VISUALIZING TIME SERIES DATA IN R

Univariate time series analysis

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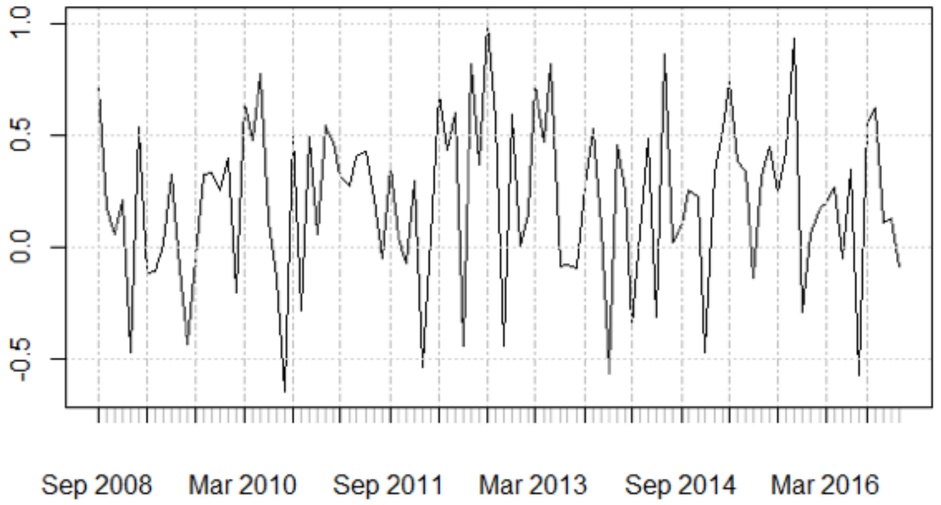
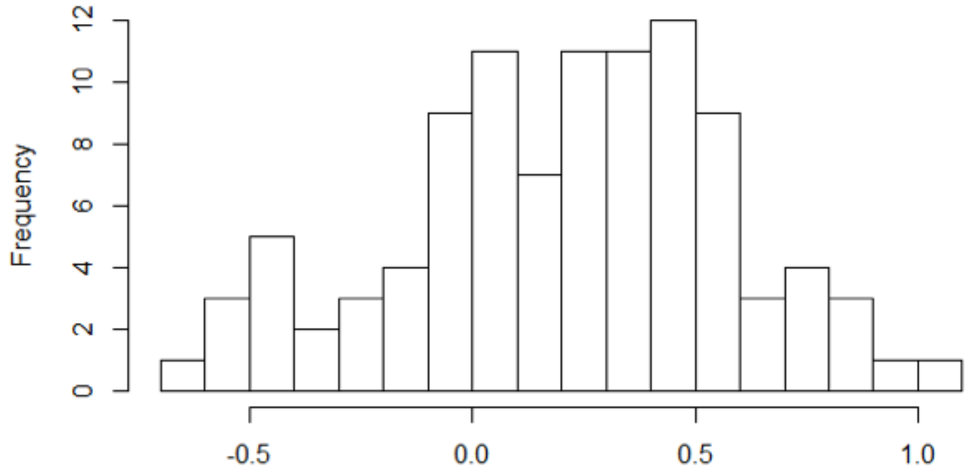
The R Trader

Univariate time series analysis

- Location
- Dispersion
- Distribution



Dispersion along the y-axis



Amazon stock price

- In their standard form, most time series do not exhibit the right statistical properties
- Example: stock with strong upward trend

Amazon stock return

- Amazon stock *return* is a random series centered around o

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Let’s practice!

