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Normalized Calmar and Sterling Ratio

R Project for Statistical Computing

August 10, 2013

Abstract

Both the Calmar and the Sterling ratio are the ratio of annualized return over the absolute value of the maximum drawdown of an investment. The Sterling ratio adds an excess risk measure to the maximum drawdown, traditionally and defaulting to 10%. It is also traditional to use a three year return series for these calculations, although the functions included here make no effort to determine the length of your series. However, Malik Magdon-Ismail devised a scaling law in which can be used to compare Calmar/Sterling ratio's with different

```
library(sandwich) fpe <- read.table("http://data.princeton.edu/wws509/datasets/effort.dat")
attach(fpe) lmfit = lm( change ~ setting + effort ) lmfit Call: lm(formula
= change ~ setting + effort)
```

```
Coefficients: (Intercept) setting effort -14.4511 0.2706 0.9677
sandwich(lmfit) (Intercept) setting effort (Intercept) 22.75973751 -0.348588963 -
0.048139277 setting -0.34858896 0.005996057 -0.002831634 effort -0.04813928
-0.002831634 0.031696236
Fr <- c(68,42,42,30, 37,52,24,43, + 66,50,33,23,
47,55,23,47, + 63,53,29,27, 57,49,19,29)
Temp <- gl(2, 2, 24, labels = c("Low",
"High"))
Soft <- gl(3, 8, 24, labels = c("Hard", "Medium", "Soft"))
M.user <- gl(2, 4, 24, labels = c("N", "Y"))
Brand <- gl(2, 1, 24, labels = c("X",
"M"))
detg <- data.frame(Fr, Temp, Soft, M.user, Brand)
detg.m0 <- glm(Fr ~ M.user * Temp * Soft + Brand, family = poisson, data = detg)
detg.m0 Call:
glm(formula = Fr ~ M.user * Temp * Soft + Brand, family = poisson, data =
detg)
```

```
Coefficients: (Intercept) M.userY 4.01524 -0.21184 TempHigh SoftMedium -
0.42381 0.05311 SoftSoft BrandM 0.05311 -0.01587 M.userY:TempHigh M.userY:SoftMedium
0.13987 0.08323 M.userY:SoftSoft TempHigh:SoftMedium 0.12169 -0.30442 Temp-
pHigh:SoftSoft M.userY:TempHigh:SoftMedium -0.30442 0.21189 M.userY:TempHigh:SoftSoft
-0.20387
```

```
Degrees of Freedom: 23 Total (i.e. Null); 11 Residual Null Deviance: 118.6
Residual Deviance: 32.83 AIC: 191.2
sandwich(detg.m0) (Intercept) M.userY
TempHigh (Intercept) 0.027320230 -2.607788e-02 -0.0260741440 M.userY -0.026077885
4.166134e-02 0.0260894765 TempHigh -0.026074144 2.608948e-02 0.0386871081
SoftMedium -0.026074715 2.608948e-02 0.0260894765 SoftSoft -0.026069834 2.608948e-
02 0.0260894765 BrandM -0.002526393 -2.336921e-05 -0.0000309104 M.userY:TempHigh
```

