DAVID F. BABBEL

Senior Advisor in Finance Group
Director of Insurance Economics Practice

Emeritus Professor, The Wharton School
University of Pennsylvania

Postdoctoral Fellow, Risk and Insurance
The Wharton School
University of Pennsylvania

Postdoctoral Studies, Financial Theory
The Haas School of Business
University of California at Berkeley

PhD Finance
University of Florida

PhD Certificate of Latin American Studies
MBA Finance and International Finance
University of Florida

BA Economics and Philosophy
Brigham Young University and
George Mason University

Prior to joining Charles River Associates as a senior advisor in the Finance Group, Dr. Babbel was a senior financial economist in the Financial Sector Development Department of the World Bank, and a vice president in the Financial Strategies Group, Fixed Income Division as well as leader of the Insurance Services Group in the Pension and Insurance Department of Goldman Sachs. With over one hundred and thirty scholarly articles and publications to his credit, along with a number of books and monographs, Dr. Babbel is an expert in the fields of finance, investments, risk management, insurance, and international finance. His specialties within these fields are fixed income securities, asset/liability management, valuation, life insurance, pensions and annuities. In addition, Dr. Babbel is Emeritus Professor at The Wharton School at the University of Pennsylvania, having previously served as a finance and international finance professor at the Haas School of the University of California at Berkeley. During his more than 25-year career as an educator, Dr. Babbel has taught courses in finance, investments, fixed income, insurance, and international finance at the undergraduate, graduate, doctoral, and executive level. He has also been invited to speak before many conferences, conventions, and seminars, both in the United States and abroad.

ACADEMIC APPOINTMENTS

2011–Present *Emeritus Professor*, The Wharton School, University of Pennsylvania

1998–2010 *Full Professor of Insurance and Risk Management and Full Professor of Finance*
The Wharton School, University of Pennsylvania

1985–1997 *Associate Professor of Finance and Associate Professor of Insurance*
The Wharton School, University of Pennsylvania

1978–1984 *Assistant Professor of Finance and Insurance and Assistant Professor of Int'l Finance*,
The Haas School, University of California at Berkeley

NONACADEMIC APPOINTMENTS

2006–Present *Senior Advisor*, Finance Group and Insurance Economics Practice
Charles River Associates, New York City, NY

1995 *Senior Financial Economist*, The World Bank,
Financial Sector Development Department, Pension Specialist, Washington, D.C.

1987 Vice President, Goldman, Sachs, and Company, Pension and Insurance Department, New York, NY. After returning to Wharton, continued on as a Senior Advisor from 1988-1992 in Fixed Income Division, Financial Strategies, Capital Markets, Mortgage Securities, and Goldman Sachs Asset Management divisions.

1976–1977 *Financial Economist*, Brazilian Capital Market Institute, Financial Research Division, Rio de Janeiro, Brazil

Consultant and Expert Witness:

U.S. Treasury Department; Federal Reserve System; Pension Benefit Guaranty Corporation; U.S. Office of Management and Budget; Federal Trade Commission; Commodities Futures Trading Commission; U.S. Dept. of Justice; U.S. State Department; Federal Bureau of Investigation; U.S. Dept. of Labor; Resolution Trust Corporation; several distinguished private law firms

Financial Consulting:

Large insurers and banks (U.S. and abroad, 1978-2015), asset/liability management, risk analysis, and other consulting projects and training for many insurers and banks

Accenture, Booz Allen Hamilton, PricewaterhouseCoopers, Ernst and Young, KPMG, various investment and insurance-related assignments (1989-2009)

NERA (New York, 2000-2002), Special Consultant on financial valuation, asset/liability management, investments, pensions and insurance

Goldman, Sachs and Company (New York, 1986-92), investigation of fixed income financial strategies and financial risk management techniques; consultation with major insurance and pension clients of the firm

The Frank Russell Company (Tacoma, 1994-5), develop fixed income investment strategies and valuation models for their pension and insurance clients

