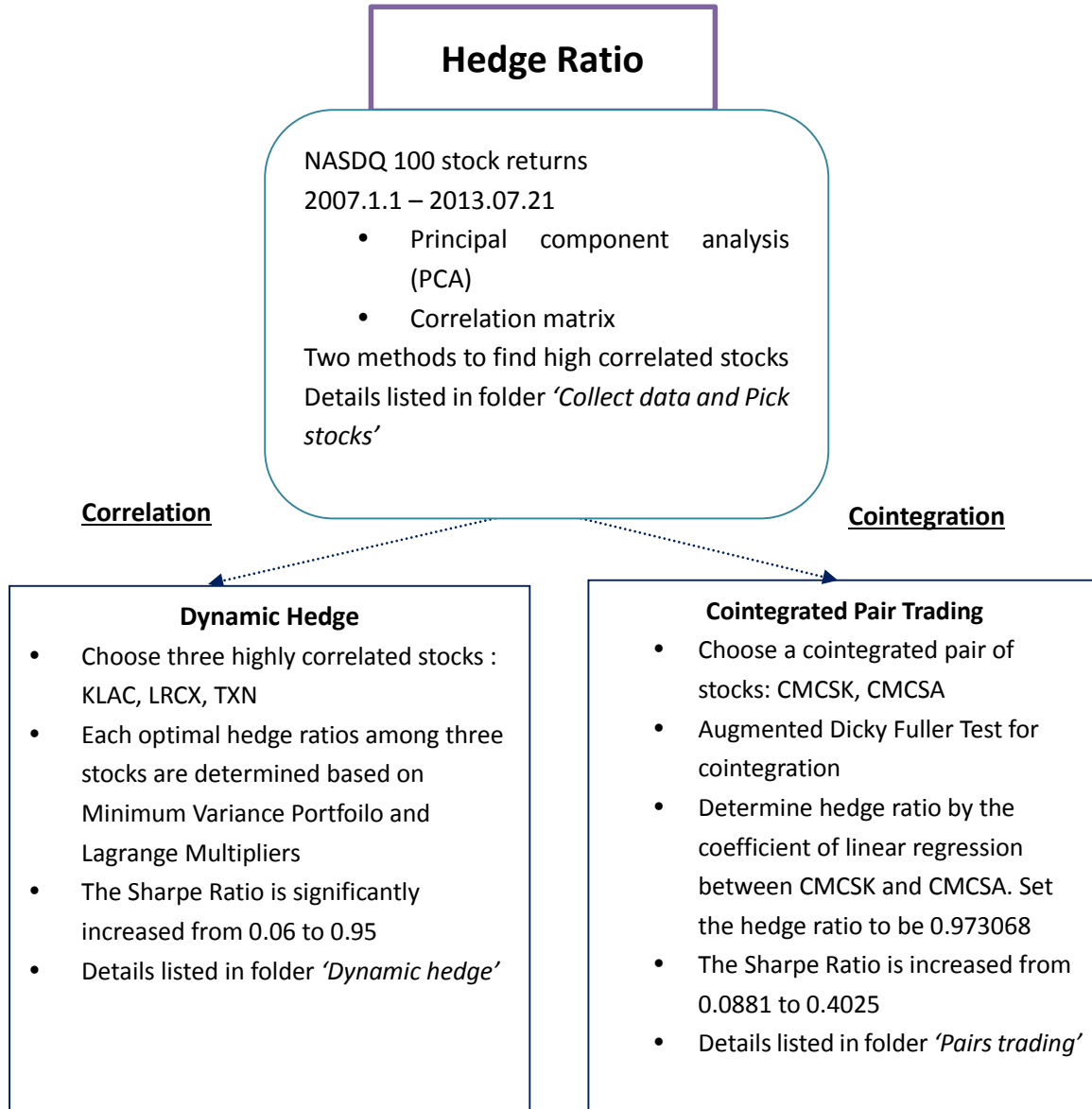
