John A. Dodson

+1-612-2517432

john.a.dodson@gmail.com

Education

Master of Science, Computational Finance 1996
Carnegie Mellon University, Pittsburgh, Pennsylvania

Dual Bachelor of Science, Physics and Mathematics 1992
Stanford University, Stanford, California

Graduate of the Securities Industry Institute, Wharton School 2017
University of Pennsylvania, Philadelphia, Pennsylvania

Certificate in Financial Mathematics, Gonville and Caius College 1993
Cambridge University, Cambridge, England

Teaching Experience

University web page: https://www-users.cse.umn.edu/~dodso013/

College of Science and Engineering, University of Minnesota 2007-present
Master in Financial Mathematics program
Professor of Practice

- Instructor of required classes to master's degree students
  - Quantitative risk management, based on the textbook by Alexander McNeil, Rüdiger Frey, and Paul Embrechts
  - Risk and asset allocation, based on the textbook by Attilio Meucci
  - Interest rate models, based on the textbook by Damiano Brigo and Fabio Mercurio
  - Data analysis, simulation, and portfolio optimization, based on the textbook by Ngai Hang Chan and Hoi-Ying Wong
- Leader of directed and independent study courses 2016-present
  - Guide students to review research in quantitative finance, often in consultation with original authors
- Leader of case competitions for students 2023
  - Advisor for the University of Minnesota team for the annual IAQF (International Association for Quantitative Finance) case competition, which was about designing and modeling a U.S. equities shares pairs trading strategy

Carlson School of Business, University of Minnesota 2004-2006
Master of Business Administration program
Academic Staff

- Instructor of elective class to MBA students
  - Derivative securities, based on the books by John Hull and Robert McDonald

Minnesota Center for Financial and Actuarial Mathematics, University of Minnesota 2023

- Organized and ran the 2023 MCFAM winter modeling workshop, which is an annual event organized by the Minnesota Center for Financial and Actuarial Mathematics for participants (generally masters and doctoral students at the University of Minnesota) to engage in two-week case studies led by finance industry practitioners.

Professional Risk Managers International Association 2016 & 2017

- Organized the Chicago regional PRMIA (Professional Risk Managers International Association) case competitions, which entailed: arranging for about a dozen teams from institutions in the Chicagoland region to prepare and deliver analyses of a case study in financial risk management chosen collectively by the regional coordinators; and for a panel of local professionals to attend the presentations, debate, and select a winning team.

Public Papers

Exact results for the structural model with perpetual debt, monograph 2008
Abstract: The structural model for a firm with a single aggregate source of uncertainty is especially tractable in a perpetual setting. I show closed-form results for the densities of the horizon value of the firm's aggregate equity and debt, and arbitrage-free values of various securities and derivatives, including European-style equity options and credit default swaps.

Why is it so hard to estimate expected returns?, monograph 2012
Abstract: A key part of experiment design is determining how much data to collect. When the data comes in the form of a timeseries, the sample size is expressed both by the count N of the observations and the duration T of the historical period over which observations were made. For forecasting the drift of an asset price process with continuous sample paths, it turns out that the duration is key. I demonstrate that the standard error of any unbiased estimator of the price of risk is bounded below by 1/sqrt(T) which is higher than many practitioners realize.

Filter for conditional heteroskedasticity, technical note 2019
Introduction: Conditional heteroskedasticity in returns is a common stylized fact of timeseries for prices and other financial risk factors. A common approach to dealing with this is to extract standard white noise through the application of a model in the generalized auto-regressive framework, such as GARCH, fit using quasi-maximum likelihood. This can fail to be robust, both in fitting and in simulation, because it assumes that the sample entropy is solely determined by the conditional variance. We propose an alternate model for extracting standard white noise from financial timeseries.

Public Presentations

- IMA Industrial Problems Seminar: Case Study in Delta Hedging, Minneapolis, January 2024
- SIAM Conference on Financial Mathematics and Engineering: Filtered Dispersion, Toronto, July 2019
- Princeton Quant Congress: High Performance Computing in Finance, Chicago, November 2015
- SIAM Annual Meeting: Addressing the potential non-robustness of sub-additive portfolio risk measures, Chicago, July 2014
- Illinois Institute of Technology: A Bound on the Standard Error of the Price of Risk, Chicago, October 2013
- MN Center for Financial and Actuarial Mathematics: Foundational Quant Topics for Clearing, Minneapolis, February 2013
- SIAM Conference on Financial Mathematics and Engineering: A Bound on the Standard Error of the Price of Risk, Minneapolis, July 2012
- PRMIA Global Event Series: Stress Testing, Chicago, May 2011

- University of Minn. Quant Practitioner Seminar, Series on Algorithmic Trading: August 2007 Crisis in Long/Short Equity, Minneapolis, June 2008
- University of Minn. Quant Practitioner Seminar, Series on Credit Derivatives: Intensity-based Models, Minneapolis, July 2007
- University of Minn. Center for Industrial Mathematics Industrial Problems Seminar: Selections from an Applied Mathematics Research Agenda for the Finance and Investments Industry, Minneapolis, January 2007 and February 2005
- RISK Training in Advanced Correlation Modeling: Correlation in Practice, New York, December 2005
- Carnegie Mellon Computational Finance Industry Lectures: Target Tracking Error: A Utility-based Model for Active Management and Implied Track Record: A Bayesian Estimator for the Information Ratio, Pittsburgh, February 2004
- Casualty Actuary Society/Society of Actuaries Enterprise Risk Management Symposium: Correlation and Credit Risk, Washington D. C., July 2003

