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.
- Define correlation and explain how to calculate it in Pandas.
- Visualize trends through rolling statistics that smooth datasets and minimize data noise.
- Compare the volatility of a portfolio against the overall market (beta).
- 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.

Introduction to Portfolios

What is an investment portfolio?

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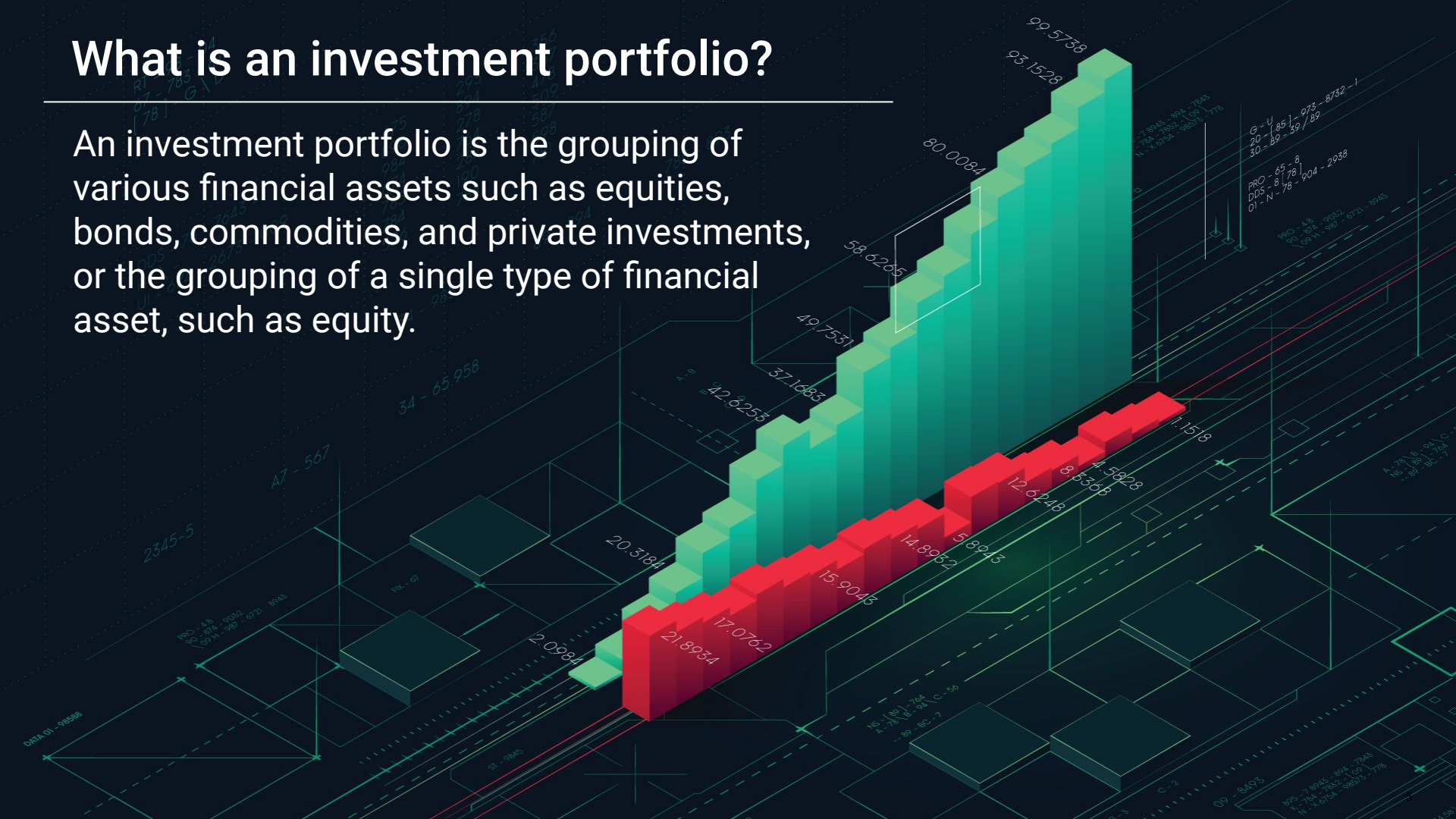
An investment portfolio is the grouping of various financial assets such as equities, bonds, commodities, and private investments, or the grouping of a single type of financial asset, such as equity.



What is a stock portfolio?

