log likelihood | -3567.033 | Hannan-Quinn criter. | 2.677579 |
| F-statistic | 1419.378 | Durbin-Watson stat | 1.999329 |
| Prob(F-statistic) | 0.000000 | | |

## Appendix A-5: Unit Root Test- ADF Test of exchange rate (At level-Trend and intercept)

Null Hypothesis: RATE has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=27)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -57.08512 | 0.0000 |
| Test critical values: | 1% level | -3.961482 | |
| | 5% level | -3.411491 | |
| | 10% level | -3.127605 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RATE)
Method: Least Squares
Date: 11/16/11 Time: 02:30
Sample (adjusted): 2 2670
Included observations: 2669 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| RATE(-1) | -1.100039 | 0.019270 | -57.08512 | 0.0000 |
| C | 1.220680 | 0.675146 | 1.808024 | 0.0707 |
| @TREND(1) | -0.000651 | 0.000438 | -1.487490 | 0.1370 |

| | | | |
|---|---|---|---|
| R-squared | 0.550020 | Mean dependent var | 8.51E-05 |
| Adjusted R-squared | 0.549683 | S.D. dependent var | 25.96827 |
| S.E. of regression | 17.42618 | Akaike info criterion | 8.554948 |
| Sum squared resid | 809589.2 | Schwarz criterion | 8.561568 |
| Log likelihood | -11413.58 | Hannan-Quinn criter. | 8.557344 |
| F-statistic | 1629.356 | Durbin-Watson stat | 2.002184 |
| Prob(F-statistic) | 0.000000 | | |

## Appendix A-6: Unit Root Test- PP Test of exchange rate (At level-Trend and intercept)

Null Hypothesis: RATE has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West using Bartlett kernel)

| | | Adj. t-Stat | Prob.* |
|---|---|---|---|
| Phillips-Perron test statistic | | -57.12410 | 0.0000 |
| Test critical values: | 1% level | -3.961482 | |
| | 5% level | -3.411491 | |
| | 10% level | -3.127605 | |

*MacKinnon (1996) one-sided p-values.

| | |
|---|---|
| Residual variance (no correction) | 303.3306 |
| HAC corrected variance (Bartlett kernel) | 299.3296 |

Phillips-Perron Test Equation
Dependent Variable: D(RATE)
Method: Least Squares
Date: 11/16/11 Time: 02:31
Sample (adjusted): 2 2670
Included observations: 2669 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| RATE(-1) | -1.100039 | 0.019270 | -57.08512 | 0.0000 |
| C | 1.220680 | 0.675146 | 1.808024 | 0.0707 |
| @TREND(1) | -0.000651 | 0.000438 | -1.487490 | 0.1370 |

| | | | |
|---|---|---|---|
| R-squared | 0.550020 | Mean dependent var | 8.51E-05 |
| Adjusted R-squared | 0.549683 | S.D. dependent var | 25.96827 |
| S.E. of regression | 17.42618 | Akaike info criterion | 8.554948 |
| Sum squared resid | 809589.2 | Schwarz criterion | 8.561568 |
| Log likelihood | -11413.58 | Hannan-Quinn criter. | 8.557344 |
| F-statistic | 1629.356 | Durbin-Watson stat | 2.002184 |
| Prob(F-statistic) | 0.000000 | | |

# Appendix B

# Long Memory Test

**Appendix B-1: Long Memory Test (GPH Test) of Thai Baht gold spot price 96.50%**

> gphTest (abs(GR.gl96))

Test for Long Memory: GPH Test

Null Hypothesis: d = 0

Test Statistics:

| | C1 |
|---|---|
| d | 0.598 |
| stat | 5.8711** |

* : significant at 5% level

** : significant at 1% level

Total Observ.: 2670

Number of Freq: 51

**Appendix B-2: Long Memory Test (R/S Test) of Thai Baht gold spot price 96.50%**

> rosTest(abs(GR.gl96),bandwidth = 0)

Test for Long Memory: R/S Test

Null Hypothesis: no long-term dependence

Test Statistics:

| C1 |
|---|
| 5.8868** |

* : significant at 5% level

** : significant at 1% level

Total Observ.: 2670

**Appendix B-3: Long Memory Test (Modified R/S Test) of Thai Baht gold spot price 96.50%**

```
> rosTest (abs(GR.gl96))

Test for Long Memory: Modified R/S Test

Null Hypothesis: no long-term dependence

Test Statistics:
     C1
 3.78**

 * : significant at 5% level
** : significant at 1% level

 Total Observ.: 2670
   Bandwidth : 9
```

**Appendix B-4: Long Memory Test (GPH Test) of Thai Baht gold spot price 99.99%**

> gphTest (abs(GR.gl99))

Test for Long Memory: GPH Test

Null Hypothesis: d = 0

Test Statistics:

| | C1 |
|---|---|
| d | 0.1393 |
| stat | 1.3675 |

* : significant at 5% level

** : significant at 1% level

Total Observ.: 2670

Number of Freq: 51

**Appendix B-5: Long Memory Test (R/S Test) of Thai Baht gold spot price 99.99%**

> rosTest(abs(GR.gl99),bandwidth=0)

Test for Long Memory: R/S Test

Null Hypothesis: no long-term dependence

Test Statistics:

| C1 |
|---|
| 3.4732** |

* : significant at 5% level

** : significant at 1% level

Total Observ.: 2670

**Appendix B-6: Long Memory Test (Modified R/S Test) of Thai Baht gold spot price 99.99%**

```
> rosTest(abs(GR.gl99))

Test for Long Memory: Modified R/S Test

Null Hypothesis: no long-term dependence

Test Statistics:
      C1
2.5613**

 * : significant at 5% level
** : significant at 1% level

 Total Observ.: 2670
   Bandwidth : 9
```

**Appendix B-7: Long Memory Test (GPH Test) of exchange rate of THB per USD**

> gphTest (abs(GRr))

Test for Long Memory: GPH Test

Null Hypothesis: d = 0

Test Statistics:

| | C1 |
|---|---|
| d | 0.5535 |
| stat | 5.4336** |

* : significant at 5% level

** : significant at 1% level

Total Observ.: 2670

Number of Freq: 51

**Appendix B-8: Long Memory Test (R/S Test) of exchange rate of THB per USD**

> rosTest (abs(GRr), bandwidth=0)