J. P. Morgan Guaranty (New York, 1989), developed a program to hedge against clustered bank loan defaults

G. E. Capital (Schenectady, N.Y., 1997-2001), assist in the development of valuation software for individual and group annuity insurance contracts

I.B.M. (New York, 1987-97), executive training on asset/liability management for financial institutions; computer applications for insurance companies; strategic planning on the future of the insurance industry

The World Bank (Washington, D.C., 1989-present), elaboration of an options approach toward insuring against default on sovereign debts; participated in programs for training central bankers to manage financial risks; developed asset allocation strategies for insurers and pension funds in developing countries

Winklevoss Pension Actuarial Consultants (Greenwich, Ct., 1997), created new valuation software for pension assets and liabilities; model employs two stochastic factors for Treasury bond valuations and achieves closed-form solutions, and provides n-factor simulations for other investment categories

Shane Chalke, Inc. (Chantilly, Va., 1989), assisted in the design of new actuarial valuation software for life insurance assets and liabilities

International Monetary and Financial Institute (San Francisco, 1984-5), analysis of inflation-indexed bonds; creation of synthetic options for hedging oil risk

CSX (Richmond, 1990) and Sealand (Metropark), developed optimal foreign currency management program for exposures from international shipping

National Development Bank of Taiwan (Taipei, 1982), executive development on international sourcing of capital; Eurobond, Eurodollar, and Asian dollar markets Bankers Institute of the Republic of China (Taipei, 1982-3), development of offshore banking expertise among commercial bank executives

Johnson & Higgins Brokerage (San Francisco, 1981-3), development of pension risk management strategies involving duration analysis, enhanced immunization

AEtna Life and Casualty (Hartford, 1990-1), fair rate of return modeling for New Jersey property/casualty business lines; California Proposition 103 research

U.S. Department of the Treasury (Washington, D.C., 1981), analysis of inflation-indexed government and private bonds; report on prospects for default on Brazilian loans

Morrison - Knudsen Engineering (Boise, 1980), analysis of Argentine hydroelectric power bidding strategies using inflation-indexed contracts

United Nations (New York, 1989-91), participated in programs for training ministries of finance and central bankers to manage financial risks

Lehman Brothers (New York, 1992), helped train their staff for insurance company investment management and mutual fund sales

Milliman & Robertson, Inc. (Seattle, 1994), research on investment trust business conducted for Nippon Life Insurance

Awards and Recognitions, Memberships

Critical Review of the U.S. Actuarial Profession (CRUSAP) Advisory Panel, 2005–2006

William G. Whitney Award for Distinguished Undergraduate Teaching, 2003

Wharton Financial Institutions Center Senior Fellow, 1995-Present

Annual Prize for best paper published in the *North American Actuarial Journal*, 2002

Valuation Tools Working Group, American Academy of Actuaries Valuation Task Force, 1997–2002

Graham and Dodd Award of Excellence, Association for Investment Mgmt. and Research, 1997

Society of Actuaries Research Grant, 1992–1996

Anheuser Busch Term Chair, 1987–1990

Award for Best Feature Article, 1989, American Risk and Insurance Association

Prochnov Foundation for Banking Studies Research Grant, 1988

CPCU—Harry J. Loman Foundation Research Fellowship, 1986

Honorary Master of Arts Degree, University of Pennsylvania, 1985

Huebner Foundation Postdoctoral Fellowship, The Wharton School, 1984–1985

Award for Best Communication, 1983, American Risk and Insurance Association

Regents of California Junior Faculty Fellowship, 1983–1984

Fulbright Fellow, U. S. Office of Education, 1977

Fulbright—Hays Fellowship, U. S. State Department, 1976

Various Academic Scholarships, Fellowships, Research Grants

Omicron Delta Epsilon (International Honor Society in Economics)

Beta Gamma Sigma (National Scholastic Honor Society of Business and Administration)

Member, American Finance Association, American Risk and Insurance Association

Past member, American Economics Association, Academy of International Business

Listed in Who’s Who in the World, Who’s Who in America, Who’s Who in the East, Who’s Who in the West, Who’s Who in Finance and Industry, Men and Women of International Distinction, Men of Achievement in International Business, Emerging Leaders of America, and Who's Who in Business Higher Education (various volumes and dates)

RESEARCH AND PUBLICATIONS

“Expanding Private Disability Insurance Coverage to Help the SSDI Program.” (with M. Meyer), *SSDI Solutions: Ideas to Strengthen the Social Security Disability Program.* Infinity Publishing, 2016.

