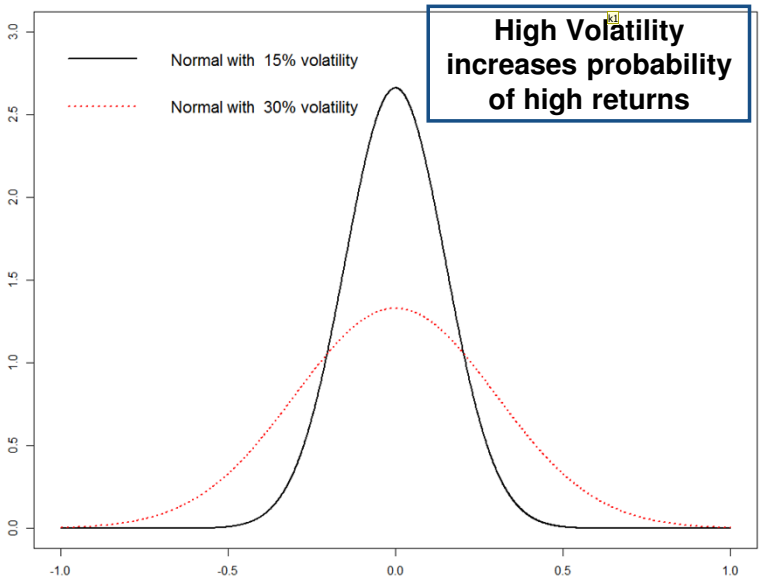
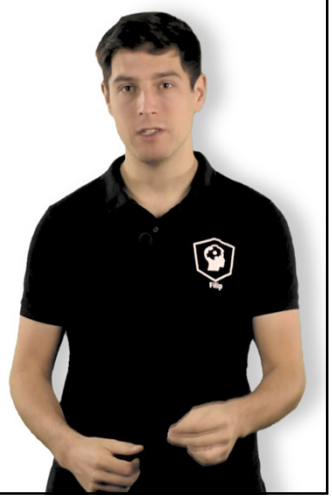
INTRODUCTION TO PORTFOLIO ANALYSIS

Non-Normality of the Return Distribution

Volatility Describes "normal" Risk





Slide 2

k1 increases probability of large (positive or negative) returns

==> just writing large returns is confusing as the student may think it is just about the large postive ones.
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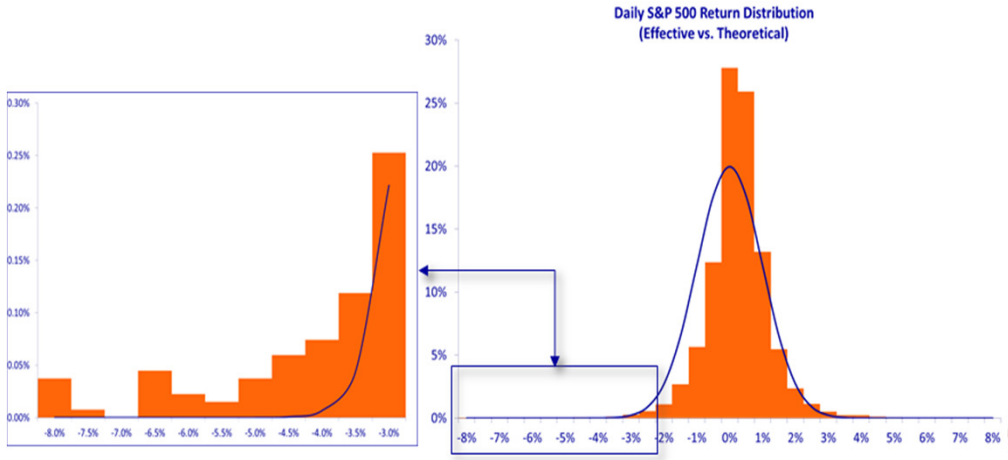
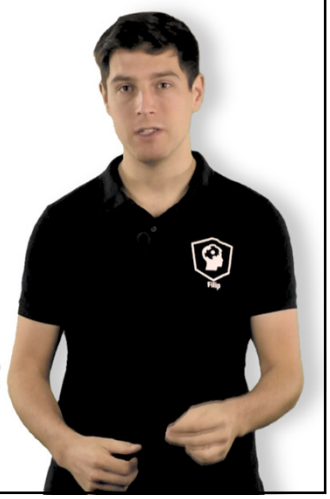
Non-Normality of Return