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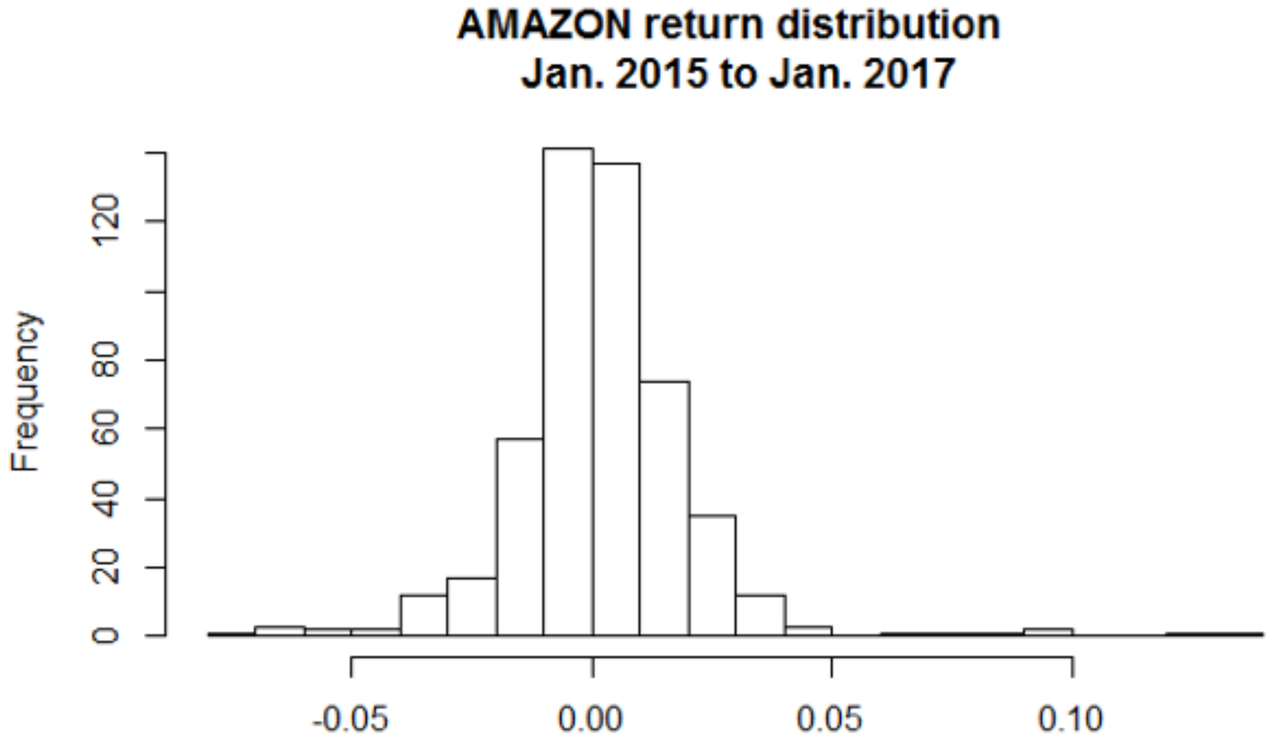
Other visualization tools

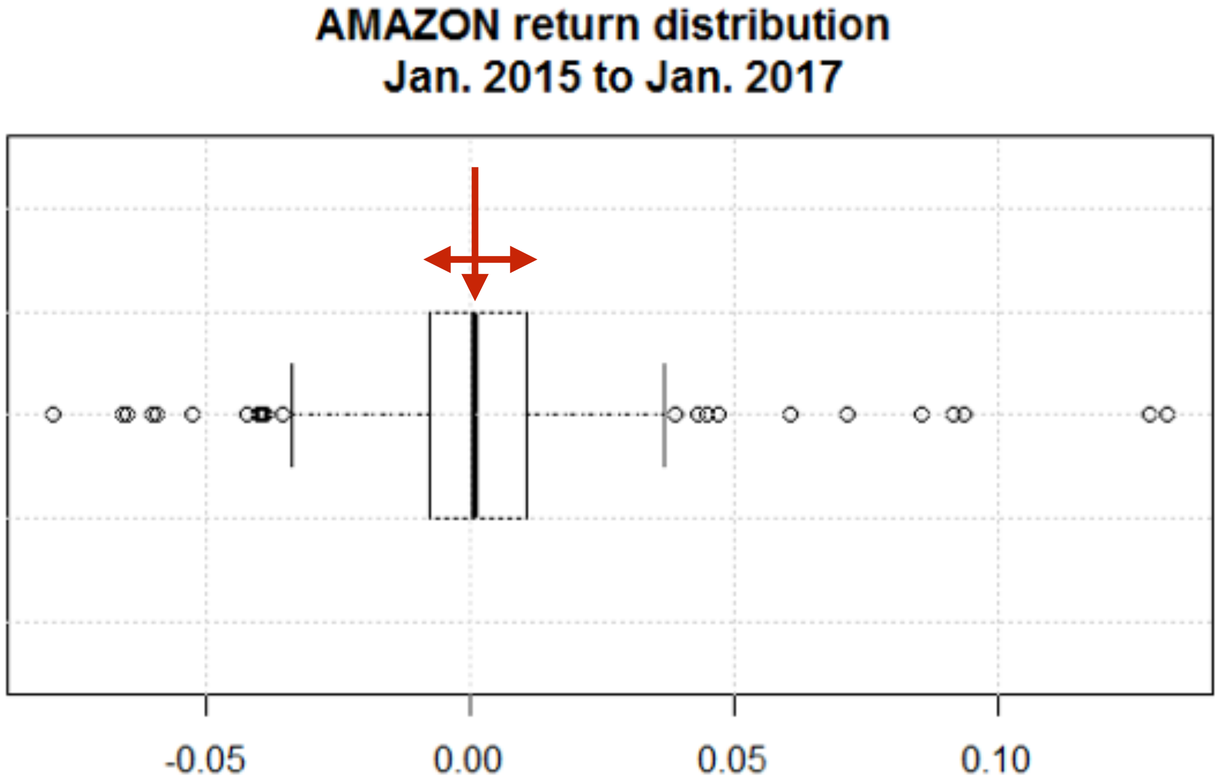
Histograms

```
> hist(amazon_stocks,
       breaks = 20,
       main = "AMAZON return distribution \n Jan. 2015 to Jan. 2017",
       xlab = "")
```



