Lesson 13: Descriptive Statistics

Data Science with Python – BSc Course

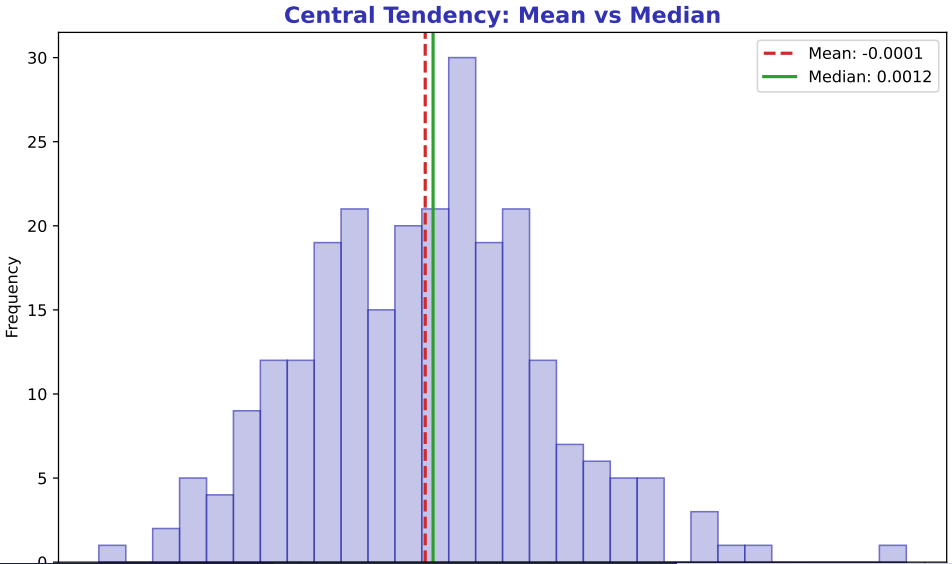
45 Minutes

Learning Objectives

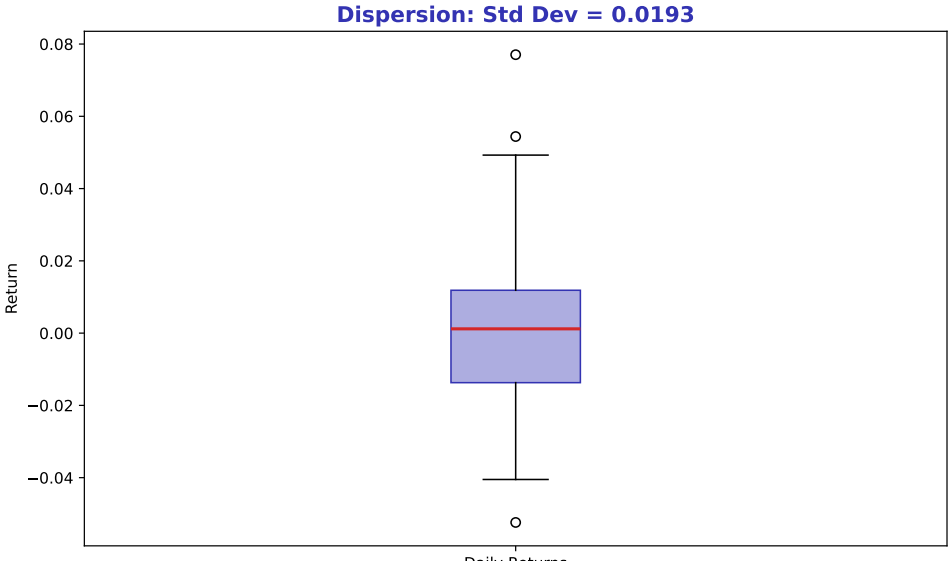
After this lesson, you will be able to:

- Calculate mean, median, mode
- Measure dispersion (std, variance, range)
- Interpret quartiles and percentiles
- Analyze skewness and kurtosis

Finance application: Statistical analysis of market data


Central Tendency: Mean vs Median
Mean: -0.0001
Median: 0.0012
Frequency
0
5
10
15
20
25
30

Dispersion


Dispersion: Std Dev = 0.0193
0.08
0.06
0.04
0.02
0.00
−0.02
−0.04
Return
Daily Returns