Test for Long Memory: R/S Test

Null Hypothesis: no long-term dependence

Test Statistics:

| C1 |
|---|
| 7.3413** |

* : significant at 5% level

** : significant at 1% level

Total Observ.: 2670

**Appendix B-9: Long Memory Test (Modified R/S Test) of exchange rate of THB per USD**

```
> rosTest(abs(GRr))

Test for Long Memory: Modified R/S Test

Null Hypothesis: no long-term dependence

Test Statistics:
      C1
3.9527**

 * : significant at 5% level
** : significant at 1% level

 Total Observ.: 2670
   Bandwidth : 9
```

# Appendix C

# ARFIMAX (p, d, q, X) Test

## Appendix C-1: ARFIMAX (0, d, 0) Test of Thai Baht gold spot price 96.50%

Dependent Variable: DIFFGRG96
Method: Least Squares
Date: 11/29/11 Time: 00:41
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.041679 | 0.019355 | -2.153336 | 0.0314 |
| GRRATE | -0.090432 | 0.043235 | -2.091618 | 0.0366 |
| C | 0.054909 | 0.017836 | 3.078577 | 0.0021 |

| | | | |
|---|---|---|---|
| R-squared | 0.003324 | Mean dependent var | 0.056166 |
| Adjusted R-squared | 0.002576 | S.D. dependent var | 0.921936 |
| S.E. of regression | 0.920748 | Akaike info criterion | 2.673862 |
| Sum squared resid | 2259.324 | Schwarz criterion | 2.680484 |
| Log likelihood | -3563.932 | Hannan-Quinn criter. | 2.676259 |
| F-statistic | 4.444386 | Durbin-Watson stat | 2.000124 |
| Prob(F-statistic) | 0.011831 | | |

## Appendix C-2: ARFIMAX (1, d, 0) Test of Thai Baht gold spot price 96.50%

Dependent Variable: DIFFGRG96
Method: Least Squares
Date: 11/29/11 Time: 00:44
Sample (adjusted): 4 2670
Included observations: 2667 after adjustments
Convergence achieved after 5 iterations

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.002966 | 0.220243 | -0.013467 | 0.9893 |
| GRRATE | -0.090678 | 0.043269 | -2.095703 | 0.0362 |
| C | 0.054918 | 0.017181 | 3.196442 | 0.0014 |
| AR(1) | -0.038780 | 0.220399 | -0.175952 | 0.8603 |

| | | | |
|---|---|---|---|
| R-squared | 0.003327 | Mean dependent var | 0.056190 |
| Adjusted R-squared | 0.002205 | S.D. dependent var | 0.922108 |
| S.E. of regression | 0.921091 | Akaike info criterion | 2.674983 |
| Sum squared resid | 2259.312 | Schwarz criterion | 2.683815 |
| Log likelihood | -3563.090 | Hannan-Quinn criter. | 2.678179 |
| F-statistic | 2.963546 | Durbin-Watson stat | 2.000027 |
| Prob(F-statistic) | 0.030965 | | |

| | |
|---|---|
| Inverted AR Roots | -.04 |

## Appendix C-3: ARFIMAX (0, d, 1) Test of Thai Baht gold spot price 96.50%

Dependent Variable: DIFFGRG96
Method: Least Squares
Date: 11/29/11 Time: 00:44
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments
Convergence achieved after 18 iterations
MA Backcast: 2

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.020925 | 0.425760 | -0.049147 | 0.9608 |
| GRRATE | -0.090658 | 0.043236 | -2.096812 | 0.0361 |
| C | 0.054906 | 0.017470 | 3.142934 | 0.0017 |
| MA(1) | -0.020752 | 0.426144 | -0.048697 | 0.9612 |

| | | | |
|---|---|---|---|
| R-squared | 0.003326 | Mean dependent var | 0.056166 |
| Adjusted R-squared | 0.002203 | S.D. dependent var | 0.921936 |
| S.E. of regression | 0.920920 | Akaike info criterion | 2.674611 |
| Sum squared resid | 2259.320 | Schwarz criterion | 2.683440 |
| Log likelihood | -3563.930 | Hannan-Quinn criter. | 2.677805 |
| F-statistic | 2.963138 | Durbin-Watson stat | 2.000098 |
| Prob(F-statistic) | 0.030982 | | |

| | |
|---|---|
| Inverted MA Roots | .02 |

## Appendix C-4: ARFIMAX (1, d, 1) Test of Thai Baht gold spot price 96.50%

Dependent Variable: DIFFGRG96
Method: Least Squares
Date: 11/29/11 Time: 00:44
Sample (adjusted): 4 2670
Included observations: 2667 after adjustments
Convergence achieved after 15 iterations
MA Backcast: 3

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | 0.008769 | 0.456923 | 0.019192 | 0.9847 |
| GRRATE | -0.090694 | 0.043286 | -2.095239 | 0.0362 |
| C | 0.054921 | 0.016979 | 3.234764 | 0.0012 |
| AR(1) | -0.032894 | 0.484190 | -0.067937 | 0.9458 |
| MA(1) | -0.017621 | 0.844232 | -0.020872 | 0.9833 |

| | | | |
|---|---|---|---|
| R-squared | 0.003328 | Mean dependent var | 0.056190 |
| Adjusted R-squared | 0.001830 | S.D. dependent var | 0.922108 |
| S.E. of regression | 0.921264 | Akaike info criterion | 2.675732 |
| Sum squared resid | 2259.311 | Schwarz criterion | 2.686772 |
| Log likelihood | -3563.089 | Hannan-Quinn criter. | 2.679727 |
| F-statistic | 2.222117 | Durbin-Watson stat | 2.000018 |
| Prob(F-statistic) | 0.064249 | | |

| | |
|---|---|
| Inverted AR Roots | -.03 |
| Inverted MA Roots | .02 |

## Appendix C-5: ARFIMAX (2, d, 2) Test of Thai Baht gold spot price 96.50%

Dependent Variable: DIFFGRG96
Method: Least Squares
Date: 11/29/11 Time: 00:45
Sample (adjusted): 5 2670
Included observations: 2666 after adjustments
Convergence achieved after 34 iterations
MA Backcast: 3 4

