

ROBERT A. JARROW

Samuel Curtis Johnson Graduate School of Management
Cornell University
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PROFESSIONAL EXPERIENCE

1979-present Ronald P. and Susan E. Lynch Professor of Investment Management
Samuel Curtis Johnson Graduate School of Management, Cornell University

2011-present Faculty Member, Economics Department, Cornell University

1998-present Faculty Member, Operations Research and Information Engineering, Cornell
University

1998 (Summer) Visiting Scholar, School of Management, Boston University

1990 (Summer) Barclays de Zoete Wedd Visiting Professor
Australian Graduate School of Management
The University of New South Wales, Australia

1989 (Summer) Distinguished Visiting Lecturer in Ph.D. Program
Swedish School of Economics and Business Administration
Helsinki, Finland

PROFESSIONAL ACTIVITIES

2020-present Board of Directors, Scientific Association of Mathematical Finance, Inc. (SIAM)
President of SIAM, Inc.

2006-present Board of Directors, Kamakura Corporation

1995-present Director of Research and Managing Director, Kamakura Corporation

2013-2014 Product Advisory Board, Decura

2011-2012 Board of Directors, Triangle Fund LLC

2009-2014 Internal Examinations Committee, Association of Certified International
Investment Analysts

2008-2010 Advisory Board, Structured Investment Management

2007-present Advisory Council, Cornell Financial Engineering, Manhattan

1995-2004 Co-Director, Cornell University's Certificate in Financial Engineering Program

2007-2008 Board of Directors, Quadrant Corporation

2005-2009 Director of Research, AJ Sterge Division, Magnetar

2002-2008 Council of the Bachelier Finance Society

2002-2005 Director of Research, WOTN Corporation

2002-2004 Advisory Committee, Cornell Theory Center

1999-2002 Executive Committee, Cornell Theory Center

2002 Interim Board Global Association of Risk Professionals (GARP)

1999-2005 Advisory Board, Center for Financial Innovation and Risk Management (CFIRM)
and Masters Financial Engineering (MFE), School of Business, The University of
Hong Kong

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| 1999–2005 | Advisory Board, Center for Financial Engineering, National University of Singapore |
| 1998–2001 | Board of Directors, The American Finance Association |
| 1997–2018 | Advisory Board, Parker Center, Cornell University |
| 1996–2003 | Honorary Board of Directors, Round Table Group, Inc. |
| 1994–1995 | Merrill Lynch Academic Advisory Council |
| 1990–2013 | Co-organizer, Annual Derivatives Securities Conference |

EDITORIAL ACTIVITIES

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|--------------|--|
| 2020-present | Advisory Board, <u>Frontiers of Mathematical Finance</u> |
| 2018-present | Advisory Board, <u>Journal of Risk and Financial Management</u> |
| 2011–present | Advisory Board, <u>The Journal of Investment Strategies</u> |
| 2007–present | Editorial Committee, <u>Annual Review of Financial Economics</u> |
| 2021 | Editor, Special Issue on Systemic Risk and Financial Networks, <u>Mathematics and Financial Economics</u> |
| 2006–2020 | Advisory Board, <u>Mathematical Finance</u> |
| 2002–2005 | Managing Editor, <u>Mathematical Finance</u> |
| 1989–2001 | Co-Editor, <u>Mathematical Finance</u> |
| 1989 | Founding Organizer, <u>Mathematical Finance</u> |
| 2007–present | Editorial Board, <u>Journal of Risk Management in Financial Institutions</u> |
| 2004–2005 | Advisory Board, <u>Journal of Finance Literature</u> |
| 2004–present | Associate Editor, <u>Journal of Credit Risk</u> |
| 2003–present | Associate Editor, <u>The Journal of Derivatives Accounting</u> |
| 1996–present | Associate Editor, <u>Journal of Fixed Income</u> |
| 1993–2015 | Associate Editor, <u>Review of Derivatives Research</u> |
| 2002–2014 | Associate Editor, <u>Finance Research Letters</u> |
| 2002–2003 | Associate Editor, <u>Journal of Bond Trading and Management</u> |
| 1999–2010 | Associate Editors Board, <u>Istanbul Stock Exchange Review</u> |
| 2002–2018 | Associate Editor, <u>The Journal of Derivatives</u> |
| 1999–2002 | Co-Editor, <u>The Journal of Derivatives</u> |
| 1998–1999 | Associate Editor, <u>The Journal of Derivatives</u> |
| 2002–2015 | Associate Editor, <u>The Journal of Financial Research</u> |
| 1998–2015 | Associate Editor, <u>The Journal of Risk</u> |
| 1998 | Editor, Special Issue on Credit Derivatives, <u>Review of Derivatives Research</u> |
| 1998–1999 | Associate Editor, <u>Journal of Financial Engineering</u> |
| 1996–1997 | Editorial Board, <u>Net Exposure: The Electronic Journal of Financial Risk</u> |
| 1995–2000 | Advisory Board, <u>Asia-Pacific Financial Markets</u> |
| 1994–1997 | Associate Editor, <u>The Review of Financial Studies</u> |
| 1992–1997 | Associate Editor, <u>Advances in Futures and Options Research</u> |