0.026062731 -4.166134e-02 -0.0386871081 M.userY:SoftMedium 0.026082569 -
 4.166134e-02 -0.0260894765 M.userY:SoftSoft 0.026078772 -4.166134e-02 -0.0260894765
 TempHigh:SoftMedium 0.026075432 -2.608948e-02 -0.0386871081 TempHigh:SoftSoft
 0.026076751 -2.608948e-02 -0.0386871081 M.userY:TempHigh:SoftMedium -0.026094691
 4.166134e-02 0.0386871081 M.userY:TempHigh:SoftSoft -0.026072218 4.166134e-
 02 0.0386871081 SoftMedium SoftSoft BrandM (Intercept) -2.607471e-02 -2.606983e-
 02 -2.526393e-03 M.userY 2.608948e-02 2.608948e-02 -2.336921e-05 TempHigh
 2.608948e-02 2.608948e-02 -3.091040e-05 SoftMedium 3.453876e-02 2.608948e-
 02 -2.975941e-05 SoftSoft 2.608948e-02 2.915260e-02 -3.959868e-05 BrandM -
 2.975941e-05 -3.959868e-05 5.184320e-03 M.userY:TempHigh -2.608948e-02 -
 2.608948e-02 5.391886e-05 M.userY:SoftMedium -3.453876e-02 -2.608948e-02 1.392533e-
 05 M.userY:SoftSoft -2.608948e-02 -2.915260e-02 2.158040e-05 TempHigh:SoftMedium
 -3.453876e-02 -2.608948e-02 2.831416e-05 TempHigh:SoftSoft -2.608948e-02 -
 2.915260e-02 2.565501e-05 M.userY:TempHigh:SoftMedium 3.453876e-02 2.608948e-
 02 1.051265e-05 M.userY:TempHigh:SoftSoft 2.608948e-02 2.915260e-02 -3.479246e-
 05 M.userY:TempHigh M.userY:SoftMedium (Intercept) 2.606273e-02 2.608257e-
 02 M.userY -4.166134e-02 -4.166134e-02 TempHigh -3.868711e-02 -2.608948e-02
 SoftMedium -2.608948e-02 -3.453876e-02 SoftSoft -2.608948e-02 -2.608948e-02
 BrandM 5.391886e-05 1.392533e-05 M.userY:TempHigh 9.675051e-02 4.166134e-
 02 M.userY:SoftMedium 4.166134e-02 5.384033e-02 M.userY:SoftSoft 4.166134e-
 02 4.166134e-02 TempHigh:SoftMedium 3.868711e-02 3.453876e-02 TempHigh:SoftSoft
 3.868711e-02 2.608948e-02 M.userY:TempHigh:SoftMedium -9.675051e-02 -5.384033e-
 02 M.userY:TempHigh:SoftSoft -9.675051e-02 -4.166134e-02 M.userY:SoftSoft
 TempHigh:SoftMedium (Intercept) 0.0260787719 2.607543e-02 M.userY -0.0416613364
 -2.608948e-02 TempHigh -0.0260894765 -3.868711e-02 SoftMedium -0.0260894765
 -3.453876e-02 SoftSoft -0.0291526034 -2.608948e-02 BrandM 0.0000215804 2.831416e-
 05 M.userY:TempHigh 0.0416613364 3.868711e-02 M.userY:SoftMedium 0.0416613364
 3.453876e-02 M.userY:SoftSoft 0.0470049643 2.608948e-02 TempHigh:SoftMedium
 0.0260894765 6.169453e-02 TempHigh:SoftSoft 0.0291526034 3.868711e-02 M.userY:TempHigh:SoftMedium
 -0.0416613364 -6.169453e-02 M.userY:TempHigh:SoftSoft -0.0470049643 -3.868711e-
 02 TempHigh:SoftSoft M.userY:TempHigh:SoftMedium (Intercept) 2.607675e-
 02 -2.609469e-02 M.userY -2.608948e-02 4.166134e-02 TempHigh -3.868711e-
 02 3.868711e-02 SoftMedium -2.608948e-02 3.453876e-02 SoftSoft -2.915260e-02
 2.608948e-02 BrandM 2.565501e-05 1.051265e-05 M.userY:TempHigh 3.868711e-
 02 -9.675051e-02 M.userY:SoftMedium 2.608948e-02 -5.384033e-02 M.userY:SoftSoft
 2.915260e-02 -4.166134e-02 TempHigh:SoftMedium 3.868711e-02 -6.169453e-02
 TempHigh:SoftSoft 4.213604e-02 -3.868711e-02 M.userY:TempHigh:SoftMedium
 -3.868711e-02 1.850157e-01 M.userY:TempHigh:SoftSoft -4.213604e-02 9.675051e-
 02 M.userY:TempHigh:SoftSoft (Intercept) -2.607222e-02 M.userY 4.166134e-02
 TempHigh 3.868711e-02 SoftMedium 2.608948e-02 SoftSoft 2.915260e-02 BrandM
 -3.479246e-05 M.userY:TempHigh -9.675051e-02 M.userY:SoftMedium -4.166134e-
 02 M.userY:SoftSoft -4.700496e-02 TempHigh:SoftMedium -3.868711e-02 Tem-
 pHigh:SoftSoft -4.213604e-02 M.userY:TempHigh:SoftMedium 9.675051e-02 M.userY:TempHigh:SoftSoft
 1.258663e-01 $\hat{\mu}$ detg.mod $\hat{\mu}$ glm(terms(Fr M.user*Temp*Soft + Brand*M.user*Temp,
 + keep.order = TRUE), + family = poisson, data = detg) $\hat{\mu}$ sandwich(detg.mod)
 (Intercept) M.userY TempHigh (Intercept) 0.0037374092 -0.0037374092 -0.0037374092

