



北京大學
汇丰商学院

Peking University HSBC Business School

Trading and Arbitrage Strategies

Module 1, 2017-2018

Course Information

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Classes:

Lectures: Tue & Fri, 15:30-17:20

Venue: PHBS Building, Room 229

1. Course Description

1.1 Context

Course Overview:

This course introduces practical quantitative analytics and modeling skills in the **Proprietary Trading** and **Global Arbitrage** business in modern investment banks and hedge funds. From industry application perspective, this course utilizes case study approach and examines a broad range of relevant issues in designing and developing arbitrage strategies in global financial markets. The major topics covered are **Proprietary Trading** and **Global Arbitrage** Strategies, Single Factor-based Investment Strategy, Multiple Factor-based Investment Strategy, Technical and Fundamental Indicators, Parameter Sweep Methodology, Combinations of Multiple Indicators in Trading Strategy, Genetic Algorithms and Evolutionary Learning, Global Index Arbitrage, Exchange Traded Fund (ETF), Pair Trading and Statistical Arbitrage, Market Neutral Alpha Strategies, Multi-Factor Model on Stock Selection, Automated Market Making and Algorithmic Trading Platform, **Model Calibration, Production and Simulations**, Policy and Regulation Reviews on China Financial Market, Market Future Directions for Quantitative Trading. In addition to the classic investment theories, this course intends to provide students with practical and useful quantitative analytics skills by using tools like **MATLAB, VBA Excel** and **SQL**, as well as insights necessary to understand and work for this rapidly changing investment industry.

Prerequisites:

1.2 Textbooks and Reading Materials

Required Text:

Lecture notes and supplemental materials will be provided to students, by in-class handouts and by archives in the Course Management System. Check also the reading lists of papers.

Recommended References:

- Ganapathy Vidyamurthy, "Pairs Trading: Quantitative Methods and Analysis"
- "MATLAB Primer" by MathWorks
- Faber, M. (2013), A Quantitative Approach to Tactical Asset Allocation.
- Clare, A., Seaton, J., Smith, P. N., & Thomas, S. (2012). The Trend is Our Friend: Risk Parity, Momentum and Trend Following in Global Asset Allocation.
- Doeswilk, R. And Vliet, P. (2011), Global Tactical Sector Allocation: A Quantitative Approach.

2. Learning Outcomes

2.1 Intended Learning Outcomes

Learning Goals	Objectives	Assessment
1. Our graduates will have a basic understanding of the proprietary trading and hedge fund business	1.1. Our students will know the business model for hedge funds and proprietary trading division of global investment banks.	Listening to introductions in the class
	1.2. Students will demonstrate ability of conducting quantitative analysis in design and develop arbitrage strategies.	Fundamental theories and practical methodologies introduced in class
2. Our graduates will be skilled in team work and leadership.	2.1 Students will be able to lead and participate in group for projects, discussion, and presentation.	Group case analysis and final project
	2.2. Students will be able to apply leadership theories and related skills.	Group work in the class
3. Our graduates will have better career plans in financial industry	3.1. Our students will be able to tell the key difference in different career paths.	Discussion in the class
	3.2. Our students will know how to achieve specific career goals.	Case study analysis and final project
4. Our graduates will have a global perspective.	4.1. Students will identify and design proprietary trading and arbitrage opportunities in a global perspective.	Learning from global cases in the class
5. Our graduates will be skilled in problem-solving and critical thinking.	5.1. Our students will have a good understanding of fundamental theories in their fields.	Fundamental theories introduced in class
	5.2. Our students will be prepared to face problems in various business settings and find solutions.	Case study analysis and final project
	5.3. Our students will demonstrate competency in critical thinking.	Discussion in the class

2.2 Course Specific Objectives

Objective1: Students will be knowledgeable of Proprietary Trading and Global Arbitrage businesses of modern investment banks and hedge funds, including global index arbitrage, market neutral statistical arbitrage, momentum & contrary strategies, and automated market making and algorithmic trading platform.

Objective2: Students will have advanced data modeling and quantitative skills in MATLAB.