1992–2003 Associate Editor, The Financial Review
1988–1994 Associate Editor, The Review of Futures Markets
1983–1999 Associate Editor, Journal of Financial and Quantitative Analysis

EDUCATION

1976-1979 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA.
Ph.D. in Finance. Minor field in economics.

1974-1976 AMOS TUCK SCHOOL OF BUSINESS, Dartmouth College, N.H.
M.B.A. with specialization in Finance. Graduated with Highest Distinction.

1970-1974 DUKE UNIVERSITY, Durham, N.C.
B.A. with double majors in Mathematics and Management Science.
Graduate magna cum laude.

AWARDS

Best Paper Prize 2020, Korean Association of Financial Engineering Conference
Ross Best Paper Award 2013, *Finance Research Letters*
Arthur Warga Best Paper Award at the Moore School of Business 2013 Fixed
Income Conference
Clifford H. Whitcomb Faculty Fellowship 2011-12
12th Annual Bernstein Fabozzi/Jacobs Levy Award 2009-2010, *Journal of
Portfolio Management*
Risk Magazine's Lifetime Achievement Award 2009
Ross Best Paper Award 2008, *Finance Research Letters*
Center for Analytic Research Award 2006, Carnegie Mellon University.
Risk Who's Who 2006
The Institute for Quantitative Research in Finance Fellowship for 2005
Fixed Income Analysts Society (FIASI) Hall of Fame, 2004
FDIC Senior Fellow, 2003 – 2014
Member Risk Magazine's 50 member Hall of Fame
Who's Who in Economics, 4th Edition (top 1200 cited economists)
Financial Services Exchange Grant 2002
2001 Graham and Dodd Scrolls Award (*Financial Analysts Journal*)
IAFE Senior Fellow, 1997
Cornell Johnson School's Exceptional Research Award 1997
1997 IAFE/SunGard Financial Engineer of the Year
Mobil Oil Scholarship 1993
The Institute for Quantitative Research in Finance Fellowship for 1992
1991 Southern Finance Association Meeting's Outstanding Paper in
Futures/Options on Futures
1990 Southern Finance Association Meeting's Outstanding Paper in
Futures/Options on Futures
Canadian Securities Institute Award for the Best Paper in Investments at the
Northern Finance Association Meetings 1990
Bankers Trust Financial Research Grant, 1990, 1991
Chicago Board Options Exchange Pomerance Prize for Excellence in the Area of
Options Research 1982

M.I.T. Endowed Fellowship 1976, 1977
The Lillian and Charles Leech Prize for Excellence in Finance 1976
Bache & Company Scholarship 1975
Edward Tuck Scholar 1975

