Time Series Regression

FinTech

Lesson 10.3

Class Objectives

By the end of today's class you will understand:

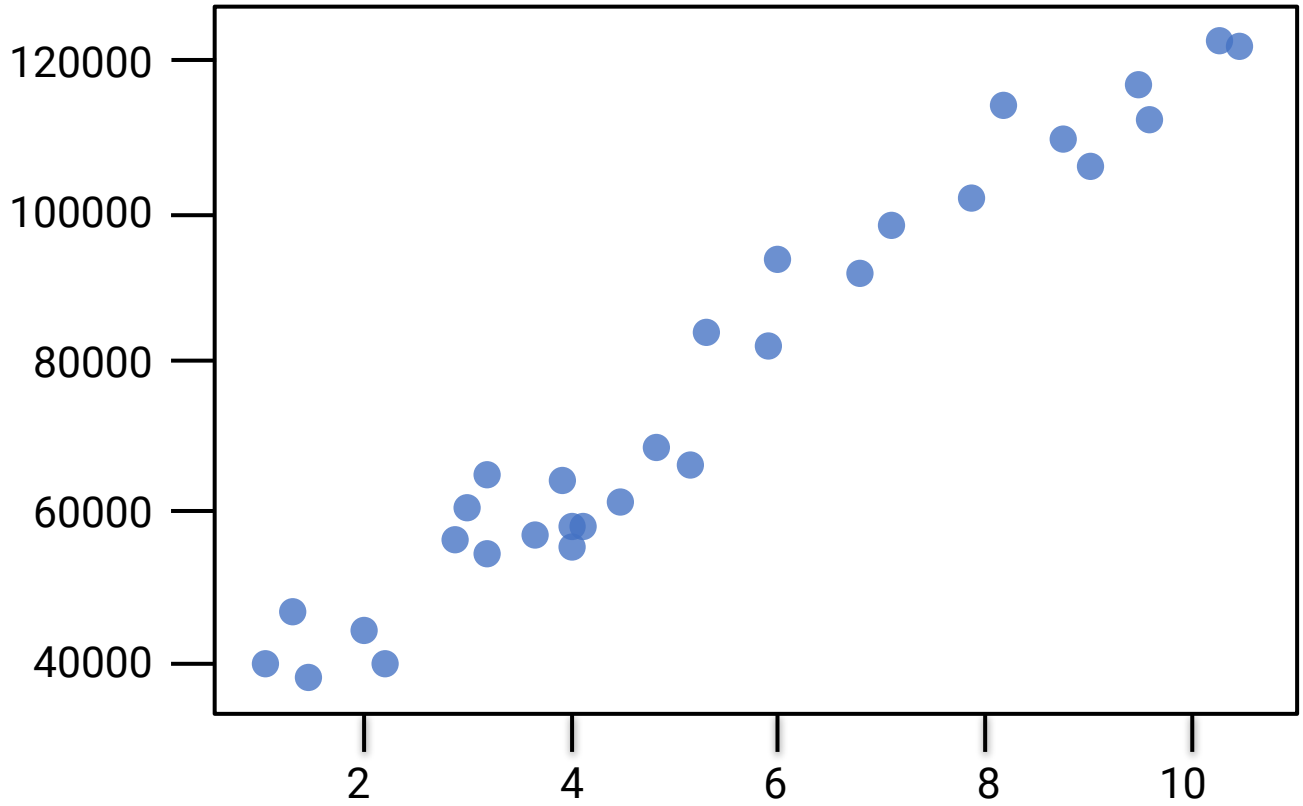
- Linear Regression
- Time Series Linear Regression
- Regression Metrics
- Train Test Split
- Rolling Out-of-Sample

