Pandas:
Investing Like the Pros

FinTech

Lesson 4.1

Class Objectives

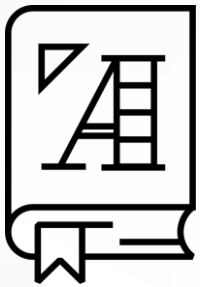
By the end of class, you will be able to:

- Describe the benefits of investing in stock portfolios over investing in a single stock.
- Explain what correlation is and how to calculate it in Pandas.
- Visualize trends through rolling statistics that minimize data noise.
- Compare the volatility of a portfolio against the overall market.
- Calculate expected returns of a portfolio utilizing custom weights.
- Build and optimize a portfolio by factoring in risk, correlation, and returns.
- Compare a portfolio's performance to that of other portfolios.

What makes portfolios better?

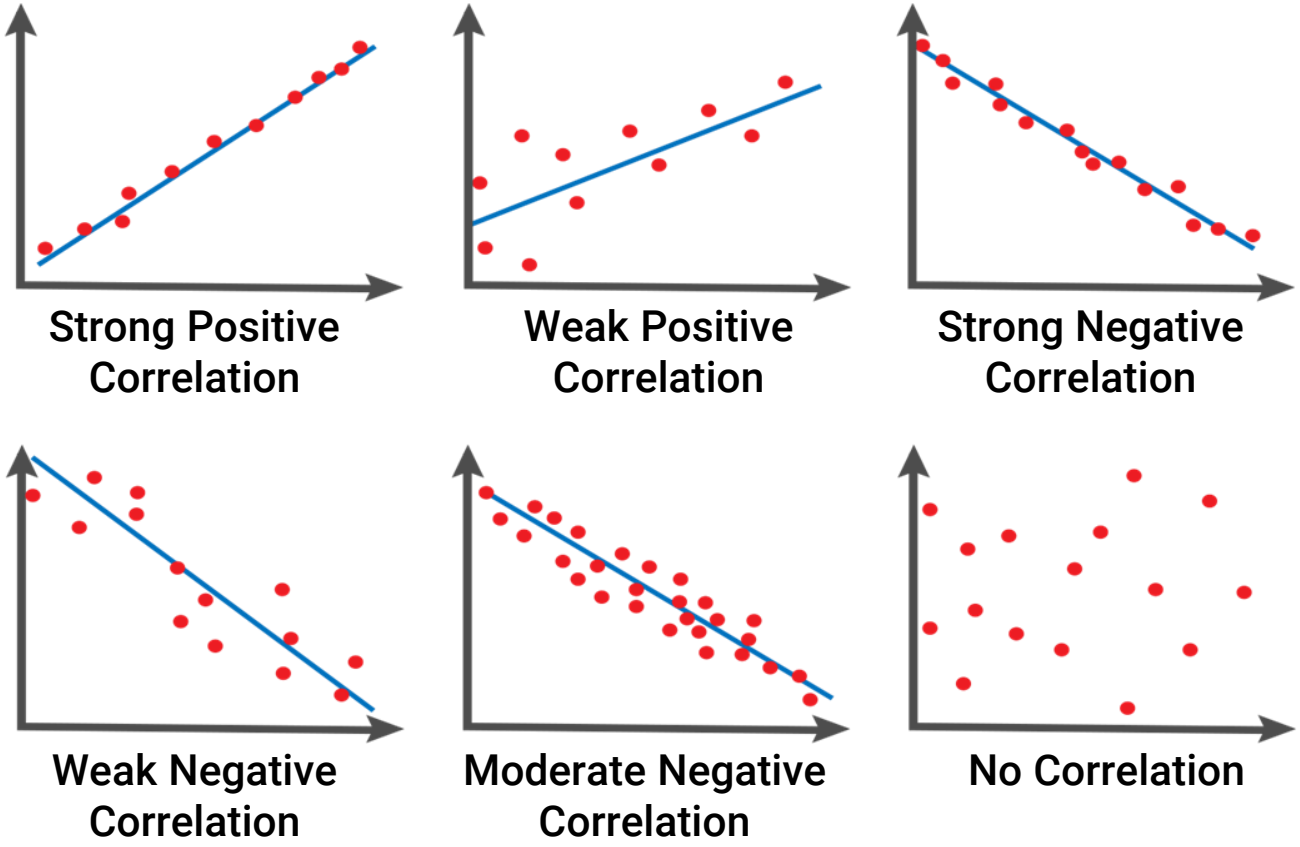
Today you'll learn how groups of stocks in portfolios can be better investments than a single stock.

Correlation



Correlation is the measure of a positive, negative, or neutral (random) relationship between two variables.

Comparison of Correlation Relationships



Activity: Diversification

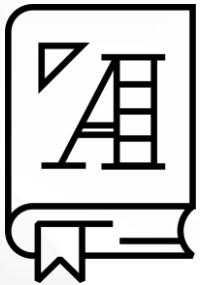
In this activity, you will apply the concept of correlation to the financial use case of diversifying a portfolio.