PUBLICATIONS

- [1] "An Autoregressive Jump Process for Common Stock Returns," The Journal of Financial Economics, 5 (1977) (with George Oldfield and Richard Rogalski).
- [2] "The Relationship Between Yield, Risk, and Return of Corporate Bonds," The Journal of Finance, 4 (September 1978).
- [3] "Negotiations versus Competition in the Sale of Securities," Financial Management, (Fall 1978) (with Dennis Logue).
- [4] "Heterogeneous Expectations, Restrictions on Short Sales, and Equilibrium Asset Prices," The Journal of Finance, 5 (December 1980).
- [5] "Forward Contracts and Futures Contracts," The Journal of Financial Economics, 4 (December 1981) (with George Oldfield).
- [6] "Liquidity Premiums and the Expectations Hypothesis," Journal of Banking and Finance, 5 (December 1981).
- [7] "Approximate Option Valuation for Arbitrary Stochastic Processes," Journal of Financial Economics, 10 (November 1982) (with Andrew Rudd).
CBOE Pomerance Prize 1982.
- [8] "Tests of an Approximate Option Valuation Formula," Option Pricing: Theory and Applications, 1983, edited by Menachem Brenner, Lexington Books (with Andrew Rudd).
- [9] "A Comparison of the APT and CAPM: A Note," Journal of Banking and Finance, 7 (June 1983) (with Andrew Rudd).
- [10] "Consensus Beliefs Equilibrium and Market Efficiency," Journal of Finance, 3 (June 1983) (with David Easley).
- [11] "The Error Learning Hypothesis: The Evidence Reexamined," Journal of Economics and Business, 36 (May 1984).
- [12] "Jump Risks and the Intertemporal Capital Asset Pricing Model," Journal of Business, 57 (July 1984) (with Eric Rosenfeld).
- [13] "A Characterization Theorem for Unique Equivalent Martingale Probability Measures," Economics Letters, 22 (1986).
- [14] "The Relationship Between Arbitrage and First Order Stochastic Dominance," Journal of Finance, 4 (September 1986).

PUBLICATIONS (continued)

- [15] "Spanning and Completeness in Markets with Contingent Claims," Journal of Economic Theory, 41 (February 1987) (with Richard Green).
- [16] "An Integrated Axiomatic Approach to the Existence of Ordinal and Cardinal Utility Functions," Theory and Decision, 22 (March 1987).
- [17] "The Pricing of Commodity Options with Stochastic Interest Rates," Advances in Futures and Options Research, 2 (1987).
- [18] "Arbitrage, Continuous Trading, and Margin Requirements," Journal of Finance, 5 (December 1987) (with David Heath).
- [19] "Beliefs and Arbitrage Pricing," Economics Letters, 24 (1987).
- [20] "Ex-Dividend Stock Price Behavior and Arbitrage Opportunities," Journal of Business, 61 (1), (1988) (with David Heath).
- [21] "Preferences, Continuity, and the Arbitrage Pricing Theory," The Review of Financial Studies, 2 (1988).
- [22] "Forward Options and Futures Options," Advances in Futures and Options Research, 3 (1988) (with George Oldfield).
- [23] "Bribes, Power, and Managerial Control in Corporate Voting Games," Theory and Decision, 26 (1989) (with Chris Leach).
- [24] "Option Pricing and Implicit Volatilities: A Review and a New Perspective," Journal of Economic Surveys, 3 (1989) (with Jim Wiggins).
- [25] "Primes and Scores: An Essay on Market Imperfections," Journal of Finance, 5 (December 1989) (with Maureen O'Hara).
- [26] "Contingent Claims Valuation with a Random Evolution of Interest Rates," The Review of Futures Markets, 9 (1), (1990) (with David Heath and Andrew Morton).
- [27] "The Stop-Loss Start-Gain Paradox and Option Valuation: A New Decomposition into Intrinsic and Time Value," The Review of Financial Studies, 3 (3), (1990) (with Peter Carr).
- [28] "Bond Pricing and the Term Structure of Interest Rates: A Discrete Time Approximation," Journal of Financial and Quantitative Analysis, (December 1990) (with David Heath and Andrew Morton).
- [29] "Large Trader Impact and Market Regulation," Financial Analysts Journal, (July/August 1991) (with Gary Gastineau).
- [30] "The Relevance of Fiduciary Conflict-of-Interests in Control Versus Issue Proxy Contests," Journal of Financial and Quantitative Analysis, 26 (4), (December 1991) (with Chris Leach).

PUBLICATIONS (continued)