Linear Regression

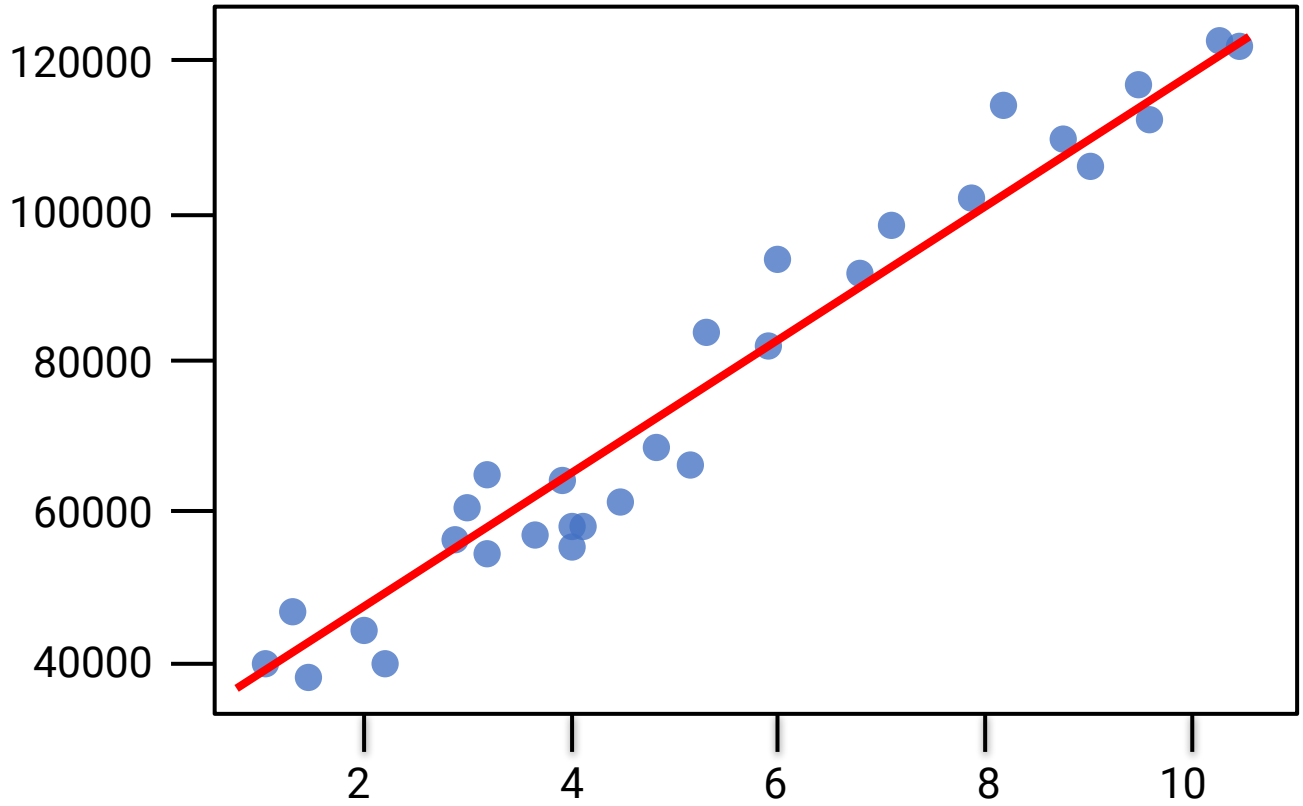
Line Equation

y	=	mx + b
m	=	slope
b	=	y-intercept (the value of y when x = 0)

