Quantitative Finance & Risk Analytics Workshop

Investments, Systemic risk, and Debt management

May 05, 2017: CBIS Auditorium, Troy, NY

Organizing Co-chairs:

Professor Chanaka Edirisinghe
Kay and Jackson Tai Chair of Quantitative Finance
Director, Center for Financial Studies
Lally School of Management
Rensselaer Polytechnic Institute
Troy, NY 12180
edirin@rpi.edu

Professor Aparna Gupta
Director, Quantitative Finance and Risk Analytics Program
Lally School of Management
Rensselaer Polytechnic Institute
Troy, NY 12180
guptaa@rpi.edu

Administrative Specialist: Ms. Shelly Samuel, Tel: 518-276-6682, email: samues@rpi.edu

WHERE: Bio-tech Auditorium, RPI, on May 05, 2017 from 8:00AM to 5:00PM
- All presentations are FREE for registered attendees.
- Breakfast, boxed-lunches, and coffee/soft-drinks on May 05 (FREE for registered attendees)
- Conference Dinner @ 6:30pm (Location: Pat’s Barn) – Bus will leave at 6pm from BioTech Bldg.

Workshop Agenda:

8:00-8:40am: Pickup registration material and Breakfast
8:40-9:00am: Dean Tom Begley’s Welcome and Chair’s Introduction

9:00-10:15am: Plenary 1: Professor Stavros Zenios
10:15 – 10:30am: Coffee break
10:30-11:45am: Plenary 2: Professor Andreea Minca
11:45-1:00pm: Lunch (brown bag, for registered attendees only)
Also, PhD Student Poster Presentation in the lobby

1:00-2:15am: Plenary 3: Professor Anna Chernobai
2:15-2:30pm: Coffee break
2:30-3:45pm: Plenary 4: Professor Nikunj Kapadia
3:45-5:00pm: Industry Panel: Mr. Leon H. Tatevossian, Mr. Charles Brown, Dr. Steven Zhu, and Dr. Kosrow Dehnad

5:00-5:15pm: Closing Remarks: Financial Analytics at Lally
5:15-6:00pm: Networking and Student Interactions – open session
6:30-9:30pm: Dinner at Pat’s Barn, Rensselaer Tech Park – Bus leaves at 6pm (maximum capacity 60, served on FCFS basis; other vehicles will also be available)
Four Research Plenary Speakers – each 75 mins:

Plenary 1:

**Professor Stavros A. Zenios**
Professor of Finance and Management Science, University of Cyprus, Business Economics and Public Policy Department, Wharton School of Business (USA) and Norwegian School of Economics

**BIO:**
Stavros Zenios is Professor of Finance and Management Science at University of Cyprus, Adjunct Professor with the Norwegian School of Economics and Senior Fellow at The Wharton School Financial Institutions Center of the University of Pennsylvania. He is currently holder of a Maria Sklodowska-Curie Fellowship. He served as vice-chairman of the Cyprus Council of Economic Advisors and on the Board of the Central Bank of Cyprus. He published more than 130 articles in leading international journals in risk management, financial engineering and management science. He authored two books and edited several more. He received awards for his work on the performance of financial institutions and for his book, *Parallel Optimization*. He was recipient of the 2006 EURO Excellence in Practice Award for work on personal financial planning. His book, "Performance of Financial Institutions: Efficiency, Innovation, Regulation" (2000), has also been translated in Chinese.

**Title:** Financial innovation for sovereign debt management in crisis countries

**Abstract:**

An old idea was revived at the G20 leaders meeting in Chengdu, China, in July 2016: issuing contingent debt for sovereigns. The International Monetary Fund was asked to analyze the "technicalities, opportunities, and challenges of state contingent debt instruments" and report back within a year. We use portfolio optimization theory to do two things. First, price two types of contingent contracts, namely GDP-linked bonds and sovereign contingent convertible bonds (S-COCO) with an automatic standstill. Second, to show how a sovereign’s debt risk profile can improve when financed using contingent debt. We use the developed pricing and risk optimization models to compare the two types of instruments in order to understand which one may be preferable and under what conditions. The G20 emphasized GDP-linked bonds in its mandate to IMF, but S-COCO deserve some serious discussion too. Another innovation of the risk optimization model is that it allows us to jointly optimize debt stock and gross financing decisions for a sovereign, and identify the hot spots of unsustainable debt in crisis countries. We illustrate using with publicly available data for Greece as a case study.
Plenary 2:

Professor Andreea C. Minca
Andrew Schultz ’36 PhD’41 Sesquicentennial Fellow,
Operations Research and Information Engineering,
Cornell University, Ithaca, NY

BIO:
Dr. Andreea Minca is an Assistant Professor in the School of Operations Research and Information Engineering at Cornell University. She received her PhD in Applied Mathematics from the University Paris 6 Pierre et Marie Curie in 2011. She studies financial systems and uses mathematical modeling to derive optimal policies that promote system stability. In recognition of her fundamental research contributions to the understanding of financial instability, quantifying and managing systemic risk, and the control of interbank contagion, Dr. Minca received the 2016 SIAM Activity Group on Financial Mathematics and Engineering Early Career Prize. She is also a GARP Fellow and the recipient of an NSF CAREER Award.

