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Abstracts of the Colloquium talks: Summer 2013

Date	Speaker and Title	Time/Location
Wednesday, June 26	Rana Alharbi and Tamader Alsalami, University of Dayton Transfer Function Models for the Lydia Pinkham Sales and Advertising Data	3:00 PM, SC 323
Wednesday, July 17	Yuchen Zhou, University of Dayton Pricing multi-asset American options with regime-switching by exponential time differencing schemes	3:00 PM, SC 323
Wednesday, July 17	Pei Xiao, University of Dayton Numerical Solutions for Option Pricing in Regime-Switching Jump Diffusion with Kou's Model	**3:40 PM, SC 323**
Wednesday, July 24	Sindhura Sunkara, University of Dayton Equity Analysis on the Banking and Financial Sectors in India	3:00 PM, SC 323
Wednesday, July 24	Jizhe Zhang, University of Dayton Contrarian and Momentum Strategies in the Chinese Stock Market: 1993 - 2012	**3:40 PM, SC 323**
Monday, July 29	Jung Yu Liu, University of Dayton Relationship between risk and cross-sectional stock return in China market	3:00 PM, SC 323
Monday, July 29	Wenzhe Chen, University of Dayton State government public pension plans: How bad are they and how do they affect state financing cost?	**3:40 PM, SC 323**
Wednesday, July 31	Shengqun Jiang, University of Dayton Analysis of systemic risk measures and the challenges of the measures	3:00 PM, SC 323
Wednesday, July 31	Chao Song, University of Dayton A comparative analysis of effectiveness of KMV model and z-score model in predicting corporate default: Empirical evidence from China	**3:40 PM, SC 323**

Transfer Function Models for the Lydia Pinkham Sales and Advertising Data

Rana Alharbi and Tamader Alsalami

Abstract: Transfer function models are multivariate time series models based on the Box-Jenkins methodology. The concept of a "transfer function" is rooted in the theory that variability in the input variable(s) transfer over to variability in the output variable.

We will use transfer function models to investigate the lagged effects of advertising on sales using data for Lydia E. Pinkham's Vegetable Compound. We will build two transfer function models: A non-seasonal model for the annual data from 1907 through 1960, and a seasonal model for the monthly data from January 1954 through June 1960.

Pricing Multi-asset American Options with Regime-Switching by Exponential Time Differencing Schemes

Yuchen Zhou

Abstract: This paper is concerned with multi-asset American option pricing problems with regime-switching. It is well known that multi-asset American option prices can be modeled by higher dimensional generalizations of the original Black-Scholes equation. Due to regime coupling, this problem gives rise to a class of complex PDE systems with free boundary conditions. We first apply the penalty method approach to convert the free boundary value PDE system to a system of PDEs over a fixed domain for the time and spatial variables. Then the exponential time differencing Crank-Nicolson (ETDCN) method is employed to solve the resulting system. In the case of two uncorrelated underlying assets, we establish an upper bound condition for the time step size and prove that under this condition the option values generated by the ETD-CN scheme satisfy a discrete version of the positivity constraint. In addition, we numerically com- pare the ETD-CN scheme with two other methods, namely the binomial tree method and the implicit penalty method. In the end of this paper, we numerically illustrate the second order convergence of the ETD-CN scheme without theoretical proof.

Numerical Solutions for Option Pricing in Regime-Switching Jump Diffusion with Kou's Model

Pei Xiao

Abstract: Pricing European option under Kou's jump-diffusion model assumes that the price of underlying asset follows a geometrical Brownian motion with a drift and jumps whose size is log-double-exponentially distributed. The price of a European option is given by a partial integro-differential equation (PIDE). Regime-Switching model is a model that constructs a system which takes into account for influence of macroeconomic factors on the behavior of individual asset prices. Regime-Switching jump-diffusion model is given by a system of partial integro-differential equations (PIDE).

In this paper we first present a numerical scheme with stationary iteration to solve jump-diffusion model with Kou's model, which have optimal computational cost. Then we solve out a complex system of partial integro-differential equations (PIDEs) of parabolic type. The system is motivated by applications in finance where the solution of the system gives the price of European options in a regime-switching jump diffusion model with Kou's model. For Kou's jump-diffusion model, we use nonuniform grids on spatial discretization and implicit Rannacher scheme on time discretization. Numerical experiments confirm that the developed methods are very efficient as fairly accurate option prices can be computed in a few milliseconds on a PC.

When we combine regime-switching model with Kou's jump, the new algorithms present a more efficient way to calculate European option price because this new type considers different market signal variability.