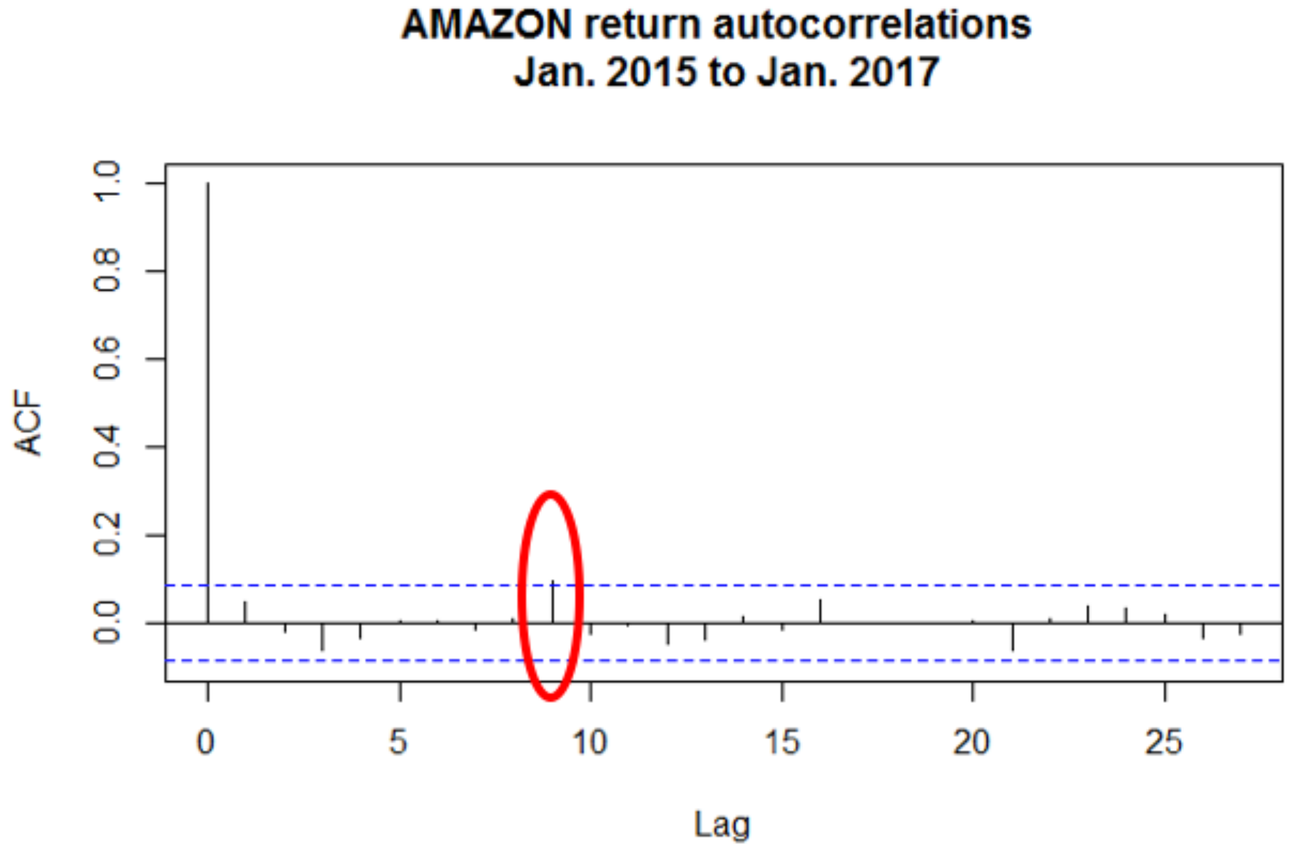
Box and whisker

```
> boxplot(amazon_stocks,
          horizontal = TRUE,
          main = "AMAZON return distribution \n Jan. 2015 to Jan. 2017")
```