“The Benefits of Private Disability Income Protection Coverage for State Budgets: Overview and Details for Four States.” (with M. Meyer), *Working Paper,* May 2015.

“The Role of Employee Retirement Benefits in State & Local Financial Conditions.” (with M. Meyer), *Working Paper,* May 2015.

“Buy Term and Invest the Difference Revisited.” (with O. Hahl) *Journal of Financial Service Professionals*, May 2015.

“Evaluating Pension Insurance Pricing.” *Journal of Pension Economics and Finance,* Cambridge University Press, April 2015.

“The Performance of TIAA’s Traditional Retirement Annuity for Selected Investment Cohorts, 1970-2013.” (with M. Herce, M. Meyer) *White Paper*, Charles River Associates, September 2014.

“Scenario Analysis in the Measurement of Operational Risk Capital: A Change of Measure Approach.” (with K. Dutta) *Journal of Risk and Insurance,* June 2014.

“Private Disability Insurance and Return-to-Word: Cost Savings to SSDA and Other Federal Programs.” (with Mark Meyer) *America’s Health Insurance Plans*, September 2013.

“Staggered Annuitization: Dealing with the Top 10 Financial Challenges.” *NAFA Annuity Outlook*, lead article, July/August 2013.

“Stable Value Funds: Performance to Date – Part I.” (with M. Herce) *Retirement Income Journal*, March 2013.

“Stable Value Funds: Performance to Date – Part II.” (with M. Herce) *Retirement Income Journal*, March 2013.

“Economic Analysis of Insurance Products in Workplace Benefit Programs in the U.S.” (with M. Meyer, M. Herce, J. Dermody, N. Vasavada) White Paper, June 2011.

“Real World Index Annuity Returns.” (with J. Marrion and G. VanderPal) *Journal of Financial Planning.*

March 2011.

“Stable Value Funds: Performance to Date.” (with M. Herce) Wharton Financial Institutions Center Working Paper, January 2011.

“A Note on Scenario Analysis in the Measurement of Operational Risk Capital: A Change of Measure Approach.” Wharton Financial Institutions Center, September 2010.

“Stable Value Funds: Performance from 1973 through 2008.” (with M. Herce) Wharton Financial Institutions Center, September 2009.

“Statistical String Theory for Courts: If the Data Don’t Fit…” (with J. Strickler and R. Sears) *Berkeley Electronic Press,* July 2008; *Journal of Legal Technology Risk Management,* Summer/Fall 2009.

“Measuring the Tax Benefit of a Tax-Deferred Annuity.” (with R. Reddy) *Journal of Financial Planning,* October 2009.

“Part Two of the Interview with Wharton Professor David Babbel on Fixed Indexed Annuities.” (with D. Cochrane) *Annuity Digest,* July 27, 2009.

“An Interview with Wharton Professor David Babbel on Fixed Indexed Annuities – Part One.” (with D. Cochrane) *Annuity Digest,* July 26, 2009.

“Review of Lifetime Financial Advice: Human Capital, Asset Allocation and Insurance.” *Journal of Pension Economics and Finance,* October 2008.

“Lifetime Income for Women: A Financial Economist’s Perspective.” *Personal Finance,* Wharton Financial Institutions Center, July 2008.

“Investing Your Lump Sum at Retirement.” (with C. Merrill) *Personal Finance,* Wharton Financial Institutions Center, July 2006. Also published by the American College, Bryn Mawr, PA.

