

IAQF

Fixed Income

DATA RETRIEVAL

BARCLAYS AGGREGATE

```
## $`83_84`
##          X10YrGovtRet      BarcAggr
## means    0.0001511765  0.001447059
## sds       0.0008685540  0.004551390
## annualizedReturnsAvg  0.0012876265  0.012283628
## annualizedSd         0.0137330444  0.071963788
## sharpeRatio          0.0937611816  0.170691788
##
## $`88_89`
##          X10YrGovtRet      BarcAggr
## means    -5.407767e-05  0.0001271845
## sds       6.047807e-04  0.0010583185
## annualizedReturnsAvg -2.790285e-03  0.0065816810
## annualizedSd         9.562422e-03  0.0167334849
## sharpeRatio          -2.917969e-01  0.3933239847
##
## $`94_95`
##          X10YrGovtRet      BarcAggr
## means     6.566802e-05  8.906883e-05
## sds       6.872564e-04  6.870477e-04
## annualizedReturnsAvg  8.162472e-03  1.112131e-02
## annualizedSd         1.086648e-02  1.086318e-02
## sharpeRatio          7.511607e-01  1.023763e+00
##
## $`99_00`
##          X10YrGovtRet      BarcAggr
## means     2.262443e-05  4.434389e-05
## sds       5.832288e-04  5.018395e-04
## annualizedReturnsAvg  2.487919e-03  4.898002e-03
## annualizedSd         9.221657e-03  7.934779e-03
## sharpeRatio          2.697908e-01  6.172828e-01
##
## $`04_06`
##          X10YrGovtRet      BarcAggr
## means     1.122754e-05  2.235529e-05
## sds       4.760467e-04  4.085330e-04
## annualizedReturnsAvg  1.871175e-03  3.739465e-03
## annualizedSd         7.526959e-03  6.459474e-03
## sharpeRatio          2.485964e-01  5.789116e-01
##
## $Recession
##          X10YrGovtRet      BarcAggr
## means    -2.509707e-05 -2.367021e-05
## sds       7.649375e-04  7.454779e-04
```

```

## annualizedReturnsAvg -4.694764e-03 -4.485108e-03
## annualizedSd          1.209472e-02  1.178704e-02
## sharpeRatio           -3.881663e-01 -3.805118e-01
##
## $Now
##           X10YrGovtRet      BarcAggr
## means      -5.644023e-06 -7.846235e-06
## sds         5.519930e-04  4.135183e-04
## annualizedReturnsAvg -1.196104e-03 -1.661342e-03
## annualizedSd        8.727776e-03  6.538299e-03
## sharpeRatio      -1.370456e-01 -2.540940e-01

```

```

## $`83_84`
##           X10YrGovtRet      BarcAggr
## X10YrGovtRet      1.0000000  0.2667834
## BarcAggr          0.2667834  1.0000000
##

```

```

## $`88_89`
##           X10YrGovtRet      BarcAggr
## X10YrGovtRet      1.0000000  0.3848871
## BarcAggr          0.3848871  1.0000000
##

```

```

## $`94_95`
##           X10YrGovtRet      BarcAggr
## X10YrGovtRet      1.0000000  0.9186311
## BarcAggr          0.9186311  1.0000000
##

```

```

## $`99_00`
##           X10YrGovtRet      BarcAggr
## X10YrGovtRet      1.0000000  0.9206738
## BarcAggr          0.9206738  1.0000000
##

```

```

## $`04_06`
##           X10YrGovtRet      BarcAggr
## X10YrGovtRet      1.0000000  0.9319208
## BarcAggr          0.9319208  1.0000000
##

