

# Course Introduction

## 金融投资学

Instructor: Haoran LEI

Hunan University

## About this course

- This course aims at providing an introductory and broad overview of the field of **machine learning** with the focus on applications on Finance.
- We will first discuss the ideas and tools in the machine learning literature, and then discuss their applications to finance.

## Motivating example: measuring **risk premiums**

- One of the major problems of finance is to measure the **risk premium (风险溢价)** of various assets.
  - Eg: The risk premium puzzle
- For decades, financial economists have been using various econometric/statistical tools to attack the problem of measuring risk premiums.
- In recent years, researchers have found that *machine learning-based methods* have a large advantage over *regression-based strategies*.

# Empirical Asset Pricing via Machine Learning

We perform a comparative analysis of machine learning methods for the canonical problem of empirical asset pricing: measuring asset risk premiums. We demonstrate large economic gains to investors using machine learning forecasts, in some cases doubling the performance of leading regression-based strategies from the literature. We identify the best-performing methods (trees and neural networks) and trace their predictive gains to allowing nonlinear predictor interactions missed by other methods. All methods agree on the same set of dominant predictive signals, a set that includes variations on momentum, liquidity, and volatility. (*JEL* C52, C55, C58, G0, G1, G17)

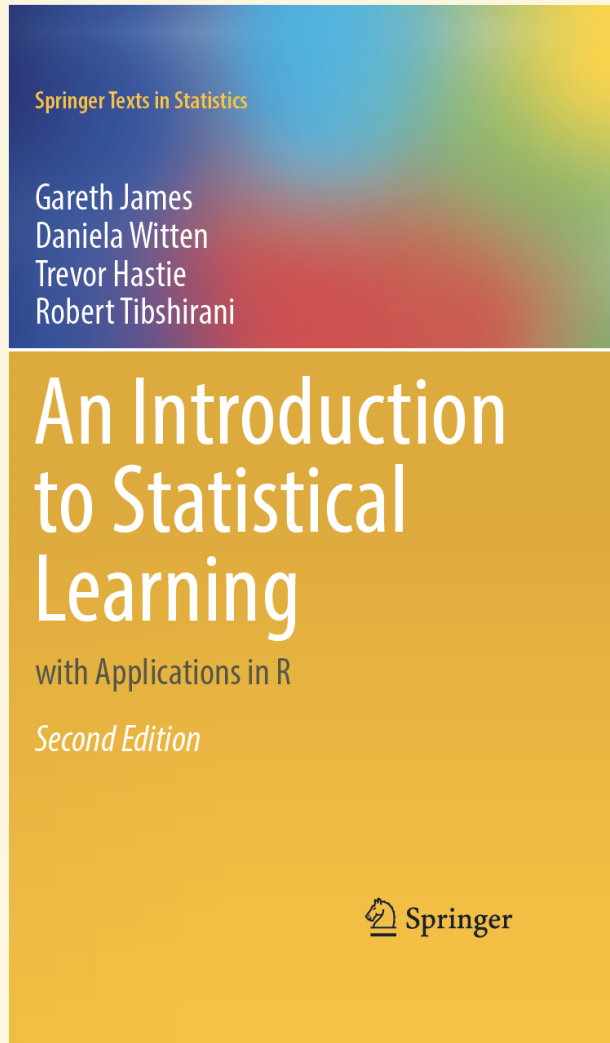
- Gu, Kelly and Xiu (2020)

# Machine learning and finance

- "Financial economics is a highly empirical discipline, perhaps the most empirical among the branches of economics and even among the social sciences," --- *The Econometrics of Financial Markets*, Campbell, Lo, and MacKinlay (*CLM*, 1996)

## Readings:

- *An Introduction to Statistical Learning (with Applications in R)*, James, Witten, Hastie and Tibshirani (2021).
  - We will call it *ISLR* in this course.
- *Empirical asset pricing: Models and methods*, Ferson (2019).



ISLR

## About me

- Name: Haoran LEI (雷浩然)
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## Course evaluation

- **One presentation** and **two to three homeworks**
- A **referee report** or a research proposal



## 同学自我介绍

每位同学简单介绍一下你的:

- 姓名 (例: 雷浩然)
- 家乡 (例: 湖北武汉)
- 本科专业
- 是否有金融或编程的相关课程经验