“Review of the Calculus of Retirement Income: Financial Models for Pension Annuities and Life Insurance.” *Journal of Risk and Insurance,* December 2007.

“A Closer Look at Stable Value Funds Performance.” (with M. Herce) Wharton Financial Institutions Center, September 2007.

“Insuring the Uninsurable II.” *The Role of Insurance and Management of Risk in the 21st Century.* The Barbon Institute, Cambridge, 2006.

“Rational Decumulation.” (with C. Merrill) Wharton Financial Institutions Working Paper, June 2006.

“Evaluation of NYISO Virtual Transaction Collateral Multiple Policy.” (with S. Harvey) NYISO White Paper, NYISO Scheduling and Pricing Working Group, New York Independent System Operator, January 2006.

“Extracting Probabilistic Information from the Price of Interest Rate Options: Tests of Distributional Assumptions.” (with K. Dutta) *Journal of Business*, May 2005.

“Real and Illusory Value Creation by Insurance Companies.” (with C. Merrill) *Journal of Risk and Insurance*, March 2005, lead article.

“The Price Pressure Hypothesis and Off-The-Run Treasury Bonds.” (with C. Merrill, M. Meyer, and M. DeVilliers) *Journal of Financial and Quantitative Analysis*, September 2004.

“Fair Value of Liabilities: The Financial Economics Perspective.” (with J. Gold and C. Merrill) *Asset and Liability Management Tools,* Risk Waters, London, 2003.

"Fair Value of Liabilities: The Financial Economics Perspective." (with J. Gold and C. Merrill) *North American Actuarial Journal*, January 2002. Awarded Annual Prize for best paper published in the *North American Actuarial Journal*.

"Fair Value of Liabilities: The Bullet GIC as an Example." (with J. Gold and C. Merrill) *Risk and Rewards*, Finance Section, Society of Actuaries, lead article, January 2001.

"Financial Engineering and Structured Products." *Proceeding of the Conference of Consulting Actuaries*, Volume 50, Summer 2001.

Financial Markets, Instruments and Institutions. (with A. Santomero) McGraw Hill–Irwin, 2nd ed., 2001.

"Asset/Liability Management for Insurers in the New Era: Focus on Value." *Journal of Risk Finance*, lead article, October 2001.

"Inverse Floaters and the Income Stability of a Debt Securities Investment Portfolio." (with C. Ma and B. Ni) *Journal of Portfolio Management*, Winter 2000.

Valuation of Interest-Sensitive Financial Instruments. (with C. Merrill) Society of Actuaries, Wiley Publishers, revised ed., 2000.

"An Analysis of the Financial Risk Management Process used by Life Insurers." (with A. Santomero) *Changes in the Life Insurance Industry: Efficiency, Technology and Risk Management*, Kluwer, Norwell, MA., 1999.

"Effective and Ineffective Duration Measures for Life Insurance." *Investment Management for Insurers*, Frank J. Fabozzi Associates, 1999.

"Financial Performance Measurement for Insurers." (with R. Stricker and I. Vanderhoof) *Investment Management for Insurers*, Frank J. Fabozzi Associates, 1999.

Investment Management for Insurers. (with F. Fabozzi) Frank J. Fabozzi Associates, 1999.

"Risk Management by Insurers: An Analysis of the Process." (with A. Santomero) *Investment Management for Insurers*, Frank J. Fabozzi Associates, 1999.

"Toward a Unified Valuation Model for Life Insurers." (with C. Merrill) *Changes in the Life Insurance Industry: Efficiency, Technology and Risk Management*, Kluwer, Norwell, MA., 1999.

"The Components of Insurance Firm Value, and the Present Value of Liabilities." *Investment Management for Insurers*, Frank J. Fabozzi Associates, 1999.

"Insurer Surplus Duration and Market Value Revisited." (with K. Staking) *Journal of Risk and Insurance*, March 1998.