```

```

## $Recession
##           X10YrGovtRet      BarcAggr
## X10YrGovtRet      1.0000000  0.8380541
## BarcAggr          0.8380541  1.0000000
##

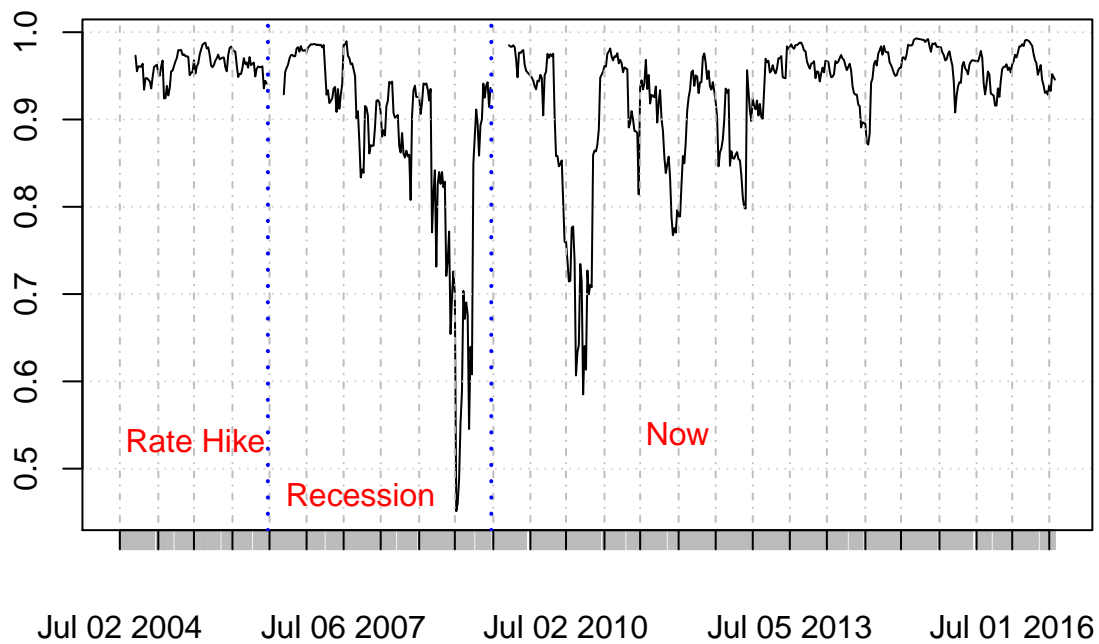
```

```

## $Now
##           X10YrGovtRet      BarcAggr
## X10YrGovtRet      1.0000000  0.8919201
## BarcAggr          0.8919201  1.0000000

```

Rolling Correlation Barclays Aggregate



GOVT INFLATION INDEXED 10 year

```
## $`83_84`
## NULL
##
## $`88_89`
## NULL
##
## $`94_95`
## NULL
##
## $`99_00`
##          X10YrGovtRet      GovtII10
## means      2.165217e-05  7.826087e-06
## sds         5.717802e-04  1.603886e-04
## annualizedReturnsAvg 2.477887e-03  9.014624e-04
## annualizedSd      9.040639e-03  2.535967e-03
## sharpeRatio      2.740831e-01  3.554709e-01
##
## $`04_06`
##          X10YrGovtRet      GovtII10
## means      9.752399e-06  8.080614e-06
## sds         4.670240e-04  4.036956e-04
## annualizedReturnsAvg 1.689635e-03  1.401555e-03
## annualizedSd      7.384298e-03  6.382988e-03
```

