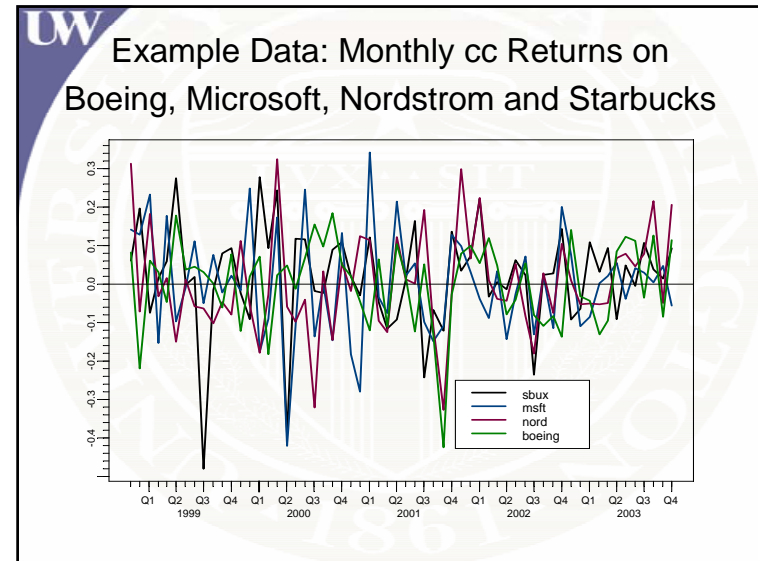


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## Rolling Analysis of Efficient Portfolios

Econ 424  
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### Full Sample CER Model Estimates

```
> muhat.vals
  sbux      msft      nord      boeing
0.01782 -0.00006364 0.003202 0.001688

> sigmahat.vals
  sbux  msft  nord boeing
0.1353 0.1375 0.1325 0.1097

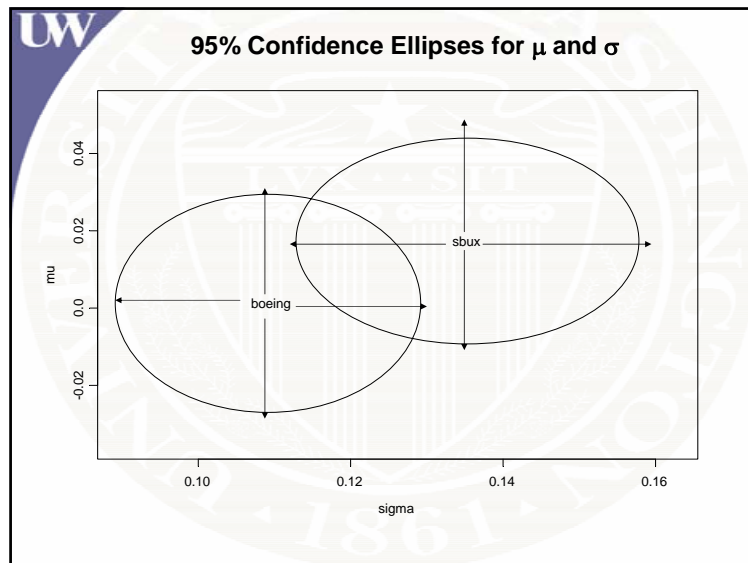
> cor.mat
      sbux      msft      nord      boeing
sbux 1.00000 0.295506 0.1525 0.008218
msft 0.295506 1.00000 0.3833 0.007876
nord 0.152500 0.383348 1.0000 0.258940
boeing 0.008218 0.007876 0.2589 1.000000
```

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### CER Model Estimates with Standard Errors

```
> rbind(muhat.vals,se.muhat)
      sbux      msft      nord      boeing
muhat.vals 0.01782 -0.00006364 0.003202 0.001688
se.muhat 0.01747 0.01775446 0.017110 0.014168

> rbind(sigmahat.vals,se.sigmahat)
      sbux  msft  nord boeing
sigmahat.vals 0.13534 0.13753 0.1325 0.10975
se.sigmahat 0.01236 0.01255 0.0121 0.01002
```