Portfolio Return Semi-Deviation

- **Standard Deviation** of Portfolio Returns:
  - Take the *full sample* of returns

$$SD = \sqrt{\frac{(R_1 - \mu)^2 + (R_2 - \mu)^2 + ... + (R_T - \mu)^2}{T - 1}}$$

- **Semi-Deviation** of Portfolio Returns:
  - Take the *subset* of returns below the mean

$$SemiDev = \sqrt{\frac{(Z_1 - \mu)^2 + (Z_2 - \mu)^2 + ... + (Z_n - \mu)^2}{n}}$$

Slide 3

k2 see the code i sent if you want this in R output
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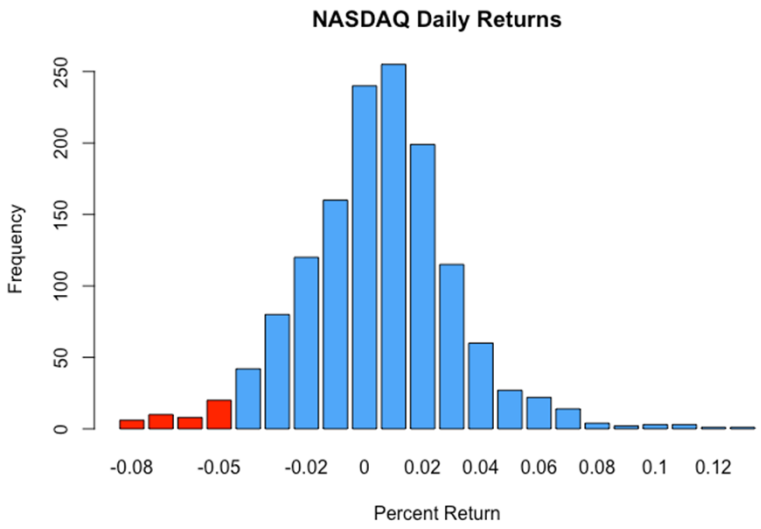
Value-at-Risk & Expected Shortfall



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Shape of the Distribution

- Is it symmetric?
  - Check the skewness
- Are the tails fatter than those of the normal distribution?
  - Check the excess kurtosis

Slide 6

k3 everywhere: excess kurtosis

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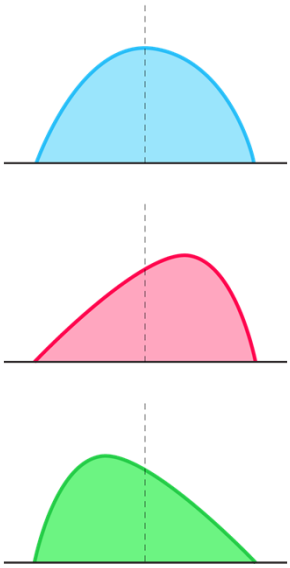
Skewness

- Zero Skewness
  - Distribution is symmetric
- Negative Skewness
  - Large negative returns occur more often than large positive returns
- Positive Skewness
  - Large positive returns occur more often than large negative returns



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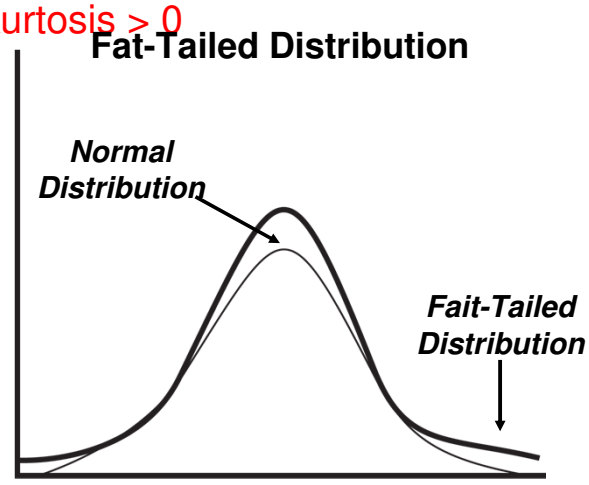
Excess Kurtosis

- The distribution is fat-tailed when the excess kurtosis > 0



Slide 8

k4 excess is crucial (since the ususal kurtosis is to be compared with 3)
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