MATH-GA 2708.001 Algorithmic Trading and Quantitative Strategies[1]

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Course Overview

What Is Algorithmic Trading?

General definition: *Trading in an automated fashion according to a set of rules.*

Includes the following functions:

- ▶ Risk adjusted optimal execution ("the New York definition")
- ▶ Smart order routing
- ▶ Program trading
- ▶ Market impact modeling
- ▶ Execution risk analytics
- ▶ Market making
- ▶ Statistical trading or statistical arbitrage ("the Chicago definition")
- ▶ The "exploitation" of market microstructure effects
- ▶ Cost aware portfolio construction
- ▶ . . . and more

Buy-Side View Of Algorithmic Trading

Objective: *Allocating capital to maximize expected portfolio value subject to risk budget and constraints.*

Examples:

- ▶ Alpha models
- ▶ Market impact models
- ▶ Transaction cost aware portfolio construction
- ▶ Optimal execution from a portfolio perspective
- ▶ Monitoring of risk and leverage
- ▶ . . . and more
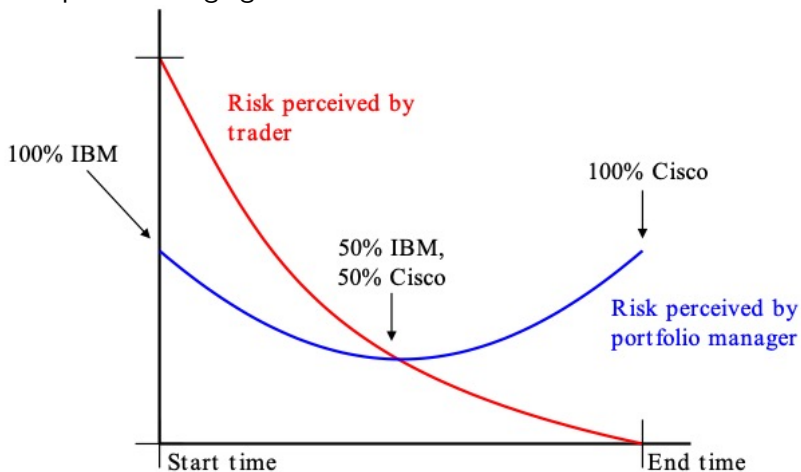
Sell-Side View Of Algorithmic Trading

Objective: *Executing trades to minimize risk adjusted cost of execution.*

Examples:

- ▶ Risk adjusted optimal execution
- ▶ Smart order routing
- ▶ Direct market access
- ▶ Principal bid programs
- ▶ Pre- and post-trade analytics
- ▶ . . . and more

Views of Portfolio Managers (buy-side) vs. Traders (sell-side)

Example: Exchanging IBM for Cisco

Prerequisites

For this courses, you should have taken the following prerequisite courses (or equivalent) in the M.S. in Mathematics in Finance program:

- ▶ "Data Science and Data-Driven Modeling"
- ▶ "Risk and Portfolio Management"
- ▶ "Stochastic Calculus"
- ▶ Familiarity with programming, preferably in Python

Course Site

- All course materials, assignments and more will be distributed using NYU Brightspace
- We will use NYU Brightspace for questions about lectures & homework
    - Post your questions to the appropriate forum

Let Us Walk Through the Syllabus Together...