Quartiles and Percentiles

Minimum: -0.0524

Q1 (25th): -0.0137

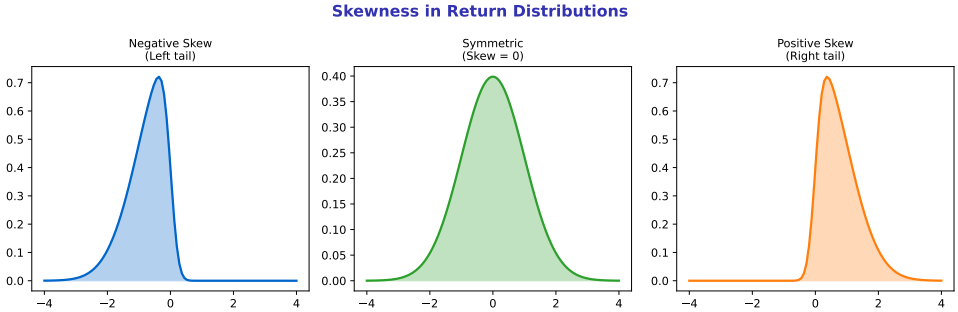
Median (50th): 0.0012

Q3 (75th): 0.0119

Maximum: 0.0771

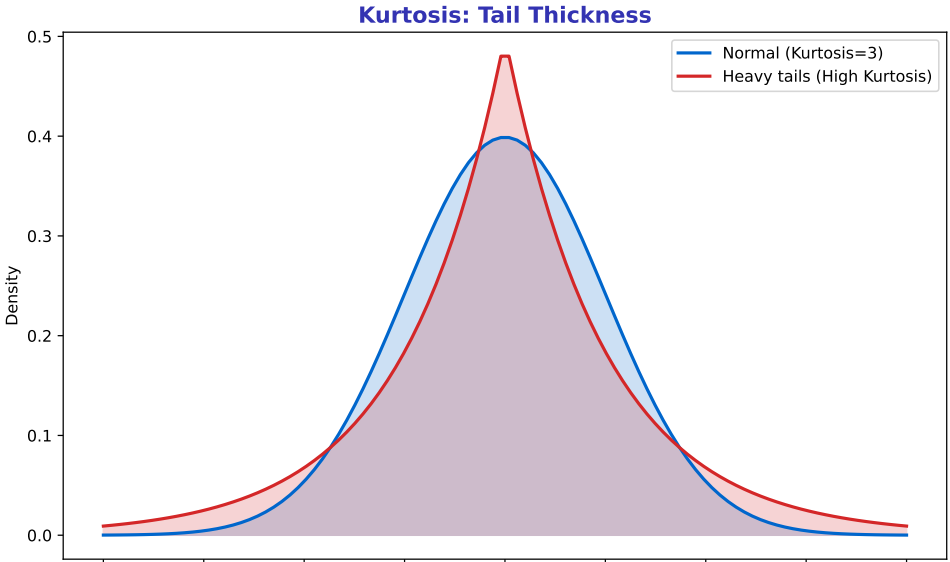
IQR: 0.0256

Skewness



Statistical foundation for data-driven decisions

Kurtosis


Kurtosis: Tail Thickness
Normal (Kurtosis=3)
Heavy tails (High Kurtosis)
Density
0.5
0.4
0.3
0.2
0.1
0.0

Summary Table

df.describe() Output

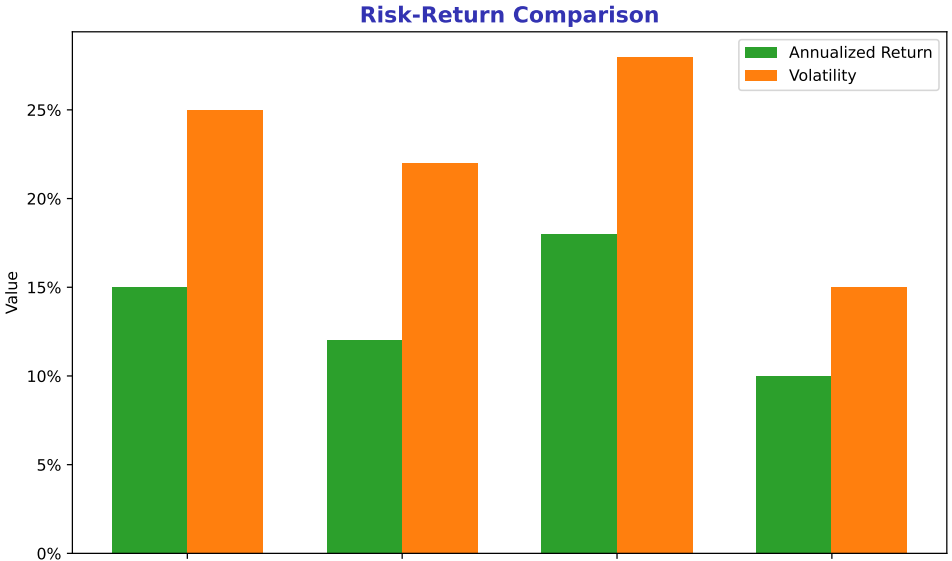
Statistic	Value
Count	252
Mean	-0.0001
Std	0.0193
Min	-0.0524
25%	-0.0137
50%	0.0012
75%	0.0119
Max	0.0771

Statistical foundation for data-driven decisions

Key Finance Statistics

Annualized Return	`mean * 252`	**-1.90%**
Annualized Volatility	`std * sqrt(252)`	**30.65%**
Sharpe Ratio	`(ret - rf) / vol`	**-0.13**
Max Drawdown	`Largest peak-to-trough`	**-12.5%**

Comparison


Risk-Return Comparison
Annualized Return
Volatility
Value
25%
20%
15%
10%
5%
0%

Lesson Summary

Key Takeaways:

- Calculate mean, median, mode
- Measure dispersion (std, variance, range)
- Interpret quartiles and percentiles
- Analyze skewness and kurtosis

Statistics + Visualization = Data Science foundation