COMP226: Slides 21

Walkforward schemes

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Overview

Walk-forward optimization: rolling in-sample optimisation and out-of-sample testing

Walk-forward analysis

If we use a single in-sample and out-of-sample periods, results will have an extreme dependence of the chosen periods

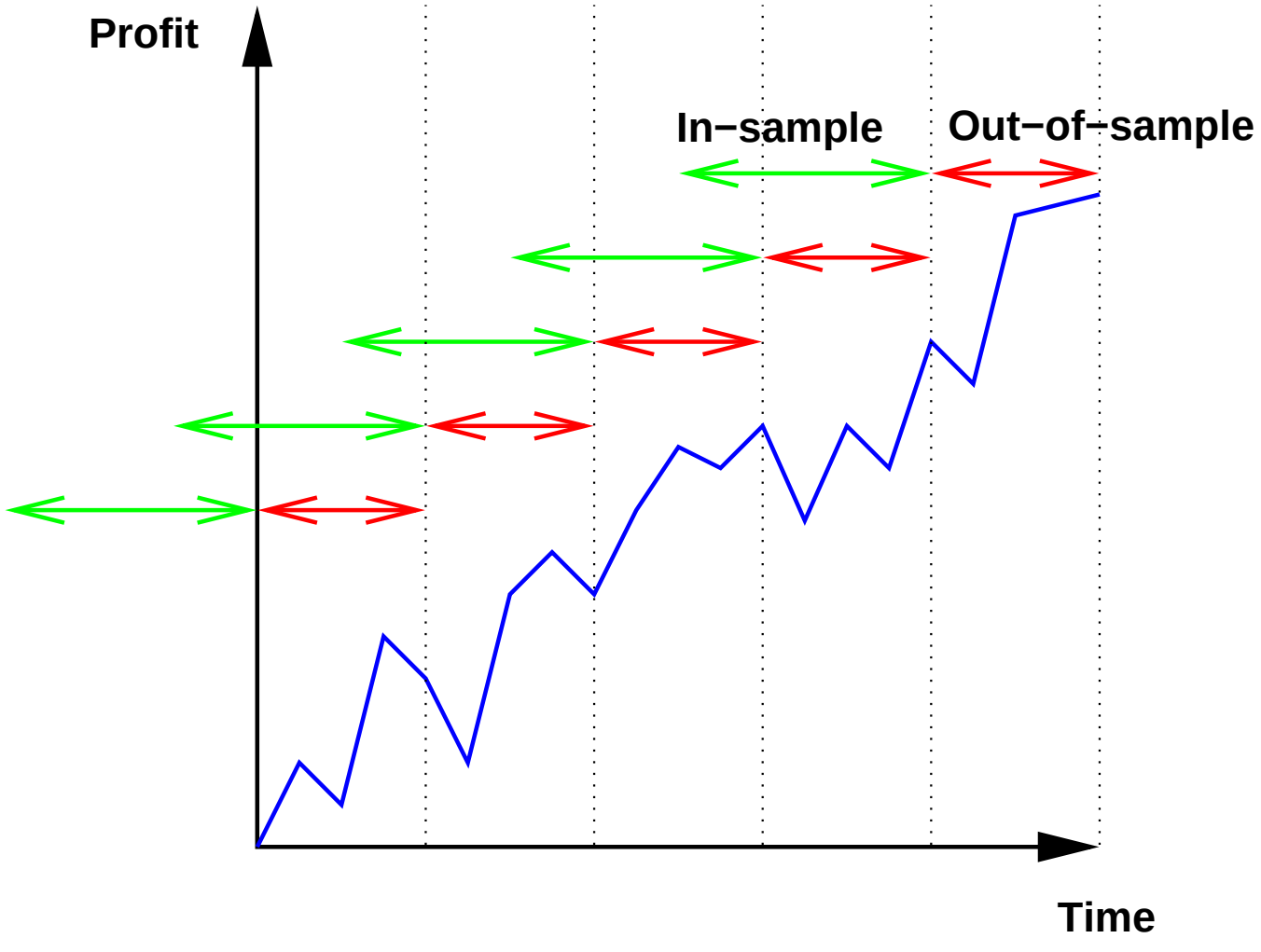
A **walk-forward scheme** is a **rolling implementation** of

- **In-sample optimization**
- **Out-of-sample testing**

Protects against the possibility for one round cross-validation that by chance we chose some input parameters that did well in **both** in and out-of-sample sets

Also allows more **adaptability**: each out-sample-period can use a different set of parameters