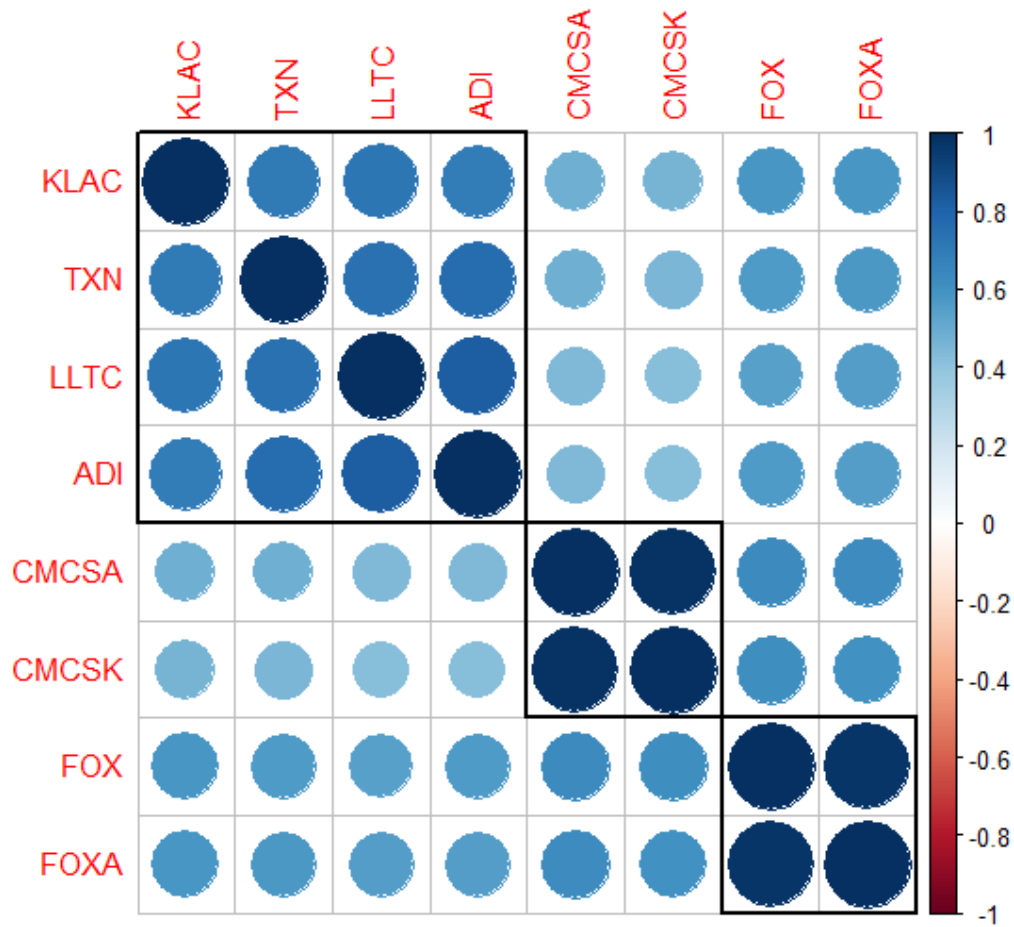