"Economic Valuation Models for Insurers." (with C. Merrill) *North American Actuarial Journal*, lead article, July 1998.

"Saiken no Hasankiken to Kakaku Kando." (with C. Merrill and W. Panning) *Security Analysts Journal of Japan*, October 1998.

"Financial Valuation of Insurance Liabilities." *Fair Value of Insurance Liabilities*, I. Vanderhoof and E. Altman, eds., Kluwer, 1998.

"An Analysis of the U.S. Department of Labor Proposed Regulation Relating to General Account Pension Contracts." (with M. Meyer) Washington, D.C., March 1998.

“The Market Value of Insurance Liabilities.” *North American Actuarial Journal*, October 1997.

“Financial Risk Management by Insurers: An Analysis of the Process.” (with A. Santomero) *Journal of Risk and Insurance*, June 1997.

“Default Risk and the Effective Duration of Bonds.” (with C. Merrill and W. Panning) *Financial Analysts Journal*, January/February 1997. Graham and Dodd Award of Excellence, Association for Investment Mgmt. and Research.

“Insuring Sovereign Debt Against Default.” *Discussion Paper*, Financial Sector Development Department, The World Bank, August 1996.

“Teaching Interest Rate Contingent Claims Pricing.” (with C. Merrill and J. Zacharias) *Journal of Financial Education*, section lead article, December 1996.

“Interest-Rate Option Pricing Revisited.” (with C. Merrill) *Journal of Futures Markets*, lead article, December 1996.

“Capping the Interest Rate Risk in Insurance Products.” (with P. Bouyoucos and R. Stricker) *The Handbook of Fixed-Income Options*, Frank J. Fabozzi, ed., Irwin Press, 1996.

“Default Risk and the Effective Duration of Bonds.” (with C. Merrill, and W. Panning) *The Strategic Dynamics of the Insurance Industry*, Ed Altman and Irwin T. Vanderhoof, eds., Irwin Press, 1996.

“Report on the Reform of New York State Insurance law Section 4228.” (with M. Meyer) New York Assembly, Albany, October 1996.

The World Bank Primer on Reinsurance. (with D. McIsaac) World Bank Monograph, 1995.

“The Liability Maze: The Impact of Liability Law on Safety and Innovation.” P. Huber and R. Litan, eds., book review, *Journal of Risk and Insurance*, March 1995.

“The Relation between Capital Structure, Interest Rate Sensitivity, and Market Value in the Property-Liability Insurance Industry.” (with K. Staking) *Journal of Risk and Insurance*, December 1995.

“Asset-Liability Matching in the Life Insurance Industry.” *The Financial Dynamics of the Insurance Industry*, E. Altman and I. Vanderhoof, eds., Irwin Press, 1994.

“A Modern Approach to Performance Measurement for Insurers.” (with R. Stricker and I. Vanderhoof) *Operations Research Models in Quantitative Finance*, Rita L. D’Ecclesia and Stavros A. Zenios, eds., Physica-Verlag, lead chapter, 1994.

“Misadventures in Duration.” *Risk and Rewards*, Finance Section, Society of Actuaries, lead article, August 1994.

“A Perspective on Model Investment Laws for Insurers.” *C.L.U. Journal (Journal of the American Society of Chartered Life Underwriters)*, September 1994.

“An Economic Approach to Valuation of Single Premium Deferred Annuities.” *Financial Optimization*, S. Zenios, ed., Cambridge University Press, 1993.

“Measuring the Interest Rate Risk of Property/Casualty Insurer Liabilities.” (with D. Klock) *Insurance, Risk Management, and Public Policy*, S. Gustavson and S. Harrington, eds., Kluwer Press, 1993.

An Insurance Primer: Review of the U.S. Insurance Industry, Market Structure, Products, Asset Need. (with D. Klock) Phillips Institute, 1993.

“Quantity-Adjusting Options and Forward Contracts.” (with L. Eisenberg) *Journal of Financial Engineering*, lead article, June 1993.