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.017222 | 0.025117 | -0.685666 | 0.4930 |
| GRRATE | -0.082764 | 0.043089 | -1.920758 | 0.0549 |
| C | 0.054880 | 0.017515 | 3.133290 | 0.0017 |
| AR(1) | -1.027933 | 0.091245 | -11.26561 | 0.0000 |
| AR(2) | -0.827058 | 0.080602 | -10.26100 | 0.0000 |
| MA(1) | 1.008366 | 0.099331 | 10.15156 | 0.0000 |
| MA(2) | 0.804070 | 0.086900 | 9.252790 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.012552 | Mean dependent var | 0.056213 |
| Adjusted R-squared | 0.010324 | S.D. dependent var | 0.922280 |
| S.E. of regression | 0.917507 | Akaike info criterion | 2.668309 |
| Sum squared resid | 2238.397 | Schwarz criterion | 2.683770 |
| Log likelihood | -3549.856 | Hannan-Quinn criter. | 2.673904 |
| F-statistic | 5.633478 | Durbin-Watson stat | 1.999410 |
| Prob(F-statistic) | 0.000008 | | |

| | | |
|---|---|---|
| Inverted AR Roots | -.51+.75i | -.51-.75i |
| Inverted MA Roots | -.50+.74i | -.50-.74i |

## Appendix C-6: ARFIMAX (0, d, 0) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: Least Squares
Date: 12/10/11 Time: 00:24
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.376290 | 0.019169 | -19.63048 | 0.0000 |
| GRR | 0.504338 | 0.117745 | 4.283323 | 0.0000 |
| C | 0.129518 | 0.048616 | 2.664091 | 0.0078 |

| | | | |
|---|---|---|---|
| R-squared | 0.132527 | Mean dependent var | 0.079669 |
| Adjusted R-squared | 0.131876 | S.D. dependent var | 2.690975 |
| S.E. of regression | 2.507267 | Akaike info criterion | 4.677388 |
| Sum squared resid | 16753.23 | Schwarz criterion | 4.684010 |
| Log likelihood | -6236.635 | Hannan-Quinn criter. | 4.679784 |
| F-statistic | 203.5700 | Durbin-Watson stat | 2.008318 |
| Prob(F-statistic) | 0.000000 | | |

## Appendix C-7: ARFIMAX (1, d, 0) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: Least Squares
Date: 12/10/11 Time: 00:26
Sample (adjusted): 4 2670
Included observations: 2667 after adjustments
Convergence achieved after 12 iterations

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.299224 | 0.106310 | -2.814635 | 0.0049 |
| GRR | 0.499177 | 0.117439 | 4.250524 | 0.0000 |
| C | 0.120787 | 0.046612 | 2.591346 | 0.0096 |
| AR(1) | -0.079897 | 0.107132 | -0.745781 | 0.4559 |

| | | | |
|---|---|---|---|
| R-squared | 0.132835 | Mean dependent var | 0.079699 |
| Adjusted R-squared | 0.131858 | S.D. dependent var | 2.691479 |
| S.E. of regression | 2.507762 | Akaike info criterion | 4.678157 |
| Sum squared resid | 16747.27 | Schwarz criterion | 4.686989 |
| Log likelihood | -6234.323 | Hannan-Quinn criter. | 4.681353 |
| F-statistic | 135.9755 | Durbin-Watson stat | 2.003630 |
| Prob(F-statistic) | 0.000000 | | |

| | |
|---|---|
| Inverted AR Roots | -.08 |

## Appendix C-8: ARFIMAX (0, d, 1) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: Least Squares
Date: 12/10/11 Time: 00:27
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments
Convergence achieved after 9 iterations
MA Backcast: 2

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | 0.044257 | 0.102936 | 0.429943 | 0.6673 |
| GRR | 0.437203 | 0.109135 | 4.006076 | 0.0001 |
| C | 0.080666 | 0.030149 | 2.675543 | 0.0075 |
| MA(1) | -0.431034 | 0.099841 | -4.317190 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.134652 | Mean dependent var | 0.079669 |
| Adjusted R-squared | 0.133678 | S.D. dependent var | 2.690975 |
| S.E. of regression | 2.504663 | Akaike info criterion | 4.675684 |
| Sum squared resid | 16712.17 | Schwarz criterion | 4.684513 |
| Log likelihood | -6233.362 | Hannan-Quinn criter. | 4.678879 |
| F-statistic | 138.1771 | Durbin-Watson stat | 1.995587 |
| Prob(F-statistic) | 0.000000 | | |

| | |
|---|---|
| Inverted MA Roots | .43 |

## Appendix C-9: ARFIMAX (1, d, 1) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: Least Squares
Date: 12/10/11 Time: 00:28
Sample (adjusted): 4 2670
Included observations: 2667 after adjustments
Convergence achieved after 11 iterations
MA Backcast: 3

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | 0.017198 | 0.124472 | 0.138168 | 0.8901 |
| GRR | 0.445835 | 0.111128 | 4.011910 | 0.0001 |
| C | 0.083732 | 0.032129 | 2.606123 | 0.0092 |
| AR(1) | 0.021136 | 0.061908 | 0.341412 | 0.7328 |
| MA(1) | -0.422697 | 0.095669 | -4.418333 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.134718 | Mean dependent var | 0.079699 |
| Adjusted R-squared | 0.133418 | S.D. dependent var | 2.691479 |
| S.E. of regression | 2.505508 | Akaike info criterion | 4.676733 |
| Sum squared resid | 16710.89 | Schwarz criterion | 4.687773 |
| Log likelihood | -6231.423 | Hannan-Quinn criter. | 4.680728 |
| F-statistic | 103.6138 | Durbin-Watson stat | 2.000260 |
| Prob(F-statistic) | 0.000000 | | |

| | |
|---|---|
| Inverted AR Roots | .02 |
| Inverted MA Roots | .42 |

## Appendix C-10: ARFIMAX (2, d, 2) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: Least Squares
Date: 12/10/11 Time: 00:29
Sample (adjusted): 5 2670
Included observations: 2666 after adjustments
Convergence achieved after 16 iterations
MA Backcast: 3 4

