ALGORITHMIC TRADING COURSE:
MEAN REVERSION STRATEGIES
18 & 19 September 2014
Nanyang Technological University

- 2-day course
- Learn how to carry out rigorous quantitative analysis of a trading strategy with emphasis on mean reversion strategies
- Class size is capped
- 50% funding from Financial Training Scheme grants (based on MAS qualifying criteria)
- SGX Trading Representatives who complete this course are eligible for one Continuing Education Programme (CEP) credit

Introduction

Algorithmic trading often involves the use of mathematical models to describe and predict market movements. These models are then implemented on computer systems for automatic execution. The job of an algorithmic trader is to first develop a market intuition or idea of how prices should evolve. Using mathematics, the trader then turns the idea into a quantitative model for analysis, back testing and refinement. When this quantitative model proves likely to be profitable after rigorous statistical testing, the trader implements the strategy on computer systems for execution.

This is a 2-day intensive course designed to provide participants with a good understanding of the core concepts and quantitative techniques used in the backtesting and optimization of a trading strategy with particular emphasis on mean reversion strategies such as pair trading, basket trading, index arbitrage, and other long-short statistical arbitrage strategies in stocks, ETFs, and futures. Participants will use MATLAB software to solve backtesting problems using real market data.

Outcome

At the end of the course, participants are expected to develop:
- an understanding of the core concepts in quantitative trading and specifically mean reversion strategies
- a deep appreciation of the process of using mathematics and statistics to analyze the profitability of a trading model
- "hands on" experience of how backtesting is done
- an understanding of pair trading in stocks, ETFs, futures and currencies

Highly Recommended for

- Traders wishing to apply their mathematical and statistical strengths in the trading arena
- Algorithmic traders seeking a deeper appreciation of the role of quantitative traders
- Regulators, risk managers and auditors who need a good understanding of the nature of quantitative analysis
- Anyone who aspires to become a quantitative trader

Preferred Background

- Some experience in trading is preferred but not essential
- Some basic statistics background
- Some programming experience in any language is preferred

Contents

Topic 1: Stationarity and cointegration of time series

- Stationarity and mean-reversion: the practical benefits
- Statistical test for stationarity: ADF
- Exercise: Using MATLAB and spatial-econometrics toolbox to find out if AUDCAD is stationary
- Exercise: Adapt Bollinger band strategy to trade AUDCAD
- Cointegration and its practical benefits
- Cointegration vs correlation
- Statistical test for cointegration: CADF
- Exercise: Find out if GLD-GDX is cointegrating using CADF
- Order-dependence of CADF
- Statistical test for cointegration: Johansen
- Exercise: Find out if GLD-GDX is cointegrating using Johansen
Topic 2: Tutorial to MATLAB

- Quick survey of syntax
- Exercises: building some utilities useful for trading and plotting simple graphs
- Using toolboxes

Topic 3: Mean-reversion trading of pairs and triplets

- Finding hedge ratio through linear regression (LR)
- Exercise: Find hedge ratio for GLD-GDX using LR
- Order-dependence of hedge ratio based on LR
- Finding hedge ratio through Johansen test
- Exercise: Test for cointegration of WTI vs Brent crude oil futures
- Case study: The breakdown of cointegration of GLD-GDX, the economic reasons and the remedy
- Exercise: Backtest Bollinger band strategy for GLD-GDX-USO
- A general guide to surviving the breakdown of cointegration

Topic 4: Half-life of mean-reversion

- Practical importance of half-life
- The Ornstein-Uhlenbeck formula
- Exercise: Computing the half-life of the GLD-GDX spread
- Parameterless-trading revisited: using half-life to eliminate lookback parameter

Topic 5: Risk management of mean-reversion strategies

- The pros and cons of using stop loss for mean-reversion strategies
- The use of implicit stop losses

Topic 6: What are the best markets for pair trading strategies?

- Pros and cons of pair trading ETFs, stocks, currencies, futures, and other markets
- Why sometimes economically-related pairs of futures do not cointegrate
- Exercise: Test for cointegration of WTI vs Brent crude oil futures
- Exercise: Test for stationarity of "crack spread"

Topic 7: Index arbitrage

- Trading an ETF against a basket of its component stocks
- Two ways of constructing a basket: linear regression and constrained optimization
- Exercise: Backtest a trading model of XLE against its components
- Issues with index arbitrage

Topic 8: Long-short portfolio

- Exercise: A long-short portfolio strategy of stocks in the S&P 500
- Relevance of strategy to 2007 quant funds meltdown
- The importance of universe selection: impact of market capitalization, liquidity, and transactions costs on strategies
- Strategy refinement: how small changes can make big differences in performance

Instructor

Dr. Ernest P. CHAN
Adjunct Associate Professor, Nanyang Technological University

Dr. Ernest P. Chan is the Managing Member of QTS Capital Management, LLC. His career since 1994 has been focusing on the development of statistical models and advanced computer algorithms to find patterns and trends in large quantities of data. He has applied his expertise in statistical pattern recognition to projects ranging from textual retrieval at IBM Research, mining customer relationship data at Morgan Stanley, and statistical arbitrage trading strategy research at Credit Suisse First Boston, Mapleridge Capital Management, Millennium Partners, MANE Fund Management, EXP Capital Management.