“Measuring Investment Performance in an Asset/Liability Context.” *Managing Asset/Liability Portfolios*, Association for Investment Management and Research, 1992.

“Generalized Put-Call Parity.” (with L. Eisenberg) *Journal of Financial Engineering*, lead article, December 1992.

“Incentive Conflicts and Portfolio Choice in the Insurance Industry.” (with A. Hogan) *Journal of Risk and Insurance*, December 1992.

“Pitfalls in the Analysis of Option-Adjusted Spreads.” (with S. Zenios) *Financial Analysts Journal*, July/August 1992.

“Estimating Market Value of Loss Payments of Property/Liability Insurance Companies Using Modern Valuation Technology.” (with J. Choi) Working Paper, Wharton School, 44 pages, August 1992.

“Forecasting Property/Casualty Loss Payments and the Influence of Inflation and Interest Rates.” (with J. Choi) unpublished report for Goldman Sachs, 68 pages, April 1991.

“The Financial Solidity of Life Insurance Companies.” (with D. Klock) *Society Page*, American Society of C.L.U. and Ch.F.C., May 1991.

“It Pays to Practice A/L M.” (with K. Staking) *Best’s Review*, Property/Casualty Edition, May 1991.

“Performance Measurement for Insurers.” (with R. Stricker and I. Vanderhoof) *Financial Institutions Research*, Goldman Sachs, October 1990.

“Valuation of Interest-Sensitive Cash Flows: The Need, The Technologies, The Implications.” *Record: Society of Actuaries*, June 1990.

“Insurance for Clustered Credit Risks in Banking.” *The Prochnow Reports*, Graduate School of Banking, University of Wisconsin, Madison, 1989.

“The Demand for Life Insurance: A Portfolio Choice.” (with L. Han, and J. Outreville) unpublished manuscript, 29 pages, April 1989.

“Optimal Insurance of the Common Form Under Moral Hazard.” (with J. Dermody) unpublished manuscript, 30 pages, March 1989.

“The Market Reward for Insurers that Practice Asset/Liability Management.” (with K. Staking) *Financial Institutions Research*, Goldman Sachs, November 1989.

“Capping the Interest Rate Risk in Insurance Products.” (with P. Bouyoucos and R. Stricker) *Fixed-Income Portfolio Strategies*, F. Fabozzi, ed., Irwin Professional Publishing, 1989.

“Insuring Banks against Systematic Credit Risk.” *Journal of Futures Markets*, December 1989.

“Aspects of Optimal Multiperiod Life Insurance.” (with E. Ohtsuka) *Journal of Risk and Insurance*, September 1989. Award for Best Feature Article, American Risk and Insurance Association.

“Assessing the Interest Rate Risk of Property and Casualty Companies.” (with D. Klock and P. Polachek) *Insurance Perspectives*, Goldman Sachs, April 1988. Also published in *Proceedings of the International Insurance Seminar*, July 1988.

“Gazing Into the Insurance Future.” *Record: Society of Actuaries*, June 1988.

"Capping the Interest Rate Risk in Insurance Products." (with P. Bouyoucos and R. Stricker) *Insurance Perspectives*, Goldman Sachs, March 1988.

"Not Whether But When." (with R. Jones) *Best's Insurance Review*, Life/ Health Edition, January 1988.

"Hokemgaisha No Tameno Shifan Fusai Kanri." (with R. Stricker and P. Polachek) *Insurance Perspectives*, Japanese Edition, Goldman Sachs, January 1988.

"Insurance Pedagogy: Executive Opinions and Priorities." (with D. Klock) *Journal of Risk and Insurance*, December 1988.

"Interest Rate Dynamics and the Term Structure." *Journal of Banking and Finance*, September 1988.

"Life Insurance Industry Trends in Asset/Liability Management." (with J. Lamm-Tennant) *Insurance Perspectives*, Goldman Sachs, November 1987.

"Asset/Liability Management for Insurers." (with R. Stricker) *Insurance Perspectives*, Goldman Sachs, 1st edition, May, 1987; 2nd edition, May 1989.

