NTU-SGX
Centre for Financial Education

NANYANG TECHNOLOGICAL UNIVERSITY

SINGAPORE EXCHANGE

ALGORITHMIC TRADING COURSE - MODULE 2
BACKTESTING & QUANTITATIVE TRADING

26 - 28 March 2011
0930hrs – 1715hrs
Thomson Reuters, One Raffles Quay

Learn how to carry out rigorous quantitative analysis of a trading strategy

Class size is capped to tutorial group size
50% funding from Financial Training Scheme grants
(based on MAS qualifying criteria)

Technology Partners

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MathWorks

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 3-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 pair trading and related strategies. 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
- 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 is preferred

Contents

Topic 6:   Trading applications of stationarity

- Statistical test for stationarity: adf
  - ❖ *Exercise: use MATLAB and spatial-econometrics toolbox to find out if AUDCAD and EURCHF is stationary*
  - ❖ *Exercise: backtest a Bollinger-band strategy for AUDCAD and EURCHF*

Topic 7:   Cointegration and pair trading

- Statistical tests for cointegration: cadf and Johansen
  - ❖ *Exercise: find out if GLD-GDX is cointegrating*
- Finding the best hedge ratio
  - ❖ *Exercise: backtest a Bollinger-band strategy on GLD-GDX and other pairs*
  - ❖ *Exercise: compute half-life of GLD-GDX strategy*
- Backtest vs. cointegration
- Past ≠ Future
- Parameterless pair trading
  - ❖ *Exercise: construct a parameterless pair trading strategy*
- Stop loss?
- Trading cointegrated triplets
  - ❖ *Optional exercise: test for cointegration of a triplet, and construct mean-reverting strategy on it*
- What are the best markets to pair-trade? Pros and cons of each market
- Automated pair trading

Topic 8:   Related strategies

- Index arbitrage: Trading an index against a basket of its component stocks
  - ❖ *Optional exercise: backtest a trading model of XLE against its components*
- Statistical arbitrage
- Momentum vs. mean-reversal
- Momentum pair trading: examples
- Other stock mean-reversion trades

Topic 9:   Reuters presentation on Quantitative Research & Trading workflow

Trainers & Speakers

Dr. Ernest P. CHAN

Dr. Ernest P. Chan's 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, and MANE Fund Management.

While in the Human Language Technologies group at IBM T. J. Watson Research Center (Yorktown Heights, NY), Ernest 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, Ernest 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.

Ernest 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 recommendation changes. He joined Mapleridge Capital Management Corp. in 2002 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.

Ernest consults for money management companies and also manages various accounts including EXP Quantitative Fund, L.P. which he co-founded. 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 and CIO Magazine, and interviewed on CNBC's Closing Bell program and Technical Analysis of Stocks and Commodities magazine on topics related to quantitative trading. He is the author of "Quantitative Trading: How to Build Your Own Algorithmic Trading Business" published by John Wiley & Sons in 2008.

Ernest holds a Bachelor of Science degree from University of Toronto in 1988, graduating with High Distinction and receiving the Lieutenant Governor's Gold Medal. He also holds a Master of Science (1991) and a Doctor of Philosophy (1994) degree in theoretical physics from Cornell University. 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. He was an invited speaker at the Automated Trading conference in London, UK, in October 2009. He conducts workshops on topics from Pair Trading to Backtesting in New York, London and Hong Kong.

Mr Neeraj MASKARA
Neeraj Maskara is the Asia Business Manager for Quantitative and Event-Driven Trading Solutions at Thomson Reuters. Thomson Reuters is the largest global technology and market data provider with an end to end solution for quants and automated traders, from hosting facilities, low latency market data feeds to pricing, news and fundamental feeds and analytics across global markets. Thomson Reuters is a leading solutions provider to buy side and sell side market players who are involved in quantitative trading.

Neeraj is responsible for the content and technology solutions offered by Thomson Reuters across Asia for high frequency trading. He has extensive experience working with a range of buyside and sellside quant trading firms/desks across EMEA and Asia. Prior to his role with Thomson Reuters, Neeraj worked for a quant hedge fund based in Switzerland.

Venue

Thomson Reuters, One Raffles Quay, #28-01 North Tower, Singapore 048583

Fees and Registration

Program Fees:

Non-SGX member	- SGD4,230 (excluding 7% GST) before funding support from FTS grants*
SGX Member	- SGD3,830 (excluding 7% GST) before funding support from FTS grants*
Early Bird[1,] Group[2] Discount & Participants of ATC 1[3]	- SGD3,380 (excluding 7% GST) before funding support from FTS grants*

[1]early bird discount is subject to payment made before 11 Feb 2011
[2]group discount applies to group registration of 5 or more participants
[3]discount applies to participants who have attended ATC 1 with NTU-SGX CFE

Fees include lunches, tea breaks, course materials and the use of an individual hands-on trading terminal.

* The Monetary Authority of Singapore (MAS) administers Financial Training Scheme (FTS) grants to financial sector organisations that sponsor eligible Singapore based participants to training programmes that meet the qualifying criteria. For more details, please visit www.mas.gov.sg, or contact the MAS at 6229-9396 or fsdf@mas.gov.sg.

To Register:
- Log on to www.ntusgxcfe.ntu.edu.sg/courses.asp
- Closing date for all registrations is 4 Mar 2011
- All payments must be received by 11 Mar 2011

For Enquiries:
Please contact Ms Michelle Chah or Ms Ahneesah Omar at tel: 6790-5736/6078 or email nscfe@ntu.edu.sg