Quantitative Investing Strategies

Student Taught Course, fall 2010

Student instructor: Tyler Hannasch (junior, Mechanical Engineering and BEM)

Sponsoring Professor: Jaksa Cvitanic (along with Brad Cornell, Visiting Professor of Finance)

Course description:
This class seeks to provide an introduction to quantitative investing strategies, which are currently being used in the financial services industry. In particular we will be addressing Pairs Trading, Momentum Strategies, and Factor Models (which are strategies of particular interest of us). We will also provide background information about the history and workings of the stock market.

Why it should be taught:
Because of the recent financial crisis the words "Wall Street" are on everyone's lips. But what is Wall Street? Do they really provide a societal benefit? How do they make so much money? When we came to Caltech we couldn't answer these questions. The courses we took taught us how securities in the market *should* be valued in a structured setting, but the extension of basic economic theory into practice is an entire field of its own.

Format:
The class will be 3 units for 1 hour of lecture each week and 2 hours of homework. Students will sign up for a fantasy portfolio on investopedia.com, giving them $100,000 in play cash to construct an investment portfolio. They will manage this portfolio throughout the class, applying what they have learned in lecture. Each week for homework, students will make at least two trades in their portfolio. They will submit these trades as well as a page arguing why each trade will be profitable, using the concepts we have covered in class. In addition there will be four required readings (four papers totaling 137 pages):

- *The Cross-Section of Expected Stock Returns* (Fama and French (1992))
- *Value and Growth Investing* (Chan and Lakonishok (2004))
- *Pairs Trading: Performance of a Relative Value Arbitrage Rule* (Gatev, Goetzmann, and Rouwenhorst (2006))
- *An Examination of Momentum Strategies in Commodity Futures Markets* (Shen, Szakmary, and Sharma (2007))

Final grades will be based on:

- 50% Homework (9 assignments)
- 50% Discussion (8 discussions)

A grade of 70% or above will be considered passing.

Topics by week:
Week 1: Introduction

- History and Mechanics of the Stock Market
- Efficient Market Hypothesis

Weeks 2 and 3: Factor Models

- Discussion: *The Cross-Section of Expected Stock Returns*

Week 4: Cognitive Biases and Risk Adverseness

- Gabbler's Fallacy, Confirmation Bias, etc
- Expected Utility Hypothesis and the St. Petersburg Paradox
- Application of Biases and Risk Adverseness to Quantitative Investing

Week 5 and 6: Value vs. Growth Investing

- Discussion: *Value and Growth Investing*
- Guest Lecture by Brad Cornell (Week 6)

Week 7 and 8: Pairs Trading Portfolios

- Discussion: *Pairs Trading: Performance of a Relative Value Arbitrage Rule*

Week 9 and 10: Momentum Strategies

- Discussion*: An Examination of Momentum Strategies in Commodity Futures Markets*

Instructor qualifications:
Tyler Hannasch I've been very interested in finance since I started Caltech and am double majoring in BEM. I have done very well in my classes earning a 4.1 BEM GPA and have been lucky enough to TA Competitive Strategy, Introductory Economics, and Advanced Corporate Finance. Seeking more applied knowledge of investing I have been self-studying investing strategies with Benjamin Flora under the mentorship of Thomas Morphet, Caltech alum who works for Deutsche Bank. My self-study primarily involves reading scientific papers, sections of MBA textbooks, and discussions with Mr. Morphet and Ben. The papers presented in the course syllabus are ones that I've read and found valuable. I'm very excited to share my knowledge with the rest of the Caltech community.