Linear Regression: Find the Line That Best Describes the Data



Best Fit Line



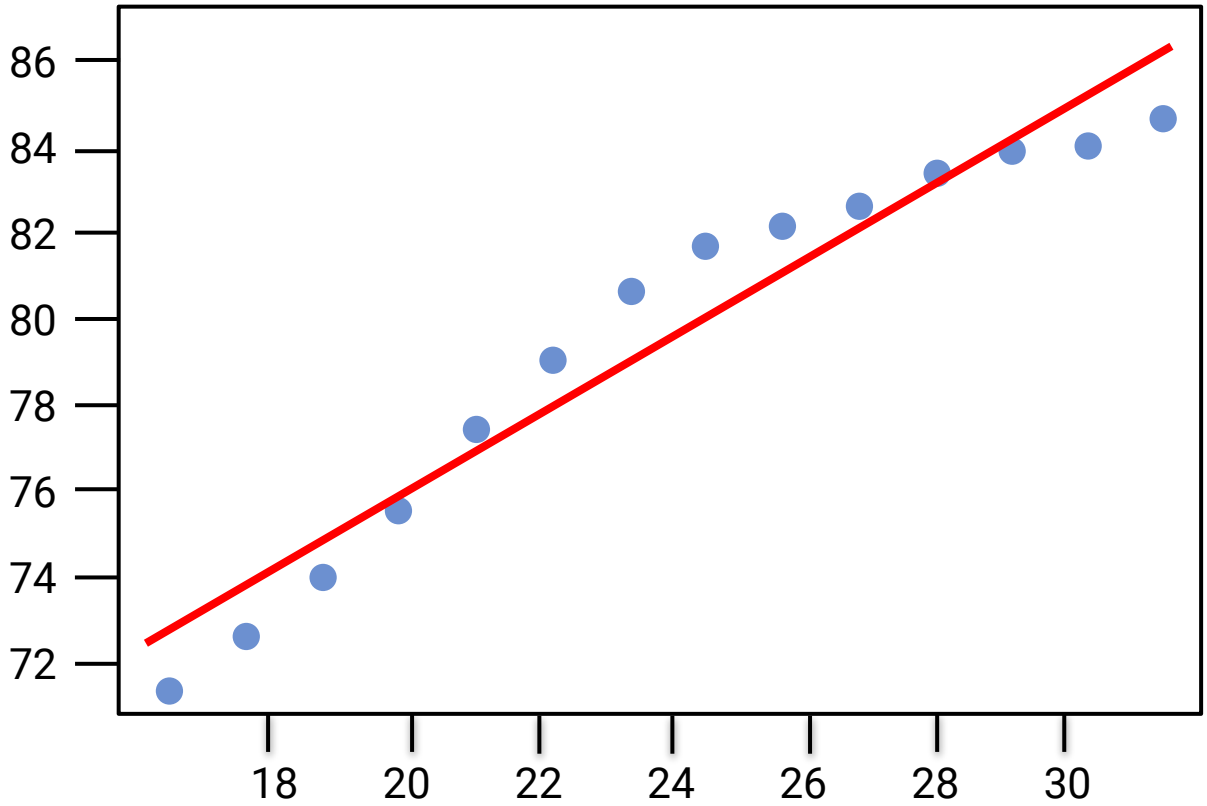
Multiple Regression

Each day (X) is assigned its weight, or coefficient.