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.338350 | 0.031459 | -10.75529 | 0.0000 |
| GRR | 0.505209 | 0.117333 | 4.305772 | 0.0000 |
| C | 0.122768 | 0.039389 | 3.116821 | 0.0018 |
| AR(1) | -0.078730 | 0.281638 | -0.279542 | 0.7799 |
| AR(2) | 0.654474 | 0.218013 | 3.001999 | 0.0027 |
| MA(1) | 0.034622 | 0.273950 | 0.126379 | 0.8994 |
| MA(2) | -0.692143 | 0.222134 | -3.115881 | 0.0019 |

| | | | |
|---|---|---|---|
| R-squared | 0.136449 | Mean dependent var | 0.079729 |
| Adjusted R-squared | 0.134501 | S.D. dependent var | 2.691984 |
| S.E. of regression | 2.504412 | Akaike info criterion | 4.676607 |
| Sum squared resid | 16677.46 | Schwarz criterion | 4.692068 |
| Log likelihood | -6226.917 | Hannan-Quinn criter. | 4.682202 |
| F-statistic | 70.02465 | Durbin-Watson stat | 2.001112 |
| Prob(F-statistic) | 0.000000 | | |

| | | |
|---|---|---|
| Inverted AR Roots | .77 | -.85 |
| Inverted MA Roots | .81 | -.85 |

# Appendix D

# ARFIMAX (p, d, q, X)-GARCH (p, q) Test

**Appendix D-1: ARFIMAX (0, d, 0)-GARCH (1, 1) Test of Thai Baht gold spot price 96.50%**

Dependent Variable: DIFFGRG96
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 11/29/11 Time: 00:48
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments
Convergence achieved after 22 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.048666 | 0.019198 | -2.534998 | 0.0112 |
| GRRATE | -0.069124 | 0.033580 | -2.058459 | 0.0395 |
| C | 0.064387 | 0.013243 | 4.861970 | 0.0000 |
| Variance Equation | | | | |
| C | 0.012231 | 0.003796 | 3.222504 | 0.0013 |
| RESID(-1)^2 | 0.069816 | 0.011401 | 6.123916 | 0.0000 |
| GARCH(-1) | 0.921522 | 0.011699 | 78.77077 | 0.0000 |
| T-DIST. DOF | 4.327340 | 0.451378 | 9.586958 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.003084 | Mean dependent var | 0.056166 |
| Adjusted R-squared | 0.000836 | S.D. dependent var | 0.921936 |
| S.E. of regression | 0.921551 | Akaike info criterion | 2.378654 |
| Sum squared resid | 2259.869 | Schwarz criterion | 2.394105 |
| Log likelihood | -3166.124 | Hannan-Quinn criter. | 2.384245 |
| F-statistic | 1.371834 | Durbin-Watson stat | 1.985547 |
| Prob(F-statistic) | 0.222115 | | |

## Appendix D-2: ARFIMAX (1, d, 0)-GARCH (1, 1) Test of Thai Baht gold spot price 96.50%

Dependent Variable: DIFFGRG96
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 11/29/11 Time: 00:48
Sample (adjusted): 4 2670
Included observations: 2667 after adjustments
Convergence achieved after 24 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(5) + C(6)*RESID(-1)^2 + C(7)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.095532 | 0.171007 | -0.558642 | 0.5764 |
| GRRATE | -0.070226 | 0.033643 | -2.087430 | 0.0368 |
| C | 0.065127 | 0.013950 | 4.668548 | 0.0000 |
| AR(1) | 0.047873 | 0.170933 | 0.280068 | 0.7794 |
| Variance Equation | | | | |
| C | 0.013468 | 0.004027 | 3.344108 | 0.0008 |
| RESID(-1)^2 | 0.073813 | 0.011893 | 6.206209 | 0.0000 |
| GARCH(-1) | 0.916421 | 0.012160 | 75.36074 | 0.0000 |
| T-DIST. DOF | 4.329474 | 0.452679 | 9.564122 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.003095 | Mean dependent var | 0.056190 |
| Adjusted R-squared | 0.000471 | S.D. dependent var | 0.922108 |
| S.E. of regression | 0.921891 | Akaike info criterion | 2.380329 |
| Sum squared resid | 2259.839 | Schwarz criterion | 2.397993 |
| Log likelihood | -3166.169 | Hannan-Quinn criter. | 2.386721 |
| F-statistic | 1.179395 | Durbin-Watson stat | 1.987806 |
| Prob(F-statistic) | 0.311006 | | |

Inverted AR Roots .05

## Appendix D-3: ARFIMAX (0, d, 1)-GARCH (1, 1) Test of Thai Baht gold spot price 96.50%

Dependent Variable: DIFFGRG96
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 11/29/11 Time: 00:53
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments
Convergence achieved after 29 iterations
MA Backcast: 2
Presample variance: backcast (parameter = 0.7)
GARCH = C(5) + C(6)*RESID(-1)^2 + C(7)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.285728 | 0.436592 | -0.654449 | 0.5128 |
| GRRATE | -0.070290 | 0.033467 | -2.100261 | 0.0357 |
| C | 0.067000 | 0.016832 | 3.980549 | 0.0001 |
| MA(1) | 0.240203 | 0.437663 | 0.548830 | 0.5831 |
| Variance Equation | | | | |
| C | 0.012267 | 0.003802 | 3.226184 | 0.0013 |
| RESID(-1)^2 | 0.070133 | 0.011439 | 6.130850 | 0.0000 |
| GARCH(-1) | 0.921210 | 0.011728 | 78.54991 | 0.0000 |
| T-DIST. DOF | 4.326511 | 0.451098 | 9.591061 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.002959 | Mean dependent var | 0.056166 |
| Adjusted R-squared | 0.000335 | S.D. dependent var | 0.921936 |
| S.E. of regression | 0.921782 | Akaike info criterion | 2.379157 |
| Sum squared resid | 2260.152 | Schwarz criterion | 2.396816 |
| Log likelihood | -3165.796 | Hannan-Quinn criter. | 2.385547 |
| F-statistic | 1.127748 | Durbin-Watson stat | 1.992106 |
| Prob(F-statistic) | 0.342398 | | |

