How to Present Tables in Plot Devices

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Outline

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2. **Example**

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Overview

Graphics in R are plotted on a graphics device

- Depending on the OS, in an interactive R session the default device is the screen, using `windows()`, `X11()`, or `quartz()`.
- Common graphics file formats use the `bmp()`, `jpeg()`, `png()`, and `tiff()` devices.
- Other useful file devices include `postscript()`, `pdf()`, `pictex()`, `xfig()`, and `bitmap()`.

Why would we display tabular data on a plot device?

- Reviewing results in a terminal isn't usually effective
- Garner benefits from formatting
- Combining graphics and tables can be very powerful

Some solutions, with a focus on `textplot`

Set up an example

```
> library('PerformanceAnalytics')
> data(managers)
> #managers=read.csv("/home/peter/dev/R/managers.csv",row.names=1)
> head(managers)
             HAM1 HAM2   HAM3    HAM4 HAM5 HAM6 EDHEC LS EQ SP500 TR
1996-01-31  0.0074  NA  0.0349  0.0222  NA   NA          NA    0.0340
1996-02-29  0.0193  NA  0.0351  0.0195  NA   NA          NA    0.0093
1996-03-31  0.0155  NA  0.0258 -0.0098  NA   NA          NA    0.0096
1996-04-30 -0.0091  NA  0.0449  0.0236  NA   NA          NA    0.0147
1996-05-31  0.0076  NA  0.0353  0.0028  NA   NA          NA    0.0258
1996-06-30 -0.0039  NA -0.0303 -0.0019  NA   NA          NA    0.0038
           US 10Y TR US 3m TR
1996-01-31   0.00380  0.00456
1996-02-29  -0.03532  0.00398
1996-03-31  -0.01057  0.00371
1996-04-30  -0.01739  0.00428
1996-05-31  -0.00543  0.00443
1996-06-30   0.01507  0.00412

> dim(managers)

[1] 132  10

> colnames(managers)

 [1] "HAM1"         "HAM2"          "HAM3"          "HAM4"          "HAM5"
 [6] "HAM6"         "EDHEC LS EQ"   "SP500 TR"      "US 10Y TR"     "US 3m TR"
```

Set up an example

```
> manager.col = 1
> peers.cols = c(2,3,4,5,6)
> indexes.cols = c(7,8)
> Rf.col = 10
> peer.colorset=c("red", rep("darkorange", 2), rep("gray", 5))
> ham1.downside = t(table.DownsideRisk(managers[,c(manager.col,
+ indexes.cols, peers.cols)],Rf=.03/12))
```

Construct a table example

```
> ham1.downside
```

	Semi Deviation	Gain Deviation	Loss Deviation
HAM1	0.0191	0.0169	0.0211
EDHEC LS EQ	0.0145	0.0143	0.0118
SP500 TR	0.0325	0.0250	0.0300
HAM2	0.0201	0.0347	0.0107
HAM3	0.0237	0.0290	0.0191
HAM4	0.0395	0.0311	0.0365
HAM5	0.0324	0.0313	0.0324
HAM6	0.0175	0.0149	0.0128

	Downside Deviation (MAR=10%)	Downside Deviation (Rf=3%)
HAM1	0.0178	0.0154
EDHEC LS EQ	0.0138	0.0109
SP500 TR	0.0323	0.0295
HAM2	0.0164	0.0129
HAM3	0.0214	0.0185
HAM4	0.0381	0.0353
HAM5	0.0347	0.0316
HAM6	0.0161	0.0133

	Downside Deviation (0%)	Maximum Drawdown	Historical VaR (95%)
HAM1	0.0145	0.1518	-0.0258
EDHEC LS EQ	0.0098	0.1075	-0.0203
SP500 TR	0.0283	0.4473	-0.0669
HAM2	0.0116	0.2399	-0.0294
HAM3	0.0174	0.2894	-0.0425
HAM4	0.0341	0.2874	-0.0799
HAM5	0.0304	0.3405	-0.0733
HAM6	0.0121	0.0788	-0.0341