Title: Systemic Risk and Central Clearing Counterparty Design

Abstract:

I will examine the effects on a financial network of multilateral clearing via a central clearing counterparty (CCP) from an ex ante and ex post perspective. The CCP is capitalized with equity and a guarantee fund and it can charge a volume-based fee. We propose a CCP design which improves aggregate surplus, and reduces banks' liquidation and shortfall losses. We characterize the CCP's equity, fee and guarantee fund policies that reduce systemic risk and are incentive compatible for banks. A simulation study based on aggregate market data shows that central counterparty clearing can reduce systemic risk and improve banks' utility.
Plenary 3:

Professor Anna Chernobai
Associate Professor Finance, Martin J. Whitman School of Management, Syracuse University, Syracuse, NY

Dr. Anna Chernobai is an Associate Professor of Finance at the M.J. Whitman School of Management at Syracuse University. The focus of her research is operational risk, default risk, stochastic processes, and applied statistics and probability. She has published in top finance and related journals such as the Journal of Financial and Quantitative Analysis, Journal of Banking and Finance, Journal of Accounting Information Systems, and Real Estate Economics. She is also an author of the book “Operational Risk: A Guide to Basel II Capital Requirements, Models, and Analysis” published by Wiley Finance in 2007. In 2008, she won a selective FDIC research fellowship for her research on operational risk in financial institutions. In 2009, she collaborated with JP Morgan Chase and served as a Syracuse University - JP Morgan Chase Faculty Research Fellow. Also in 2009, her work in the area of operational risk received recognition from the industry and she was selected as one of the "Top 50 Faces of Operational Risk."

Title: Business Complexity and Risk Management: Evidence from Operational Risk Events in U.S. Bank Holding Companies

Abstract:

Recent regulatory proposals tie the systemic importance of a financial institution to its complexity. However, we know little about how complexity affects a bank’s behavior, including its risk management. Using the gradual deregulation of banks’ nonbank activities during 1996–1999 as a natural experiment, we show that the frequency and magnitude of operational risk events in U.S. bank holding companies have increased significantly with their business complexity. This trend is particularly strong for banks that were bound by regulations beforehand, especially for those with an existing Section 20 subsidiary, and weaker for the other banks that were not bound and for nonbank financial institutions that were not subject to the same regulations to begin with. These results reveal the darker side of post-deregulation diversification, which in earlier studies has been shown to lead to improved earnings performance. We use operational risk events as a risk management measure because (i) the timing of the origin of each event is well identified, whereas actual balance sheet losses can take years to materialize, and (ii) the risk events can serve as a direct measure of materialized failures in risk management without being influenced by the confounding factors that drive asset prices, such as implicit government guarantees. Our findings have important implications for the regulation of financial institutions deemed systemically important, a designation tied closely to their complexity by the Bank for International Settlements and the Federal Reserve.
Plenary 4:

**Professor Nikunj Kapadia**
Professor Finance, Isenberg School of Management, University of Massachusetts, Amherst, MA

Nikunj Kapadia is Professor of Finance at the Isenberg School of Management, University of Massachusetts, Amherst. He holds a Ph. D. in Finance from the Stern School of Business, New York University. His research interests are in equity derivatives and credit risk. He has published articles in the Journal of Financial Economics, Journal of Finance, Review of Financial Studies, Journal of Derivatives, and the Journal of Fixed Income. He is on the editorial board of the Journal of Derivatives, and has previously served on the editorial board of the Financial Analyst Journal. He is the recipient of the Isenberg School's Teaching Award, twice-recipient of the Isenberg School's Researcher of the Year Award, and the recipient of the Western Finance Association's Caesarea Best Paper in Risk Management award. Prior to joining the University of Massachusetts, he was with Bear Stearns, New York. As visiting faculty, he has taught at New York University, University of Maryland, China-Europe International Business School, and the Indian School of Business. He has served as a visiting researcher at the Office of Financial Research of the United States Treasury, and as a Fellow of the Federal Deposit Insurance Corporation. He was previously on the corporate board of Aurionpro Solutions.