Inverted MA Roots -.24

## Appendix D-4: ARFIMAX (0, d, 2)-GARCH (1, 1) Test of Thai Baht gold spot price 96.50%

Dependent Variable: DIFFGRG96
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 11/29/11 Time: 00:52
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments
Convergence achieved after 29 iterations
MA Backcast: 1 2
Presample variance: backcast (parameter = 0.7)
GARCH = C(6) + C(7)*RESID(-1)^2 + C(8)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.343075 | 0.416338 | -0.824030 | 0.4099 |
| GRRATE | -0.068949 | 0.033417 | -2.063303 | 0.0391 |
| C | 0.067585 | 0.017373 | 3.890225 | 0.0001 |
| MA(1) | 0.295424 | 0.417040 | 0.708381 | 0.4787 |
| MA(2) | -0.011896 | 0.018427 | -0.645591 | 0.5185 |
| Variance Equation | | | | |
| C | 0.012269 | 0.003800 | 3.228507 | 0.0012 |
| RESID(-1)^2 | 0.070010 | 0.011428 | 6.126314 | 0.0000 |
| GARCH(-1) | 0.921335 | 0.011711 | 78.67232 | 0.0000 |
| T-DIST. DOF | 4.318527 | 0.450516 | 9.585732 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.002912 | Mean dependent var | 0.056166 |
| Adjusted R-squared | -0.000088 | S.D. dependent var | 0.921936 |
| S.E. of regression | 0.921977 | Akaike info criterion | 2.379771 |
| Sum squared resid | 2260.259 | Schwarz criterion | 2.399637 |
| Log likelihood | -3165.615 | Hannan-Quinn criter. | 2.386960 |
| F-statistic | 0.970687 | Durbin-Watson stat | 1.986981 |
| Prob(F-statistic) | 0.456964 | | |

| | | |
|---|---|---|
| Inverted MA Roots | .04 | -.33 |

## Appendix D-5: ARFIMAX (1, d, 2)-GARCH (1, 1) Test of Thai Baht gold spot price 96.50%

Dependent Variable: DIFFGRG96
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 11/29/11 Time: 00:51
Sample (adjusted): 4 2670
Included observations: 2667 after adjustments
Convergence achieved after 16 iterations
MA Backcast: 2 3
Presample variance: backcast (parameter = 0.7)
GARCH = C(7) + C(8)*RESID(-1)^2 + C(9)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.328426 | 0.237162 | -1.384821 | 0.1661 |
| GRRATE | -0.068590 | 0.032692 | -2.098068 | 0.0359 |
| C | 0.067834 | 0.016988 | 3.992964 | 0.0001 |
| AR(1) | -0.867658 | 0.236853 | -3.663274 | 0.0002 |
| MA(1) | 1.147874 | 0.000182 | 6291.400 | 0.0000 |
| MA(2) | 0.239152 | 0.135468 | 1.765375 | 0.0775 |
| Variance Equation | | | | |
| C | 0.013538 | 0.004090 | 3.310275 | 0.0009 |
| RESID(-1)^2 | 0.074406 | 0.012153 | 6.122262 | 0.0000 |
| GARCH(-1) | 0.916293 | 0.012335 | 74.28324 | 0.0000 |
| T-DIST. DOF | 4.267424 | 0.443040 | 9.632141 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.003409 | Mean dependent var | 0.056190 |
| Adjusted R-squared | 0.000033 | S.D. dependent var | 0.922108 |
| S.E. of regression | 0.922093 | Akaike info criterion | 2.381228 |
| Sum squared resid | 2259.129 | Schwarz criterion | 2.403307 |
| Log likelihood | -3165.367 | Hannan-Quinn criter. | 2.389217 |
| F-statistic | 1.009734 | Durbin-Watson stat | 1.985336 |
| Prob(F-statistic) | 0.429553 | | |

| | | |
|---|---|---|
| Inverted AR Roots | -.87 | |
| Inverted MA Roots | -.27 | -.87 |

## Appendix D-6: ARFIMAX (0, d, 0)-GARCH (1, 1) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 12/10/11 Time: 00:32
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments
Convergence achieved after 24 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.146499 | 0.019003 | -7.709214 | 0.0000 |
| GRR | 0.160681 | 0.049677 | 3.234499 | 0.0012 |
| C | 0.079542 | 0.019107 | 4.162946 | 0.0000 |
| Variance Equation | | | | |
| C | 0.087175 | 0.015196 | 5.736553 | 0.0000 |
| RESID(-1)^2 | 0.132814 | 0.018342 | 7.240784 | 0.0000 |
| GARCH(-1) | 0.832557 | 0.015870 | 52.46012 | 0.0000 |
| T-DIST. DOF | 4.090122 | 0.240747 | 16.98929 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.082462 | Mean dependent var | 0.079669 |
| Adjusted R-squared | 0.080393 | S.D. dependent var | 2.690975 |
| S.E. of regression | 2.580541 | Akaike info criterion | 3.166014 |
| Sum squared resid | 17720.11 | Schwarz criterion | 3.181465 |
| Log likelihood | -4216.463 | Hannan-Quinn criter. | 3.171605 |
| F-statistic | 39.85862 | Durbin-Watson stat | 2.444596 |
| Prob(F-statistic) | 0.000000 | | |

## Appendix D-7: ARFIMAX (1, d, 0)-GARCH (1, 1) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 12/10/11 Time: 00:34
Sample (adjusted): 4 2670
Included observations: 2667 after adjustments
Convergence achieved after 27 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(5) + C(6)*RESID(-1)^2 + C(7)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.083448 | 0.059587 | -1.400426 | 0.1614 |
| GRR | 0.172788 | 0.049364 | 3.500264 | 0.0005 |
| C | 0.074459 | 0.018694 | 3.983140 | 0.0001 |
| AR(1) | -0.067288 | 0.061732 | -1.089996 | 0.2757 |
| Variance Equation | | | | |
| C | 0.088910 | 0.015399 | 5.773797 | 0.0000 |
| RESID(-1)^2 | 0.133977 | 0.018493 | 7.244673 | 0.0000 |
| GARCH(-1) | 0.830215 | 0.016058 | 51.70017 | 0.0000 |
| T-DIST. DOF | 4.103312 | 0.241020 | 17.02478 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.083962 | Mean dependent var | 0.079699 |
| Adjusted R-squared | 0.081551 | S.D. dependent var | 2.691479 |
| S.E. of regression | 2.579400 | Akaike info criterion | 3.166286 |
| Sum squared resid | 17691.13 | Schwarz criterion | 3.183950 |
| Log likelihood | -4214.242 | Hannan-Quinn criter. | 3.172678 |
| F-statistic | 34.81692 | Durbin-Watson stat | 2.429991 |
| Prob(F-statistic) | 0.000000 | | |