While at the Human Language Technologies group at IBM T. J. Watson Research Center (Yorktown Heights, NY), Dr. Chan spearheaded IBM’s research effort to develop a system for searching large text databases such as the World Wide Web, catapulting IBM’s reputation as a top player in the field. His system was placed seventh among some forty competitors in a competition sponsored by the National Institute of Science and Technology and the Department of Defense in 1996. At the Data Mining group in Morgan Stanley’s headquarter in New York, Ernie pioneered the application of some of these sophisticated statistical algorithms to the complex task of extracting customer relationships in the Morgan Stanley customer accounts database.

Ernie was invited to join a proprietary trading group at Credit Suisse First Boston in New York in 1998 to develop statistical models for futures trading, stock pair-trading as well as trading based on earnings revisions, surprises and analyst recommendations. In 2002 he joined Mapleridge Capital Management Corp. as a Senior Quantitative Analyst working on futures trading strategies, and then Maple Securities/MANE Fund Management Inc. in 2003 as a senior researcher and trader. He was a co-founder and principal of EXP Capital Management, LLC, a Chicago-based fund management company. He is currently the principal of QTS Capital Management, LLC, which manages a hedge fund as well as separate client accounts.
Ernie has consulted for money management companies and independent traders. He has served as an expert witness in a matter related to algorithmic trading. He writes the Quantitative Trading blog which is syndicated to www.tradingmarkets.com and Yahoo Finance, and has published in the Automated Trader magazine. He was quoted by the New York Times, Forbes, and the CIO magazines, and interviewed on CNBC’s Closing Bell program, Technical Analysis of Stocks and Commodities magazine, Securities Industry News, Automated Trader magazine, and the CFA Institute Magazine on topics related to quantitative trading. In recognition of his expertise in statistical data mining, he was invited to serve on the Program Committees of the International Conference of Knowledge Discovery and Data Mining in 1998 and also of the SPIE Conference on Data Mining and Knowledge Discovery in 1999. He was an invited panelist on Effective Arbitrage Strategies at the ETF Evolution 2007 Summit, an invited speaker at the Automated Trading conference in London, UK, in October 2009, the Market Technicians Association Toronto Annual Conference in 2010, and the Quant Invest Canada conference in 2012. He is the author of “Quantitative Trading: How to Build Your Own Algorithmic Trading Business”, and “Algorithmic Trading: Winning Strategies and Their Rationale”, both published by John Wiley & Sons. Ernie conducts workshops on Statistical Arbitrage, Quantitative Momentum Strategies, and Millisecond Frequency Trading in London. He is an Adjunct Associate Professor of Finance at Nanyang Technological University in Singapore, and an Industry Fellow of the NTU-SGX Centre for Financial Education, which is jointly set up by NTU and the Singapore Exchange. He also teaches a graduate course on Risk Analytics at Northwestern University in Chicago.

Ernie holds a Bachelor of Science degree from University of Toronto in 1988, a Master of Science (1991) and a Doctor of Philosophy (1994) degree in theoretical physics from Cornell University.

Venue and Time

Nanyang Technological University
NTU-SGX Financial Trading Lab
Block S4, Level B1, Section B, Unit 14/16, Nanyang Avenue, Singapore 639798

Time
18 and 19 September 2014     09 00 hrs - 17 00hrs

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*Only one discount applies

# NTU Alumni discount is only applicable for Non-SGX member’s programme fee

Note: Fee excludes GST & before funding support from FTS Grants

Mode of Payment

1) Cheque
2) Bank Wire Transfer

Payment will be advised once the online application is received.

Cancellation Fee

1. 100% refund of the program fee if notification is received more than 60 days from the start of the program, minus administrative fee of SGD$250.00nett.
2. 50% refund of the program fee if notification is received between 45-60 days from the start of the program
3. 25% refund of the program fee if notification if received between 15-44 days from the start of the program.
4. No refund if notification is received less than 15 days from the start of the program. In this regard, we would recommend you to either defer or find a replacement.

For Enquiries:
Please contact Ms Denise @ 6592 1791 or email nscfe@ntu.edu.sg

Register Now!