

Stock Data Analysis

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The goal is to find a strategy that uses the fact that this ETF is constantly going down, in order to make a daily compounding profit.

What we have

- UVXY
 - Daily Open/Close Prices
 - Daily High/Low Prices
 - Daily Volume
 - Split-Adjusted Equivalent Open/Close Prices
- VIX
 - Daily Open/Close Prices

Descriptive Analysis

```
library(knitr)
options(scipen = 100)
options(digits = 2)
kable(stat.desc(UVXY_desc, desc = F), caption = "UVXY Descriptive Table")
```

Table 1: UVXY Descriptive Table

	Open	Close	Adj_Open	Adj_Close	High	Low	Volume
nbr.val	1355.0	1355.0	1355	1355	1355.0	1355.0	1355
nbr.null	0.0	0.0	0	0	0.0	0.0	120
nbr.na	0.0	0.0	0	0	0.0	0.0	0
min	4.7	3.9	19	19	4.8	3.9	0
max	100.7	102.8	12134988	10289989	108.4	97.9	32269500
range	96.0	98.9	12134969	10289971	103.7	94.0	32269500
sum	34734.7	34581.1	567289728	561941598	36450.1	33249.5	1746013800

```
kable(stat.desc(VIX_desc, desc = F), caption = "VIX Descriptiv Table")
```

Table 2: VIX Descriptiv Table

	Vix_Open	Vix_Close
nbr.val	1355	1355
nbr.null	0	0
nbr.na	0	0
min	10	10

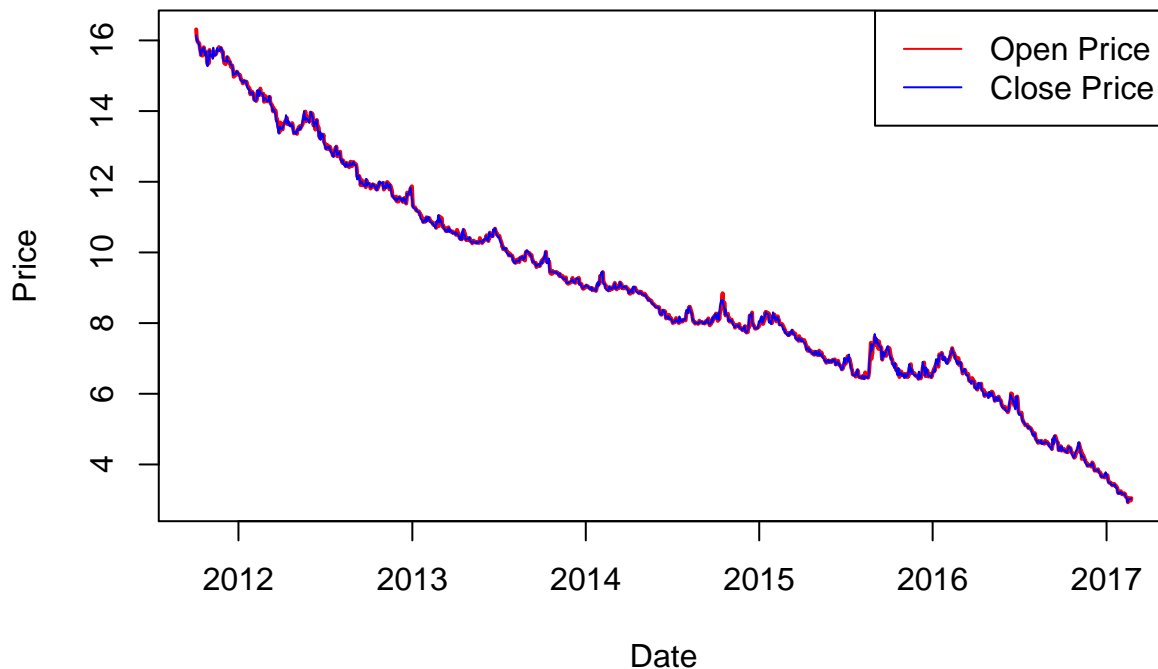
	Vix_Open	Vix_Close
max	46	41
range	36	30
sum	22186	22041

Task 1

For example, consider you short sell UVXY every morning and buy to cover at the end of every day. On average, how profitable would this strategy be?