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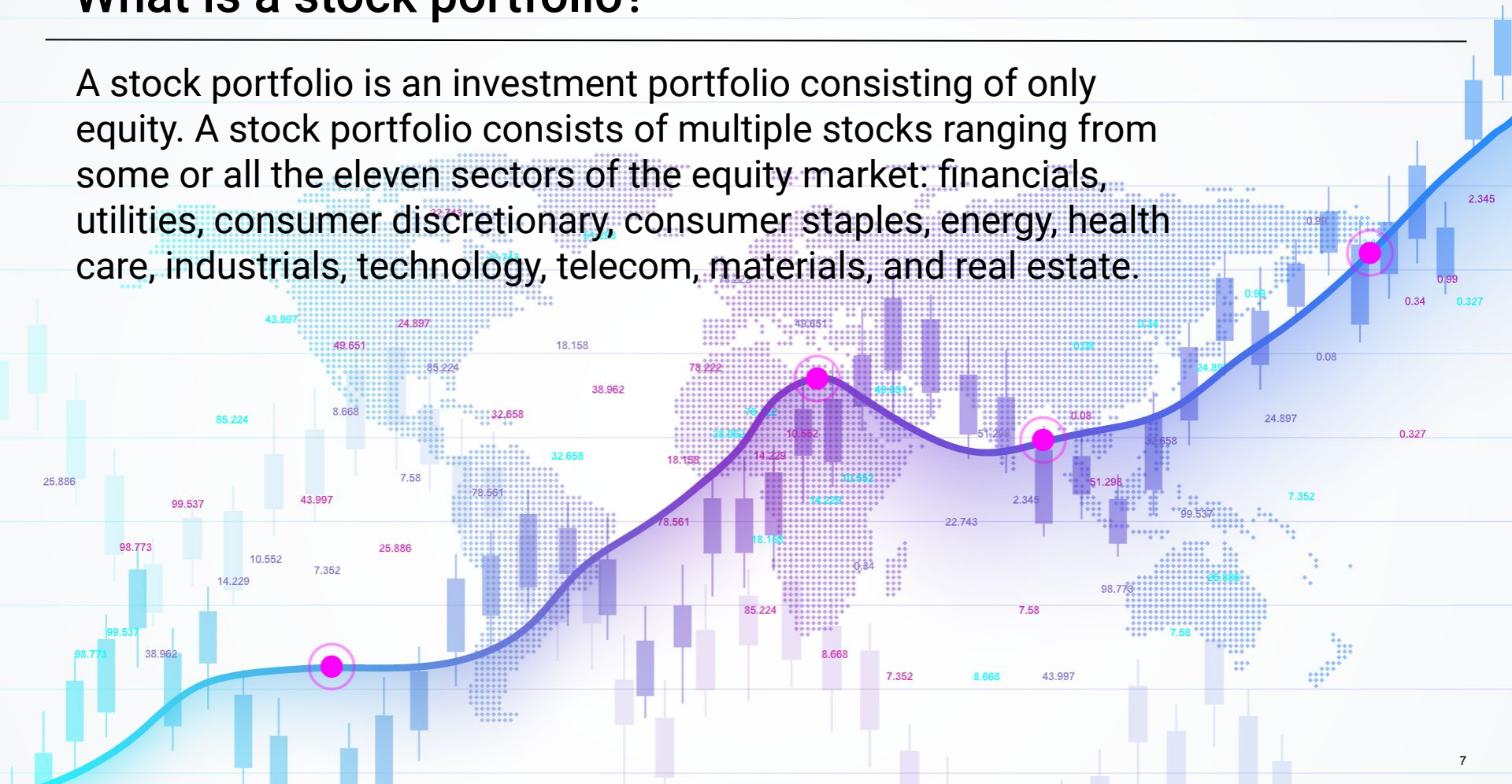
A stock portfolio is an investment portfolio consisting of only equity. A stock portfolio consists of multiple stocks ranging from some or all the eleven sectors of the equity market: financials, utilities, consumer discretionary, consumer staples, energy, health care, industrials, technology, telecom, materials, and real estate.



Why are stock portfolios better than single stock investments?

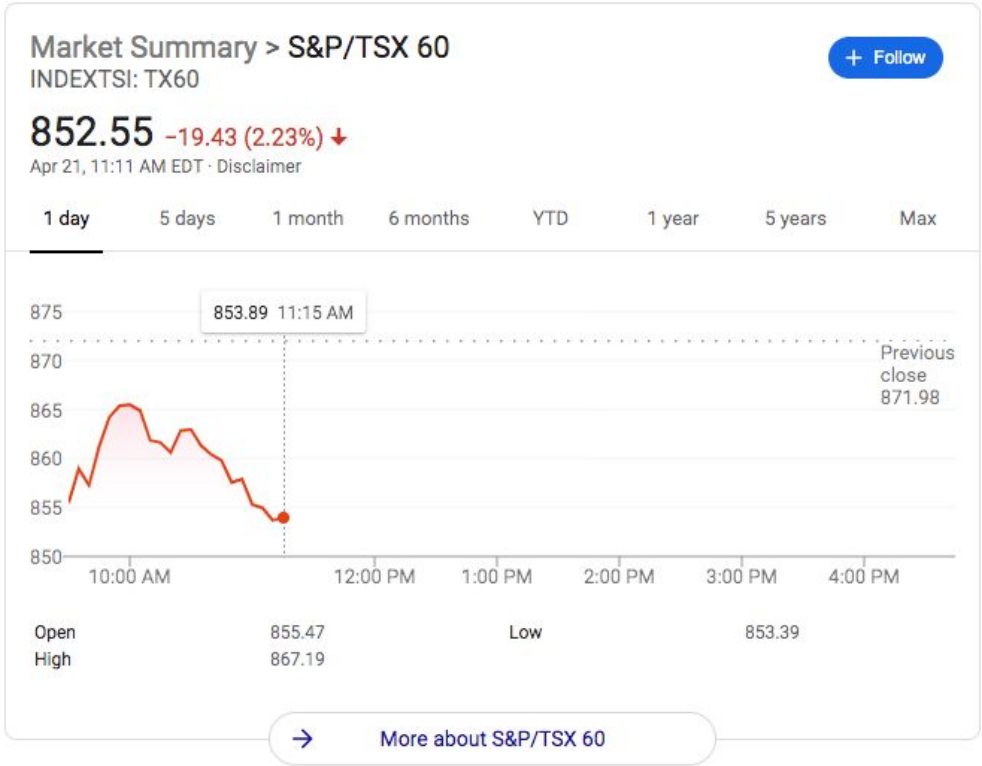
Why are stock portfolios better than single stock investments?