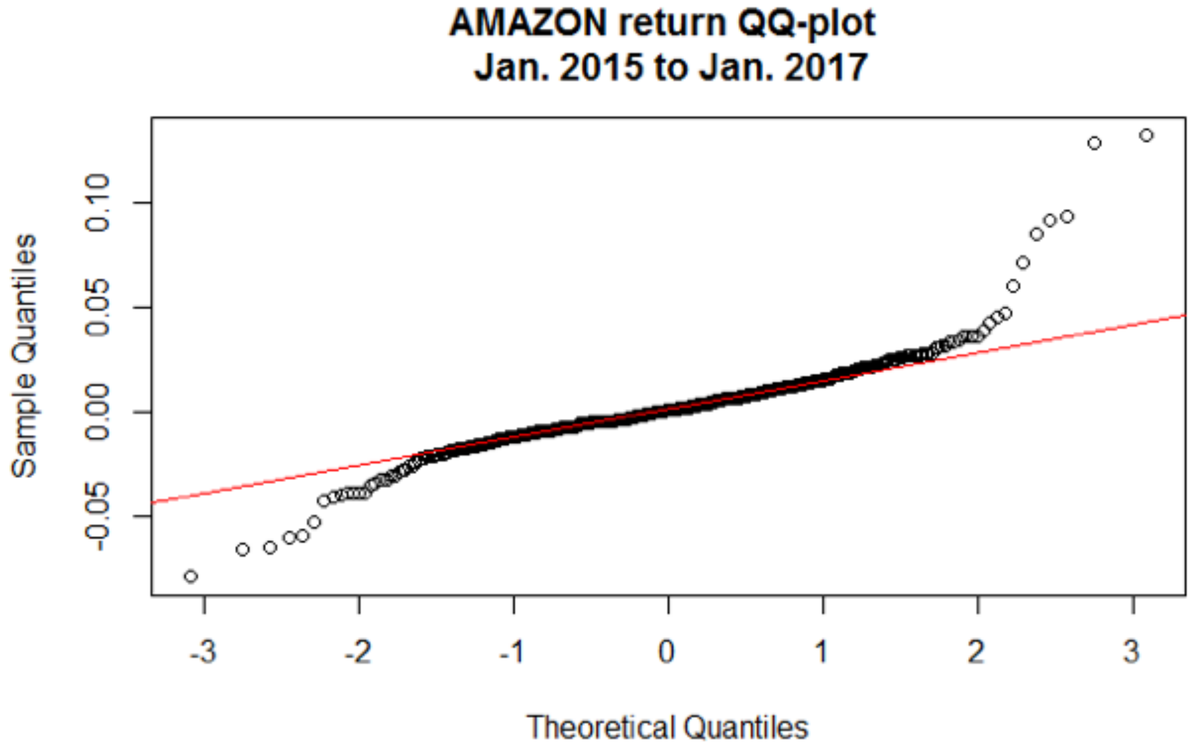
Autocorrelation

```
> acf(amazon_stocks,
      main = "AMAZON return autocorrelations \n Jan. 2015 to Jan. 2017")
```



