抓台灣黃金價格、台灣物價指數CPI、原油價格、美元指數(月資料)，長度不限

黃金=CPI+匯率+美元指數

個別畫圖

cpi



cpi之變動

ccpi=dlog(cpi)\*100



油價:oil



油價報酬

roil=dlog(oil)\*100



美元指數:usd



美元指數變動

cusd=dlog(usd)\*100



黃金價格:gold



黃金報酬率

rgold=dlog(gold1)\*100



疊圖觀察



ccpi and cusd



rgold and roil



四個變數看起來似乎都有季節性波動的問題。

有無outlier

模型

rgold=c(1)ccpi+c(2)roil+c(3)cusd+c



Jarque-Bera之P值顯示為0.999752>0.5，殘差不服從常態分配。

Gold=c(1)oil+c(2)usd+c(3)cpi+c

先處理CPI季節性波動(設DUM)再跑

影響CPI變動的原因:春節(2月)、颱風(好發於7到8月)

Equation的殘差圖



將殘差>8或<-8者設置dummy viable

2011M08

2011M12

2012M01

2013M04

2013M06

2013M07

2016M06

2019M08

沒有調整波動前的model

rgold=c(1)ccpi+c(2)roil+c(3)cusd+c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: RGOLD | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/31/20 Time: 10:19 | | |  |  |
| Sample (adjusted): 2010M02 2019M12 | | | |  |
| Included observations: 119 after adjustments | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| ROIL | -0.117419 | 0.056483 | -2.078852 | 0.0399 |
| CCPI | 0.083298 | 0.716949 | 0.116184 | 0.9077 |
| CUSD | -1.456430 | 0.405361 | -3.592918 | 0.0005 |
| C | 0.430784 | 0.405350 | 1.062748 | 0.2901 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.104100 | Mean dependent var | | 0.285168 |
| Adjusted R-squared | 0.080728 | S.D. dependent var | | 4.525034 |
| S.E. of regression | 4.338541 | Akaike info criterion | | 5.805989 |
| Sum squared resid | 2164.638 | Schwarz criterion | | 5.899405 |
| Log likelihood | -341.4563 | Hannan-Quinn criter. | | 5.843922 |
| F-statistic | 4.454168 | Durbin-Watson stat | | 2.301732 |
| Prob(F-statistic) | 0.005343 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

調整後

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: RGOLD | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/31/20 Time: 10:19 | | |  |  |
| Sample (adjusted): 2010M02 2019M12 | | | |  |
| Included observations: 119 after adjustments | | | |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| ROIL | -0.117877 | 0.047997 | -2.455935 | 0.0157 |
| CCPI | 0.348700 | 0.600403 | 0.580776 | 0.5626 |
| CUSD | -1.549943 | 0.345400 | -4.487390 | 0.0000 |
| DUM1 | 10.81838 | 3.650625 | 2.963431 | 0.0038 |
| DUM2 | -9.981475 | 3.629333 | -2.750223 | 0.0070 |
| DUM3 | -10.98951 | 3.642121 | -3.017337 | 0.0032 |
| DUM4 | 9.127557 | 3.628248 | 2.515693 | 0.0134 |
| DUM5 | -10.83988 | 3.636037 | -2.981235 | 0.0036 |
| DUM6 | 8.695832 | 3.655864 | 2.378598 | 0.0192 |
| DUM7 | 9.165896 | 3.630103 | 2.524968 | 0.0130 |
| DUM8 | 9.292112 | 3.656888 | 2.540989 | 0.0125 |
| C | 0.291970 | 0.346171 | 0.843427 | 0.4009 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.426081 | Mean dependent var | | 0.285168 |
| Adjusted R-squared | 0.367080 | S.D. dependent var | | 4.525034 |
| S.E. of regression | 3.599949 | Akaike info criterion | | 5.495102 |
| Sum squared resid | 1386.680 | Schwarz criterion | | 5.775350 |
| Log likelihood | -314.9586 | Hannan-Quinn criter. | | 5.608902 |
| F-statistic | 7.221581 | Durbin-Watson stat | | 2.191371 |
| Prob(F-statistic) | 0.000000 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |



Jarque-Bera之P值顯示為0.485207<0.5，殘差服從常態分配。

Another model

Gold=c(1)oil+c(2)usd+c(3)cpi+c

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: GOLD1 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/31/20 Time: 10:28 | | |  |  |
| Sample: 2010M01 2019M12 | | |  |  |
| Included observations: 120 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| OIL | 1.473199 | 1.495475 | 0.985104 | 0.3266 |
| USD | -14.48445 | 5.965072 | -2.428210 | 0.0167 |
| CPI | 20.64769 | 8.886510 | 2.323487 | 0.0219 |
| C | 532.4218 | 627.2533 | 0.848815 | 0.3977 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.305317 | Mean dependent var | | 1346.520 |
| Adjusted R-squared | 0.287351 | S.D. dependent var | | 180.7505 |
| S.E. of regression | 152.5869 | Akaike info criterion | | 12.92611 |
| Sum squared resid | 2700800. | Schwarz criterion | | 13.01903 |
| Log likelihood | -771.5666 | Hannan-Quinn criter. | | 12.96384 |
| F-statistic | 16.99424 | Durbin-Watson stat | | 0.183638 |
| Prob(F-statistic) | 0.000000 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |



模型殘差圖



將殘差<-300或>300者設置dummy variable

2011M08

2011M11

調整後

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: GOLD1 | | |  |  |
| Method: Least Squares | | |  |  |
| Date: 05/31/20 Time: 10:33 | | |  |  |
| Sample: 2010M01 2019M12 | | |  |  |
| Included observations: 120 | | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|  |  |  |  |  |
|  |  |  |  |  |
| OIL | 1.776614 | 1.453952 | 1.221921 | 0.2243 |
| USD | -12.63343 | 5.808310 | -2.175061 | 0.0317 |
| CPI | 20.66368 | 8.563344 | 2.413038 | 0.0174 |
| DUM1 | 395.3633 | 150.0283 | 2.635258 | 0.0096 |
| DUM2 | 328.4698 | 148.2743 | 2.215285 | 0.0287 |
| C | 332.9512 | 605.6496 | 0.549742 | 0.5836 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.370057 | Mean dependent var | | 1346.520 |
| Adjusted R-squared | 0.342428 | S.D. dependent var | | 180.7505 |
| S.E. of regression | 146.5720 | Akaike info criterion | | 12.86162 |
| Sum squared resid | 2449103. | Schwarz criterion | | 13.00099 |
| Log likelihood | -765.6971 | Hannan-Quinn criter. | | 12.91822 |
| F-statistic | 13.39377 | Durbin-Watson stat | | 0.238237 |
| Prob(F-statistic) | 0.000000 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