Single stock investments are risky as they represent the "all eggs in one basket" problem. If that stock fails, so does the entire investment. By grouping multiple stocks together, risk is minimized or spread throughout the portfolio; a single stock might fail, but others can continue to succeed.

What is a stock market index?

What is a stock market index?

Similar to a stock portfolio, a stock market index is a collection of stocks used to gauge the performance of a particular area within the stock market. A popular stock market index is the S&P TSX 60, a collection of 60 large companies on the Toronto Stock Exchange that serves as a general health indicator of the Canadian stock market.



Why do stock market indexes matter?

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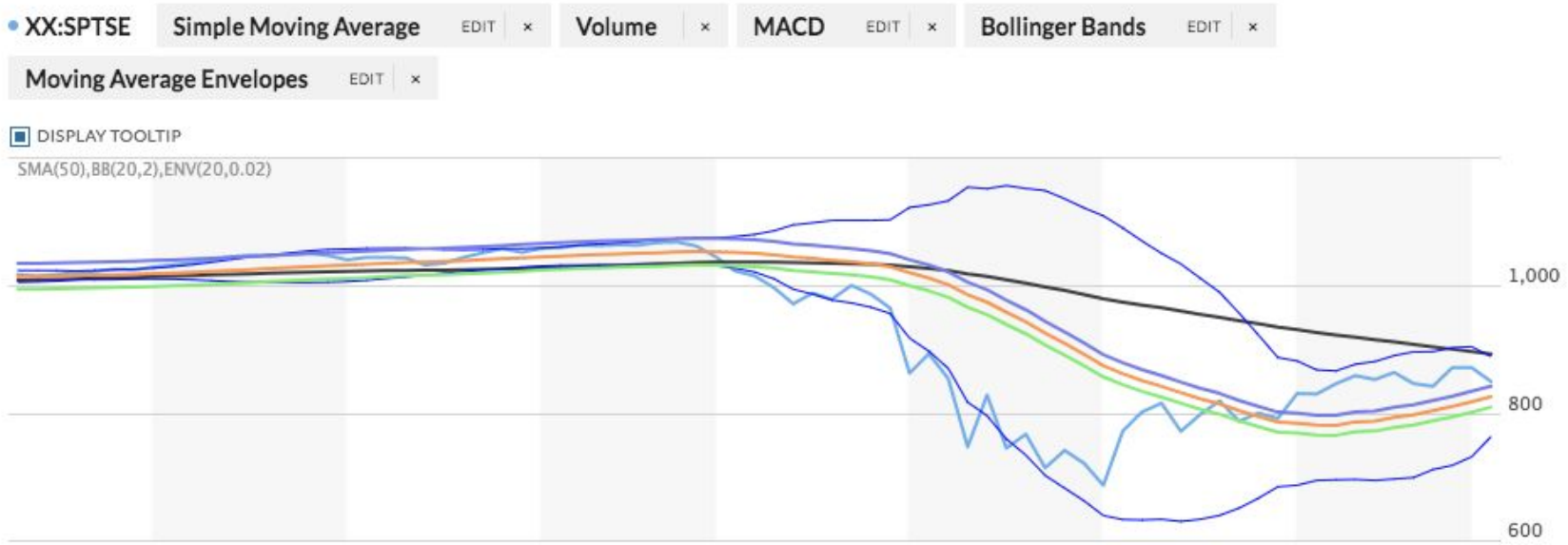
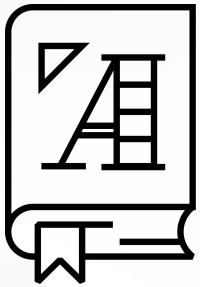
Stock market indexes such as the S&P TSX 60 serve as general health indicators for particular areas in the stock market. They also serve as benchmarks to compare performances of portfolios.