M.userY -0.0037374092 0.0127963058 0.0037374092 TempHigh -0.0037374092
0.0037374092 0.0048306068 M.userY:TempHigh 0.0037374092 -0.0127963058 -
0.0048306068 SoftMedium -0.0034082315 0.0034082315 0.0034082315 SoftSoft
-0.0035007974 0.0035007974 0.0035007974 M.userY:SoftMedium 0.0034082315
-0.0104781887 -0.0034082315 M.userY:SoftSoft 0.0035007974 -0.0104272373 -
0.0035007974 TempHigh:SoftMedium 0.0034082315 -0.0034082315 -0.0040756560
TempHigh:SoftSoft 0.0035007974 -0.0035007974 -0.0042850711 M.userY:TempHigh:SoftMedium
-0.0034082315 0.0104781887 0.0040756560 M.userY:TempHigh:SoftSoft -0.0035007974
0.0104272373 0.0042850711 BrandM -0.0007869245 0.0007869245 0.0007869245
M.userY:BrandM 0.0007869245 -0.0045599973 -0.0007869245 TempHigh:BrandM
0.0007869245 -0.0007869245 -0.0018597790 M.userY:TempHigh:BrandM -0.0007869245
0.0045599973 0.0018597790 M.userY:TempHigh SoftMedium SoftSoft (Inter-
cept) 0.0037374092 -0.0034082315 -0.0035007974 M.userY -0.0127963058 0.0034082315
0.0035007974 TempHigh -0.0048306068 0.0034082315 0.0035007974 M.userY:TempHigh
0.0148165802 -0.0034082315 -0.0035007974 SoftMedium -0.0034082315 0.0036542930
0.0035546658 SoftSoft -0.0035007974 0.0035546658 0.0057221112 M.userY:SoftMedium
0.0104781887 -0.0036542930 -0.0035546658 M.userY:SoftSoft 0.0104272373 -0.0035546658
-0.0057221112 TempHigh:SoftMedium 0.0040756560 -0.0036542930 -0.0035546658
TempHigh:SoftSoft 0.0042850711 -0.0035546658 -0.0057221112 M.userY:TempHigh:SoftMedium
-0.0109090626 0.0036542930 0.0035546658 M.userY:TempHigh:SoftSoft -0.0108981903
0.0035546658 0.0057221112 BrandM -0.0007869245 -0.0003453831 -0.0001270551
M.userY:BrandM 0.0045599973 0.0003453831 0.0001270551 TempHigh:BrandM
0.0018597790 0.0003453831 0.0001270551 M.userY:TempHigh:BrandM -0.0070665951
-0.0003453831 -0.0001270551 M.userY:SoftMedium M.userY:SoftSoft (Intercept)
0.0034082315 0.0035007974 M.userY -0.0104781887 -0.0104272373 TempHigh
-0.0034082315 -0.0035007974 M.userY:TempHigh 0.0104781887 0.0104272373
SoftMedium -0.0036542930 -0.0035546658 SoftSoft -0.0035546658 -0.0057221112
M.userY:SoftMedium 0.0110102778 0.0105207109 M.userY:SoftSoft 0.0105207109
0.0206232269 TempHigh:SoftMedium 0.0036542930 0.0035546658 TempHigh:SoftSoft
0.0035546658 0.0057221112 M.userY:TempHigh:SoftMedium -0.0110102778 -0.0105207109
M.userY:TempHigh:SoftSoft -0.0105207109 -0.0206232269 BrandM 0.0003453831
0.0001270551 M.userY:BrandM -0.0001475503 -0.0002024573 TempHigh:BrandM
-0.0003453831 -0.0001270551 M.userY:TempHigh:BrandM 0.0001475503 0.0002024573
TempHigh:SoftMedium TempHigh:SoftSoft (Intercept) 0.0034082315 0.0035007974
M.userY -0.0034082315 -0.0035007974 TempHigh -0.0040756560 -0.0042850711
M.userY:TempHigh 0.0040756560 0.0042850711 SoftMedium -0.0036542930 -
0.0035546658 SoftSoft -0.0035546658 -0.0057221112 M.userY:SoftMedium 0.0036542930
0.0035546658 M.userY:SoftSoft 0.0035546658 0.0057221112 TempHigh:SoftMedium
0.0054692361 0.0042110405 TempHigh:SoftSoft 0.0042110405 0.0108644722 M.userY:TempHigh:SoftMedium
-0.0054692361 -0.0042110405 M.userY:TempHigh:SoftSoft -0.0042110405 -0.0108644722
BrandM 0.0003453831 0.0001270551 M.userY:BrandM -0.0003453831 -0.0001270551
TempHigh:BrandM -0.0003199684 0.0001671126 M.userY:TempHigh:BrandM 0.0003199684
-0.0001671126 M.userY:TempHigh:SoftMedium (Intercept) -0.0034082315 M.userY
0.0104781887 TempHigh 0.0040756560 M.userY:TempHigh -0.0109090626 Soft-
Medium 0.0036542930 SoftSoft 0.0035546658 M.userY:SoftMedium -0.0110102778
M.userY:SoftSoft -0.0105207109 TempHigh:SoftMedium -0.0054692361 TempHigh:SoftSoft

