

***ROBERT A. JARROW***

S.C. Johnson Graduate School of Management  
Cornell University  
Ithaca, NY 14853  
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***PROFESSIONAL EXPERIENCE***

- 1979-present Ronald P. and Susan E. Lynch Professor of Investment Management  
S.C. Johnson Graduate School of Management  
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***

- 2002–present Interim Board Global Association of Risk Professionals (GARP)
- 2002–present Council of the Bachelier Finance Society
- 1999–present Executive Committee, Cornell Theory Center
- 1999–present Advisory Board, Center for Financial Innovation and Risk Management (CFIRM)  
and Masters Financial Engineering (MFE), School of Business, The University of  
Hong Kong
- 1999–present Advisory Board, Center for Financial Engineering, National University of Singapore.
- 1998–present Faculty member, Operations Research and Industrial Engineering, Cornell University
- 1998–2001 Board of Directors, The American Finance Association.
- 1997–present Advisory Board, Parker Center, Cornell University.
- 1996–present Board of Directors, Round Table Group, Inc.
- 1995–present Co-Director, Cornell University's Certificate in Financial Engineering Program.
- 1995–present Director of Research and Managing Director, Kamakura Corporation.
- 1994–1995 Merrill Lynch Academic Advisory Council.
- 1990–present Co-organizer, Cornell University and Queen's University Annual Derivatives  
Securities Conference.
- 1988–present Center for Analytic Economics at Cornell University.
- 1985–present Center for Applied Mathematics at Cornell University.

***EDITORIAL ACTIVITIES***

2002–present	Associate Editor, <u>The Journal of Financial Research</u>
2002–present	Associate Editor, <u>Journal of Bond Trading and Management</u>
2002–present	Managing Editor, <u>Mathematical Finance</u>
1999–present	Istanbul Stock Exchange Associate Editors Board
1999–present	Associate Editor, <u>The International Journal of Bonds</u>
1999–2002	Co-Editor, <u>The Journal of Derivatives</u>
1998–present	Associate Editor, <u>The Journal of Risk</u>
1998–1999	Associate Editor, <u>The Journal of Derivatives</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–present	Associate Editor, <u>Journal of Fixed Income</u> .
1996–present	Editorial Board, <u>Net Exposure: The Electronic Journal of Financial Risk</u>
1995–present	Advisory Editor, <u>Asia-Pacific Financial Markets</u> .
1994–1997	Associate Editor, <u>The Review of Financial Studies</u> .
1993–present	Associate Editor, <u>Review of Derivatives Research</u> .
1992–present	Associate Editor, <u>Advances in Futures and Options Research</u> .
1992–present	Associate Editor, <u>The Financial Review</u> .
1989–2001	Co-Editor, <u>Mathematical Finance</u> .
1989	Founding Organizer, <u>Mathematical Finance</u> .
1988–present	Associate Editor, <u>The Review of Futures Markets</u> .
1983–1999	Associate Editor, <u>Journal of Financial and Quantitative Analysis</u> .

***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***

Who's Who in Economics, 4<sup>th</sup> Edition (top 1200 cited economists)  
Financial Services Exchange Grant 2002  
2001 Graham and Dodd Scrolls Award (*Financial Analysts Journal*)  
IAFE Senior Fellow  
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.

*AWARDS (continued)*

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).
- [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).

***PUBLICATIONS (continued)***

- [14] "The Relationship Between Arbitrage and First Order Stochastic Dominance," Journal of Finance, 4 (September 1986).
- [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).
- [31] "Pricing Foreign Currency Options Under Stochastic Interest Rates," Journal of International Money and Finance, 10(3), (September 1991) (with Kaushik Amin).

***PUBLICATIONS (continued)***

- [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.
- [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.
- [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.

*PUBLICATIONS (continued)*

- [46] "Pricing Interest Rate Options," Jarrow, Maksimoviz, Ziembra, editors, Finance: Handbook in Operations Research and Management Science, North Holland, (1995).
- [47] "Market Manipulation," Jarrow, Maksimoviz, Ziembra, 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, Ziembra, 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.
- [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).
- [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).

***PUBLICATIONS (continued)***

- [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).
- [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).
- [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 Janoski and Ferdinando Zullo).

***PUBLICATIONS (continued)***

- [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).
- [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,” forthcoming, Journal of Financial and Quantitative Analysis (with Yildiray Yildirim).
- [85] “Estimating Expected Losses and Liquidity Discounts Implicit in Debt Prices,” forthcoming, Journal of Risk (with Tibor Janosi and Yildiray Yildirim).

***WORKING PAPERS***

- [1] “Pricing the Convenience Yield of Treasury Securities: Theory and Evidence” (with Joseph Cherian, Eric Jacquier, and Xianghai Ma).
- [2] “Estimating Default Probabilities Implicit in Equity Prices” (with Tibor Janosi and Yildiray Yildirim).
- [3] “Default Risk and Diversification: Theory and Applications” (with David Lando and Fan Yu).
- [4] “How Valuable is Credit Card Lending” (with Arka Chatterjea, Robert Neal, Yildiray Yildirim).
- [5] “Markov Modeling in the HJM Term Structure Framework” (with Jason Cohen and Tibor Tomita).
- [6] “Bankruptcy Prediction with Industry Effects” (with Sudheer Chava).
- [7] “Estimating the Term Structure of Corporate Debt with a Semiparametric Penalized Spline Model” (with David Ruppert and Yan Yu).
- [8] “A Comparison of Explicit versus Implicit Estimates of Default Probabilities” (with Sudheer Chava).
- [9] “Estimating the Value of Delivery Options in Futures Contracts” (with Jana Hranaiova and William Tomek).
- [10] “Modeling Credit Risk with Partial Information” (with Umut Cetin, Philip Protter, Yildiray Yildirim).
- [11] “A Robust Test of Merton’s Structural Model for Credit Risk” (with Don van Deventer and Xiaoming Wang).
- [12] “Liquidity Risk and Arbitrage Pricing Theory” (with Umut Cetin, Philip Protter).
- [13] “Option Pricing with Liquidity Risk” (with Umut Cetin, Philip Protter, Mitch Warachka).



***BOOKS***

Option Pricing, 1983, Richard D. Irwin, Inc. (with Andrew Rudd).

Finance Theory, 1988, Prentice-Hall, Inc.

Modelling Fixed Income Securities and Interest Rate Options, 1996, McGraw-Hill Book Company.

Second edition, forthcoming, Stanford University Press.

Translated into Japanese, 1997, Japan UNI Agency, Inc., Tokyo.

Translated into Korean, 1997, Bob Mun Sa Publishing Co.

Derivative Securities, 1996, Southwestern Publishing Co.,

Second edition, Fall 2000 (with Stuart Turnbull).

***EDITED BOOK OF READINGS***

Finance: Handbook in Operations Research and Management Science, North Holland, 1995 (with

V. Maksimoviz and W. Ziemba).

Translated into Japanese, 1997.

Over the Rainbow: Developments in Exotic Options and Complex Swaps, Risk Publications:

London, 1995.

Volatility: New Estimation Techniques for Pricing Derivatives, Risk Publications: London, 1998.

August 2002

*Consulting Experiences - Robert Jarrow*

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

2002, Kamakura Corporation

2002, SKG Board of Advisors