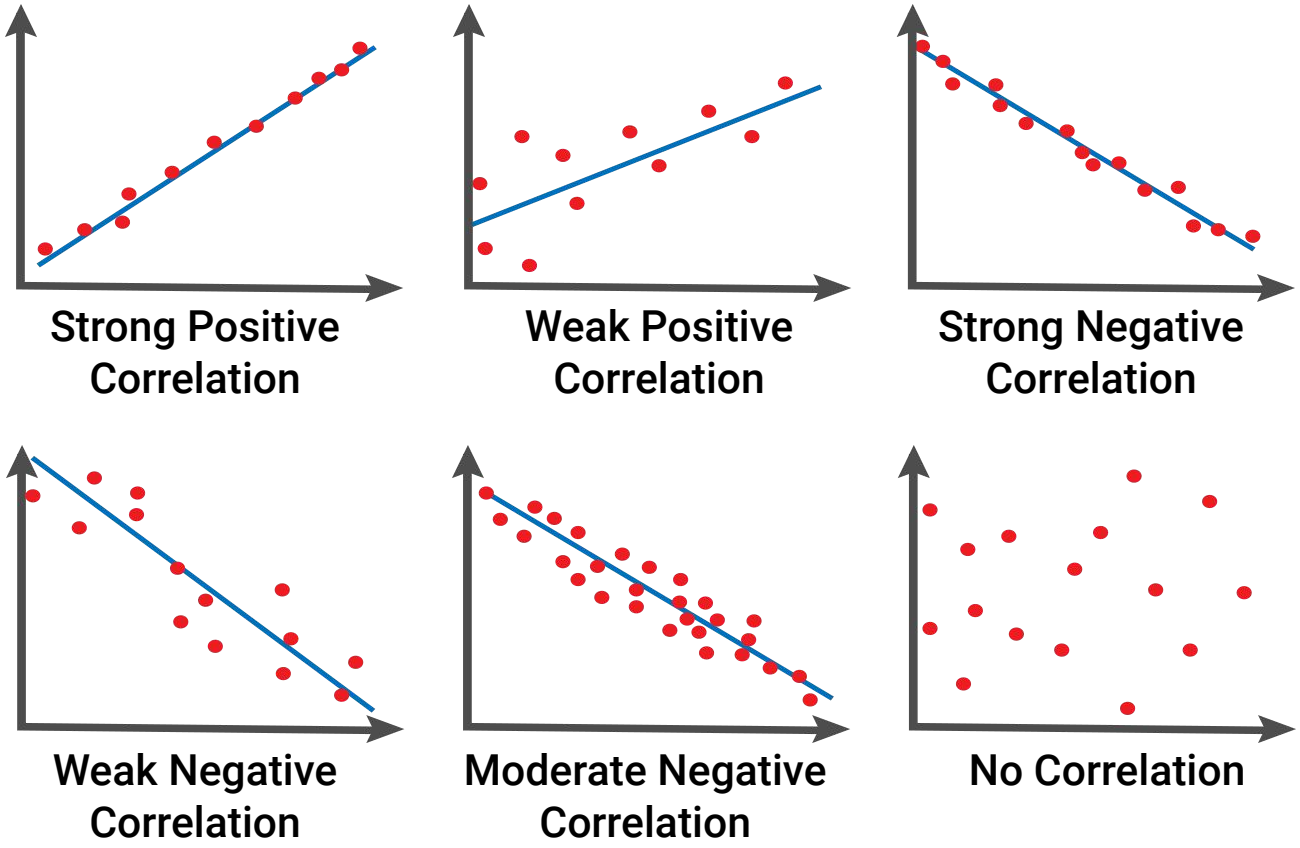


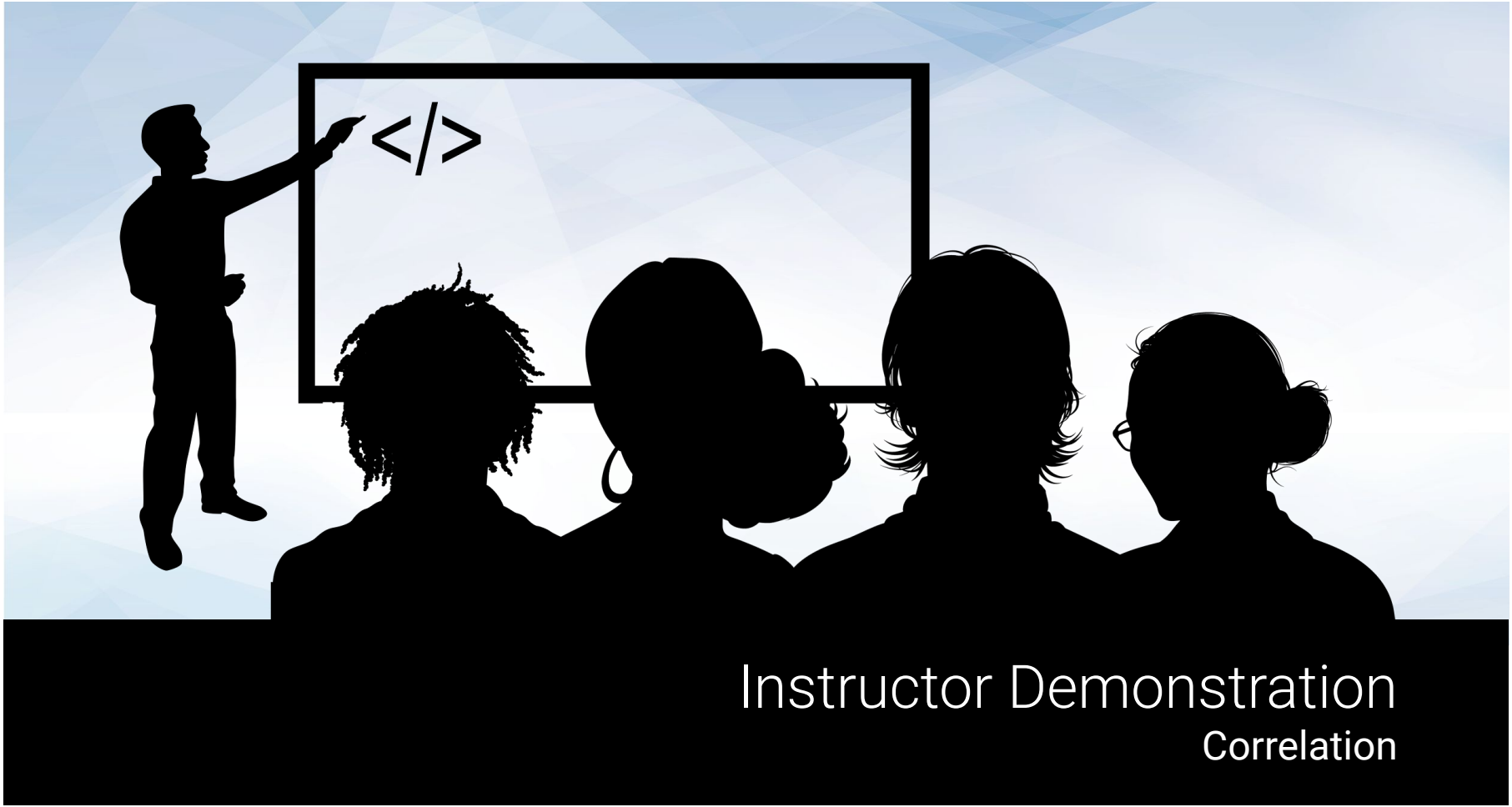
Correlation



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

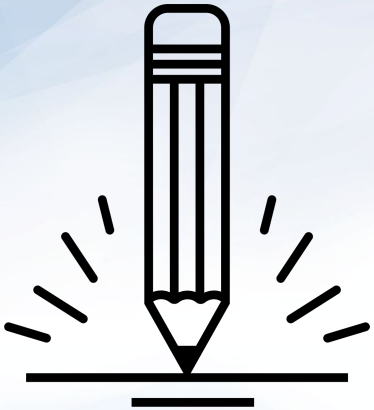
Comparison of Correlation Relationships





Instructor Demonstration

Correlation



Activity: Diversification

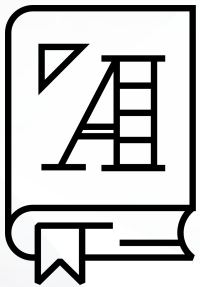
In this activity, you will apply the concept of correlation to the financial use case of diversifying a portfolio.

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.