Quantitative Assessment – Xinlu Tu

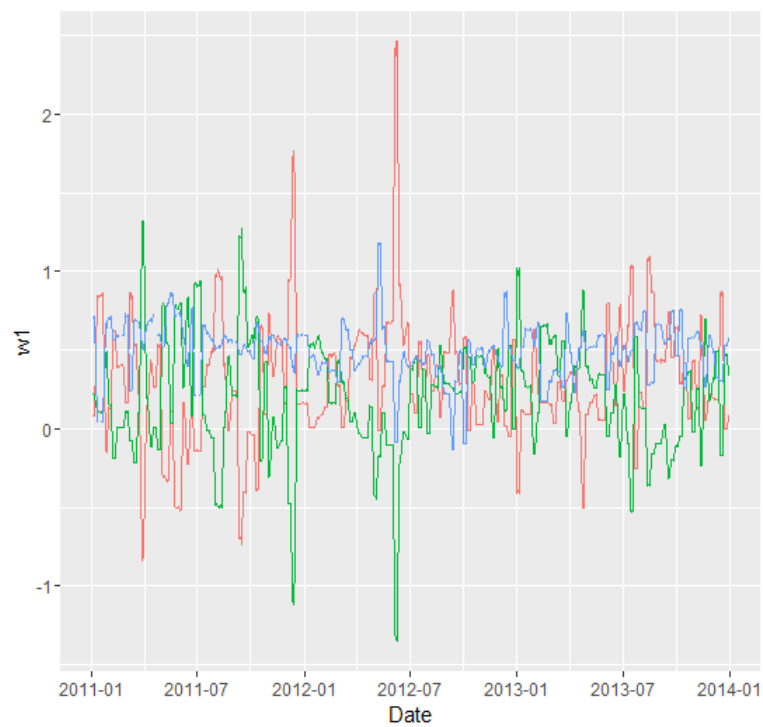
1. Process flow chart



2. Result summary



✓ Choose KLAC, LRCX, TXN for dynamic hedging and CMCSK, CMCSA for pair trading



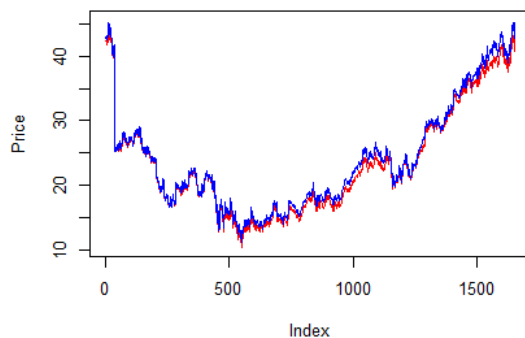
- ✓ Dynamic hedge ratio plot from 2011-01 to 2014-01
List w1, w2, w3 in R for detailed numbers

invest \$10000 to three stocks equally weighted vs Dynamic hedging

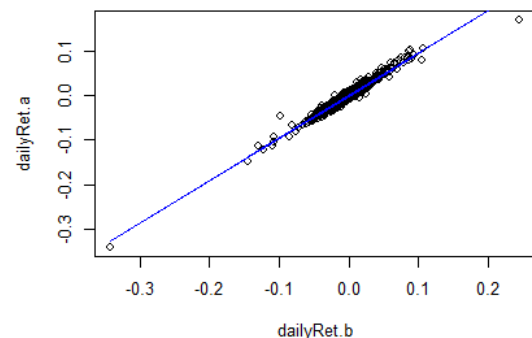
```
> mean(diff(log(Value)))*252/(sd(diff(log(Value)))*sqrt(252))
[1] 0.06099502
> mean(diff(log(value[!is.na(value)])))*252/(sd(diff(log(value[!is.na(value)])))*sqrt(252))
[1] 0.9539509
```

- ✓ Sharpe Ratio comparison

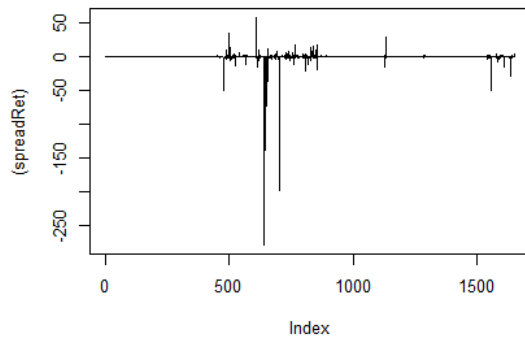
Comcast Corporation K vs Comcast Corporation A