Inverted AR Roots -.07

## Appendix D-8: ARFIMAX (0, d, 1)-GARCH (1, 1) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 12/10/11 Time: 00:35
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments
Convergence achieved after 29 iterations
MA Backcast: 2
Presample variance: backcast (parameter = 0.7)
GARCH = C(5) + C(6)*RESID(-1)^2 + C(7)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | -0.026810 | 0.100253 | -0.267425 | 0.7891 |
| GRR | 0.180337 | 0.048999 | 3.680442 | 0.0002 |
| C | 0.069650 | 0.019058 | 3.654614 | 0.0003 |
| MA(1) | -0.127444 | 0.104705 | -1.217171 | 0.2235 |
| Variance Equation | | | | |
| C | 0.087086 | 0.015168 | 5.741509 | 0.0000 |
| RESID(-1)^2 | 0.132709 | 0.018326 | 7.241719 | 0.0000 |
| GARCH(-1) | 0.832533 | 0.015870 | 52.45913 | 0.0000 |
| T-DIST. DOF | 4.100101 | 0.241213 | 16.99781 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.085173 | Mean dependent var | 0.079669 |
| Adjusted R-squared | 0.082766 | S.D. dependent var | 2.690975 |
| S.E. of regression | 2.577210 | Akaike info criterion | 3.166137 |
| Sum squared resid | 17667.75 | Schwarz criterion | 3.183795 |
| Log likelihood | -4215.626 | Hannan-Quinn criter. | 3.172526 |
| F-statistic | 35.37908 | Durbin-Watson stat | 2.421668 |
| Prob(F-statistic) | 0.000000 | | |

Inverted MA Roots .13

## Appendix D-9: ARFIMAX (0, d, 2)-GARCH (1, 1) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 12/10/11 Time: 00:38
Sample (adjusted): 3 2670
Included observations: 2668 after adjustments
Convergence achieved after 23 iterations
MA Backcast: 1 2
Presample variance: backcast (parameter = 0.7)
GARCH = C(6) + C(7)*RESID(-1)^2 + C(8)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | 0.343088 | 0.127140 | 2.698508 | 0.0070 |
| GRR | 0.173959 | 0.045929 | 3.787585 | 0.0002 |
| C | 0.035682 | 0.014224 | 2.508631 | 0.0121 |
| MA(1) | -0.494827 | 0.128387 | -3.854187 | 0.0001 |
| MA(2) | -0.081615 | 0.025690 | -3.176910 | 0.0015 |
| Variance Equation | | | | |
| C | 0.086723 | 0.015130 | 5.731999 | 0.0000 |
| RESID(-1)^2 | 0.134138 | 0.018467 | 7.263804 | 0.0000 |
| GARCH(-1) | 0.831847 | 0.015862 | 52.44199 | 0.0000 |
| T-DIST. DOF | 4.083878 | 0.240713 | 16.96576 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.084623 | Mean dependent var | 0.079669 |
| Adjusted R-squared | 0.081868 | S.D. dependent var | 2.690975 |
| S.E. of regression | 2.578470 | Akaike info criterion | 3.164992 |
| Sum squared resid | 17678.38 | Schwarz criterion | 3.184858 |
| Log likelihood | -4213.100 | Hannan-Quinn criter. | 3.172181 |
| F-statistic | 30.72657 | Durbin-Watson stat | 2.435418 |
| Prob(F-statistic) | 0.000000 | | |

| | | |
|---|---|---|
| Inverted MA Roots | .63 | -.13 |

## Appendix D-10: ARFIMAX (1, d, 2)-GARCH (1, 1) Test of Thai Baht gold spot price 99.99%

Dependent Variable: DIFFGRG99
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 12/10/11 Time: 00:39
Sample (adjusted): 4 2670
Included observations: 2667 after adjustments
Convergence achieved after 21 iterations
MA Backcast: 2 3
Presample variance: backcast (parameter = 0.7)
GARCH = C(7) + C(8)*RESID(-1)^2 + C(9)*GARCH(-1)

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| D1(-1) | 0.397717 | 0.130973 | 3.036625 | 0.0024 |
| GRR | 0.162555 | 0.045807 | 3.548689 | 0.0004 |
| C | 0.030491 | 0.014051 | 2.170114 | 0.0300 |
| AR(1) | -0.109212 | 0.225247 | -0.484856 | 0.6278 |
| MA(1) | -0.440581 | 0.207703 | -2.121208 | 0.0339 |
| MA(2) | -0.155371 | 0.151709 | -1.024139 | 0.3058 |
| Variance Equation | | | | |
| C | 0.088139 | 0.015303 | 5.759744 | 0.0000 |
| RESID(-1)^2 | 0.135089 | 0.018591 | 7.266382 | 0.0000 |
| GARCH(-1) | 0.829938 | 0.016028 | 51.78190 | 0.0000 |
| T-DIST. DOF | 4.092319 | 0.240742 | 16.99878 | 0.0000 |