Walk-forward equity curve



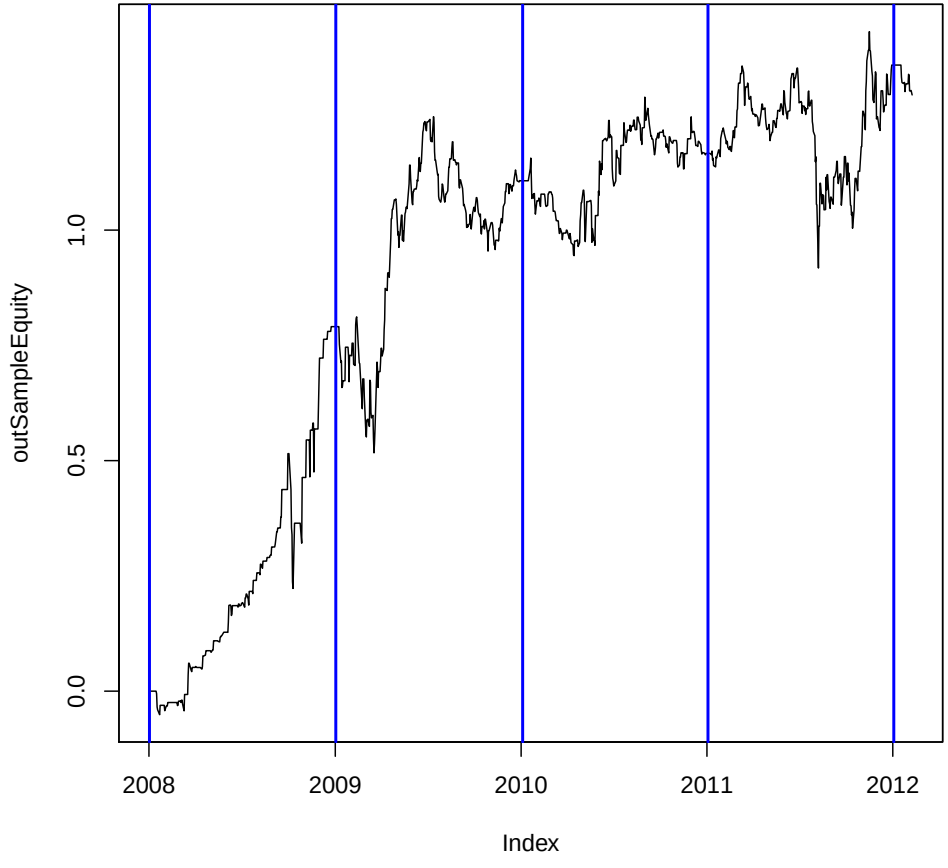
Example: Walkforward

```
files <- c('functions.R','utilities.R','strategies/bbands.R')
for (f in paste('../', sep='',files)) source(f)
prices <- getPrices(readCsvData('../GSPC.csv'))

# Define parameter ranges
n  <- seq(5,by=5,to=25); sd <- seq(0.5,by=0.25,to=3)
params <- expand.grid(n=n,sd=sd) # all combinations
cat('There are ', nrow(params), 'combinations','\n')

ep <- endpoints(prices,on='years')
#[1] 0  251  504  756 1008 1260 1286
nperiods <- length(ep) - 2
```

Example: Walkforward

```
outSamplePositions <- list() # store out-of-sample (oos) positions
for (i in 1:nperiods) { # start with equal in out
   ret <- in_out_test(prices,startIn=ep[i]+1,
                              endIn=ep[i+1],
                              endOut=ep[i+2])
   cat('Period', i , 'best:', unlist(ret$best), '\n')
   outSamplePositions[[i]] <- ret$outSample$pos
}
# create combined equity curve
outSampleCombPositions <- do.call(rbind,outSamplePositions)
log_returns <- getLogReturn(prices)
outSampleEquity <- getEquityCurve(log_returns,outSampleCombPositions)

pdf('outSampleEquity.pdf'); plot.zoo(outSampleEquity)
for (i in 1:nperiods) # draw oos period delimiters
    abline(v=index(prices)[ep[i+1]+1],col='blue',lwd=2)
dev.off()
```

Example: Walkforward



Implementation

In that last example, we took equal in and out of sample periods of one year

In and out sample periods are actually parameters

We need to **validate our choices of these parameters** and a common approach is to

1. Develop and optimize walk forward scheme on **training set**
2. Validate the scheme on a **test set**