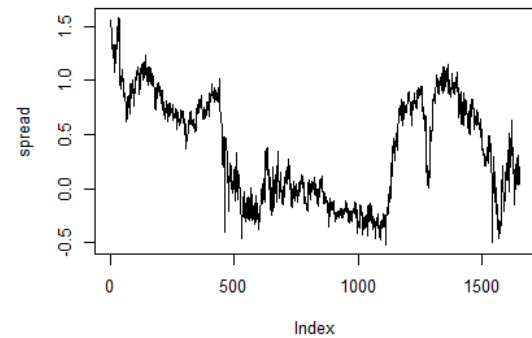
Regression of RETURNS for Stock A & B



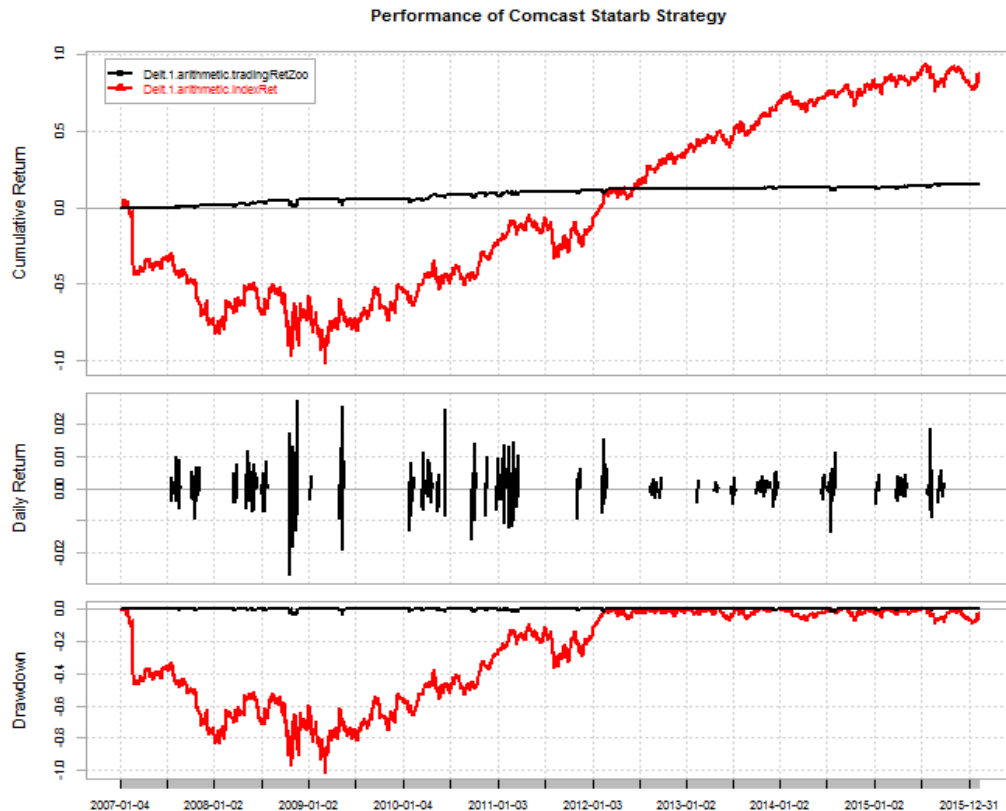
Spread Returns



Spread Actual



- ✓ CMCSK vs CMCSA cointegration overview



- ✓ Return comparison of Pair vs simply invest CMCSA

```
> print(SharpeRatio.annualized(zooTradeVec))
```

Annualized Sharpe Ratio (Rf=0%)	Pairs	CMCSA
	0.4025047	0.08813146

- ✓ Sharpe Ratio comparison

3. Reference

- ❖ Find correlation:

<http://arxiv.org/pdf/1512.03537.pdf>

- ❖ Dynamic hedging:

https://rpubs.com/OmarMa/Equity_Portfolio_Hedging

- ❖ Pairs trading series:

<http://gekkoquant.com/2012/10/21/statistical-arbitrage-correlation-vs->

cointegration/

<http://gekkoquant.com/2012/12/17/statistical-arbitrage-testing-for->

cointegration-augmented-dicky-fuller/

<http://gekkoquant.com/2013/01/21/statistical-arbitrage-trading-a->

cointegrated-pair/

4. Improvements

- a. The methods of finding optimal hedge ratios and trading strategies are highly sensitive to time. The period chosen to implement the methods is very important. Thus, I am thinking about using predictive models of machine learning to predict future price when finding the perfect stocks to hedge.
- b. If time is allowed, I am considering to apply similar methods to other derivatives or ETFs.
- c. I copied a large chunk of codes from references because the limited time to understand thoroughly about all the theories behind them. Codes and methods can be improved in the future after fully understand the concepts.