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.

Rolling Statistics



A **rolling statistic** is a metric calculated over the range of a shifting (or rolling) window.

Rolling Statistics

A rolling statistic helps to show the progression or change of a particular metric over time.

Activity: Simple Moving Averages

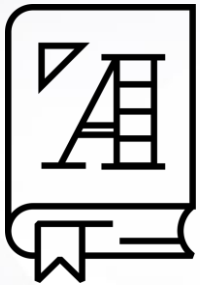
In this activity, you will calculate multiple windows of rolling statistics, such as moving averages and rolling standard deviations, in order to identify trends in average price and volatility/risk that can provide insight into the investment decisions of a particular stock.

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.

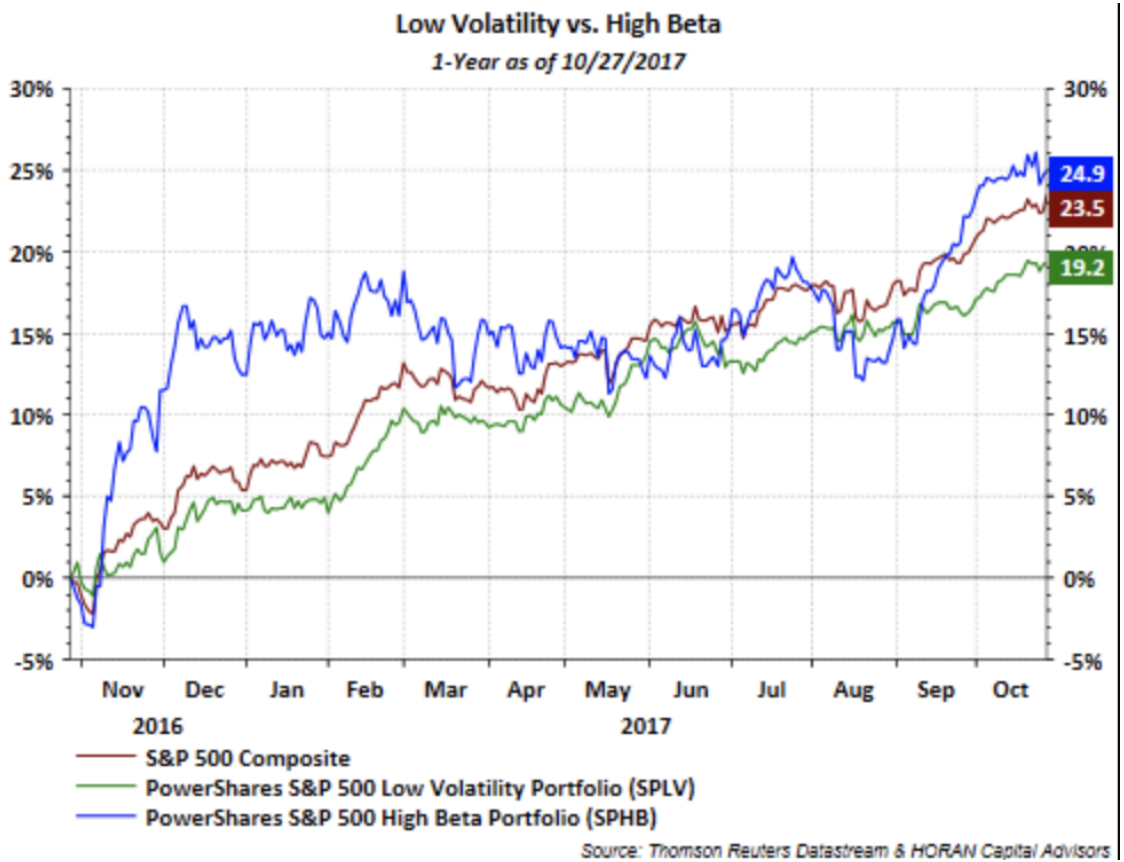
Beta



Beta is the measure of the volatility of an individual stock in comparison to the volatility of the entire market.

Beta vs. Correlation

Beta tries to measure the impact of one variable on another variable. Correlation measures the possible frequency of similarly directional movements without considerations of cause and effect. Beta is the slope of the two variables. Correlation is the strength of that linear relationship.



Covariance

$$\mathrm{Cov}\,(X, Y) = \frac{\sum(X_i - \bar{X})(Y_j - \bar{Y})}{n - 1}$$

Where:

- $\mathbf{X_i}$ – the values of the X-variable
- $\mathbf{Y_j}$ – the values of the Y-variable
- $\bar{\mathbf{X}}$ – the mean (average) of the X-variable
- $\bar{\mathbf{Y}}$ – the mean (average) of the Y-variable
- **n** – the number of data points

Activity: Beta Comparisons

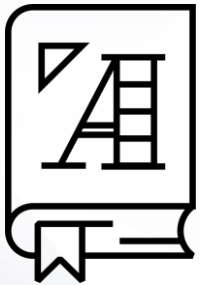
This activity uses your knowledge of rolling statistics and beta to plot the 30-day rolling betas of a group of stocks, showing the stock that would be the most conservative choice (the stock with the lowest beta).