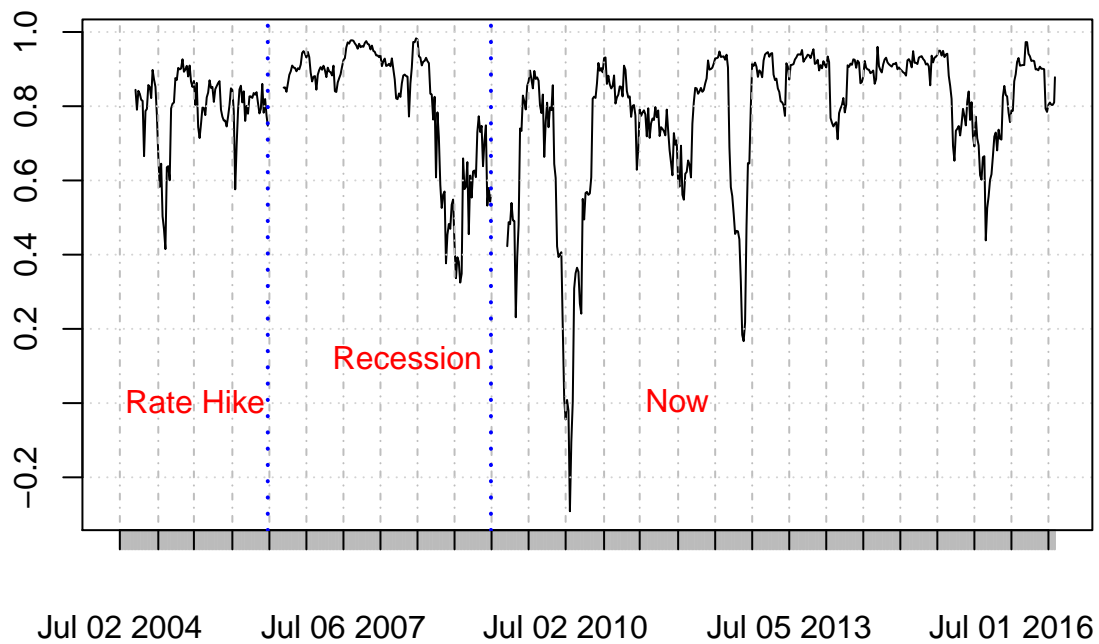
```

## sharpeRatio          2.288145e-01 2.195767e-01
##
## $Recession
##           X10YrGovtRet      GovtIII10
## means      -2.181505e-05 -1.153061e-05
## sds         7.506345e-04  6.953970e-04
## annualizedReturnsAvg -4.258551e-03 -2.297081e-03
## annualizedSd      1.186857e-02  1.099519e-02
## sharpeRatio      -3.588090e-01 -2.089169e-01
##
## $Now
##           X10YrGovtRet      GovtIII10
## means      -5.454775e-06 -6.937847e-06
## sds         5.408082e-04  4.566432e-04
## annualizedReturnsAvg -1.204855e-03 -1.524089e-03
## annualizedSd      8.550928e-03  7.220162e-03
## sharpeRatio      -1.409035e-01 -2.110879e-01

## $`83_84`
##           X10YrGovtRet GovtIII10
## X10YrGovtRet      NA      NA
## GovtIII10         NA      NA
##
## $`88_89`
##           X10YrGovtRet GovtIII10
## X10YrGovtRet      NA      NA
## GovtIII10         NA      NA
##
## $`94_95`
##           X10YrGovtRet GovtIII10
## X10YrGovtRet      NA      NA
## GovtIII10         NA      NA
##
## $`99_00`
##           X10YrGovtRet GovtIII10
## X10YrGovtRet      1.0000000 0.4104358
## GovtIII10         0.4104358 1.0000000
##
## $`04_06`
##           X10YrGovtRet GovtIII10
## X10YrGovtRet      1.0000000 0.8653163
## GovtIII10         0.8653163 1.0000000
##
## $Recession
##           X10YrGovtRet GovtIII10
## X10YrGovtRet      1.0000000 0.7977249
## GovtIII10         0.7977249 1.0000000
##
## $Now
##           X10YrGovtRet GovtIII10
## X10YrGovtRet      1.0000000 0.8170651
## GovtIII10         0.8170651 1.0000000

```

Rolling Correlation Govt10 Inflation Indexed bonds



GOVT INFLATION INDEXED 5 year

```
## $`83_84`
## NULL
##
## $`88_89`
## NULL
##
## $`94_95`
## NULL
##
## $`99_00`
##
##           X10YrGovtRet      GovtII5
## means      2.165217e-05  3.739130e-06
## sds         5.717802e-04  2.354609e-04
## annualizedReturnsAvg 2.477887e-03  4.270229e-04
## annualizedSd      9.040639e-03  3.722964e-03
## sharpeRatio      2.740831e-01  1.146997e-01
##
## $`04_06`
##
##           X10YrGovtRet      GovtII5
## means      7.702703e-06  2.198842e-05
## sds         4.666728e-04  4.793307e-04
## annualizedReturnsAvg 1.326589e-03  3.798626e-03
## annualizedSd      7.378745e-03  7.578884e-03
```