QQ-plot

```
> qqnorm(amazon_stocks,
         main = "AMAZON return QQ-plot \n Jan. 2015 to Jan. 2017")
> qqline(amazon_stocks,
         col = "red")
```



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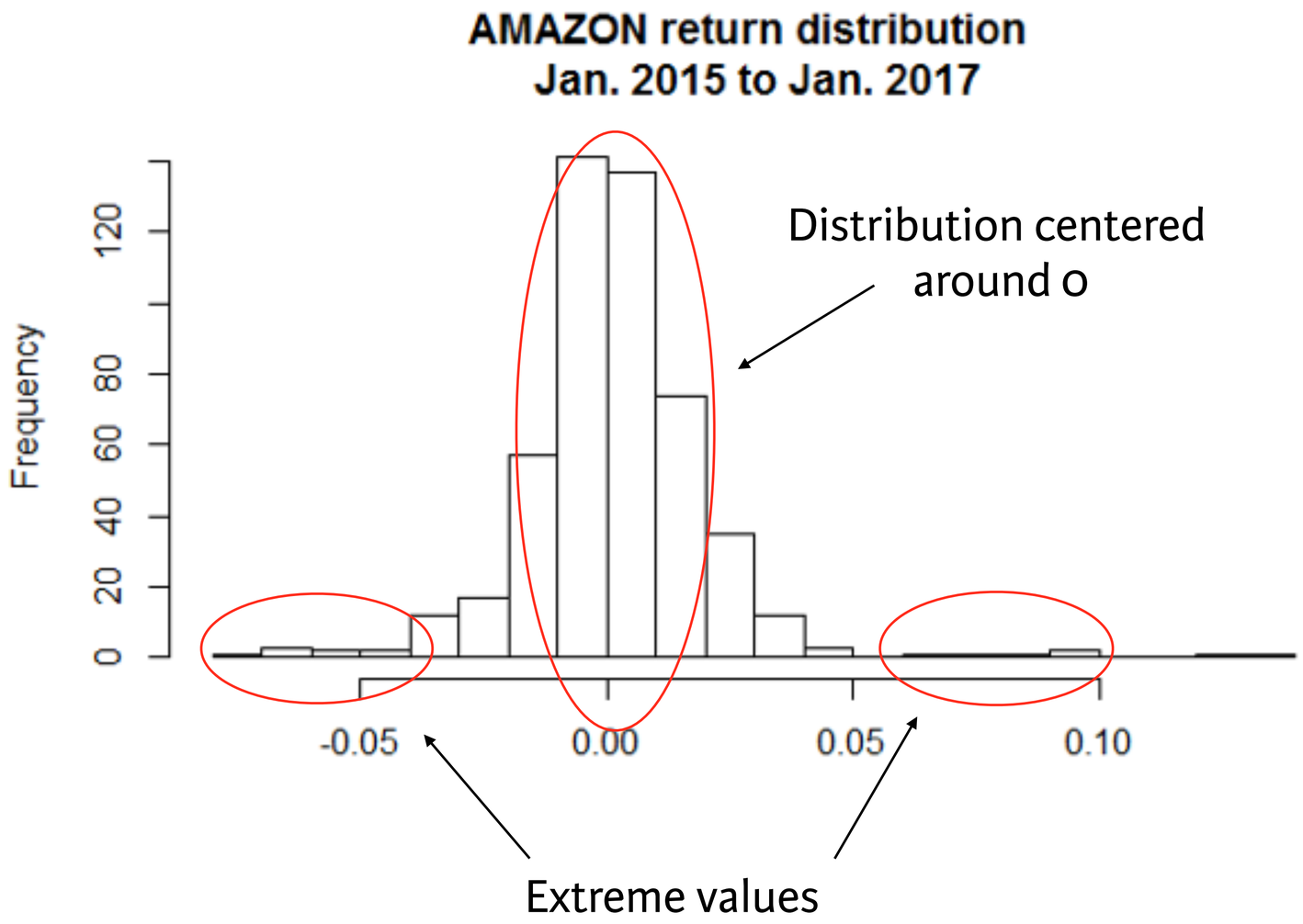
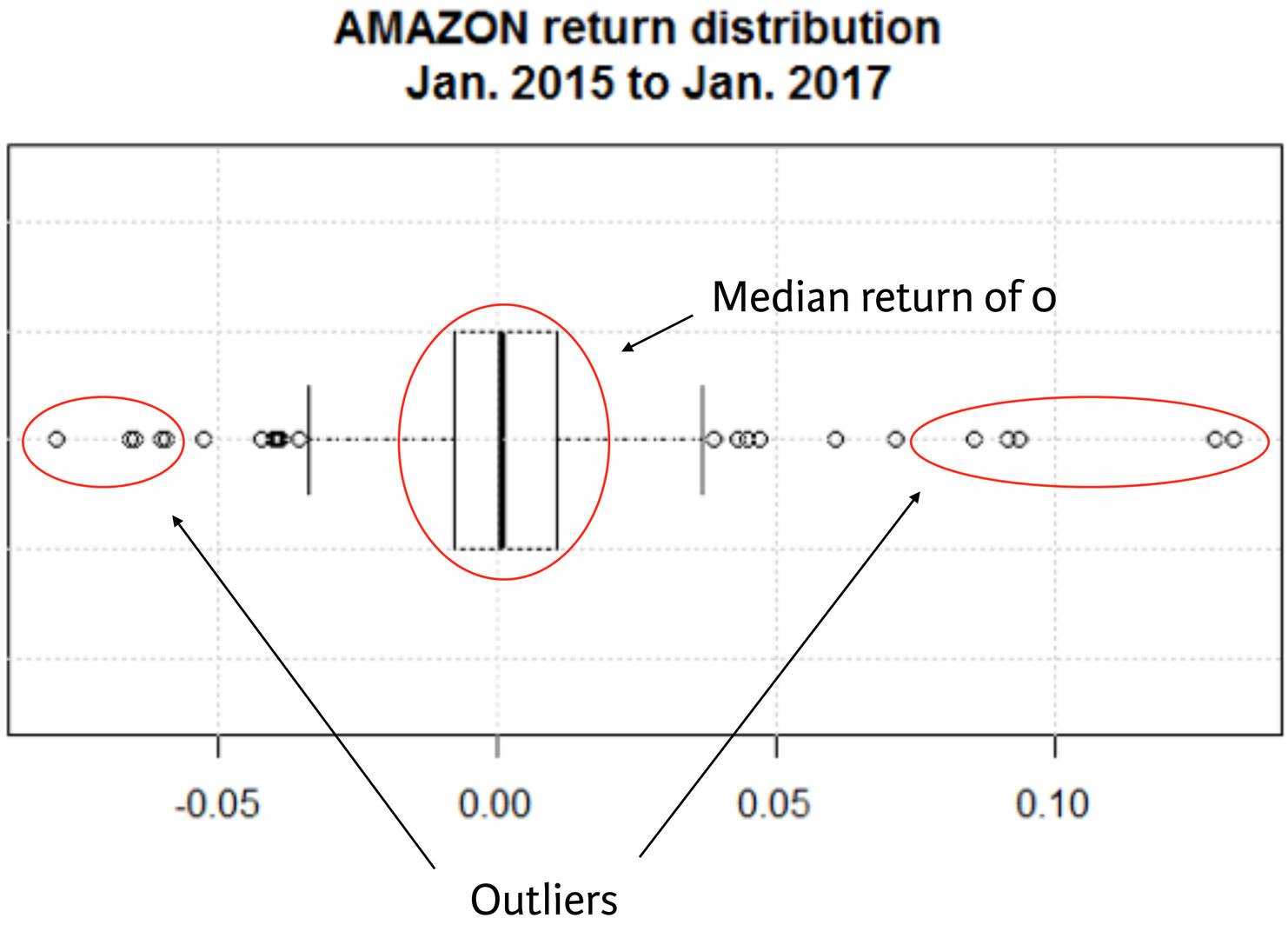
How to use everything we learned so far?