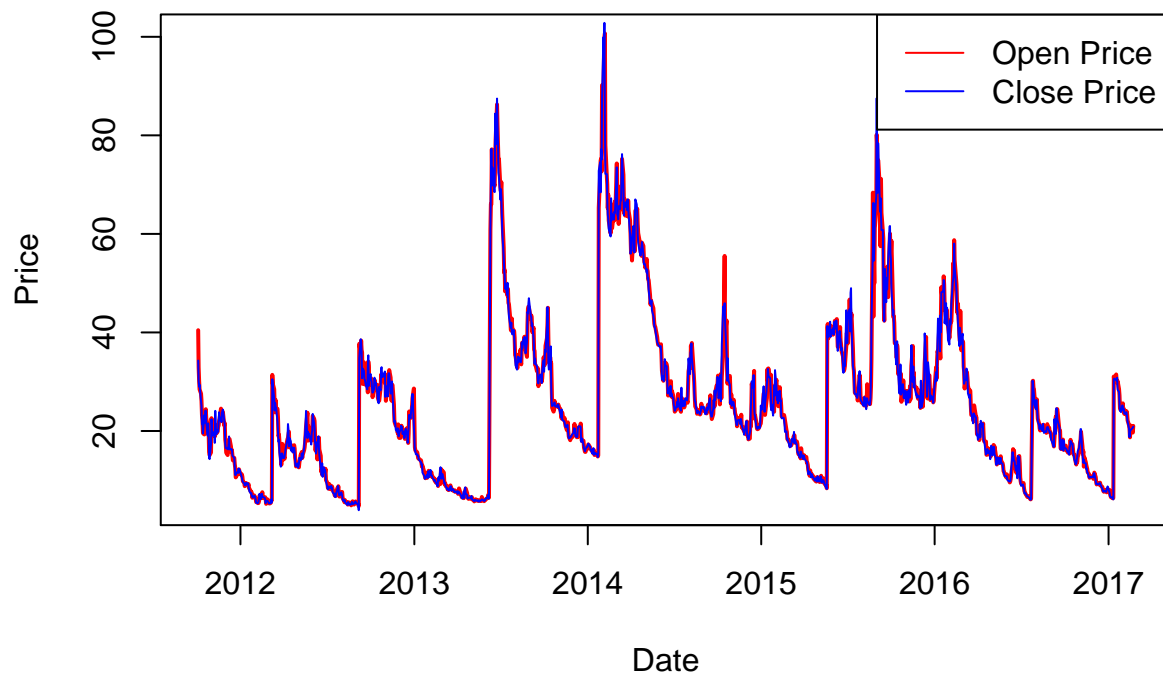
- Time Series Plot of **Log Split-Adjusted Equivalent Open/Close Prices**

```
plot(Date, log(UVXY_Adj_Open), ylab = "Price", col = "red", type = "l", lwd = 2)
lines(Date, log(UVXY_Adj_Close), col = "blue")
legend('topright', legend = c('Open Price', 'Close Price'), col = c("red","blue"), lty=1)
```



- Time Series Plot of **Daily Open/Close Prices**

```
plot(Date, UVXY_Open, ylab = "Price", col = "red", type = "l", lwd = 2)
lines(Date, UVXY_Close, col = "blue")
legend('topright', legend = c('Open Price', 'Close Price'), col = c("red","blue"), lty=1)
```



- Suppose we trade 100 shares of UVXY per day and we use original daily UVXY open/close price,

```
daily_profit_ave = mean((UVXY_Open - UVXY_Close)*100)
daily_profit_max = max((UVXY_Open - UVXY_Close)*100)
daily_profit_min = min((UVXY_Open - UVXY_Close)*100)
```