Equity Analysis on Banking and Financial Sector in India

Sindhura Sunkara

Abstract: The project is about doing analysis on stocks and suggesting the investor in making a decision to buy, sell or hold the stocks. The project consists of two types of analysis: i) Fundamental Analysis, ii) Technical Analysis. Fundamental analysis consists of economy analysis, industry analysis and company analysis. Economy analysis includes economic factors like GDP, inflation rates, interest rates, exchange rates. Industry analysis consists of analysis of industry and recent developments in the industry etc. Company analysis includes analyzing the company's ratios etc. Technical analysis mainly consists of

charts, graphs etc. It takes the closing prices and plots the graphs. It is mainly used for short term purpose. Five banking and finance stocks are considered, namely, ICICI Bank, HDFC Bank, Axis Bank, Infrastructure Development Finance Company Ltd (IDFC Ltd), and Housing Development Finance Corporation Ltd. (HDFCL). The analysis is done on these five stocks to determine which one is better for investor. For each stock based upon the ratios recommendations as to which stock to buy are made. Some investors look for sales of a company, some may look for dividend payout ratio. It again depends on investor. Based upon the ratios an investor can choose which stock to invest. At the conclusion, recommendations are made to make the project work more meaningful and purposeful.

Contrarian and Momentum Strategies in China Stock Market: 1993-2012

Jizhe Zhang

Abstract: This paper examines whether contrarian and momentum strategies generate abnormal profits in short-horizon and intermediate-horizon in Chinese stock market during 1993 to 2012. We find statistically significant abnormal profits for both the arbitrage investment strategies. Detailed analysis indicates that: (1) during the pre-2000 period, significant contrarian profits exist in short-term horizon and significant momentum profits emerge in intermediate-horizon; (2) during the post- 2000 period, contrarian profits are observed for both short and intermediate-horizon, momentum profits no long exist ; (3) in 2007, a typical bull market, almost all strategies generate significant contrarian profits ; and (4) in 2008, a typical bear market, all strategies yield significant contrarian profits.

Relationship between risk and cross-sectional stock return in China market

Jung-Yu Liu

Abstract: The paper is about investigating the relationship between risk and cross-sectional stock return in China market. First, we compare the traditional market risk measure, CAPM beta, with three downside risk measures, downside beta, expected shortfall and downside variance, by several regression models. Secondly, expending the one factor model to the Fama-French three factor model, which add two idiosyncratic risk factor into the regression (size factor and book to market ratio factor). Applying the China equity data, the test results show that downside risk measures perform better than traditional risk measures. Downside risk measures give the plausible explanatory power whether relative to mean or 0. Also, In the Fama-French three factor model, idiosyncratic risk (size and book-to-market ratio) might be more relevant than systematic risk (market risk), suggesting diversification may not be effective in China.

State government public pension plans: How bad are they and how do they affect state financing cost?

Wenzhe Chen

Abstract: The 50 states across the U.S. are currently facing a big issue with their government-sponsored pension plans. These plans, mostly defined benefit (DB) pension plans, are severely underfunded. The total funding gap, or the difference between pension assets and liabilities, is estimated to be $843 billion as of March 2013 for 99 pension systems. The paper provides the first comprehensive study on the current state of the public pension plans in the US. We first rate all public pension plans based on their actuarial funding ratio, risky asset allocation, and other multiple variables using both a simple ranking and a PCA (principal component analysis) methods. A website is also created to provide our rating information, to help public employees/retirees understand their pension plans, and to raise the public

awareness of the pension issues. Finally, we investigate how pension funds affect state government financing costs. For the first time in the literature, we find that risky asset allocation, not actuarial funding ratio of pension funds has significant effect on state financing costs.

Analysis of Systemic Risk Measures and the Challenges of the Measures

Shengqun Jiang

Abstract: This paper is about identifying systemic risk, analyzing measures of systemic risk and the challenges of different kinds of measures mentioned in this paper. The analysis of the characteristics of the 31 quantitative measures and their corresponding challenges is written in 6 parts based on one of their taxonomies* ： Macroeconomic Measures, Granular Foundations and Network Measures, Forward-Looking Risk Measures, Stress-Test Measures, Cross-Sectional Measures, and Measures of Illiquidity and Insolvency. In addition to the theoretical analysis of the systemic risk measures, this paper also analyzes the financial crisis of 2007-2008 by comparing two models.

A Comparative Analysis of Effectiveness of KMV Model and Z-score Model in Predicting Corporate Default: Empirical Evidence from China

Chao Song

Abstract: In this article, we will address two main questions: first, to what extent, the Moody's KMV model and Z-score model can accurately predict the default probability of listed companies in China; second, which of the models is more effective in default probability prediction? We use both Moody's KMV model and Altman's Z-score model to estimate the probability of default. Then, in order to test the predicting power of the models, we apply Logistic Regression methods, using EDF (Expected Default Frequency) and Z-score as independent variables.

By testing the performance of logit KMV and logit Z and constructing cumulative accuracy profiles (CAP) and the receiver operating characteristic (ROC), we find that there is no significant difference between the predicting power of KMV and Altman's Z-score. And we also model the two indicators into one equation by Logit. The result shows that, the mixed model works way better than each of the model itself.