

Trading Simulation

blotter and the emerging toolchain in R

Trade Simulation Tool Chain

Manage
Data

Evaluate
Data

Determine
Trades

Size
Trades

Calculate
Performance

Analyze
Performance

Types of Activities

Connect to
database

Download
historical
data

Clean and
align data

Graph prices
and indi-
cators

Calculate
indicators

Transform
prices

Estimate
volatility

Calculate
trailing
volume

Estimate pre-
trade pricing

Forecast
return

Forecast risk

Evaluate
rules

Generate
signals

Optimize
portfolio

Budget risk

Calculate
target
position

Calculate
trade size

Evaluate
trading costs

Specify
contract
specs

Capture
trades

Calculate
positions

Calculate
P&L

Aggregate
portfolio

Calculate
returns and
risk

Compare to
benchmarks

Provide
attribution

Analyze risk

Example R Packages

quantmod
indexes
RTAQ
xts
...

TTR
signal-
extraction
...

quantstrat
quantmod

lspm
Portfolio-
Analytics

blotter
Financial-
Instrument

Performance-
Analytics

About blotter

- Transaction/price framework
- Stores transactions
- Calculates positions and P&L
- Aggregates positions into accounts
- Strategy independent
- Multi-instrument portfolios
- Multiple currency portfolios (new)
- Alpha-stage code
- Not on CRAN yet, on R-Forge

About the Faber Example

- A very simple trend following strategy:
 - Faber, Mebane T., "*A Quantitative Approach to Tactical Asset Allocation.*" *Journal of Risk Management* (Spring 2007).
- Buy when monthly price $>$ 10-month SMA.
- Sell and move to cash when monthly price $<$ 10-month SMA.
- 10 years of monthly data, S&P Sector ETFs.
- No shorting, 'sell' goes to cash.
- Positions are fixed.

Faber in R Code

```
currency('USD')
symbols = c("XLF", "XLP", "XLE", "XLY", "XLV", "XLI", "XLB", "XLK", "XLU")
for(symbol in symbols){ stock(symbol, currency="USD",multiplier=1) }
getSymbols(symbols, src='yahoo', index.class=c("POSIXt","POSIXct"),
from='1998-01-01')
for(symbol in symbols) {
  x<-get(symbol)
  x<-to.monthly(x,indexAt='lastof',drop.time=TRUE)
  colnames(x)<-gsub("x",symbol,colnames(x))
  assign(symbol,x)
}
initPortf('longtrend', symbols=symbols, initDate='1997-12-31')
initAcct('longtrend', portfolios='longtrend', initDate='1997-12-31')
initOrders(portfolio='longtrend', initDate='1997-12-31')
s <- strategy("longtrend")
s <- add.indicator(strategy = s, name = "SMA", arguments = list(x =
quote(Cl(mktdata)), n=10), label="SMA10")
s <- add.signal(s, name="sigCrossover", arguments = list(data=quote(mktdata),
columns=c("Close","SMA"), relationship="gt"), label="Cl.gt.SMA")
s <- add.signal(s,name="sigCrossover", arguments = list(data=quote(mktdata),
columns=c("Close","SMA"), relationship="lt"),label="Cl.lt.SMA")
s <- add.rule(s, name='ruleSignal', arguments = list(data=quote(mktdata),
sigcol="Cl.gt.SMA", sigval=TRUE, orderqty=100, ordertype='market',
orderside=NULL, threshold=NULL), type='enter')
s <- add.rule(s, name='ruleSignal', arguments = list(data=quote(mktdata),
sigcol="Cl.lt.SMA", sigval=TRUE, orderqty='all', ordertype='market',
orderside=NULL, threshold=NULL), type='exit')
out <- try(applyStrategy(strategy='s' , portfolios='longtrend'))
updatePortf(Portfolio='longtrend')
```

Code Color Key:

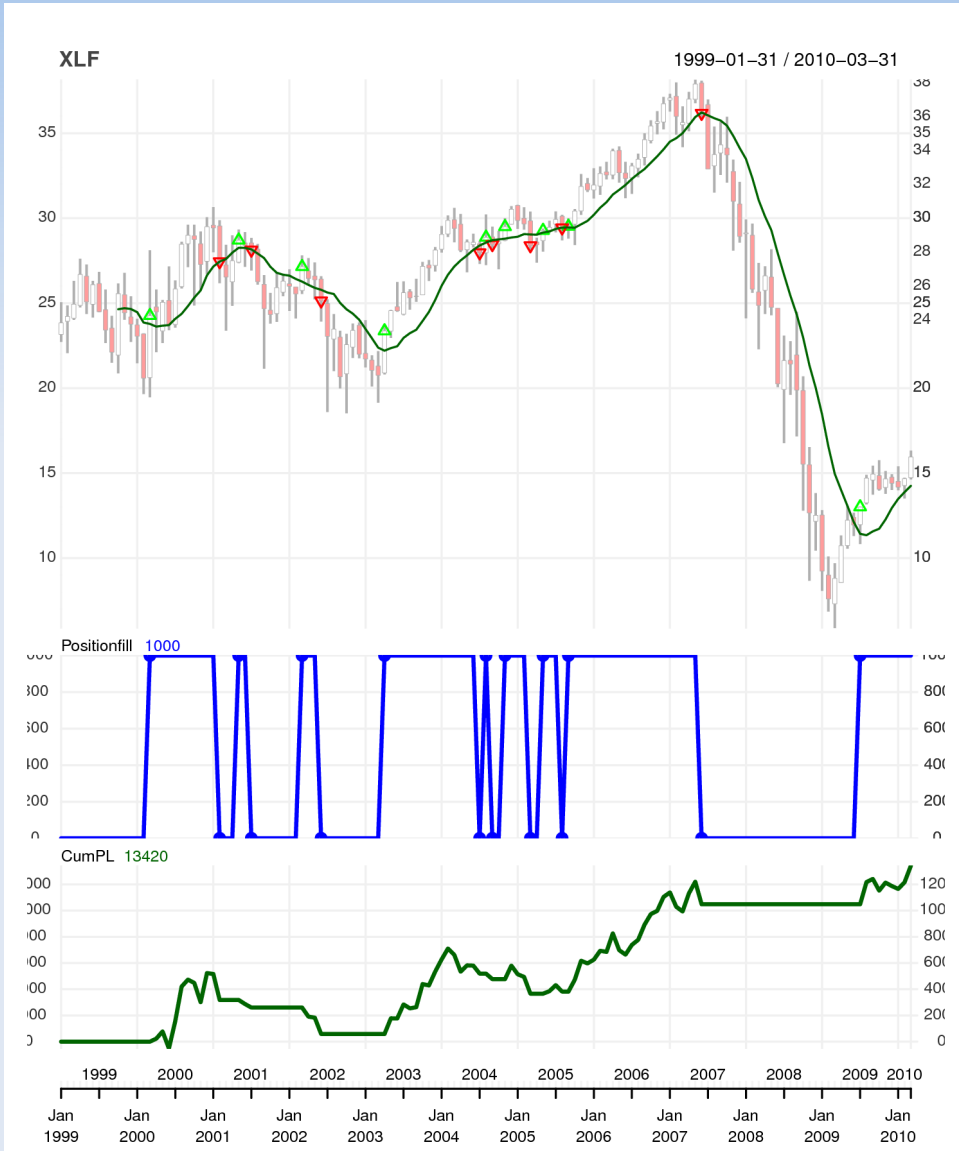
Financial-
Instrument
quantmod
blotter
quantstrat
TTR
xts

Hidden:

xts
TTR
blotter

No custom code

Results



- A profitable demo!
 - *new* quantmod graphics
 - blotter for P&L, trade record

```
> head(x$XLF$txn)
```

	Txn.Qty	Txn.Price	Txn.Value	Txn.Avg.Cost	Pos.Qty	Pos.Avg.Cost
1997-12-31	0	0.00	0	0.00	0	0.00
2000-03-31	1000	24.27	24270	24.27	1000	24.27
2001-02-28	-1000	27.45	-27450	27.45	0	0.00
2001-05-31	1000	28.71	28710	28.71	1000	28.71
2001-07-31	-1000	28.13	-28130	28.13	0	0.00
2002-03-31	1000	27.15	27150	27.15	1000	27.15

	Gross.Txn.Realized.PL	Txn.Fees	Net.Txn.Realized.PL	Con.Mult
1997-12-31	0	0	0	0
2000-03-31	0	0	0	1
2001-02-28	3180	0	3180	1
2001-05-31	0	0	0	1
2001-07-31	-580	0	-580	1
2002-03-31	0	0	0	1

About the Tool Chain

- Many pieces are still in active development.
- Benefits from wide community involvement.
- Your participation is encouraged.
 - Sample code that can be generalized.
 - Feedback, bug reports, testing, examples, documentation...
- Use it at your OWN RISK.