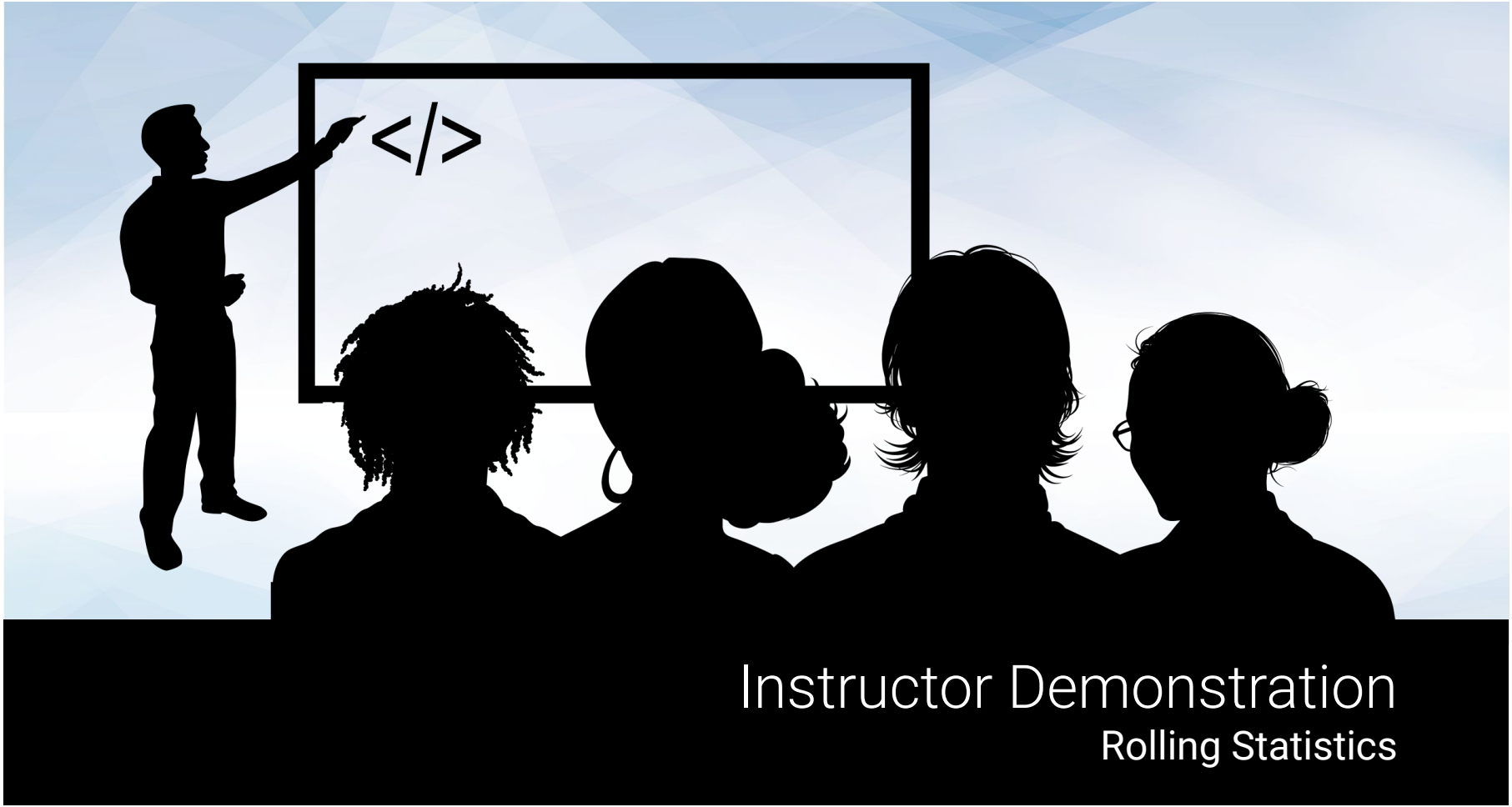
Rolling Statistics



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

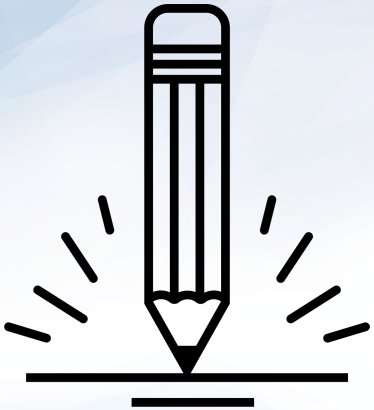
Rolling Statistics

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



Instructor Demonstration

Rolling Statistics



Activity: Simple Moving Averages

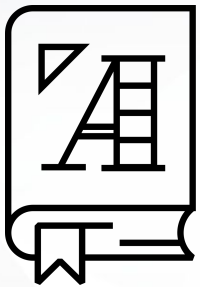
In this activity, you will calculate multiple windows of rolling statistics, such as moving averages and rolling standard deviations, to identify trends in average price and volatility/risk that can provide insight into the investment decisions of a particular stock.

(Instructions sent via Slack.)

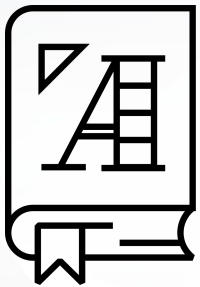
Suggested Time:
15 Minutes

Time’s Up! Let’s Review.

Beta



Covariance is a measure of the directional relationship between two variables.



Variance is the measurement of how far numbers in a dataset are spread about their mean.

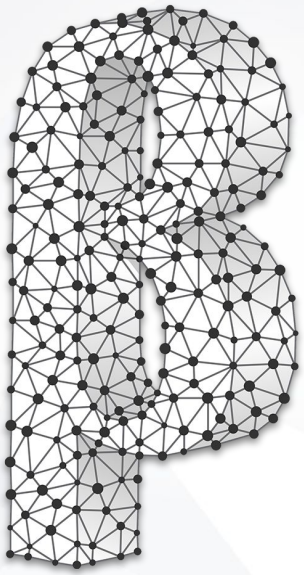
Variance and Covariance

Variance

Variance looks at one variable, measuring the range in which that variable's values may take.

Covariance

Covariance looks at the variance of two variables, and studies how those two variables vary together.