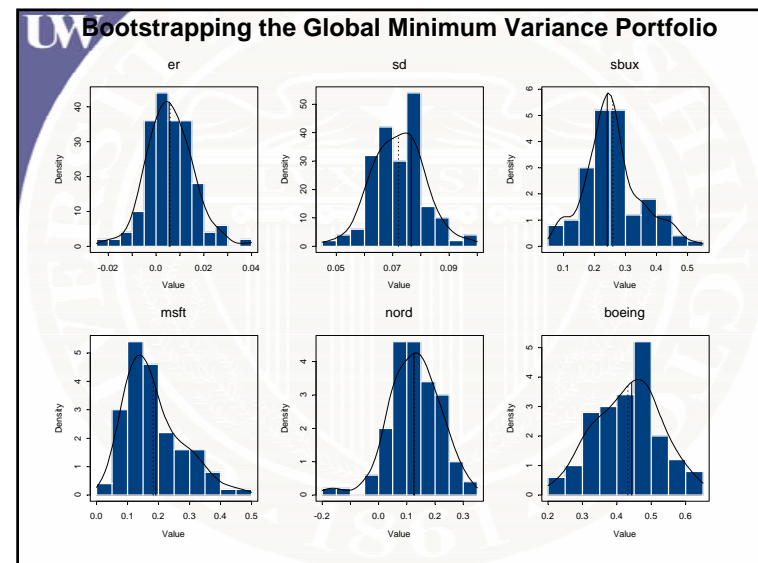
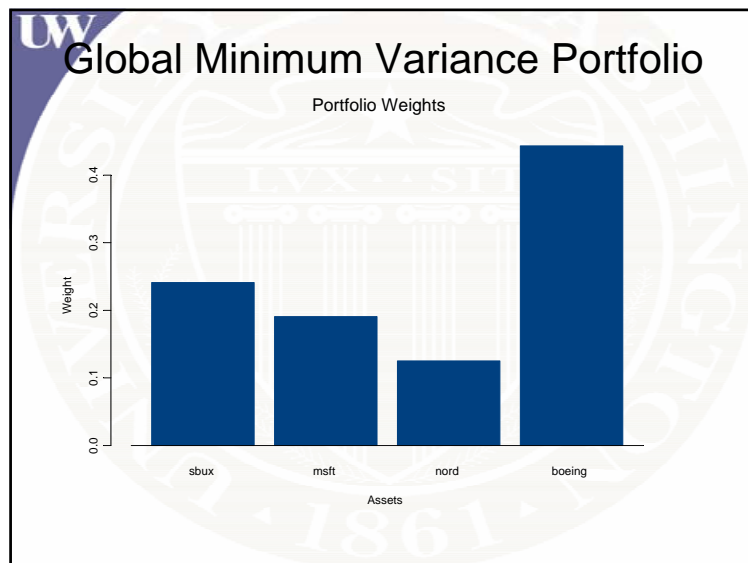
### Global Minimum Variance Portfolio

```

> # global minimum variance portfolio
> gmin.4 = globalMin.portfolio(er=muhat.vals,
+                               cov.mat=cov.mat)
> summary(gmin.4)
Call:
globalMin.portfolio(er = muhat.vals, cov.mat = cov.mat)

Portfolio expected return:      0.00543
Portfolio standard deviation:   0.07655
Portfolio weights:
  sbux  msft  nord boeing
0.241 0.1907 0.1252 0.443

```



## Bootstrapping the Global Minimum Variance Portfolio

Number of Replications: 100

Summary Statistics:

	Observed	Bias	Mean	SE
er	0.00543	0.0003845	0.005815	0.009668
sd	0.07655	-0.0045245	0.072027	0.009249
sbux	0.24100	0.0177585	0.258759	0.090101
msft	0.19070	-0.0081261	0.182577	0.090327
nord	0.12525	0.0015642	0.126812	0.089178
boeing	0.44305	-0.0111965	0.431852	0.094154

## Efficient Portfolio: Target $\mu = 0.015$

```
> eport.015 =
+ efficient.portfolio(er=muhat.vals,
+                   cov.mat=cov.mat,
+                   target.return=0.015)
> summary(eport.015)
```

Call:

```
efficient.portfolio(er = muhat.vals, cov.mat
= cov.mat, target.return = 0.015)
```

Portfolio expected return: 0.015

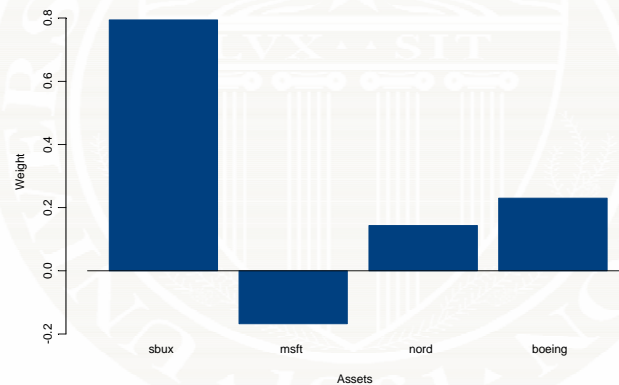
Portfolio standard deviation: 0.1104

Portfolio weights:

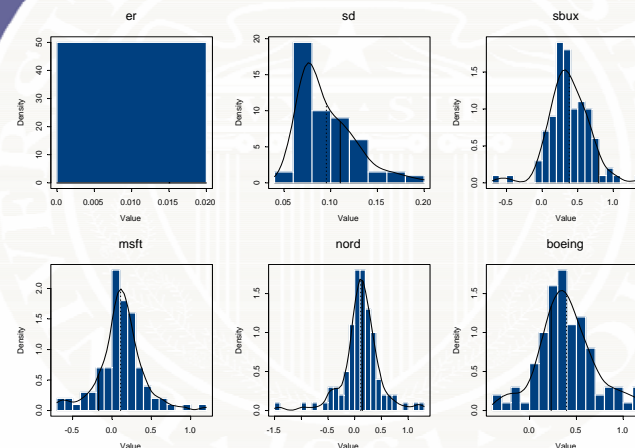
```
sbux msft nord boeing
0.7937 -0.1673 0.1435 0.2301
```

## Efficient Portfolio: Target $\mu = 0.015$

Portfolio Weights



## Bootstrapping the Efficient Portfolio with Target=0.015



## Bootstrapping the Efficient Portfolio with Target=0.015

Number of Replications: 100

### Summary Statistics:

	Observed	Bias	Mean	SE
er	0.0150	-1.735e-017	0.01500	5.293e-018
sd	0.1104	-1.500e-002	0.09537	2.932e-002
sbux	0.7937	-4.139e-001	0.37986	2.831e-001
msft	-0.1673	2.781e-001	0.11084	2.938e-001
nord	0.1435	-2.817e-002	0.11529	3.653e-001
boeing	0.2301	1.639e-001	0.39401	3.013e-001