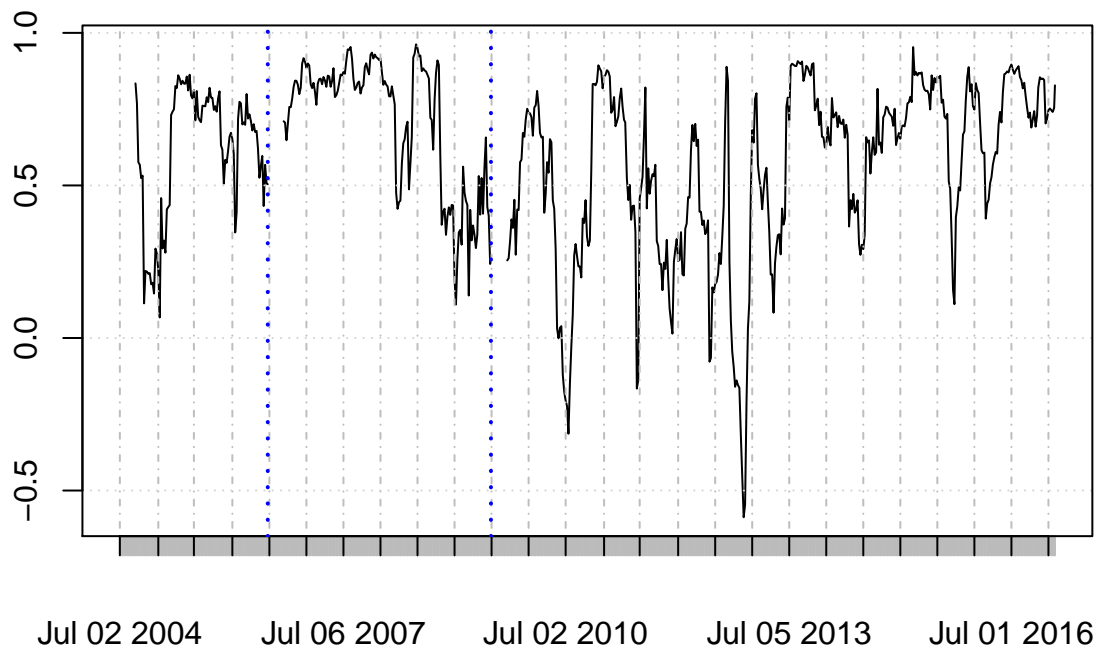
```

## sharpeRatio          1.797851e-01 5.012118e-01
##
## $Recession
##           X10YrGovtRet      GovtII5
## means      -2.181505e-05 -1.867347e-05
## sds         7.506345e-04  8.249424e-04
## annualizedReturnsAvg -4.258551e-03 -3.696223e-03
## annualizedSd      1.186857e-02  1.304349e-02
## sharpeRatio      -3.588090e-01 -2.833770e-01
##
## $Now
##           X10YrGovtRet      GovtII5
## means      -5.429221e-06 -0.0000069818
## sds         5.409437e-04  0.0004834038
## annualizedReturnsAvg -1.198721e-03 -0.0015392062
## annualizedSd      8.553071e-03  0.0076432855
## sharpeRatio      -1.401509e-01 -0.2013801819

## $`83_84`
##           X10YrGovtRet GovtII5
## X10YrGovtRet          NA      NA
## GovtII5                NA      NA
##
## $`88_89`
##           X10YrGovtRet GovtII5
## X10YrGovtRet          NA      NA
## GovtII5                NA      NA
##
## $`94_95`
##           X10YrGovtRet GovtII5
## X10YrGovtRet          NA      NA
## GovtII5                NA      NA
##
## $`99_00`
##           X10YrGovtRet      GovtII5
## X10YrGovtRet      1.0000000 0.1816883
## GovtII5            0.1816883 1.0000000
##
## $`04_06`
##           X10YrGovtRet      GovtII5
## X10YrGovtRet      1.0000000 0.7129488
## GovtII5            0.7129488 1.0000000
##
## $Recession
##           X10YrGovtRet      GovtII5
## X10YrGovtRet      1.0000000 0.6989494
## GovtII5            0.6989494 1.0000000
##
## $Now
##           X10YrGovtRet      GovtII5
## X10YrGovtRet      1.0000000 0.6162173
## GovtII5            0.6162173 1.0000000