**Title: Indexing Market Risk using Option Prices**

**Abstract:**

The growth and popularity of the CBOE’s VIX index suggests that option prices are uniquely suited to generate measures of market risk. In this talk, I show how to construct volatility and tail index from option prices. Both indexes are model-free, and can be constructed using portfolios of options. The volatility index improves upon the VIX as it is unbiased in the presence of jump risk or discontinuities. The jump index can be used to distinguish between upside and downside risk. Both indexes are useful in predicting one-year ahead returns in the aftermath of the financial crisis. Finally, I consider why option markets are successful in aggregating risk, and how to construct an early warning system using anomalies in the option market.
Industry Panel Discussion – 75 mins
Moderated by: Professor Brian Clark, Lally School of Management, RPI

TOPIC: CHALLENGES IN INVESTMENTS, FIXED-INCOME MARKETS, AND REGULATION

Mr. Leon H. Tatevossian
School of Engineering and Applied Science, Columbia University, NY; former Director, RBC Capital Markets, LLC
Leon Tatevossian was a director in Group Risk Management at RBC Capital Markets, LLC. At RBC (where he worked from 2009-16) he covered market risk for securitized-product trading. Leon has twenty-eight years of experience in the fixed-income capital markets, including positions as a trader, quantitative strategist, derivatives modeler, and market-risk analyst. In 2006-07, he was a principal/senior trader in the MBS/ABS principal-investment group at Banc of America Securities. Starting in 2008 Leon has been an associate in financial engineering in the Industrial Engineering & Operations Research Department at Columbia U.; since 2009 he has also been a fellow/adjunct instructor in the Mathematics in Finance Program at NYU-Courant Institute. Leon's product background includes US Treasury securities, US agency securities, interest-rate derivatives, MBSs, and credit derivatives. He graduated from MIT (BS, mathematics) and was a graduate student in mathematics (algebraic number theory) at Brown University.

Mr. Charles Brown
Hugh Johnson Advisors, LLC, Albany, NY
Mr. Charlie Brown leads the bottom-up investment process for the firm’s core equity portfolio. His work encompasses both quantitative and qualitative equity analysis, with a particular focus on valuation inputs and quantifying market expectations. In addition, he is the originator and portfolio manager for the firm’s Athena Dividend Strategy, an all-equity portfolio emphasizing lower portfolio volatility through global dividend paying stocks.

Dr. Steven Zhu
Quantitative Finance Manager, Bank of America, NY
Mr. Steven Zhu is a SVP/Quantitative Finance Manager in model and regulatory risk analysis at Bank of America based in New York. He joined the bank in 2003 and has worked in various positions, including as director of market risk analytics and head of counterparty credit risk analytics. He started his career in financial industry at Citibank's derivative research in 1993 and worked in the global market derivatives group at both New York and Tokyo office. He is a graduate of Peking University from China. He obtained his PhD in Applied Mathematics from Brown University and spent one-year as a visiting scholar at MIT Sloan School of Management.
Dr. Kosrow Dehnad  
Adjunct Professor, Columbia University; former Head of Analytics and Quantitative Trading at Samba Financial Group, and Managing Director, Citigroup  
Dr. Dehnad is Adjunct Professor of Industrial Engineering and Operations Research at Columbia University. Until recently, he was Assistant General Manager and head of Analytics and Quantitative Trading at Samba Financial Group. In that role he initiated the use of Big Data and Machine Learning to develop trading strategies. Prior to Samba, Dr. Dehnad was a Managing Director at Citigroup where he joined from Chase Manhattan Bank to establish the Hybrid Desk. He started his career on Wall Street at D.E. Shaw, a premier computer trading hedge fund. Dr. Dehnad received his BSc. in Mathematics with first class honors from University of Manchester and his PhD. in Mathematics from University of California, Berkeley. He was the Deputy Director of the Foreign Exchange Department at Central Bank of Iran. After receiving his second Doctorate from Stanford University, he joined AT&T Bell Labs where he published the book “Quality Control and Taguchi Method.” Dr. Dehnad has published articles on finance, computer security, and quality control. He has also taught at San Jose State University and Rutgers University.

PhD Student Poster Presentation – during the lunch hour and breaks  
Directed by: Professor Bill Francis, Warren H. and Pauline U. Bruggeman Distinguished Professor of Finance, Director of the Ph.D. Program, Lally School of Management, RPI

About Rensselaer Polytechnic Institute:
Rensselaer Polytechnic Institute, founded in 1824, is America’s first technological research university. For nearly 200 years, Rensselaer has been defining the scientific and technological advances of our world. Rensselaer faculty and alumni represent 85 members of the National Academy of Engineering, 17 members of the National Academy of Sciences, 25 members of the American Academy of Arts and Sciences, 8 members of the National Academy of Medicine, 8 members of the National Academy of Inventors, and 5 members of the National Inventors Hall of Fame, as well 6 National Medal of Technology winners, five National Medal of Science winners, and a Nobel Prize winner in Physics. With 7,000 students and nearly 100,000 living alumni, Rensselaer is addressing the global challenges facing the 21st century—to change lives, to advance society, and to change the world. To learn more, go to www.rpi.edu.