Daily Profit based on 100 Shares	Average	Max	Min
	11.33	1837	-2308

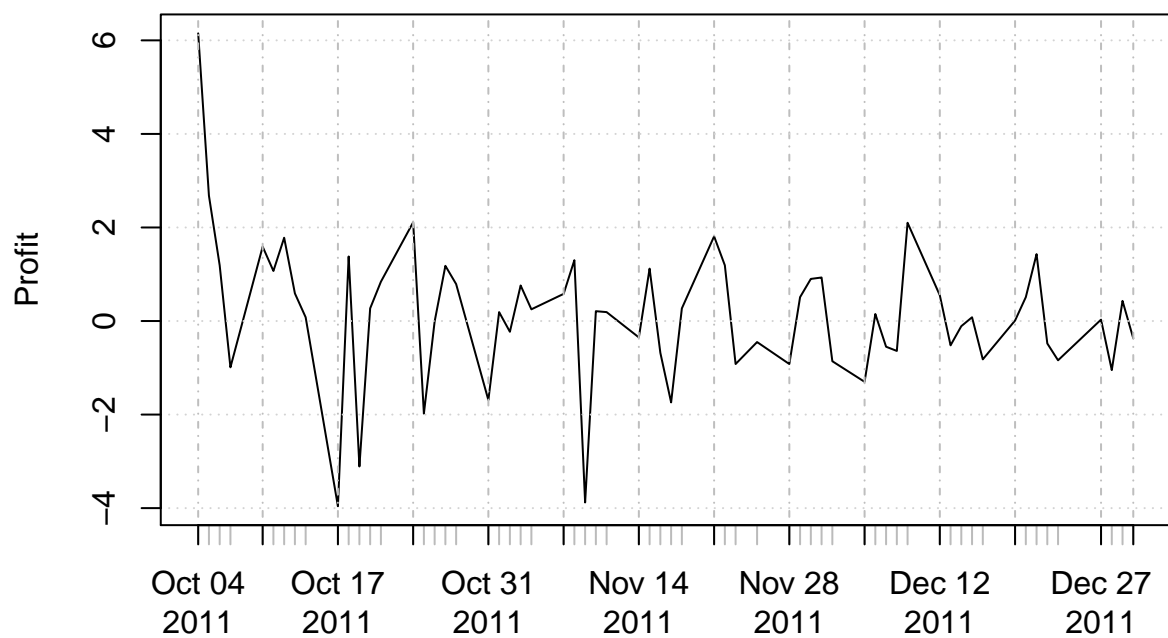
Task 2

What was the return of this strategy every year on a yearly basis, 2011-present?

- **2011**

```
plot(data2011$Open-data2011$Close, ylab = "Profit",
     main = "Time Series of Daily Profit per Share")
```

