NEW YORK UNIVERSITY STERN
Leonard N. Stern School of Business

TRADING STRATEGIES AND SYSTEMS

B20.2350.30 Fall 2008

Instructor	**Professor Vasant Dhar**, Information Systems
Classroom	TBD
Class times	tBD
Exam date/time	
Office Hours	Preferred communication: Email and telephone; 4-6PM Wednesday and by appointment KMC Room 8-97
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1. COURSE SYNOPSIS

As financial markets become more electronic and more liquid, a higher degree of knowledge about systems and analytics is required in order to compete. This course teaches students how modern financial markets function as a network of systems and information flows, and how to use the information emanating from the markets for decision making and building and implementing systematic computer-based models for trading.

The financial industry as we know it today wouldn't exist without high powered information systems. These systems make markets possible through electronic intermediation and supporting services such as data and analytical support, payment, settlement, authentication and representation. They are also becoming used increasingly to support or make decisions about taking or controlling some sort of risk – financial, operational, and regulatory.

The course begins with a description of the financial markets, specifically, equity, currency, fixed income, and commodities, and the systems that enable them. We consider exchanges, ECNs, and other dealer markets and the information that emanates from them. This provides the backdrop for the bulk of the course which covers the design, evaluation and execution of trading strategies that are commonly used by professionals in the various markets. There is increasing interest in particular, on *systematic* trading strategies and execution systems because of their scalability and transparency.

The course strikes a balance between theory and practice by grounding the discussion in the current state of financial markets. Senior portfolio managers from industry are invited to class periodically, and students are encouraged to make the most of these visits. The course requires students to do several hands-on exercises with real market data. The exercises start with a review of simple concepts of risk and return and progress to simple trading strategies that students build and evaluate. The objective is to help you understand how to assess markets in an orderly and scientific way so as to be able to draw sound inferences from the analysis.

The course should be of interest to students across the financial services industry. It will not transform you into a trading expert, which takes considerable effort, time, and pain. It will, however, bring the concepts of risk and return alive by working with real data and exercises, and through industry experts describing their approach to fund management and administration. More generally, the course should give you a clearer appreciation on the fact that understanding markets is a theory building exercise, where professionals spend a lot of time in understanding emerging market phenomena with the objective of translating their insights into profitable strategies. These concepts are useful regardless of your specific interest in the financial industry, i.e. whether you intend to be a trader, risk manager, controller, salesperson, or analyst.

Self learning is a particularly important part of this course. You will get the best value from this course if you experiment actively with ideas and actively construct and test trading strategies instead of just coming to class and expecting to be told what works and what doesn't. There's nothing like learning by doing. Accordingly, 50% of the grade is assigned to your project. So, start early. Exploratory work always takes longer than you think.

2. TEXTBOOK AND MATERIALS

There are three types of materials used in the course: the main textbook, current readings, and data. The textbook for the course is:

New Trading Systems and Methods, Perry Kaufman, Wiley 2004 (Fourth edition)

Because of the currency and richness of the topics, it is very difficult to find a single textbook that is simultaneously rigorous and practical. The above textbook is the best available for our purposes, but it is biased towards practice at the expense of theory and it has way too much detail for a textbook. However, it is an excellent reference due to its very diverse coverage of indicators and methods. It does provide some intuition about markets, but it is not mathematically rigorous. It is most useful in helping you think about measurement issues with time series data, commonly used types of indicators to describe states of markets, and vanilla models from which portfolio managers build more elaborate strategies. Indeed, one of your challenges is to try and relate the relationships in data that you're observing to plausible reasons, economic or psychological.

You should be warned that the lectures do not closely follow the book. The lectures present basic concepts central to trading strategies and provide the basis for developing strategies. Through simple assignments, they build a foundation for thinking about trading strategies. To keep the material accessible, all examples are illustrated in Excel.

The textbook is supplemented with several useful articles:

1. Life at Sharpe's End
2. BARRA on Campus
3. Have Hedge Funds Eroded Market Opportunities?
4. Reconciling the Structural Forces on the Dollar, DB Research Report
5. DB Guide to FX Trading
6. Interview with William Eckhardt, from The New Market Wizards

Since one of the main objectives of the course is to provide you with hands-on skills in developing and understanding trading strategies, **several datasets are provided:**

1. Daily S&P500 cash data 1960-2005
2. Daily data for selected currency, fixed income, equity futures, and commodity futures
3. Fundamentals (Trade Balance) data for currencies (aligned with the dollar index)
4. Fundamentals-based aggregated equities data
5. Equities data for pairs trading

All materials (except for late breaking articles and non-electronic information) are posted on the class website. Students are also encouraged to explore the Internet for materials relevant to the course.

3. REQUIREMENTS AND EVALUATION

Since this is a hands-on course, there are several small assignments involving data analysis. You must have reasonable Excel skills to do these assignments. There are up to six such assignments. You must also participate in class discussion and come prepared to present your analyses to the class. Each class where an assignment is due will begin with several students at random being chosen to present their results.

In addition, you must hand in a term paper describing a complete trading strategy. It is preferable if this strategy is demonstrated using data and analysis, but conceptual analyses are also acceptable. Examples of things you could explore are:

- Is there any relationship between current volatility and future returns in equity, bond, and currency or commodity markets?
- Which macroeconomic indicators have exhibited a consistent influence on which markets and what could explain this?
- Under what conditions would you expect an automated trader to outperform a human and why?
- Design and evaluate a fundamentals or technicals based trading strategy to trade indices, individual stocks, ETFs, etc.
- What will the electronic trading marketplace look like in 5 years and why? What are the implications of this structure for individual and institutional investors?
- Engineer a system where you can describe the market conditions under which it would make and lose money. How would you position such a system for investors?
- Is high frequency trading worthwhile? In which markets? Why or why not?

There is no final exam. The grade breakdown is as follows.

i. Assignments: 50 points
ii. Term paper on a trading strategy plus class participation: 50 points

The assignments will address the following types of questions:

1. Has there been any correlation historically between equity market volatility and direction?
2. What types of trend following models have worked historically in equity, currency, and fixed income markets and why? How do you compare models?
3. How and when does pairs trading work?
4. Is there any relationship between fundamentals such Trade Balance, interest rates, etc and dollar movement?
5. Is it possible to predict earnings surprises? Why or why not?

4. TIMETABLE (Feb 07 to May 02 2005): Subject to Revision

Session	Topic	Readings	Due
1.	Introduction and Course Objectives	Chapters 1 and 2	
2.	Markets and basic measurements of direction and volatility	Life at Sharpe's End Chapter 23 pp 983-1002	
3.	Technical trading: Trend Following Systems	Chapter 8	Assignment 1
4.	Technical trading: Trend and Counter-trend systems	Chapter 9	Assignment 2
5.	Technical trading: spreads and pairs trading	Chapter 13	Assignment 3
6.	Fundamentals and currency trading strategies	FX Guide	
7.	Value-Based Equity strategies	Barra on Campus Reading (JM)	Assignment 4
8.	Discretionary strategies	TBA (AR)	
9.	Events and pattern recognition strategies	TBA	Assignment 5
10.	High frequency trading	Chapter 16 (AB)	
11.	Artificial Intelligence and Trading	Chapter 15	
12.	Selected student project presentations	None	
13	None	None	Project