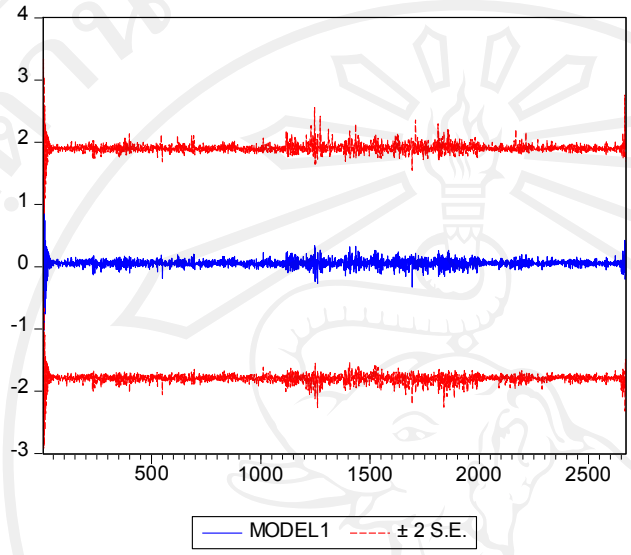
| | | | |
|---|---|---|---|
| R-squared | 0.084850 | Mean dependent var | 0.079699 |
| Adjusted R-squared | 0.081750 | S.D. dependent var | 2.691479 |
| S.E. of regression | 2.579119 | Akaike info criterion | 3.165530 |
| Sum squared resid | 17673.98 | Schwarz criterion | 3.187610 |
| Log likelihood | -4211.234 | Hannan-Quinn criter. | 3.173520 |
| F-statistic | 27.37214 | Durbin-Watson stat | 2.436228 |
| Prob(F-statistic) | 0.000000 | | |

| | | |
|---|---|---|
| Inverted AR Roots | -.11 | |
| Inverted MA Roots | .67 | -.23 |

# Appendix E

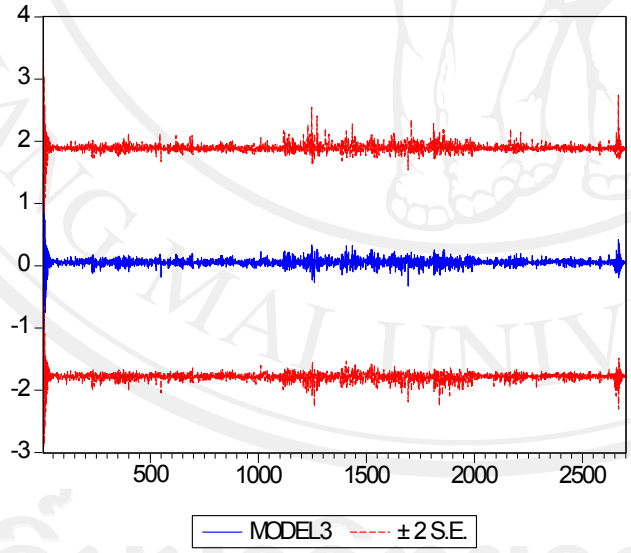
# Forecasting Test

**Appendix E-1: Forecasting Test of Thai Baht gold spot price 96.50% based on ARFIMAX (2, d, 2)**




Forecast: MODEL1
Actual: DIFFGRG96
Forecast sample: 1 2670
Adjusted sample: 5 2670
Included observations: 2666

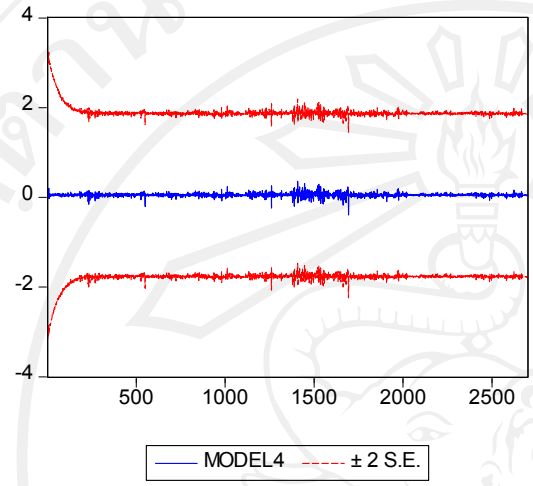
| | |
|---|---|
| Root Mean Squared Error | 0.916302 |
| Mean Absolute Error | 0.621015 |
| Mean Abs. Percent Error | 1502.359 |
| Theil Inequality Coefficient | 0.895966 |
| Bias Proportion | 0.000000 |
| Variance Proportion | 0.841713 |
| Covariance Proportion | 0.158287 |




Forecast: MODEL3
Actual: DIFFGRG96
Forecast sample: 1 2700
Adjusted sample: 5 2700
Included observations: 2696

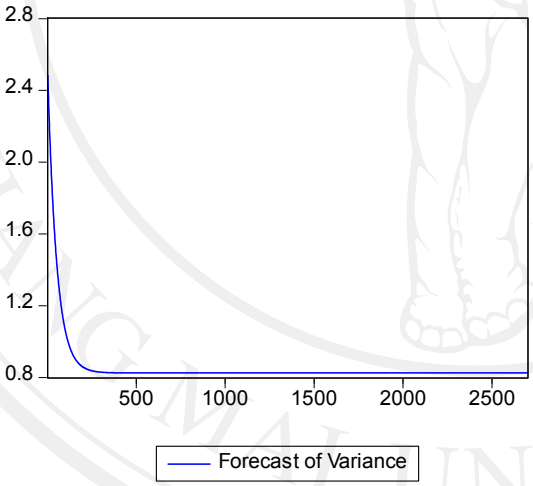
| | |
|---|---|
| Root Mean Squared Error | 0.911253 |
| Mean Absolute Error | 0.614879 |
| Mean Abs. Percent Error | 1478.583 |
| Theil Inequality Coefficient | 0.896193 |
| Bias Proportion | 0.000000 |
| Variance Proportion | 0.842387 |
| Covariance Proportion | 0.157613 |