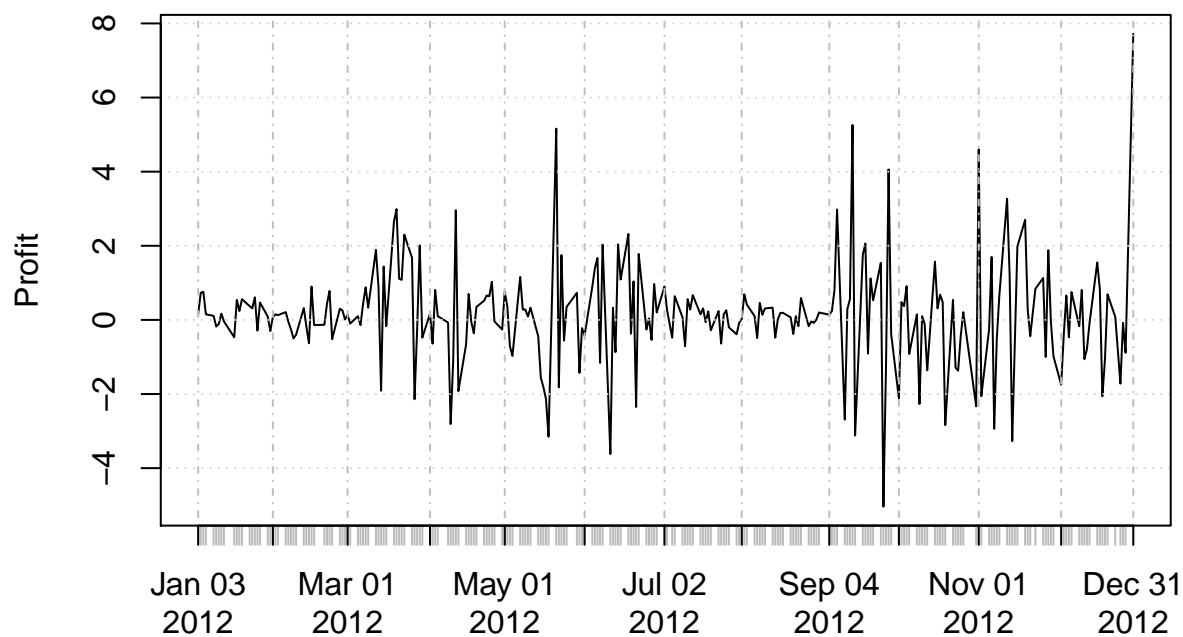
Time Series of Daily Profit per Share



Daily Profit based on 100 Shares	Average	Max	Min
	14.11	615	-396

- 2012

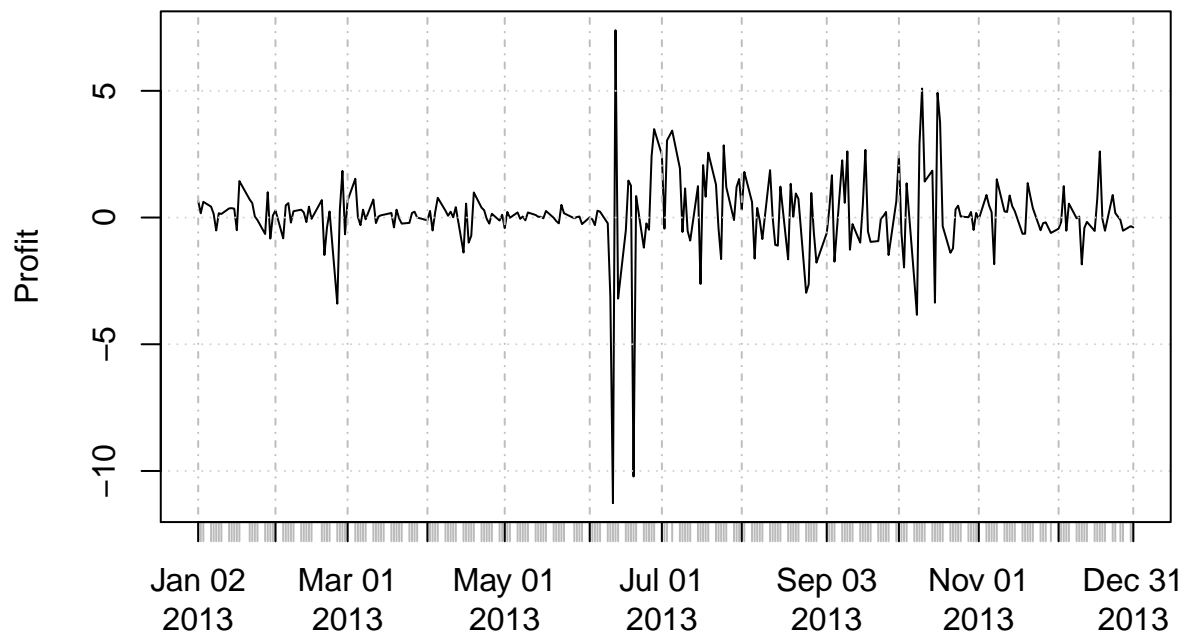
Time Series of Daily Profit per Share



Daily Profit based on 100 Shares	Average	Max	Min
	14.14	772	-504

- 2013

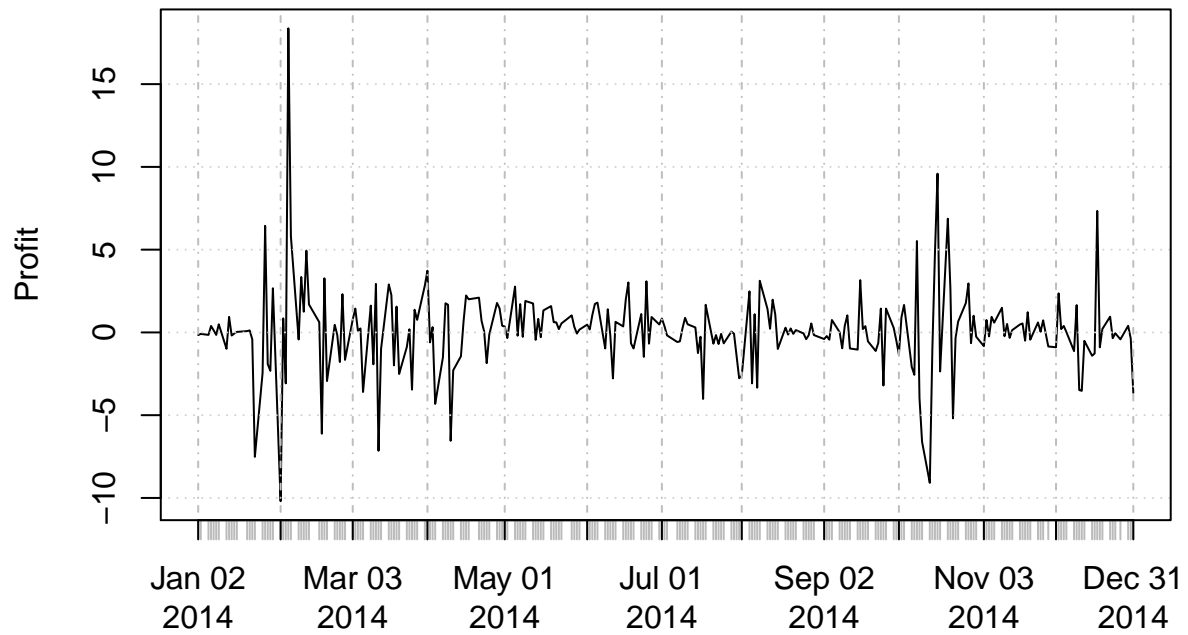
Time Series of Daily Profit per Share



Daily Profit based on 100 Shares	Average	Max	Min
	9.6	739	-1127

- 2014

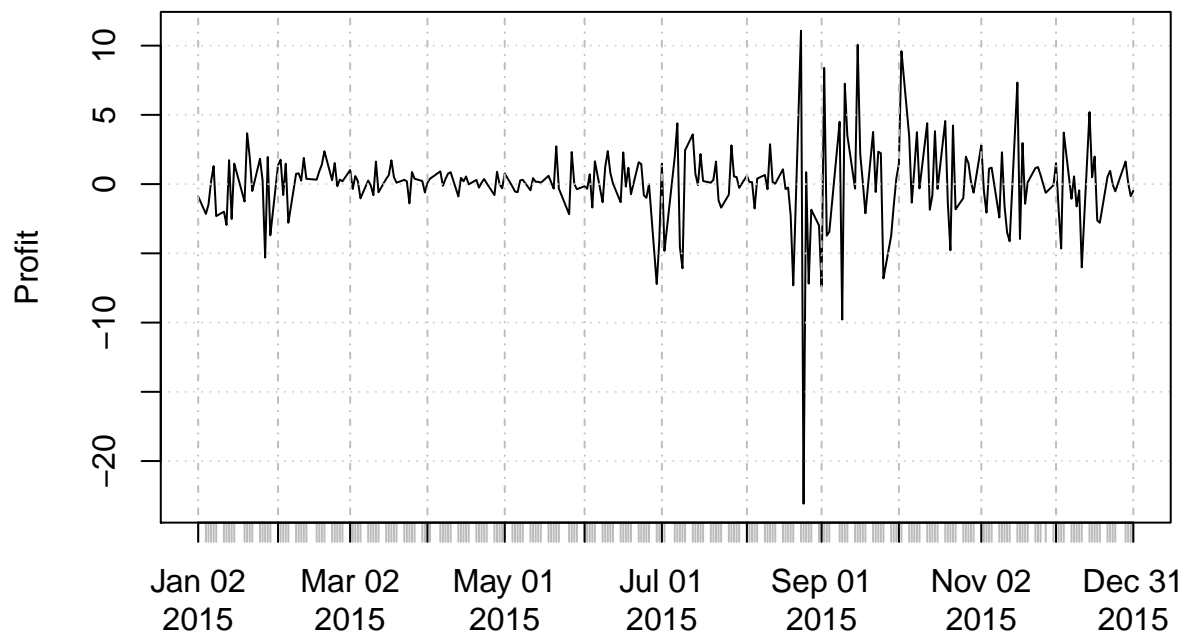