- [31] "Pricing Foreign Currency Options Under Stochastic Interest Rates," Journal of International Money and Finance, 10(3), (September 1991) (with Kaushik Amin).
- [32] "A Characterization of Complete Security Markets on a Brownian Filtration," Mathematical Finance, 1 (3), (July 1991) (with Dilip Madan).
- [33] "Bond Pricing and the Term Structure of Interest Rates: A New Methodology for Contingent Claims Valuation," Econometrica, 60(1), (January 1992) (with David Heath and Andrew Morton).
Reprinted in *Vasicek and Beyond*, 1997, Risk Publications: London.
Reprinted in *Options Markets*, ed. G.M. Constantinides and A.G. Malliaris, 1999, Edward Elgar Pub., U.K.
Reprinted in *The Debt Market*, ed. Steve Ross and Franco Modigliani, 1999, Edward Elgar Pub., UK.
Reprinted in *The New Interest Rate Models*, ed. Lane Hughston, 2000, Risk Books: London.
Reprinted in *Derivatives Pricing: The Classic Collection*, ed. Peter Carr, 2004, Risk Books: London.
- [34] "Market Manipulation, Bubbles, Corners, and Short Squeezes," Journal of Financial and Quantitative Analysis, 27(3), (September 1992).
- [35] "Alternative Characterizations of American Put Options," Mathematical Finance, 2 (2), (April 1992) (with Peter Carr and Ravi Myneni).
- [36] "Pricing American Options on Risky Assets in a Stochastic Interest Rate Economy," Mathematical Finance, 2 (4), (October 1992) (with Kaushik Amin).
Reprinted in *Vasicek and Beyond*, 1997, Risk Publications: London.
- [37] "Easier Done Than Said," Risk Magazine, 5 (9), (October 1992) (with David Heath, Andrew Morton, and Mark Spindel).
Reprinted in *Over the Rainbow: Developments in Exotic Options and Complex Swaps*, 1995, Risk Publications: London.
- [38] "Credit Risk: Drawing the Analogy," Risk Magazine, 5 (9), (October 1992) (with Stuart Turnbull).
Reprinted in *Derivative Credit Risk: Advances in Measurement and Management*, 1995, Risk Publications: London.
- [39] "Diffusion Processes in Finance," The New Palgrave Dictionary of Money and Finance, 1993.
- [40] "A Simple Formula for Options on Discount Bonds," Advances in Futures and Options Research, Vol. 6, (1993) (with Robin Brenner).
- [41] "Futures," Douglas Greenwald, editor, Encyclopedia of Economics, McGraw-Hill, Inc., 1993.

PUBLICATIONS (continued)

- [42] "Market Manipulation and Corporate Finance: A New Perspective," Financial Management, (Summer 1993) (with Arkadev Chatterjea and Joseph Cherian).
- [43] "Option Pricing with Random Volatilities in Complete Markets," Review of Quantitative Finance and Accounting, 4 (1), (March 1994) (with Larry Eisenberg).
Reprinted in *Volatility: New Estimation Techniques for Pricing Derivatives*, 1998, Risk Publications: London.
- [44] "Derivative Security Markets, Market Manipulation, and Option Pricing Theory," Journal of Financial and Quantitative Analysis, 29 (2), (June 1994).
- [45] "Delta, Gamma and Bucket Hedging of Interest Rate Derivatives," Applied Mathematical Finance, 1, (September 1994) (with Stuart Turnbull).
Reprinted in *Surveys in Applied and Industrial Mathematics*, 2 (5), (1995).
Reprinted in *Interest Rate Risk Measurement and Management*, editors D. Chambers and S. Nawalkha, Institutional Investor, Inc.
- [46] "Pricing Interest Rate Options," Jarrow, Maksimoviz, Ziemba, editors, Finance: Handbook in Operations Research and Management Science, North Holland, (1995).
- [47] "Market Manipulation," Jarrow, Maksimoviz, Ziemba, editors, Finance: Handbook in Operations Research and Management Science, North Holland, (1995) (with Joseph Cherian).
- [48] "A Discrete Time Synthesis of Derivative Security Valuation Using a Term Structure of Futures Prices," Jarrow, Maksimoviz, Ziemba, editors, Finance: Handbook in Operations Research and Management Science, North Holland, (1995) (with Peter Carr).
- [49] "Pricing Derivatives on Financial Securities Subject to Credit Risk," Journal of Finance, 50 (1), (March 1995) (with Stuart Turnbull).
Reprinted in *Credit Risk Models and Management*, 1999, Risk Publications: London.
Reprinted in *Options Markets*, eds. G.M. Constantinides and A.G. Malliaris, 2000, Edward Elgar Publishing Ltd: Cheltenham, U.K.
Reprinted in *Credit Risk Models and Management*, 2004, 2nd edition, Risk Publications, London.
- [50] "Option Pricing Using the Term Structure of Interest Rates to Hedge Systematic Discontinuities in Asset Returns," Mathematical Finance, 5 (4), (October 1995) (with Dilip Madan).
- [51] "Vital Statistics," Risk Magazine, 8 (4), (April 1995) (with Eric Jacquier).
Reprinted in *Over the Rainbow: Developments in Exotic Options and Complex Swaps*, 1995, Risk Publications: London.
- [52] "Credit Risk", C. Alexander, editor, Handbook of Risk Management and Analysis, John Wiley (1996) (with Stuart Turnbull).
- [53] "Power Swaps: Disease or Cure?," Risk Magazine, 9 (2), (February 1996) (with Donald van Deventer).
Reprinted in *Structured Products*, 2009, Risk Publications, London.