```

Rolling Correlation Govt 5year Inflation Indexed bonds



Govt 30 YEAR

```
## `$83_84`
##                               X10YrGovtRet data.returns
## means                       6.235988e-05 4.955752e-05
## sds                         8.786190e-04 8.516090e-04
## annualizedReturnsAvg       1.056612e-02 8.380656e-03
## annualizedSd               1.389219e-02 1.346512e-02
## sharpeRatio                7.605802e-01 6.223974e-01
##
## `$88_89`
##                               X10YrGovtRet data.returns
## means                       9.255319e-06 1.985816e-06
## sds                         6.430132e-04 6.112902e-04
## annualizedReturnsAvg       1.287976e-03 2.560204e-04
## annualizedSd               1.016693e-02 9.665347e-03
## sharpeRatio                1.266829e-01 2.648849e-02
##
## `$94_95`
##                               X10YrGovtRet data.returns
## means                       7.277992e-05 5.571429e-05
## sds                         6.822563e-04 6.008268e-04
## annualizedReturnsAvg       9.500402e-03 7.254202e-03
## annualizedSd               1.078742e-02 9.499905e-03
## sharpeRatio                8.806928e-01 7.636078e-01
```

```

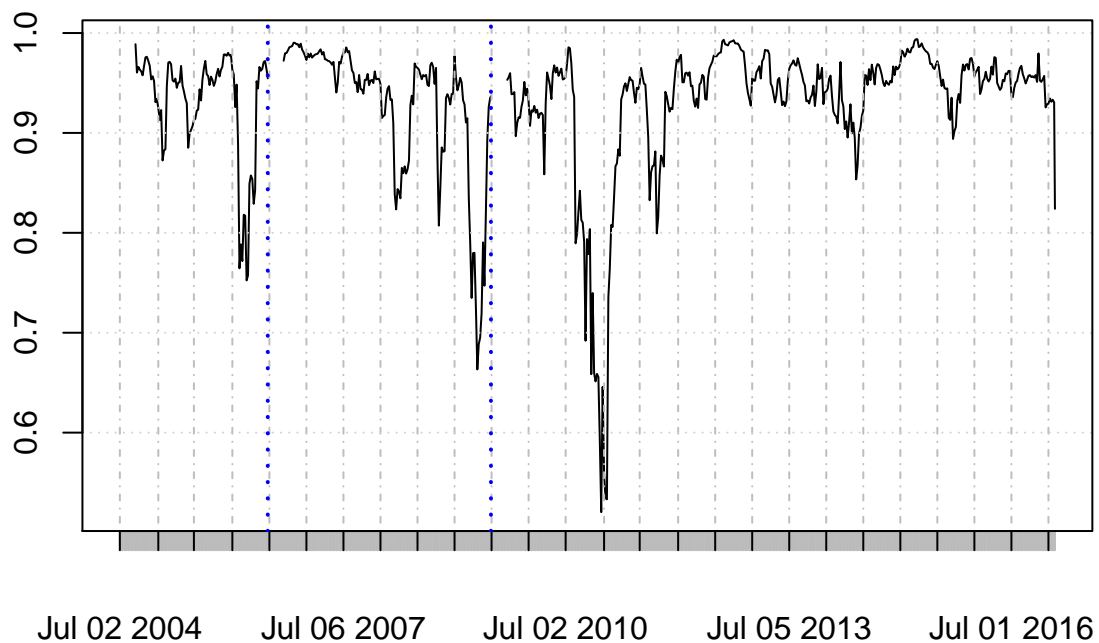
##
## $`99_00`
##           X10YrGovtRet data.returns
## means      2.165217e-05 1.956522e-06
## sds         5.717802e-04 5.387249e-04
## annualizedReturnsAvg 2.477887e-03 2.159189e-04
## annualizedSd    9.040639e-03 8.517989e-03
## sharpeRatio    2.740831e-01 2.534858e-02
##
## $`04_06`
##           X10YrGovtRet data.returns
## means      9.752399e-06 -2.264875e-06
## sds         4.670240e-04 4.362284e-04
## annualizedReturnsAvg 1.689635e-03 -3.950899e-04
## annualizedSd    7.384298e-03 6.897377e-03
## sharpeRatio    2.288145e-01 -5.728118e-02
##
## $Recession
##           X10YrGovtRet data.returns
## means      -2.181505e-05 -1.214286e-05
## sds         7.506345e-04 6.684224e-04
## annualizedReturnsAvg -4.258551e-03 -2.345580e-03
## annualizedSd    1.186857e-02 1.056869e-02
## sharpeRatio   -3.588090e-01 -2.219368e-01
##
## $Now
##           X10YrGovtRet data.returns
## means      -5.452020e-06 -6.404040e-06
## sds         5.406715e-04 5.363179e-04
## annualizedReturnsAvg -1.204855e-03 -1.413492e-03
## annualizedSd    8.548768e-03 8.479931e-03
## sharpeRatio   -1.409391e-01 -1.666868e-01
##
## $`83_84`
##           X10YrGovtRet data.returns
## X10YrGovtRet    1.0000000    0.9591237
## data.returns    0.9591237    1.0000000
##
## $`88_89`
##           X10YrGovtRet data.returns
## X10YrGovtRet    1.0000000    0.9634574
## data.returns    0.9634574    1.0000000
##
## $`94_95`
##           X10YrGovtRet data.returns
## X10YrGovtRet    1.0000000    0.9700733
## data.returns    0.9700733    1.0000000
##
## $`99_00`
##           X10YrGovtRet data.returns
## X10YrGovtRet    1.0000000    0.8944599
## data.returns    0.8944599    1.0000000
##
## $`04_06`