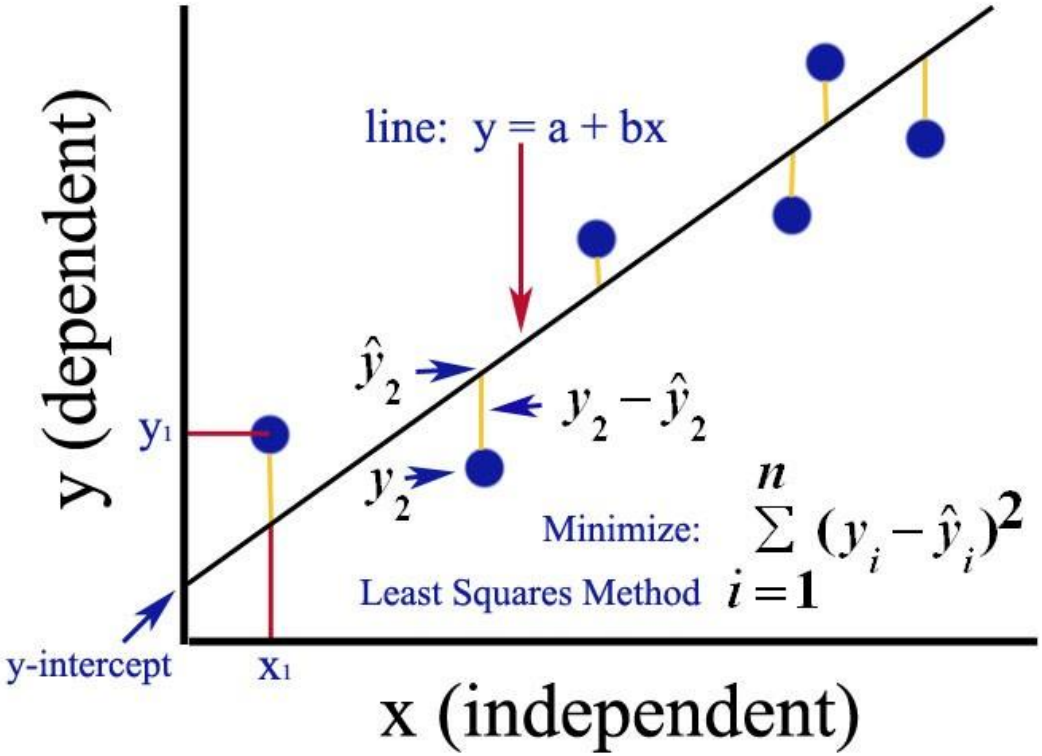
$$y = b_0 + b_1 X_1 + b_2 X_2 \ldots$$

Regression Metrics

Best Fit Line



Regression Metrics



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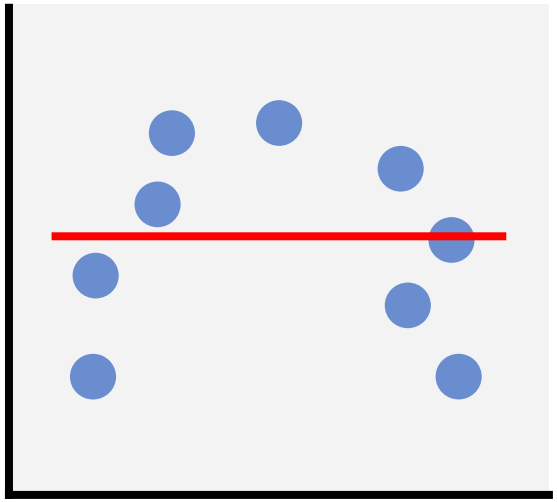
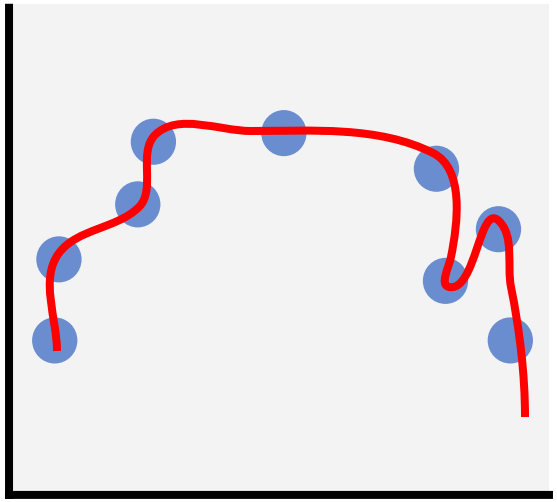
Overfitting