Professional Experience

LinkedIn profile: https://www.linkedin.com/in/john-anthony-dodson

Options Clearing Corporation, *Executive Principal, Quantitative Risk Management* 2009-preset

Responsible for developing and maintaining the quantitative models in use at a systemically important financial utility and the principal U.S. equity derivatives central clearing counterparty. OCC margins are based on portfolio risk metrics calculated from a full revaluation Monte Carlo with scenarios based on sophisticated econometrics for the joint conditional dynamics of thousands of risk factors for share prices, implied volatilities, and other quantities that drive the theoretical valuations of millions of cleared equity, fixed income, currency, and commodity derivatives traded on more than a dozen major U.S. derivatives exchanges

- Serve as agile product owner for the OCC's data platform, which includes business-as-usual change management for the firm-wide operational data store and the technical architecture for the real-time clearing system currently under development
- Develop, maintain, and document analytic models and methodologies for OCC's member portfolio valuations, margins assessments, and guarantee fund sizing in cooperation with departmental and model risk management staff
- Represent OCC's quantitative risk management in regulatory examinations and supervisory missions with the Federal Reserve and the Securities and Exchange Commission
- Responsible for significant methodology enhancements to support clearing members, including a revision of the treatment for collateral in margins and expiring products resulting in a substantial reduction in margin requirements during expiration week and new collateral efficiency opportunities
- Direct quantitative research and development in cooperation with business development and information technology staff to support new product initiatives, including non-vanilla index options, implied volatility and realized variance products, dividend products, and energy derivatives
- Organize and direct production support for risk models supporting OCC's core clearing and risk management processes
- Managed and directed a team of quantitative managers, analysts, and developers
- Negotiated and managed million-dollar consulting and contracting agreements
- Led a major re-implementation of the analytic models as part of a multi-year technical integration project

RiverSource Investments, *Vice President, Investment Risk Management* 2004-2009

Responsible for modeling the financial risks of investments in our mutual funds, institutional accounts, and hedge funds

- Improved the efficiency of active investment strategies by advising investment managers on aligning their portfolios' risk profiles with their competitive strengths
- Represented the department in valuation, new products, investment strategy, and other committees
- Implemented a proprietary risk attribution model for equity funds, which was a key competitive strength marketing to institutional clients

Ameriprise Financial, *Vice President, Treasury Risk Management* 2002-2004

Responsible for modeling the financial risks of investments in our insurance and annuity premiums and proprietary accounts

- Created economic capital models for business lines, which included managing the negotiation and implementation of two separate vendor system initiatives related to enterprise risk
- Developed and deployed a simulation-based credit risk framework for portfolio default risk based on the intensity model with latent systematic factors

DFA Capital Management*, Director, Asset Modeling* 2001

Developed simulation, valuation, and risk management models for defaultable assets for a proprietary insurance enterprise model

- Participated in model reviews of other components of the system

Centerprise Services, *Director, Risk Advisory Services* 1998-2001

Built and staffed an office employing computer science students from the University of Minnesota to develop proprietary technology for the portfolio credit risk of loans and investments as part of an enterprise risk management system

- Developed a credit risk system for firm-wide risk management consulting service in partnership with consultants for IBM's business and process model group; Directed methodology discussions leading to the conclusion to implement an intensity-based default framework; Performed and presented custom risk analyses to insurance and finance industry clients; Hired and managed a team of programmers

Lehman Brothers, *Vice President, Risk Management* 1997-1998

Controlled market risk of Global Fixed Income Derivatives and European Fixed Income including presentations to the UK regulatory authorities

- Participated in periodic portfolio reviews with desk head and regularly coordinated with other members of the global risk team
- Modeled risks of fixed income and foreign exchange derivative trading operations

Union Bank of Switzerland, *Director, Risk Control* 1996-1997

Coordinated enterprise risk control for worldwide trading operations

- Modeled risks of fixed income, equity, and commodity trading operations as part of an implementation of a proprietary enterprise risk system

Credit Suisse, *Junior Trader, Proprietary Analytic Trading* 1994-1995

Traded fixed income derivatives on Bank's account

- Managed proprietary derivatives positions
- Contributed to fixed-income modeling and trading strategies

Bank for International Settlements, *Research Analyst, Banking Division* 1992-1994
Researched fixed income markets for Own Funds group

- Developed custom indices for international money markets
- Reviewed risk models for the Committee on Banking Supervision
- Reviewed derivatives documentation for the Banking Division

Technical Experience

Programming: Fortran, C, C++, Java, Perl, Ruby, k, Python, OCaml, Julia
Data management and scientific computing: SQL, R, MATLAB, Mathematica, Jupyter, DataFrames

Additional Notes

United States and the United Kingdom dual citizen
B1 French, A2 Portuguese, A1 German