"Capping the Risks of Life Insurance Policy Loans and Lapses." *Insurance Perspectives*, Goldman Sachs, November 1986.

"The Pareto Optimal Design of Term Life Insurance Contracts." (with N. Economides) *Scandinavian Actuarial Journal*, Spring 1985.

"The Price Elasticity of Demand for Whole Life Insurance." *Journal of Finance*, March 1985.

"The Term Structure of Interest Rate Volatility: A Binational Comparison." *Proceedings of the Academy of International Business*, 1985.

"A New Technique for Forecasting Short-Term Interest Rates?" *Berkeley Finance Quarterly*, January 1984.

"Real Immunization with Index-Linked Bonds." *Financial Analysts Journal*, November/ December 1984.

"Duration and the Term Structure of Interest Rate Volatility." *Innovations in Bond Portfolio Management: Duration Analysis and Immunization*, G. Bierwag, G. Kaufman, and A. Toevs, eds., JAI Press, 1983.

"An Engel Curve Analysis of Gambling and Insurance in Brazil." (with K. Staking) *Journal of Risk and Insurance*, December 1983. Award for Best Communication, American Risk and Insurance Association.

"Determining the Optimum Strategy for Hedging Currency Exposure." *Journal of International Business Studies*, spring/summer 1983.

"A Capital Budgeting Analysis of Life Insurance Costs in the United States: 1950-1979." (with K. Staking) *Journal of Finance*, March 1983.

"Real Security: The Case for Inflation-Indexed Government Bonds." (with L. Helzel) *Barron's*, March 1, 1982.

"Exchange-Rate Fluctuations and Transaction Exposure in the Multinational Corporation." *I.E.E. Proceedings*, June 1982.

"Inflation, Indexation, and Life Insurance Sales in Brazil." *Journal of Risk and Insurance*, March 1981.

"Public Information and Investment Decisions." (with Y. Kwon) unpublished manuscript, 17 pages, September 1981.

"A Mathematical Note on Inflation, Regulation, and the Cost of Life Insurance." *Journal of Risk and Insurance*, March 1980.

"The Rise and Decline of Foreign Currency Options." *Euromoney*, September 1980.

"Inflation's Impact on Life Insurance Costs: Brazilian Indexed and Nonindexed Policies." *Journal of Risk and Insurance*, December 1979.

"Measuring Inflation Impact on Life Insurance Costs." *Journal of Risk and Insurance*, September 1979.

"Risk Management in Tropical Agriculture Systems." unpublished manuscript, 30 pages, March 1978.

Inflation and Indexation in Brazil: The Influence on Life Insurance. Ph.D. Dissertation, University Microfilms, Ann Arbor, 1978.

"Consumer Valuation of Life Insurance: Comment." *Journal of Risk and Insurance*, September 1978.

"Inflação Esperada e o Custo do Seguro de Vida." *Revista Brasileira de Mercado de Capitais*, lead article, May/August 1977.

"Monetary Correction in Brazil: Effect on Life Insurance." *Latinamericanist*, lead article, fall 1977.

"Governmental Disincentives on Agricultural Response to Demand-Developing Countries." *World Agricultural Highlights*, July 1974.

"On Measuring Skewness and Kurtosis in Short Rate Distributions: The Case of the U.S. Dollar London Inter Bank Offer Rates." (with K. Dutta) Wharton Financial Institutions Center, 2001.

"A Financial Analysis of the Executive Life Insolvency." Report to Federal District Courts in California, Louisiana, Texas, Maine, North Carolina, approx. 150 pages (sealed documents).

"A Financial Analysis of the First Capital Life and Fidelity Bankers Life Insolvencies." Report to Federal District Court of Southern California, approx. 600 pages (sealed documents).

Participation in Conventions and Seminars

Chair and Invited Presentation, "Retirement System Provisions." *The Swiss Risk and Insurance Forum – Old-Age Provision: Past, Present, Future*. Zurich, November 2015.