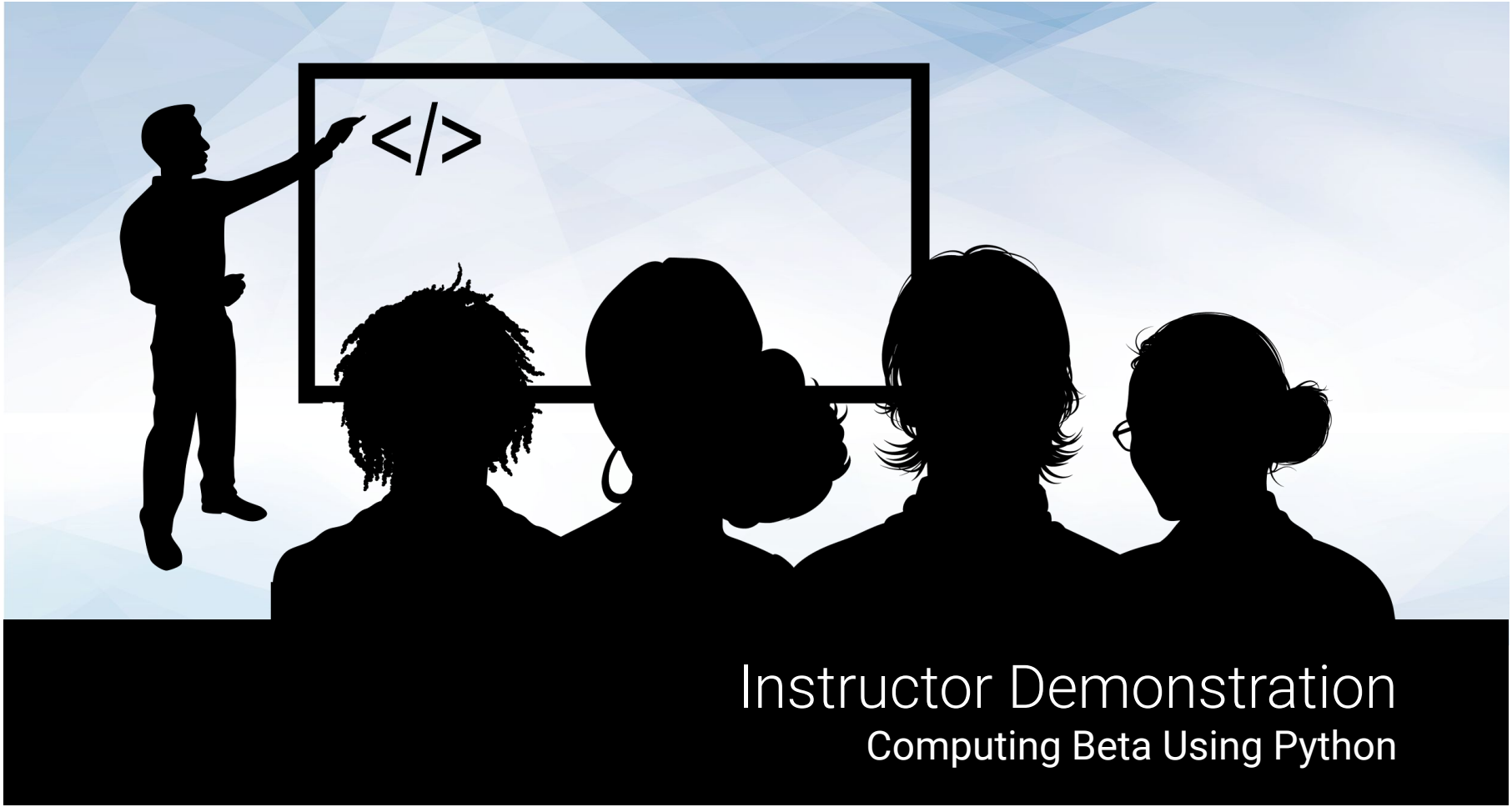


Beta uses covariance and variance to calculate the relative volatility of an individual stock’s returns in comparison to the volatility of overall market returns.

Interpreting Beta

$\beta = 1$	exactly as volatile as the market
$\beta > 1$	more volatile than the market
$\beta < 1 > 0$	less volatile than the market
$\beta = 0$	uncorrelated to the market
$\beta < 0$	negatively correlated to the market

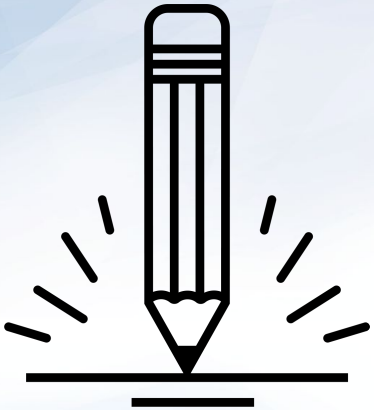
A company with a **higher beta** has greater risk, and also greater expected returns.



Instructor Demonstration

Computing Beta Using Python


Break



Activity: Beta Comparisons

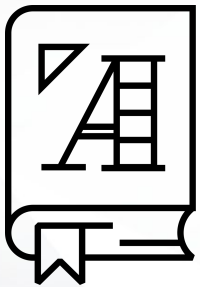
This activity uses your knowledge of rolling statistics and beta to plot the 30-day rolling betas of a group of stocks. The goal is to determine the most conservative stock, or the one with the lowest beta.

(Instructions sent via Slack.)

Suggested Time:
15 Minutes

Time’s Up! Let’s Review.