Time Series of Daily Profit per Share



Daily Profit based on 100 Shares	Average	Max	Min
	11.04	1837	-1020

- 2015

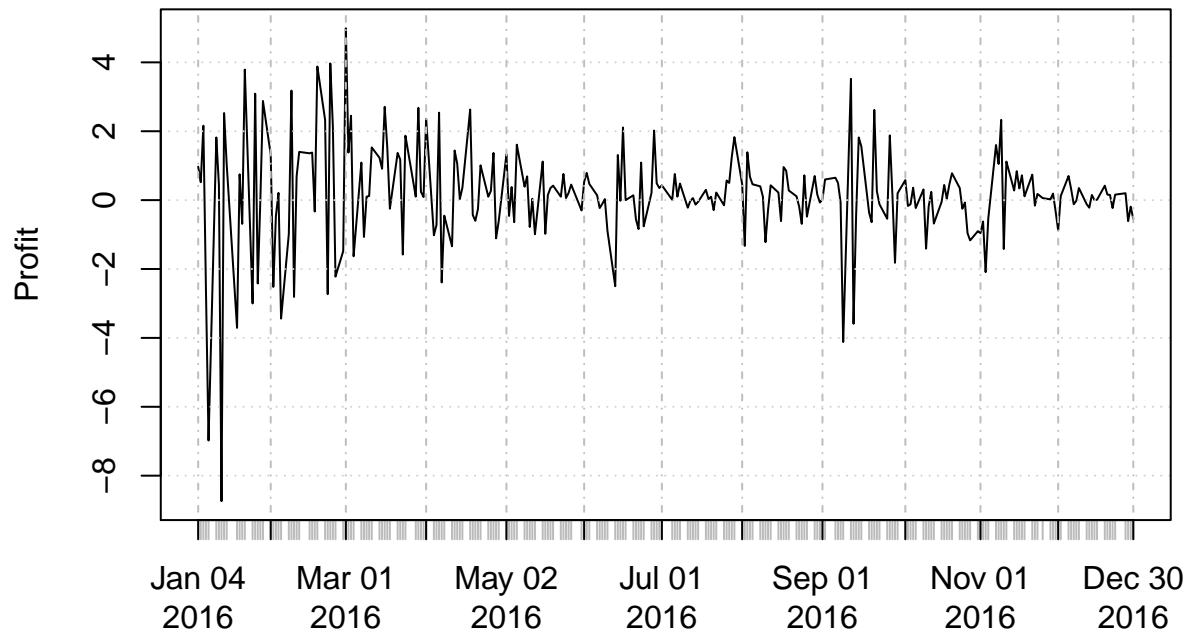
Time Series of Daily Profit per Share



Daily Profit based on 100 Shares	Average	Max	Min
	2.71	1107	-2308

- 2016

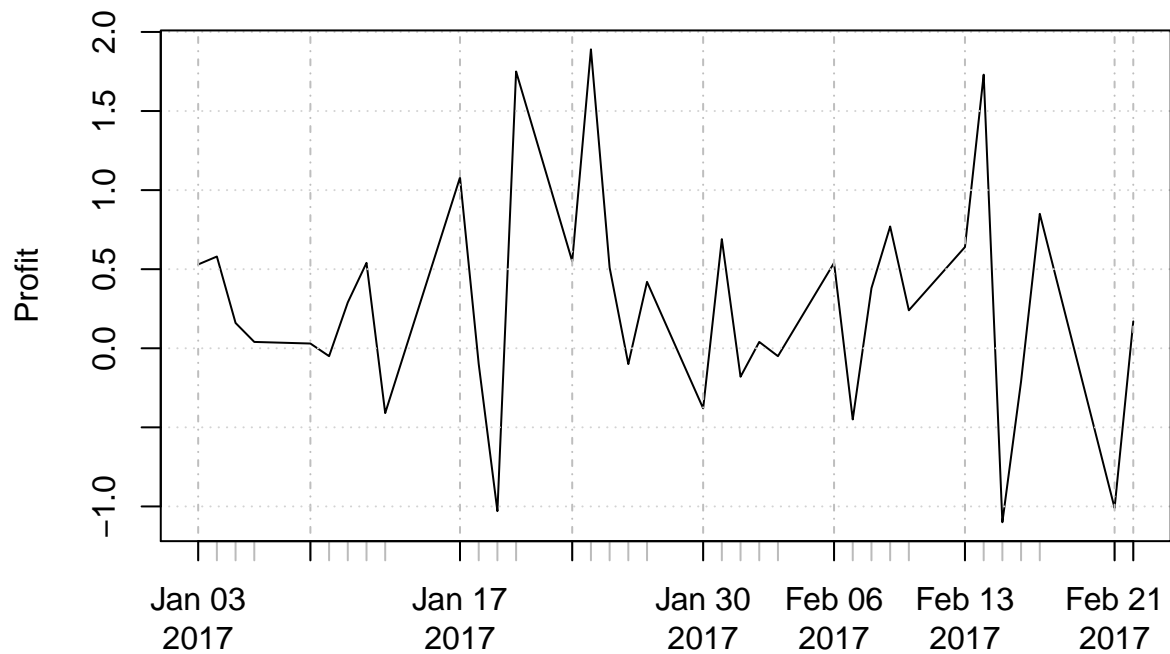
Time Series of Daily Profit per Share



Daily Profit based on 100 Shares	Average	Max	Min
	16.37	499	-874

- 2017

Time Series of Daily Profit per Share



Daily Profit based on 100 Shares	Average	Max	Min