PUBLICATIONS (continued)

- [54] "Option Pricing Using a Binomial Model with Random Time Steps (A Formal Model of Gamma Hedging)," Review of Derivatives Research, 1 (2) (1996), (with Heike Dengler).
- [55] "A Markov Model for the Term Structure of Credit Risk Spreads," The Review of Financial Studies, 10 (1), (Summer 1997) (with David Lando and Stuart Turnbull).
- [56] "Is Mean-Variance Analysis Vacuous: or Was Beta Still Born?" European Finance Review, 1 (1), (1997), (with Dilip Madan).
- [57] "The Impact of Default Risk on Swap Rates and Swap Values," Risk Magazine, 10 (5), (May 1997) (with Stuart Turnbull).
Reprinted in *Hedging with Trees*, 1998, Risk Publications: London.
- [58] "A Unified Approach for Pricing Contingent Claims on Multiple Term Structures," Review of Quantitative Finance and Accounting, 10 (1), (January 1998), (with Stuart Turnbull).
- [59] "An Integrated Approach to Hedging and Pricing Eurodollar Derivatives," Journal of Risk and Insurance, 64 (2), (1997), (with Stuart Turnbull).
- [60] "New Developments in Option-Adjusted Valuation," Derivatives Use, Trading and Regulation, 3 (1), (1997), (with Don van Deventer).
- [61] "A Review of Gilster's Option Pricing Theory: Is Risk Free Hedging Feasible?," Financial Management, 26 (1), (Spring 1997).
Reprinted in *Behavioral Finance*, ed. H. Shefrin, 2000, Edward Elgar Publishing Ltd: Cheltenham, U.K.
- [62] "Market Manipulation and a Model of the United States Treasury Securities Auction Market," Journal of Financial and Quantitative Analysis, 33 (2), (June 1998), (with Arkadev Chatterjea).
- [63] "The Arbitrage-Free Valuation and Hedging of Demand Deposits and Credit Card Loans," Journal of Banking and Finance, 22 (3), (March 1998), (with Don van Deventer).
- [64] "The HJM Model: Its Past, Present, and Future," Journal of Financial Engineering, 6 (4), (December 1997).
- [65] "Hedging Contingent Claims on Semimartingales," Finance and Stochastics, 3 (1), (January 1999), (with Dilip Madan).
- [66] "Mopping up Liquidity," Risk Magazine, (December 1997), (with Ajay Subramanian).
- [67] "Options Markets, Self-Fulfilling Prophecies, and Implied Volatilities," Review of Derivatives Research, 2 (1), (1998), (with Joseph Cherian).
- [68] "Current Advances in the Modeling of Credit Risk," Derivatives: Tax, Regulation, Finance, (May/June 1998).
- [69] "Bayesian Analysis of Contingent Claim Model Error," Journal of Econometrics, 94 (1), (2000), (with Eric Jacquier).

PUBLICATIONS (continued)