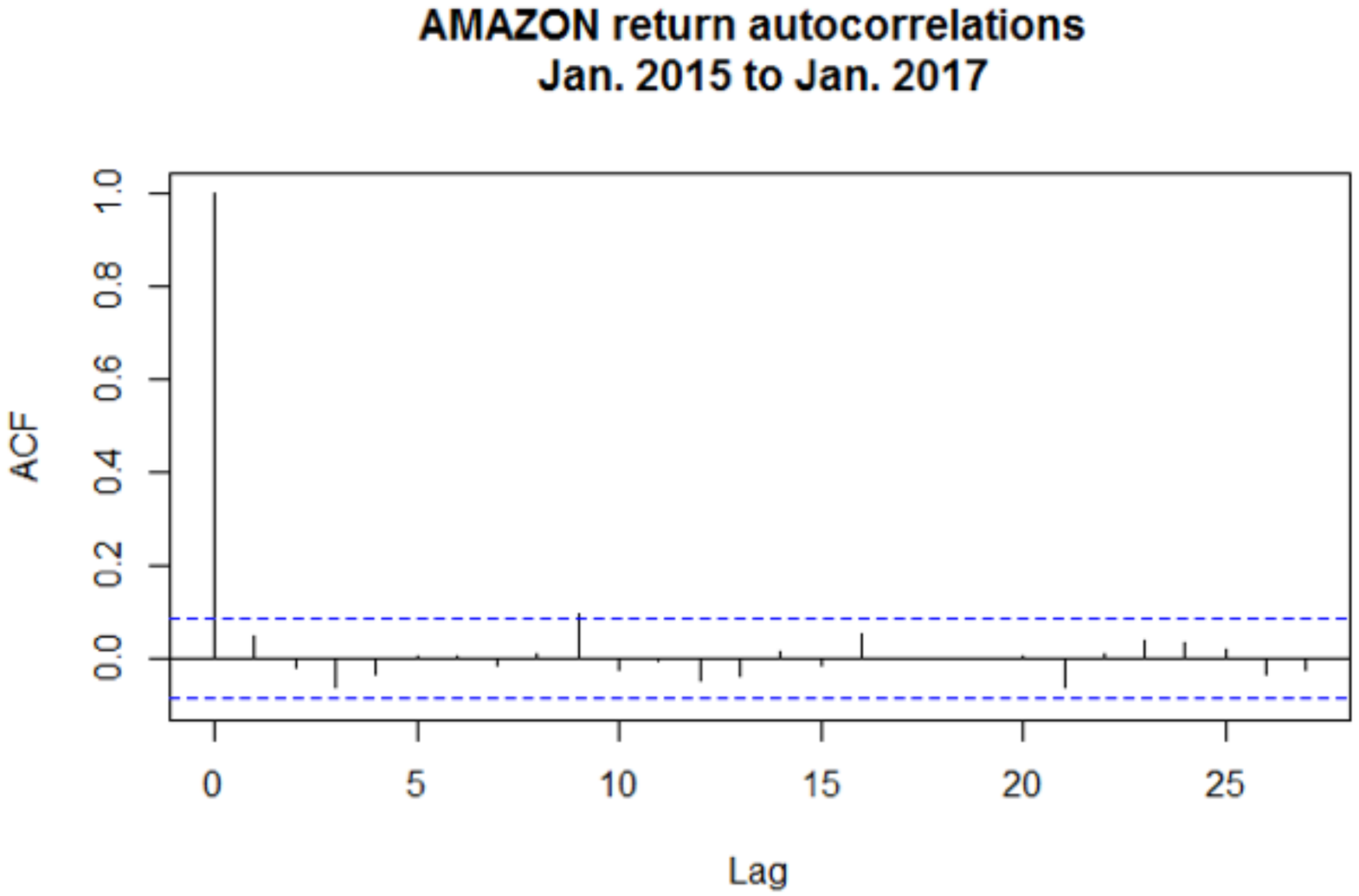
Histograms


AMAZON return distribution
Jan. 2015 to Jan. 2017
Frequency
0
20
40
60
80
120
-0.05
0.00
0.05
0.10
Distribution centered around 0
Extreme values