	26.71	189	-110

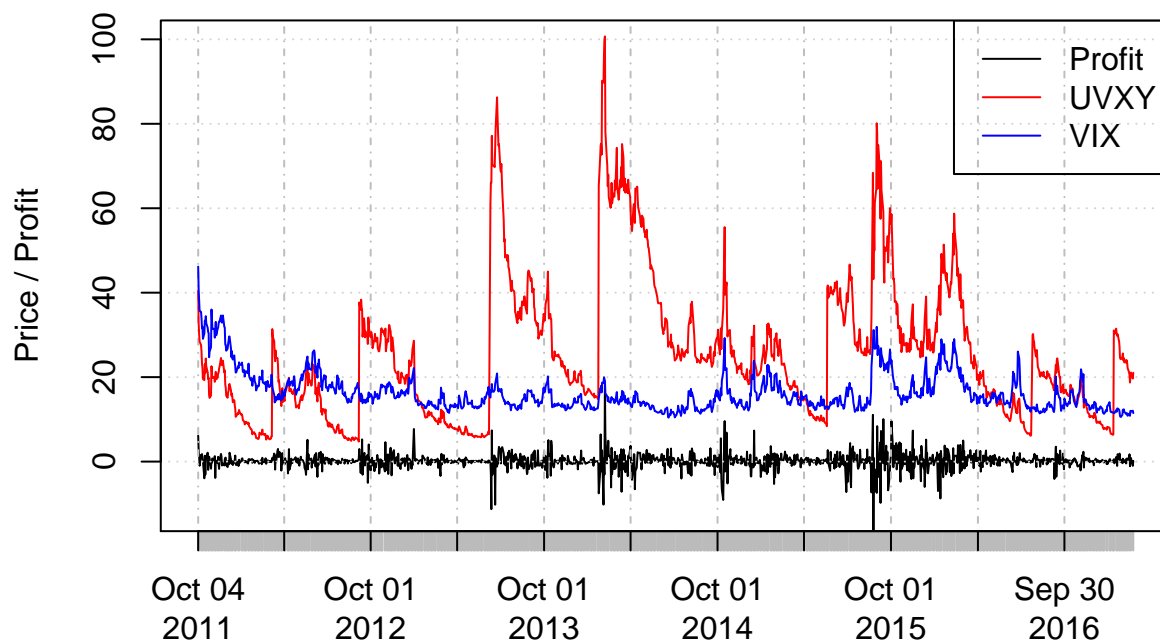
Further Thinking

For example, considering the VIX (volatility index) as part of the calculation or excluding certain days of the week.

- Time Series Plot of **Daily UVXY Open Prices**, **VIX Open Prices** and **Daily Profit per Share**

```
plot(data$Open-data$Close, ylim = c(-12, 100), ylab = "Price / Profit",
     main = "UVXY/VIX Open Price and Daily Profit per Share")
lines(Date, UVXY_Open, col = "red")
lines(Date, VIX_Open, col = "blue")
legend('topright', legend = c('Profit', 'UVXY', 'VIX'),
     col = c("black", "red", "blue"), lty=1)
```


UVXY/VIX Open Price and Daily Profit per Share



- Time Series Plot of **VIX Open Prices** and **Daily Profit per Share**

```
plot(data$Open-data$Close, ylim = c(-12, 50), ylab = "Price / Profit",
     main = "VIX Open Price and Daily Profit per Share")
lines(Date, VIX_Open, col = "blue")
legend('topright', legend = c('Profit', 'VIX'),
     col = c("black", "blue"), lty=1)
```

VIX Open Price and Daily Profit per Share