```



```
##           X10YrGovtRet data.returns
## X10YrGovtRet    1.0000000    0.9463274
## data.returns    0.9463274    1.0000000
##
## $Recession
##           X10YrGovtRet data.returns
## X10YrGovtRet    1.0000000    0.9372764
## data.returns    0.9372764    1.0000000
##
## $Now
##           X10YrGovtRet data.returns
## X10YrGovtRet    1.0000000    0.9434978
## data.returns    0.9434978    1.0000000
```

Rolling Correlation Govt 30 bonds



1Y-10Y yield curve check vs 1Y-10Y-20Y vol check vs Credit check

```
## $`83_84`
##           X1Y10Y          SP500
## means      -3.073529e-06  0.0001935987
## sds         8.228312e-04  0.0080350058
## annualizedReturnsAvg -5.506298e-04  0.0279470465
## annualizedSd      1.301010e-02  0.1270445968
## sharpeRatio     -4.232324e-02  0.2199782373
##
## $`88_89`
```

```

##                X1Y10Y        SP500
## means          -5.554965e-05 0.0007624146
## sds             5.695226e-04 0.0085824614
## annualizedReturnsAvg -7.800221e-03 0.1082195929
## annualizedSd      9.004943e-03 0.1357006302
## sharpeRatio      -8.662154e-01 0.7974877693
##
## `$94_95`
##                X1Y10Y        SP500
## means          -0.0000567600 -6.775786e-05
## sds             0.0004732899  6.166537e-03
## annualizedReturnsAvg -0.0070529473 -1.018329e-02
## annualizedSd      0.0074833702  9.750151e-02
## sharpeRatio      -0.9424827472 -1.044424e-01
##
## `$99_00`
##                X1Y10Y        SP500
## means          -3.190583e-05 0.0004549637
## sds             4.018609e-04 0.0134329846
## annualizedReturnsAvg -3.559339e-03 0.0424904244
## annualizedSd      6.353979e-03 0.2123941353
## sharpeRatio      -5.601748e-01 0.2000546028
##
## `$04_06`
##                X1Y10Y        SP500
## means          -4.280396e-05 0.0002472076
## sds             3.571271e-04 0.0066800892
## annualizedReturnsAvg -7.175991e-03 0.0387814552
## annualizedSd      5.646676e-03 0.1056214842
## sharpeRatio      -1.270835e+00 0.3671739274
##
## $Recession
##                X1Y10Y        SP500
## means          4.043783e-05 -0.000231457
## sds             6.752011e-04 0.018479030
## annualizedReturnsAvg 7.644799e-03 -0.048372087
## annualizedSd      1.067587e-02 0.292179125
## sharpeRatio      7.160823e-01 -0.165556272
##
## $Now
##                X1Y10Y        SP500
## means          -5.890110e-06 0.0005234479
## sds             5.105367e-04 0.0098046933
## annualizedReturnsAvg -1.252996e-03 0.1101116701
## annualizedSd      8.072295e-03 0.1550258129
## sharpeRatio      -1.552218e-01 0.7102795853

## `$83_84`
## NULL
##
## `$88_89`
## NULL
##
## `$94_95`