2.3 Assessment/Grading Details

In-class participation (20 %)
1) Actively participate in class discussion and group presentations. 2) Present in group project and case summary.
Case Study Analysis (40 %)
1) Hard copy of assignment 2) Provide insightful analysis of the topic 3) Provide practical solutions or novel opinions
Final Projects (40 %)
1) Hard copy of the project 2) Solving the business problem by using data modeling and programming skills 3) Provide insight and quantitative analysis on the results

2.4 Academic Honesty and Plagiarism

It is important for a student's effort and credit to be recognized through class assessment. Credits earned for a student work due to efforts done by others are clearly unfair. Deliberate dishonesty is considered academic misconducts, which include plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis.

All assessments are subject to academic misconduct check. Misconduct check may include reproducing the assessment, providing a copy to another member of faculty, and/or communicate a copy of this assignment to the PHBS Discipline Committee. A suspected plagiarized document/assignment submitted to a plagiarism checking service may be kept in its database for future reference purpose.

Where violation is suspected, penalties will be implemented. The penalties for academic misconduct may include: deduction of honour points, a mark of zero on the assessment, a fail grade for the whole course, and reference of the matter to the Peking University Registrar.

For more information of plagiarism, please refer to *PHBS Student Handbook*.

3. Topics, Teaching and Assessment Schedule

Course Schedule: Minor modifications to this schedule are possible. The professor will inform you

if modifications are made.

Schedule	Lecture Topics
Week 1	Demonstration on the Model Development Process for Quantitative Trading <ul style="list-style-type: none"> - Single Factor-based Investment Strategies - Multiple Factor-based Investment Strategies - Demonstration with MATLAB Programming
Week 2	Data Modeling with MATLAB <ul style="list-style-type: none"> - Matrices, Arrays and Expressions - Working with Matrices and Arrays - Other Data Structures - Basic Data Analysis with MATLAB
Week 3	General Introduction on Trading Strategies <ul style="list-style-type: none"> - Introducing Proprietary Trading and Global Arbitrage Business - Major Categories of Trading and Arbitrage Strategies - Major Trading Strategies in China Market
Week 4	Statistical Arbitrage Strategies <ul style="list-style-type: none"> - The Basics of Pair Trading and Statistical Arbitrage - An Introduction to Market Neutral Alpha Strategies - Common Multi-Factor Model on Stock Selection - Case Study: Development of Statistical Arbitrage Strategies
Week 5	Global Arbitrage Strategies <ul style="list-style-type: none"> - An Introduction to Exchange Traded Fund (ETF) - An Introduction to Select Sector SPDR ETFs - The Basics of Global Index Arbitrage - Case Study: Development of Global Index Arbitrage Strategies
Week 6	Momentum and Contrary Strategies <ul style="list-style-type: none"> - Time Series Momentum and Cross Sectional Momentum Strategies - Trend Following and Momentum Strategies in Global Asset Allocation - Overreaction and Contrary Strategies - Case Study: Pattern Recognition Strategy in Day Trading
Week 7	Introducing High Frequency Trading Strategies <ul style="list-style-type: none"> - Major Categories of High Frequency Trading Strategies - Basics for Market Making Strategies - Basics for Algorithmic Trading and its Applications
Week 8	Automated Market Making and Algorithmic Trading Platform <ul style="list-style-type: none"> - The Framework for Automated Market Making and Algorithmic Trading - Daily Operations of Model Calibration, Production and Simulations - Trading Strategies PnL Performance Tracking System
Week 9	Policy and Regulation Reviews on China's Financial Markets <ul style="list-style-type: none"> - China Financial Market Policy and Regulation Reviews (2014-2017) - The Policy Effects on Proprietary Trading and Arbitrage Strategies - Market Future Direction for Quantitative Trading

Important Deadlines:

By end of the Class of Week 2: Group Selection Due

By end of the Class of Week 9: Final Project by Group Due

4. Miscellaneous

For group presentation and final project, our class will have a number of groups with several students in each. Each group will choose one topic for their group presentation. The candidate topics are listed in the CMS document.