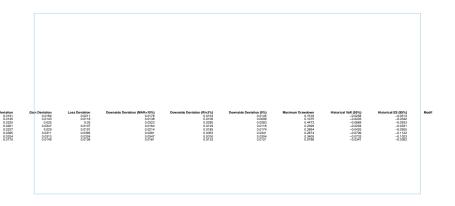Historical ES (95%) Modified VaR (95%) Modified ES (95%)

`gplots:::textplot`

Gregory R. Warnes' package, gplots, includes the textplot function

- Displays text output in a graphics window
- Provides the equivalent of print
- Creates a new plot and displays a table using the largest font that will fit in the plotting region
- Several other good things in the package, too

gplots::textplot example

```
> library(gplots)
> #args(gplots::textplot)
> gplots::textplot(ham1.downside); box(col="lightblue")
```

Deviation	Gain Deviation	Loss Deviation	Downside Deviation (MAR=10%)	Downside Deviation (Rf=3%)	Downside Deviation (0%)	Maximum Drawdown	Historical VaR (95%)	Historical ES (95%)	Modif
0.0191	0.0169	0.0211	0.0178	0.0154	0.0145	0.1518	−0.0258	−0.0513	
0.0145	0.0143	0.0118	0.0138	0.0109	0.0098	0.1075	−0.0203	−0.0342	
0.0325	0.025	0.03	0.0323	0.0295	0.0283	0.4473	−0.0689	−0.0933	
0.0201	0.0347	0.0107	0.0164	0.0129	0.0116	0.2399	−0.0294	−0.0331	
0.0237	0.029	0.0191	0.0214	0.0185	0.0174	0.2894	−0.0425	−0.0555	
0.0395	0.0311	0.0365	0.0381	0.0353	0.0341	0.2874	−0.0799	−0.1122	
0.0324	0.0313	0.0324	0.0347	0.0316	0.0304	0.3405	−0.0733	−0.1023	
0.0175	0.0149	0.0128	0.0161	0.0133	0.0121	0.0788	−0.0341	−0.0392	

Hmisc:::format.df

The Hmisc package by Frank E. Harrell, Jr., and Richard M. Heiberger contains several functions useful for data analysis

- Includes functions for advanced table making, character string manipulation, and conversion of S objects to LaTeX code, and many others.
- format.df does rounding and decimal alignment for data.frames, similar to format in base
- Generates a character matrix containing the formatted data
- Useful for formating tables in LaTeX or HTML, as well

Hmisc:::format.df example

```
> library(Hmisc)
> args(format.df)

function (x, digits, dec = NULL, rdec = NULL, cdec = NULL, numeric.dollar = !dcolumn,
    na.blank = FALSE, na.dot = FALSE, blank.dot = FALSE, col.just = NULL,
    cdot = FALSE, dcolumn = FALSE, matrix.sep = " ", scientific = c(-4,
        4), math.row.names = FALSE, math.col.names = FALSE, double.slash = FALSE,
    format.Date = "%m/%d/%Y", format.POSIXt = "%m/%d/%Y %H:%M:%OS",
    ...)
NULL

> ham1.f.downside = format.df(ham1.downside, na.blank=TRUE, numeric.dollar = FALSE, cdec=rep(4,d:
```