- [70] “Integrating Interest Rate Risk and Credit Risk in Asset and Liability Management,” Asset and Liability Management: The Synthesis of New Methodologies, Risk Publications, (1998), (with Don van Deventer).
- [71] “The Second Fundamental Theorem of Arbitrage Pricing Theory,” Mathematical Finance, (July 1999), (with Xing Jin and Dilip Madan).
- [72] “The Second Fundamental Theorem of Asset Pricing-A New Approach,” Review of Financial Studies, (Winter 1999), (with Robert Battig).
- [73] “Practical Usage of Credit Risk Models in Loan Portfolio and Counterparty Exposure Management,” Credit Risk Models and Management, Risk Publications, (1999), (with Don van Deventer).
Reprinted in *Credit: The Complete Guide to Pricing, Hedging and Risk Management*, ed. A. Arvanitis and J. Gregory, 2001, Risk Books: London.
- [74] “In Honor of the Nobel Laureates Robert C. Merton and Myron S. Scholes: A Partial Differential Equation that Changed the World,” The Journal of Economic Perspectives, 13 (4), (Fall 1999).
Reprinted in *Pioneers of Financial Economics: Volume 2*, ed. G. Poitras, F. Jovanovic, 2007, Edward Elgar Pub.
- [75] “The Intersection of Market and Credit Risk,” Journal of Banking and Finance, 24 (1), (2000), (with Stuart Turnbull).
- [76] “An Empirical Analysis of the Jarrow-van Deventer Model for Valuing Non-Maturity Demand Deposits,” The Journal of Derivatives, (Fall 1999), (with Tibor Janosi and Ferdinando Zullo).
- [77] “The Liquidity Discount,” Mathematical Finance, 11 (4), (October 2001), (with Ajay Subramanian).
- [78] “Arbitrage, Martingales, and Private Monetary Value,” Journal of Risk, 3 (1), (Fall 2000), (with Dilip Madan).
- [79] “Contingent Claim Models with Deterministic Volatility: Model Error versus Poor Estimation,” Model Risk, ed. R. Gibson, Risk Books, (2000), (with Eric Jacquier).
- [80] “Default Parameter Estimation Using Market Prices,” Financial Analysts Journal, (Sept./Oct. 2001). 2001 Graham and Dodd Scrolls Award
- [81] “Counterparty Risk and the Pricing of Defaultable Securities,” Journal of Finance, 56 (5), (2001), (with Fan Yu).
- [82] “Put Premiums and Coherent Risk Measures,” Mathematical Finance, 12 (2), (2002).
- [83] “A Simple Model for Valuing Default Swaps When Both Market and Credit Risk Are Correlated,” The Journal of Fixed Income, 11 (4), (March 2002), (with Yildiray Yildirim).
- [84] “Pricing Treasury Inflation Protected Securities and Related Derivatives Using an HJM Model,” 38 (2), (June 2003), Journal of Financial and Quantitative Analysis, (with Yildiray Yildirim).

PUBLICATIONS (continued)

- [85] “Estimating Expected Losses and Liquidity Discounts Implicit in Debt Prices,” Journal of Risk, 5 (1), (2002), (with Tibor Janosi and Yildiray Yildirim).
Reprinted in *Innovations in Risk Management*, ed. P. Jorion, 2004, Risk Books: London.
- [86] “Market Pricing of Deposit Insurance,” Journal of Financial Services Research, 24 (2/3), (2003), (with Darrell Duffie, Amiyatosh Purnanandam and Wei Yang).
- [87] “How Valuable is Credit Card Lending,” The Journal of Derivatives, 11 (2), (2003), (with Arka Chatterjea, Robert Neal, Yildiray Yildirim).
- [88] “Estimating Default Probabilities Implicit in Equity Prices,” Journal of Investment Management, (2003, First Quarter), (with Tibor Janosi and Yildiray Yildirim).
Reprinted in *The Credit Market Handbook: Advanced Modeling Issues*, e.d. Gifford Fong, (2006), John Wiley.
- [89] “Modeling Credit Risk with Partial Information,” The Annals of Applied Probability, 14 (3), (August 2004), (with Umut Cetin, Philip Protter, Yildiray Yildirim).
- [90] “A Robust Test of Merton’s Structural Model for Credit Risk,” Journal of Risk, 6 (1), (2003), (with Don van Deventer and Xiaoming Wang).
- [91] “Pricing the Convenience Yield of Treasury Securities: Theory and Evidence,” Review of Derivatives Research, 7 (2), (2004), (with Joseph Cherian and Eric Jacquier).
- [92] “Testing Market Efficiency using Statistical Arbitrage with Applications to Momentum and Value Strategies,” Journal of Financial Economics, 73 (3), (September 2004), (with Steve Hogan, Melvyn Teo, and Mitch Warachka).
- [93] “Estimating the Term Structure of Corporate Debt with a Semiparametric Penalized Spline Model,” Journal of the American Statistical Association, 99 (465), (March 2004), (with David Ruppert and Yan Yu).
- [94] “Liquidity Risk and Arbitrage Pricing Theory,” Finance and Stochastics, 8 (3), (August 2004), (with Umut Cetin, Philip Protter).
Reprinted in *Handbook of Quantitative Finance and Risk Management*, ed. C.F. Lee, A.C. Lee, John Lee, (2010), Springer Verlag.
- [95] “Default Risk and Diversification: Theory and Empirical Applications,” Mathematical Finance, 15 (1), (January 2005), (with David Lando and Fan Yu).
- [96] “Practical Usage of Credit Risk Models in Loan Portfolio and Counterparty Exposure Management: An Update,” Credit Risk Models and Management, ed. David Shimko, Risk Publications, (2004), (with Don van Deventer).
- [97] “A Short History of Stochastic Integration and Mathematical Finance: The Early Years, 1880-1970,” A Festschrift to Honor Herman Rubin, ed. Anirban Dasgupta, IMS Lecture Notes, Monograph Series, (2004), Vol. 45, (with Philip Protter).