```

```

##                               VolCheck          SP500
## means                        0.0000439200 -6.775786e-05
## sds                         0.0005875234  6.166537e-03
## annualizedReturnsAvg       0.0055053536 -1.018329e-02
## annualizedSd                0.0092895609  9.750151e-02
## sharpeRatio                0.5926387334 -1.044424e-01
##
## $`99_00`
##                               VolCheck          SP500
## means                        1.224215e-05 0.0004549637
## sds                         5.789919e-04 0.0134329846
## annualizedReturnsAvg       1.347630e-03 0.0424904244
## annualizedSd                9.154666e-03 0.2123941353
## sharpeRatio                1.472069e-01 0.2000546028
##
## $`04_06`
##                               VolCheck          SP500
## means                        3.090495e-05 0.0002472076
## sds                         4.471989e-04 0.0066800892
## annualizedReturnsAvg       5.206758e-03 0.0387814552
## annualizedSd                7.070835e-03 0.1056214842
## sharpeRatio                7.363711e-01 0.3671739274
##
## $Recession
##                               VolCheck          SP500
## means                        -3.285979e-05 -0.000231457
## sds                         8.655182e-04  0.018479030
## annualizedReturnsAvg       -6.247095e-03 -0.048372087
## annualizedSd                1.368504e-02  0.292179125
## sharpeRatio                -4.564907e-01 -0.165556272
##
## $Now
##                               VolCheck          SP500
## means                        4.048666e-06 0.0005234479
## sds                         6.000964e-04 0.0098046933
## annualizedReturnsAvg       8.527177e-04 0.1101116701
## annualizedSd                9.488356e-03 0.1550258129
## sharpeRatio                8.986991e-02 0.7102795853
##
## $`83_84`
## NULL
##
## $`88_89`
## NULL
##
## $`94_95`
## NULL
##
## $`99_00`
##                               CreditCheck          SP500
## means                        1.659193e-05 0.0004549637
## sds                         1.653363e-04 0.0134329846
## annualizedReturnsAvg       1.853965e-03 0.0424904244
## annualizedSd                2.614196e-03 0.2123941353

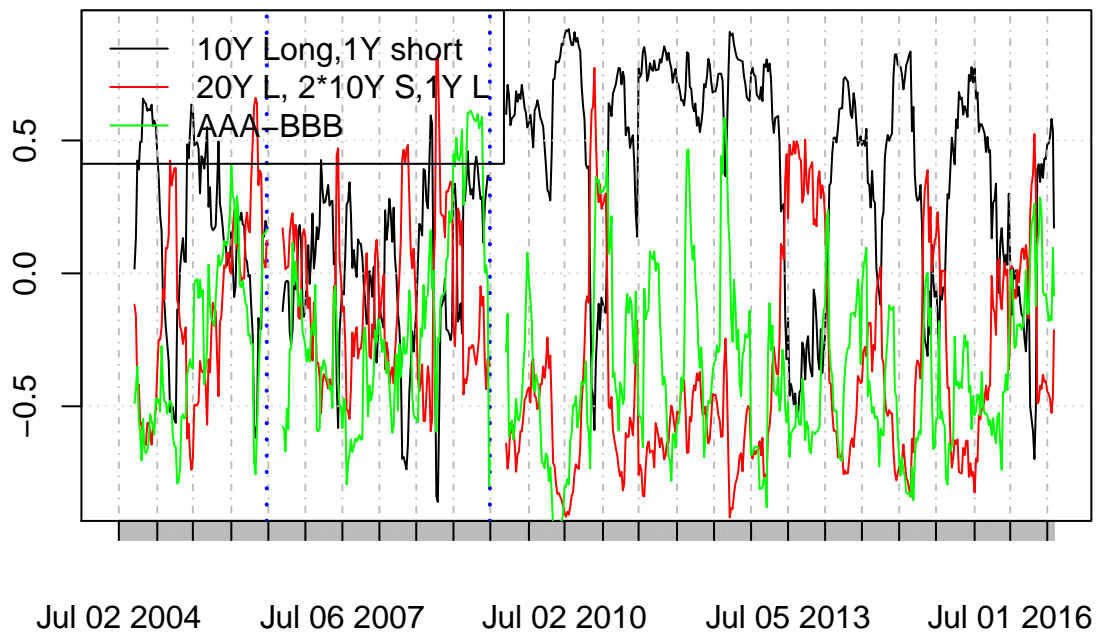
```

```

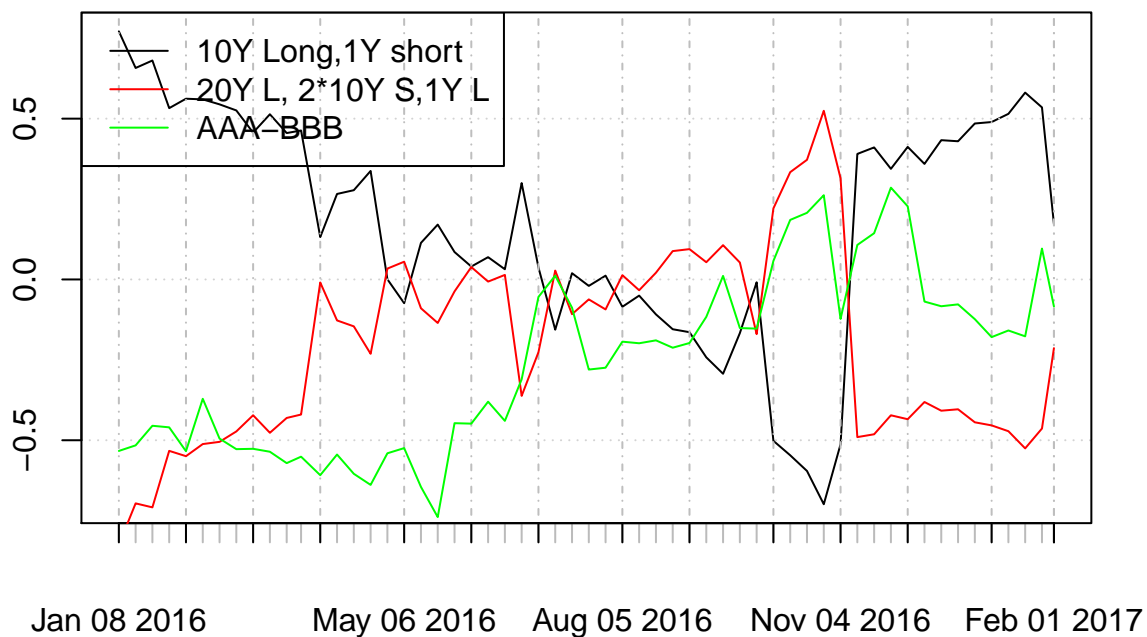
## sharpeRatio          7.091914e-01 0.2000546028
##
## $`04_06`
##           CreditCheck          SP500
## means      -7.920792e-07 0.0002472076
## sds         1.567254e-04 0.0066800892
## annualizedReturnsAvg -1.351932e-04 0.0387814552
## annualizedSd       2.478047e-03 0.1056214842
## sharpeRatio      -5.455636e-02 0.3671739274
##
## $Recession
##           CreditCheck          SP500
## means      3.253968e-05 -0.000231457
## sds         9.536820e-04 0.018479030
## annualizedReturnsAvg 6.223989e-03 -0.048372087
## annualizedSd       1.507904e-02 0.292179125
## sharpeRatio      4.127577e-01 -0.165556272
##
## $Now
##           CreditCheck          SP500
## means      -0.0000142483 0.000518627
## sds         0.0002331900 0.009805017
## annualizedReturnsAvg -0.0030028984 0.109109100
## annualizedSd       0.0036870582 0.155030933
## sharpeRatio      -0.8144429194 0.703789222