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.

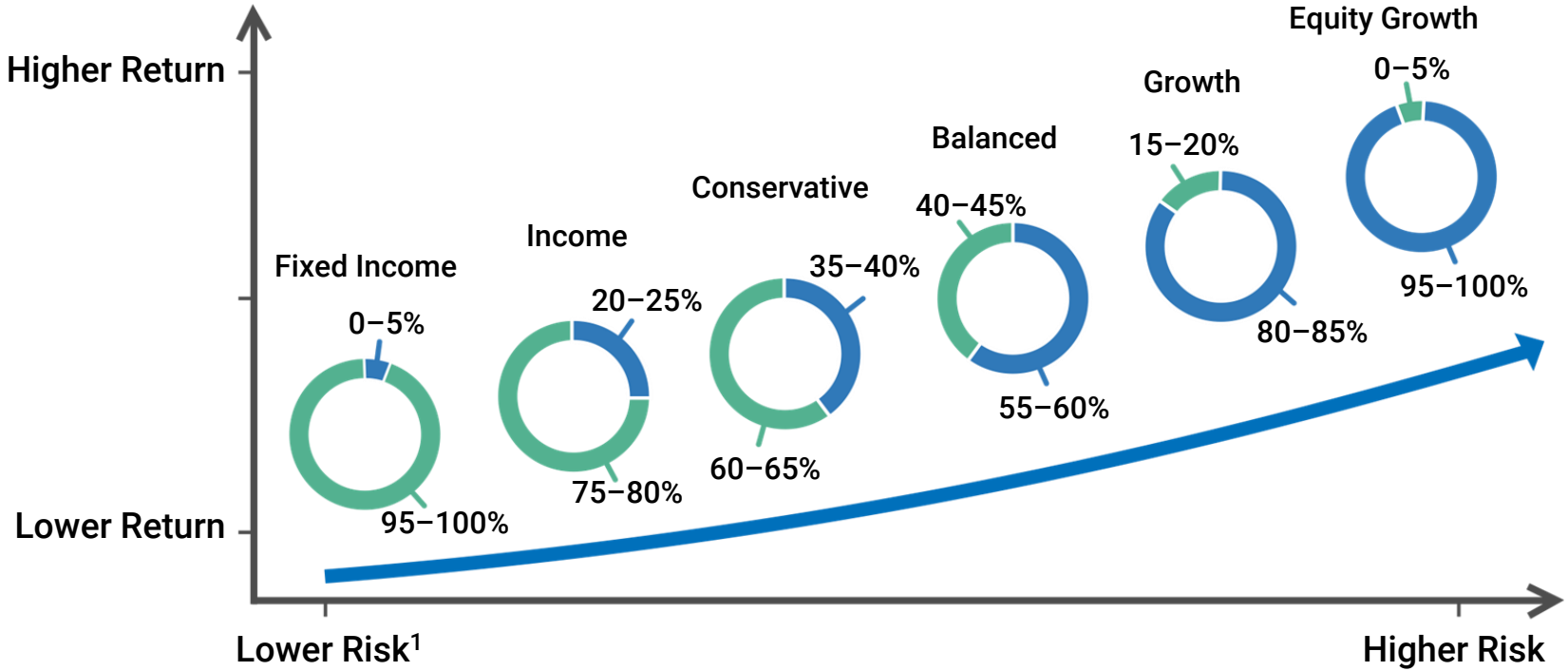
Portfolio Returns



The purpose of a portfolio is to control the amount of risk and diversity in an investment.

Portfolio Returns

Portfolio returns can be calculated using a dot product function, which multiplies allocated weights to each stock return.



[1]Risk is defined as the uncertainty of a return and the potential for capital loss in your investment.

Activity:
Portfolio Planner Part 1

In this activity, you will work in pairs to research a group of 10 stocks, find the least to most volatile stocks, drop the top 5 highly volatile stocks, set portfolio weights to the remaining stocks according to risk profile, and perform an analysis of a $10,000 investment in the portfolio over time.

(Instructions sent via Slack.)

Suggested Time:
20 Minutes

Time’s Up! Let’s Review.


Countdown timer
40:00
(with alarm)
Break

Partner Activity: Portfolio Planner Part 2

In this activity, you will work in pairs to continue where they left off in part 1 of evaluating portfolios.

(Instructions sent via Slack.)

Suggested Time:
25 Minutes

Time’s Up! Let’s Review.