Overfitting

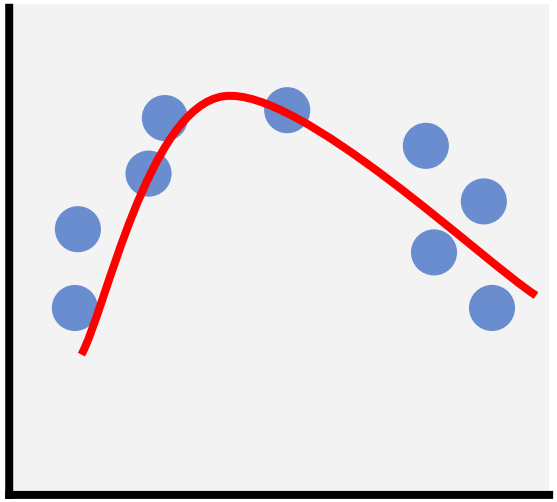
Underfit



Overfit

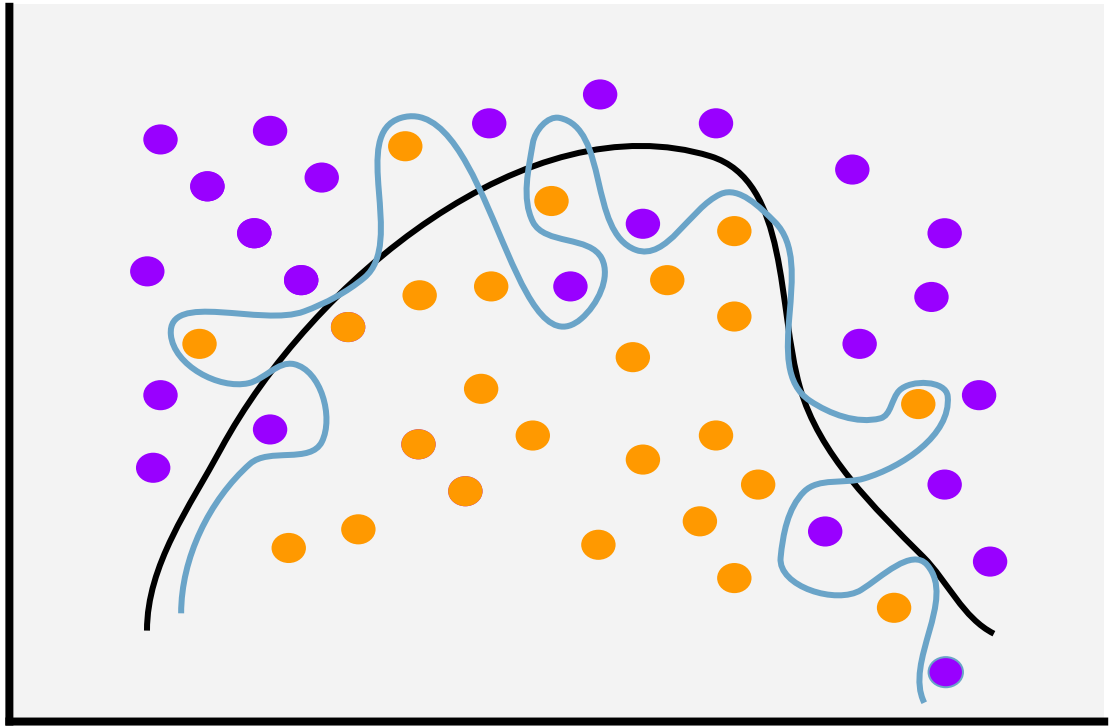


Ideal

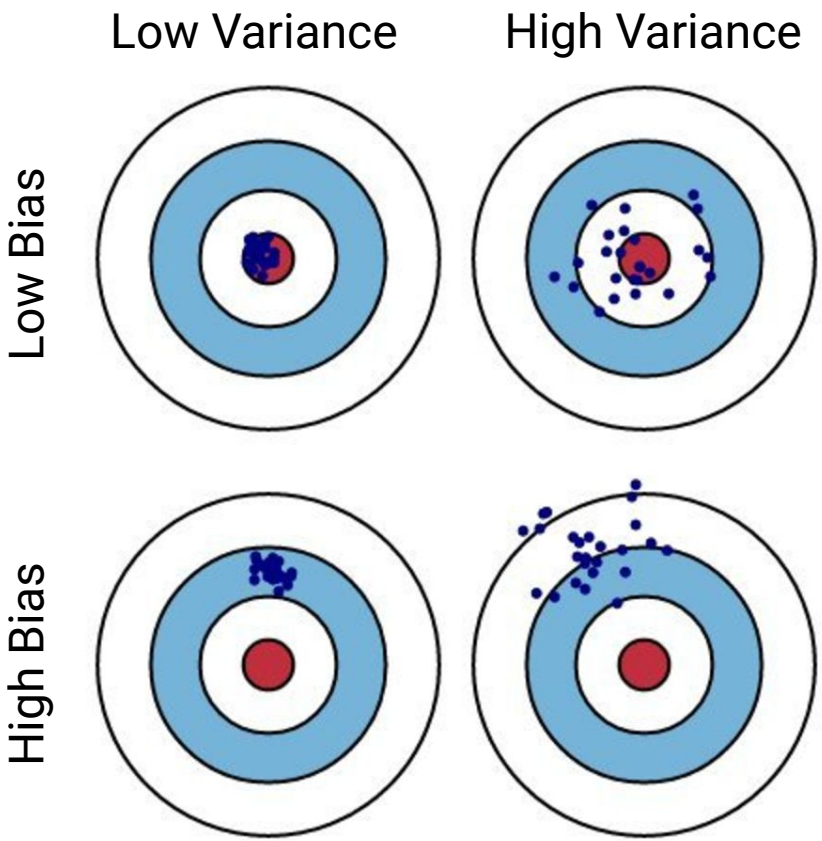


Overfitting

Overfit models learn the ‘noise’ found in the training data, rather than just the ‘signal’