PUBLICATIONS (continued)

- [98] “Risky Coupon Bonds as a Portfolio of Zero-Coupon Bonds,” Finance Research Letters, 1 (2), (June 2004).
- [99] “Mathematics and Finance: A Fruitful Relationship,” Modern Risk Management: A History, Risk Books, (2003).
- [100] “Structural versus Reduced Form Models: A New Information Based Perspective,” Journal of Investment Management, 2 (2), (2004), (with Philip Protter).
Reprinted in *The Credit Market Handbook: Advanced Modeling Issues*, e.d. Gifford Fong, (2006), John Wiley.
- [101] “Estimating the Value of Delivery Options in Futures Contracts,” Journal of Financial Research, 28 (3), (Fall 2005), (with Jana Hranaiova and William Tomek)
- [102] “Bankruptcy Prediction with Industry Effects,” Review of Finance, 8 (4), (2004), (with Sudheer Chava).
Nominated 2005 GSAM Best Paper Prize.
- [103] “Large Traders, Hidden Arbitrage and Complete Markets,” Journal of Banking and Finance, 29, (2005), (with Philip Protter).
- [104] “Generalized Coherent Risk Measures: The Firm’s Perspective,” Finance Research Letters, 2, (2005), (with Amiyatosh Purnanandam).
- [105] “Estimating Default Correlations Using a Reduced Form Models,” Risk Magazine, (January 2005), (with Don van Deventer).
- [106] “Liquidity Risk and Option Pricing Theory,” Handbook of Financial Engineering, ed., J. Birge and V. Linetsky, Elsevier Publishers, (with Philip Protter), (2007).
- [107] “An Introduction to Financial Asset Pricing,” Handbook of Financial Engineering, ed., J. Birge and V. Linetsky, Elsevier Publishers, (with Philip Protter), (2007).
- [108] “Pricing Options in an Extended Black-Scholes Economy with Illiquidity: Theory and Empirical Evidence,” Review of Financial Studies, 19 (2), (Summer 2006), (with Umut Cetin, Philip Protter, Mitch Warachka).
- [109] “Liquidity Risk and Risk Measure Computation,” Review of Futures Markets, 11 (1), (Summer 2005), (with Philip Protter).
- [110] “A Loss Default Simulation Model of the Federal Bank Deposit Insurance Funds,” Proceedings of the 2005 Winter Simulation Conference, M.E. Kuhl, N.M. Steiger, F.B. Armstrong, and J.A. Joines, eds., (with Rosalind Bennett, Daniel Nuxoll, Michael Fu, Huiju Zhang).
- [111] “Liquidity Risk and Classical Option Pricing Theory,” Liquidity Risk Measurement and Management, eds. L. Matz and P. Neu, (2007), John Wiley & Sons (Asia).

PUBLICATIONS (continued)