Hmisc::format.df example

```
> ham1.f.downside
          Semi Deviation Gain Deviation Loss Deviation
HAM1      "0.0191"       "0.0169"       "0.0211"
EDHEC LS EQ "0.0145"     "0.0143"       "0.0118"
SP500 TR  "0.0325"       "0.0250"       "0.0300"
HAM2      "0.0201"       "0.0347"       "0.0107"
HAM3      "0.0237"       "0.0290"       "0.0191"
HAM4      "0.0395"       "0.0311"       "0.0365"
HAM5      "0.0324"       "0.0313"       "0.0324"
HAM6      "0.0175"       "0.0149"       "0.0128"
          Downside Deviation (MAR=10%) Downside Deviation (Rf=3%)
HAM1      "0.0178"                      "0.0154"
EDHEC LS EQ "0.0138"                    "0.0109"
SP500 TR  "0.0323"                      "0.0295"
HAM2      "0.0164"                      "0.0129"
HAM3      "0.0214"                      "0.0185"
HAM4      "0.0381"                      "0.0353"
HAM5      "0.0347"                      "0.0316"
HAM6      "0.0161"                      "0.0133"
          Downside Deviation (0%) Maximum Drawdown Historical VaR (95%)
HAM1      "0.0145"                "0.1518"         "-0.0258"
EDHEC LS EQ "0.0098"              "0.1075"         "-0.0203"
SP500 TR  "0.0283"                "0.4473"         "-0.0669"
HAM2      "0.0116"                "0.2399"         "-0.0294"
HAM3      "0.0174"                "0.2894"         "-0.0425"
HAM4      "0.0341"                "0.2874"         "-0.0799"
HAM5      "0.0304"                "0.3405"         "-0.0733"
HAM6      "0.0121"                "0.0788"         "-0.0341"
          Historical ES (95%) Modified VaR (95%) Modified ES (95%)
```

`PerformanceAnalytics:::textplot`

The PerformanceAnalytics package extends the gplots:::textplot function

- Equivalent of print except that the output is displayed as a plot
- Fixes some of the layout math
- Adds column and row name word wrapping
- Adds color to the table elements
- Adds vertical alignment for headers and data

`PerformanceAnalytics::textplot` **example**

```
> require(PerformanceAnalytics)
> args(PerformanceAnalytics:::textplot)

function (object, halign = "center", valign = "center", cex,
    max.cex = 1, cmar = 2, rmar = 0.5, show.rownames = TRUE,
    show.colnames = TRUE, hadj = 1, vadj = NULL, row.valign = "center",
    heading.valign = "bottom", mar = c(0, 0, 0, 0) + 0.1, col.data = par("col"),
    col.rownames = par("col"), col.colnames = par("col"), wrap = TRUE,
    wrap.colnames = 10, wrap.rownames = 10, ...)
NULL
```

`PerformanceAnalytics:::textplot` **example**

```
> PerformanceAnalytics:::textplot(ham1.f.downside,  halign = "center", valign = "top", row.valig
> box(col="lightblue")
```

	Semi Deviation	Gain Deviation	Loss Deviation	Downside Deviation (MAR=10%)	Downside Deviation (Rf=3%)	Downside Deviation (0%)	Maximum Drawdown	Historical VaR (95%)	Historical ES (95%)	Modified VaR (95%)	Modified ES (95%)
HAM1	0.0191	0.0169	0.0211	0.0178	0.0154	0.0145	0.1518	−0.0258	−0.0513	−0.0342	−0.0610
EDHEC LS EQ	0.0145	0.0143	0.0118	0.0138	0.0109	0.0098	0.1075	−0.0203	−0.0342	−0.0235	−0.0346
SP500 TR	0.0325	0.0250	0.0300	0.0323	0.0295	0.0283	0.4473	−0.0669	−0.0933	−0.0683	−0.0944
HAM2	0.0201	0.0347	0.0107	0.0164	0.0129	0.0116	0.2399	−0.0294	−0.0331	−0.0276	−0.0614
HAM3	0.0237	0.0290	0.0191	0.0214	0.0185	0.0174	0.2894	−0.0425	−0.0555	−0.0368	−0.0440
HAM4	0.0395	0.0311	0.0365	0.0381	0.0353	0.0341	0.2874	−0.0799	−0.1122	−0.0815	−0.1176
HAM5	0.0324	0.0313	0.0324	0.0347	0.0316	0.0304	0.3405	−0.0733	−0.1023	−0.0676	−0.0974
HAM6	0.0175	0.0149	0.0128	0.0161	0.0133	0.0121	0.0788	−0.0341	−0.0392	−0.0298	−0.0390

Other Possibilities

What else is available?

- A very promising package presented at useR! 2010, `tabulaR`
- Dump results to a spreadsheet, perhaps with `XLConnect`
- Finally learn LATEX and Sweave
- What did I miss? Any feedback would be much appreciated . . .