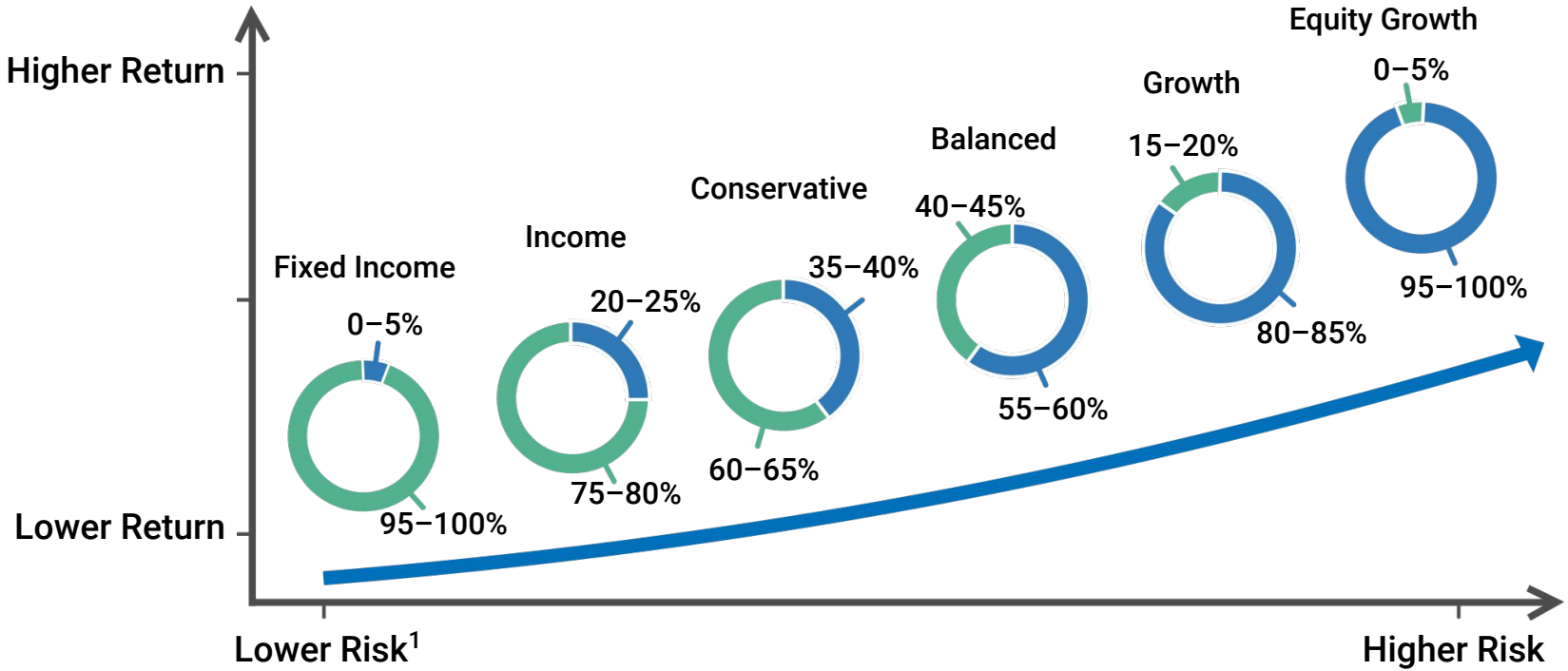
Portfolio Returns



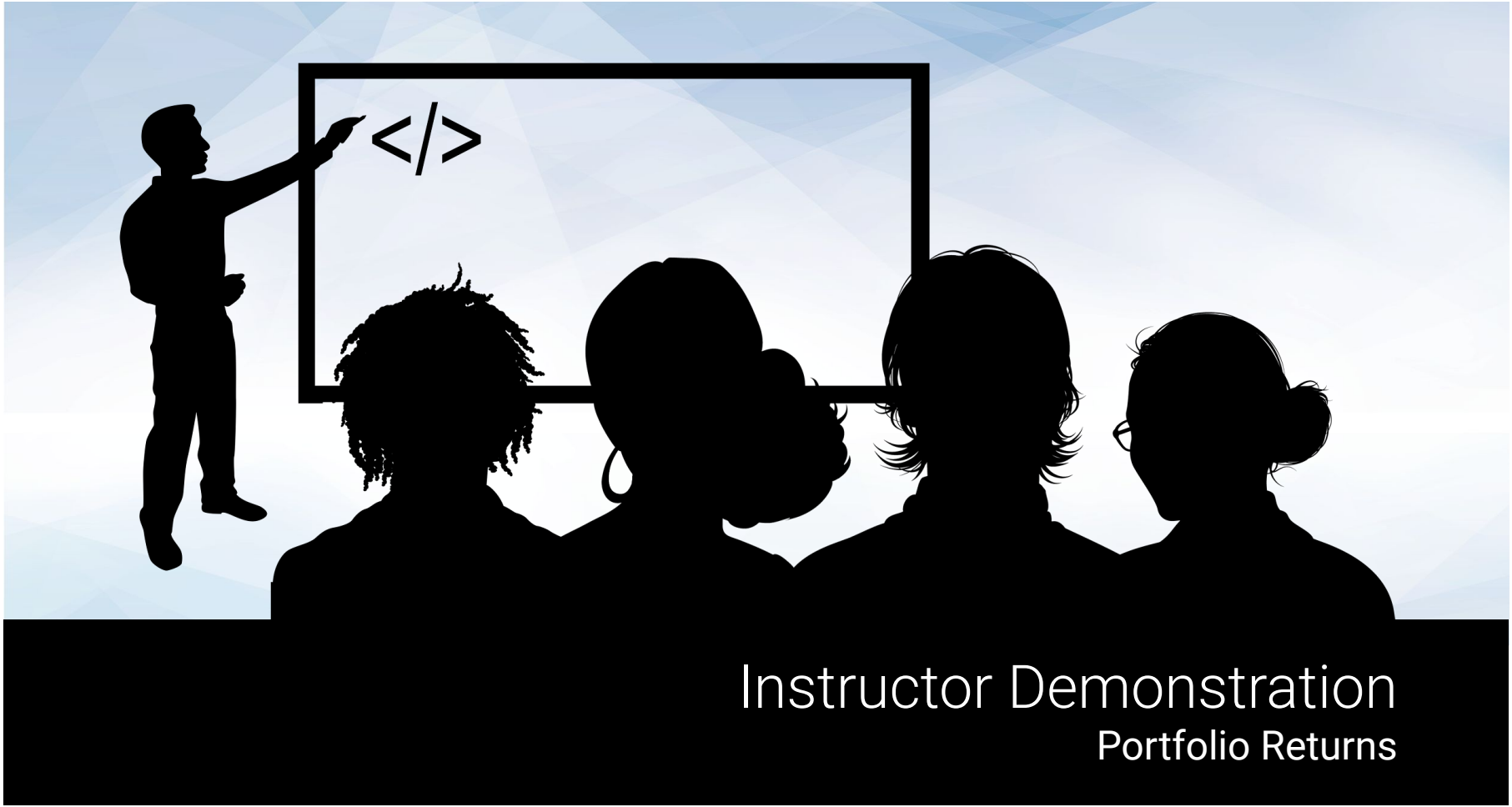
The purpose of a portfolio is to control the amount of risk and diversity in an investment.

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.



Instructor Demonstration

Portfolio Returns

Activity: Portfolio Planner

In this two part mini-project, you will work in pairs to research a group of 10 stocks and perform an analysis of a $10,000 investment in the portfolio over time.

(Instructions sent via Slack.)

Suggested Time:
30 Minutes

Time’s Up! Let’s Review.

Questions?


The End