- [112] “Downside Loss Aversion and Portfolio Management,” Management Science, 52 (4), (April 2006), (with Feng Zhao).
- [113] “Interest Rate Caps ‘Smile’ Too! But Can the LIBOR Market Models Capture It?,” Journal of Finance, 62 (1), (February 2007), (with Haitao Li and Feng Zhao).
- [114] “A Tutorial on Zero Volatility and Option Adjusted Spreads,” Advances in Mathematical Finance, (2007), eds., M. Fu, R. Jarrow, J. Yen, R. Elliott, Birkhauser, Boston, MA.
- [115] “Asset Price Bubbles in Complete Markets,” Advances in Mathematical Finance, (2007), eds., M. Fu, R. Jarrow, J. Yen, R. Elliott, Birkhauser, Boston, MA, (with Philip Protter and Kazuhiro Shimbo).
- [116] “Information Reduction via Level Crossings in a Credit Risk Model,” Finance and Stochastics, 11 (2), (April 2007), (with Philip Protter and A. Deniz Sezer).
- [117] “A Critique of Revised Basel II,” Journal of Financial Services Research, 32 (1-2), (October 2007).
- [118] “Restructuring Risk in Credit Default Swaps: An Empirical Analysis,” Stochastic Processes and Their Applications, 117 (11), (2007), (with Antje Berndt and ChoongOh Kang).
Center for Analytic Research Award 2006.
- [119] “Operational Risk,” Journal of Banking and Finance, 32, (May 2008).
- [120] “The Determinants of Corporate Credit Spreads,” Risk Magazine, (September 2007), (with Li Li, Mark Mesler, Don van Deventer).
- [121] “Modeling the Recovery Rate in a Reduced Form Model,” Mathematical Finance, 19 (1), (January 2009), (with Xin Guo and Yang Zeng).
- [122] “Commercial Mortgage Backed Securities (CMBS) and Market Efficiency with Respect to Costly Information,” Real Estate Economics, 36 (3), (2008), (with Andreas Christopoulos and Yildiray Yildirim).
- [123] “Capital Structure and the Present Value of a Firm’s Investment Opportunities: A Reduced Form Credit Risk Perspective,” Review of Derivatives Research, 10 (1), (January 2007), (with Amiyatosh Purnanandam).
- [124] “Modeling Loan Commitments,” Finance Research Letters, 5 (1), (March 2008), (with Sudheer Chava).
Ross Best Paper Award 2008.
- [125] “CDO Valuation: Fact and Fiction,” The Definitive Guide to CDOs, ed. G. Meissner, Risk Books, London, (2008), (with Li Li, Mark Mesler, Don van Deventer).
- [126] “Tax Liens: A Novel Application of Asset Pricing Theory,” Review of Derivatives Research, 10 (2), (May 2007), (with Vikrant Tyagi).

PUBLICATIONS (continued)

- [127] “Synthetic CDO Equity: Short or Long Correlation Risk?,” Journal of Fixed Income, 17 (4), (Spring 2008), (with Don van Deventer).
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Consulting Experiences

1987, Citibank, Executive Training

1988, Bank of America, Capital Markets Research

1988, Citicorp, Research Group

1989, Bank of America, Capital Markets Research

1989, Bankers Trust, Research Group

1990, Security Pacific, Swaps Group

1991, Merrill Lynch, Professional Trading

1991, MacQuarie Bank Ltd., Research

1991, Dealerware

1992, World Bank, Derivatives Products and Liability Management

1992, Merrill Lynch, Investors Strategies Group

1992, Spear, Leeds, Kellogg - expert witness (index options)

1993, Bankers Trust, Global Assets Retirement Services

1994, Treasury Services

1994, Merrill Lynch, Trading Research Group

1995, Merrill Lynch, Trading Research Group

1995, Citicorp, Global Derivatives

1995, Kamakura Corporation

1996, Kamakura Corporation

1996, Coburn & Croft - expert witness (manipulation)

1997, Kamakura Corporation

1997, Nomura Securities—expert witness (agency securities)

1998, Kamakura Corporation

1998, Expert Witness (foreign currency swaps)

1998, S.E.C. and U.S. Attorney's Office (bond valuation)

1999, Kamakura Corporation

1999, Expert Witness (foreign currency swaps)

2000, Kamakura Corporation

2000, Expert Witness (Orange County)

2000, First Union National Bank, Risk Management

2000, Expert Witness (Valuation of Tax Liens)

2001, Kamakura Corporation

2001, SKG Board of Advisors

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2002, SKG Board of Advisors

2002, WOTN Corporation

Consulting Experiences (continued)

2003, Barclays Capital (TIPS pricing)
2003, Kamakura Corporation
2003, WOTN Corporation
2003, Federal Deposit Insurance Corporation (FDIC)

2004, Kamakura Corporation
2004, WOTN Corporation
2004, Federal Deposit Insurance Corporation (FDIC)
2004, Wachovia Bank

2005, Kamakura Corporation
2005, WOTN Corporation
2005, Federal Deposit Insurance Corporation (FDIC)
2005, AJ Sterge Investments

2006, Kamakura Corporation
2006, Federal Deposit Insurance Corporation (FDIC)
2006, Magnetar Capital

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2009, Federal Deposit Insurance Corporation (FDIC)
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2009, U.S. Treasury (Valuing TARP Warrants)

2010, Kamakura Corporation
2010, Federal Deposit Insurance Corporation (FDIC)

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2012, Federal Reserve Bank of New York

2013, Kamakura Corporation
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Consulting Experiences (continued)

2015, Kamakura Corporation

2016, Kamakura Corporation

2017, Kamakura Corporation

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