-0.0042110405 M.userY:TempHigh:SoftMedium 0.0144182641 M.userY:TempHigh:SoftSoft
 0.0111813034 BrandM -0.0003453831 M.userY:BrandM 0.0001475503 TempHigh:BrandM
 0.0003199684 M.userY:TempHigh:BrandM -0.0004964395 M.userY:TempHigh:SoftSoft
 BrandM (Intercept) -0.0035007974 -0.0007869245 M.userY 0.0104272373 0.0007869245
 TempHigh 0.0042850711 0.0007869245 M.userY:TempHigh -0.0108981903 -0.0007869245
 SoftMedium 0.0035546658 -0.0003453831 SoftSoft 0.0057221112 -0.0001270551
 M.userY:SoftMedium -0.0105207109 0.0003453831 M.userY:SoftSoft -0.0206232269
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 -0.0108644722 0.0001270551 M.userY:TempHigh:SoftMedium 0.0111813034 -0.0003453831
 M.userY:TempHigh:SoftSoft 0.0288237633 -0.0001270551 BrandM -0.0001270551
 0.0026954945 M.userY:BrandM 0.0002024573 -0.0026954945 TempHigh:BrandM
 -0.0001671126 -0.0026954945 M.userY:TempHigh:BrandM -0.0004019419 0.0026954945
 M.userY:BrandM TempHigh:BrandM (Intercept) 0.0007869245 0.0007869245
 M.userY -0.0045599973 -0.0007869245 TempHigh -0.0007869245 -0.0018597790
 M.userY:TempHigh 0.0045599973 0.0018597790 SoftMedium 0.0003453831 0.0003453831
 SoftSoft 0.0001270551 0.0001270551 M.userY:SoftMedium -0.0001475503 -0.0003453831
 M.userY:SoftSoft -0.0002024573 -0.0001270551 TempHigh:SoftMedium -0.0003453831
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 0.0001475503 0.0003199684 M.userY:TempHigh:SoftSoft 0.0002024573 -0.0001671126
 BrandM -0.0026954945 -0.0026954945 M.userY:BrandM 0.0094763818 0.0026954945
 TempHigh:BrandM 0.0026954945 0.0053198325 M.userY:TempHigh:BrandM -
 0.0094763818 -0.0053198325 M.userY:TempHigh:BrandM (Intercept) -0.0007869245
 M.userY 0.0045599973 TempHigh 0.0018597790 M.userY:TempHigh -0.0070665951
 SoftMedium -0.0003453831 SoftSoft -0.0001270551 M.userY:SoftMedium 0.0001475503
 M.userY:SoftSoft 0.0002024573 TempHigh:SoftMedium 0.0003199684 TempHigh:SoftSoft
 -0.0001671126 M.userY:TempHigh:SoftMedium -0.0004964395 M.userY:TempHigh:SoftSoft
 -0.0004019419 BrandM 0.0026954945 M.userY:BrandM -0.0094763818 TempHigh:BrandM
 -0.0053198325 M.userY:TempHigh:BrandM 0.0143281662