**Appendix E-2: Forecasting Test of Thai Baht gold spot price 96.50% based on ARFIMAX (0, d, 0)-GARCH(1, 1)**

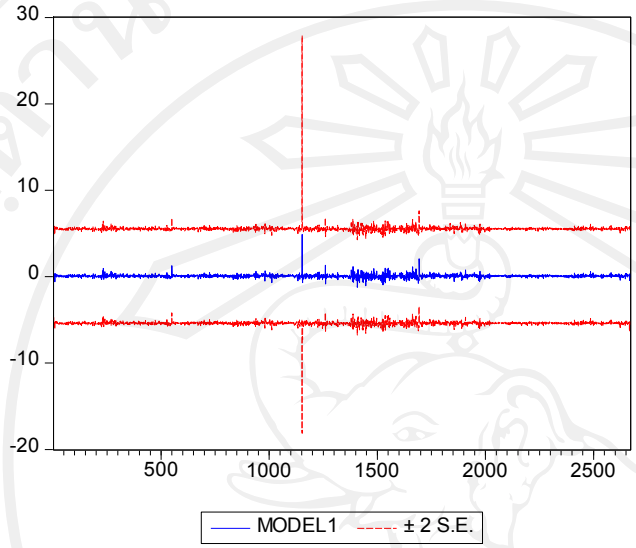



Forecast: MODEL4
Actual: DIFFGR
Forecast sample: 1 2700
Adjusted sample: 3 2700
Included observations: 2698

| | |
|---|---|
| Root Mean Squared Error | 0.915581 |
| Mean Absolute Error | 0.614339 |
| Mean Abs. Percent Error | 1491.609 |
| Theil Inequality Coefficient | 0.928429 |
| Bias Proportion | 0.000007 |
| Variance Proportion | 0.913314 |
| Covariance Proportion | 0.086679 |

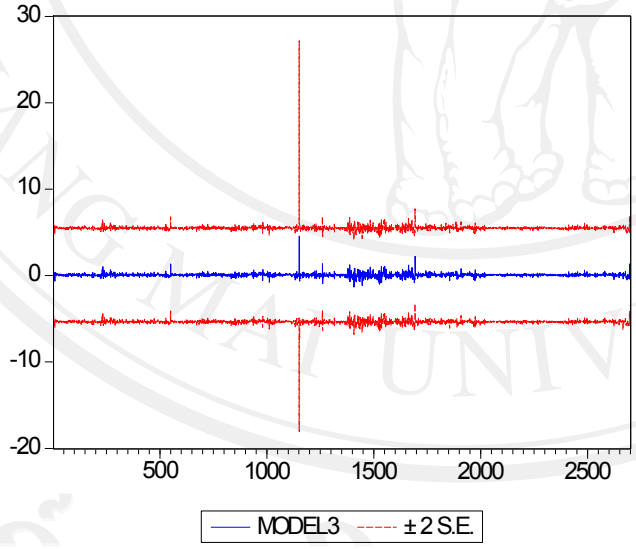


**Appendix E-3: Forecasting Test of Thai Baht gold spot price 99.99% based on ARFIMAX (0, d, 1)**




Forecast: MODEL1
Actual: DIFFGRG99
Forecast sample: 1 2670
Adjusted sample: 3 2670
Included observations: 2668

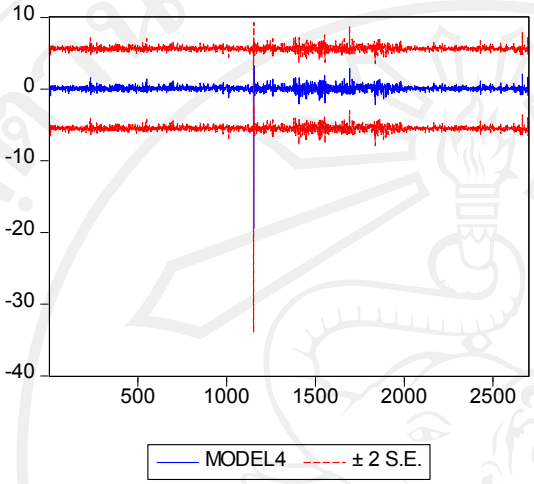
| | |
|---|---|
| Root Mean Squared Error | 2.723199 |
| Mean Absolute Error | 0.971957 |
| Mean Abs. Percent Error | 1440.590 |
| Theil Inequality Coefficient | 0.933671 |
| Bias Proportion | 0.000000 |
| Variance Proportion | 0.829383 |
| Covariance Proportion | 0.170617 |




Forecast: MODEL3
Actual: DIFFGRG99
Forecast sample: 1 2700
Adjusted sample: 3 2700
Included observations: 2698

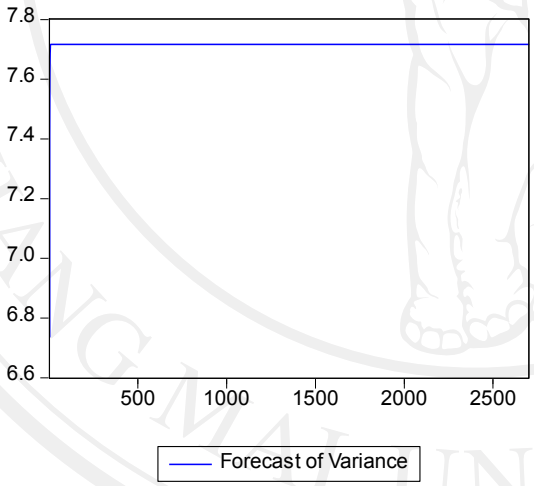
| | |
|---|---|
| Root Mean Squared Error | 2.705260 |
| Mean Absolute Error | 0.965095 |
| Mean Abs. Percent Error | 1478.572 |
| Theil Inequality Coefficient | 0.929235 |
| Bias Proportion | 0.000000 |
| Variance Proportion | 0.824632 |
| Covariance Proportion | 0.175368 |

**Appendix E-4: Forecasting Test of Thai Baht gold spot price 99.99% based on ARFIMAX (0, d, 0)-GARCH(1, 1)**




Forecast: MODEL4
Actual: DIFFGRG99
Forecast sample: 1 2700
Adjusted sample: 3 2700
Included observations: 2698

| | |
|---|---|
| Root Mean Squared Error | 2.541028 |
| Mean Absolute Error | 0.959433 |
| Mean Abs. Percent Error | 2398.839 |
| Theil Inequality Coefficient | 0.791875 |
| Bias Proportion | 0.000063 |
| Variance Proportion | 0.719172 |
| Covariance Proportion | 0.280765 |



# CURRICULUM VITAE

| | |
|---|---|
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| **Training** | March-May, 2010: Customer Service Officer Training at Bangkok Bank, Nakhonratchasima, Thailand |