

FRE-GY 7121 Statistical Arbitrage (1.5 Credits)

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Description

Statistical arbitrage refers to strategies that combine many relatively independent positive expected value trades so that profit, while not guaranteed, becomes very likely. This course prepares students to research and practice in this area by providing the tools and techniques to generate and evaluate individual trading strategies, combine them into a coherent portfolio, manage the resulting risks, and monitor for excess deviations from expected performance. It introduces theoretical concepts such as cointegration, risk capital allocation, proper backtesting, and factor analysis, as well as practical considerations such as data mining, automated systems, and trade execution. **Programming languages such as R, Java, Python, C or C++ will be used to present applications to data at low, intermediate and high frequency.**

Reference: Recommended, not required,

- Statistical Arbitrage: Algorithmic Trading Insights and Technics, Andrew Pole
- Pairs Trading: Quantitative Methods and Analysis, Ganapathy Vidyamurthy
- An Introduction to Statistical Learning: with Applications in R, Gareth James

Grading

Grading will be 30% homework, 60% final project, and 10% class participation. Grades will be A, A-, B+, B, B-, C+, C, or F.

Indicative program:

- Introduction and history. Differences and similarities between stat arb and technical analysis.
 - Volatility Signature, Frequency Arbitrage
- Pairs trading. Cointegration. Proper ratio construction and dynamic rebalancing.
- Hidden Markov Chain approach, PCA Methods
- Backtesting. Data mining. Applications of machine learning. Data error detection. Survivorship bias. Time series vs. cross-sectional mean reversion and momentum.
- Automated systems. Trade execution. Advantages and disadvantages of various frequencies.
- Deploying and monitoring. Style drift. Idea generation. Constructing an optimal strategy conditional on a given set of indicators.