```

Strategies based on 1Y–10Y–20Y data vs SP500



Election – Rolling Correlation 1Y–10–20Y strategy vs SP500



COVARIANCE MATRIX BASED ON WEIGHTS

Warning: 1 failed to parse.

	Enrgy	Telcm	Hlth	Oil	Gold
Enrgy	0.0016192	0.0004823	0.0004660	0.0008618	0.0001516
Telcm	0.0004823	0.0009243	0.0006120	-0.0001676	-0.0000762
Hlth	0.0004660	0.0006120	0.0010111	-0.0002246	-0.0000961
Oil	0.0008618	-0.0001676	-0.0002246	0.0052529	0.0004342
Gold	0.0001516	-0.0000762	-0.0000961	0.0004342	0.0010153

BUILDING PORTFOLIO using MVE

[,1]

[1,] 0.04260706

$$SharpeRatio_{MVE} = (R_{avg,exc})' \Sigma R_{avg,exc}$$

where

$R_{avg,exc}$ is the average excess returns of the assets

Σ is the covariance matrix of the assets

```

#Tactical
dailyReturnOfPortfolio <- ExcessReturns[,-ncol(ExcessReturns)]%*%weightsOfAssets[[1]]
dailyReturnOfPortfolio.xts <- xts(dailyReturnOfPortfolio,index(ExcessReturns))

strat2 <- do.call(rbind,Strat2.HikePeriods.Daily[hikePeriodNames])
compdata <- merge.xts(dailyReturnOfPortfolio.xts,strat2[,1])%>%na.omit
cor(compdata)

```

```

##                                dailyReturnOfPortfolio.xts      VolCheck
## dailyReturnOfPortfolio.xts              1.000000000 0.008520379
## VolCheck                                0.008520379 1.000000000

```