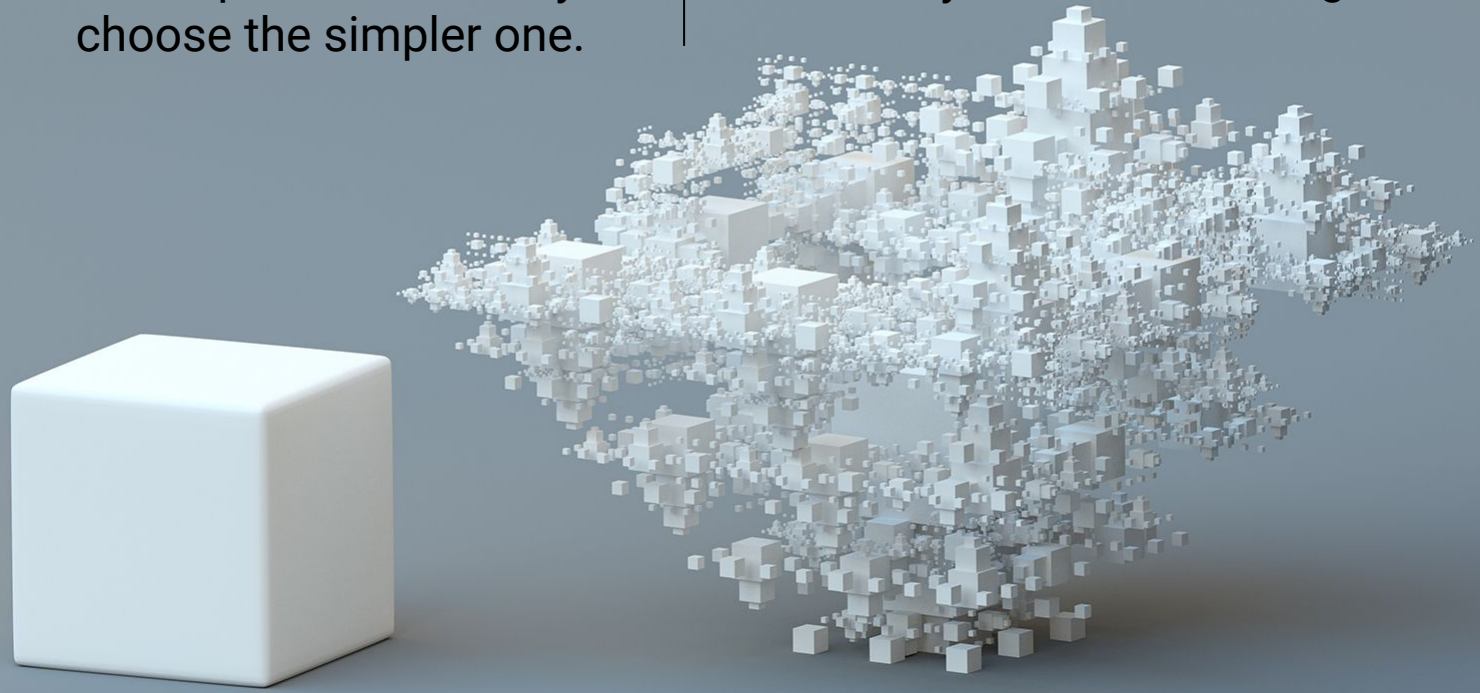
Variance vs Bias



Parsimony

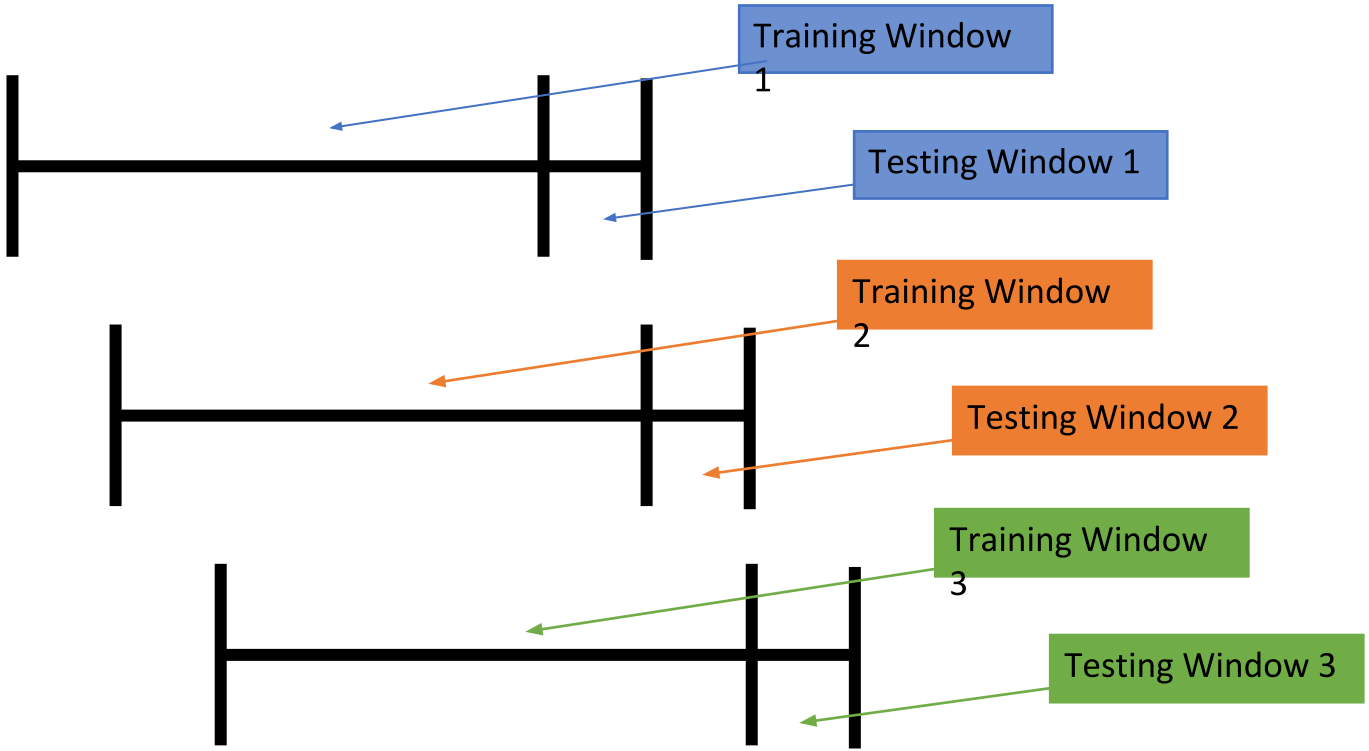
Statistical application of Occam's razor: when two models perform similarly, choose the simpler one.

Why? Needlessly complex models are harder to compute and may lead to overfitting.



Rolling Out-of-Sample

A Rolling Out-of-Sample Approach



Questions?