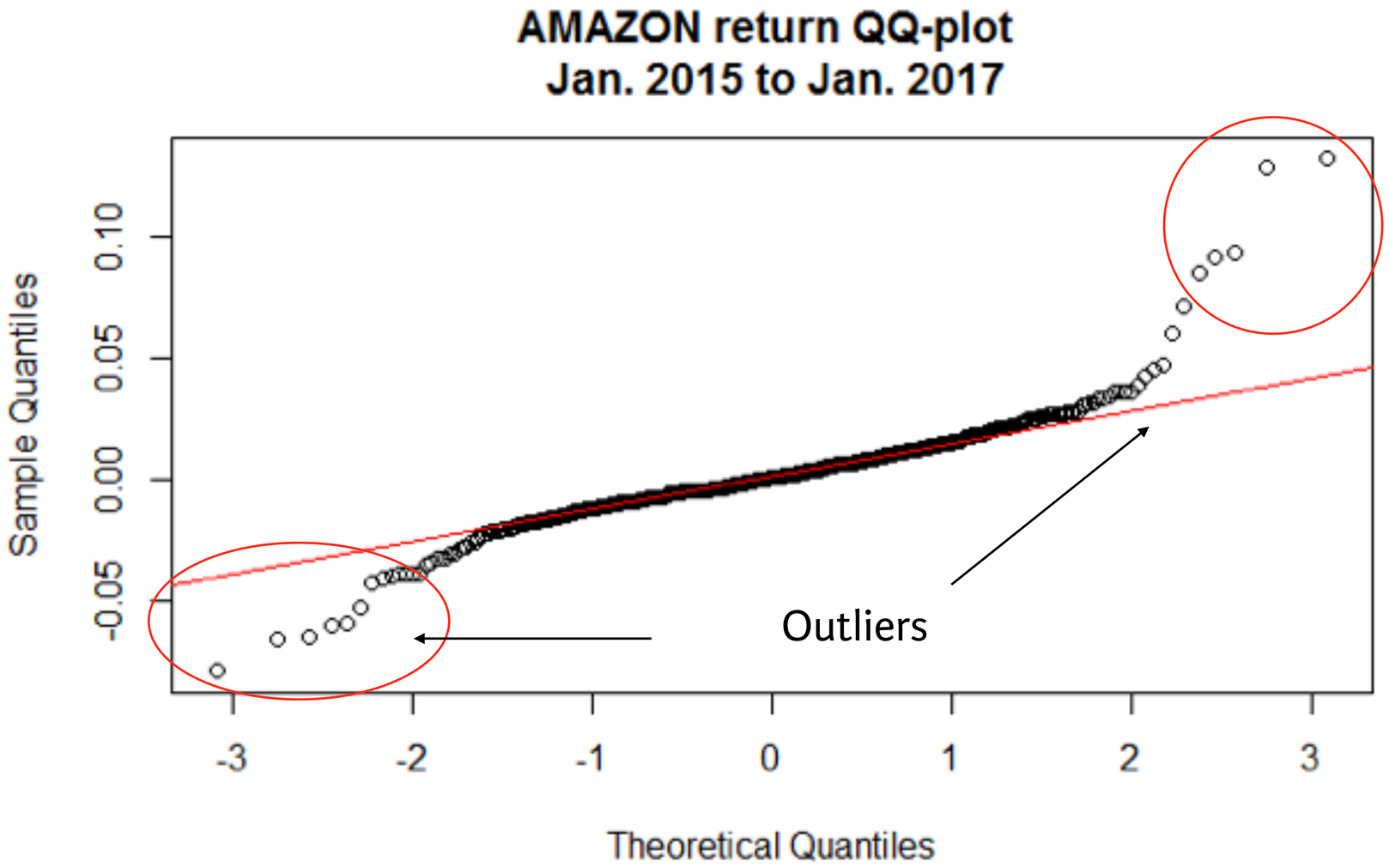
Box and whisker



Autocorrelation



QQ-plot


AMAZON return QQ-plot
Jan. 2015 to Jan. 2017
Sample Quantiles
-0.05
0.00
0.05
0.10
-3
-2
-1
0
1
2
3
Theoretical Quantiles
Outliers

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