Invited Presentation, "The Performance of TIAA's Traditional Retirement Annuity 1970-2013." *TIAA-CREF Institute, 2015 Fellows Symposium: Retirement Benefits for a 21st Century Workforce*. New York, October 2015.

Invited Lecture, "My Retirement Strategy for Confronting the 10 Top Challenges to Retirement Planning." *Chubb Research Symposium*, St. John's University. New York, September 2015.

Keynote Speaker, "Equity Indexed Annuities: Retrospective and Prospective." *2015 China International Conference on Insurance and Risk Management*. Hangzhou, China, July 2015.

Chairman of Valuation, "Risk Measures and Insurance Regulation." *Expert Forum*. Zurich, May 2014.

7th Annual International Advanced Seminar Speaker, "Princípios de Consenso: Como Melhorar Suas Decisões e Previsões para os Seus Negócios." ("Principles of Consensus: How to Improve Your Decisions and Forecasts in Business.") *Instituto Nacional de Pósgraduação Business School.* São Paulo, April 2014.

Annual Insurance Day Speaker, “Financial Challenges to Funding Retirement.” *Eastern Kentucky University*. April 2014.

Keynote Speaker, “Women and Money: How to Stretch It and Make it Last Lifetime.” *Wharton Women and Money Conference, University of Pennsylvania Forum for Women Faculty and Focus on Health & Leadership for Women*. April 2014.

Invited Presentation, “Women and Risk: Myth or Market Opportunity?” *Global Interdependence Center Inaugural Women’s Conference*, Federal Reserve Bank of Philadelphia. November 2013.

Invited Presentation, “Assessment of the PIMS Pricing Model.” Technical Review Panel for the Pension Insurance Modeling System (PIMS) Model, *Pension Benefit Guaranty Corporation (PBGC)*, The Wharton School, University of Pennsylvania. Philadelphia, April 2013.

Keynote Speaker, “Financial Security for Working Americans: An Economic Analysis of Insurance Products in Workplace Benefits Programs.” *Protect 2011: Workplace Benefits and Financial Security Symposium*. Washington, D.C., July 2011.

Keynote Speaker, “Stable Value Funds: Performance to Date.” *NYU-Stern Five Star Conference on Research in Finance* (Yale, Columbia, Princeton, NYU, and Wharton). New York, January 2011.

Invited Presentation, “UnSupermodels and the Equity-Indexed Annuity.” *Retirement Income Products Executive Symposium*. Individual Finance and Insurance Decisions (IFID) Centre of the Schulich School of Business, York University of Toronto, Ibbotson Associates, Morningstar, University of Chicago, November 2008. Also presented at Laval University, New York University, University of Pennsylvania.

Invited Presentation, “Statistical String Theory for Courts: If the Data Don’t Fit…” *Atlantic Economic Association*, Villanova, September 2007 and *Applied Economics Seminar*, The Wharton School. March 2008 and *Finance Seminar*, Laval University, April 2008.

Keynote Speaker, “A Closer Look at Stable Investment Funds Performance.” *Stable Value Investment Association Conference*. Charleston, April 2007.

Keynote Speaker, “Reinsurance Strategies for Emerging Markets.” *The Association for Colombian Insurers*. Cartagena, Colombia. October 2002.

Keynote Speaker, “The Redington Centenary Lecture.” *Institute of Actuaries*. London, May 2006.

Invited Presentation, “A/L Management for Life Insurance.” *Contractual Savings Conference*, World Bank and IMF. Washington, D.C., May 2002.

Invited Presentation, “Insurers’ Financial Risk Management Processes.” *Global Issues in Insurance Regulation*. London, April 2002.

Invited Presentation, “Asset/Liability Management for Insurers in the New Millennium.” *Asset and Liability Management: From Institutions to Households*. Nicosia, May 2001.

Invited Presentation, “Financial Engineering and the Actuarial Profession.” *50th Conference of Consulting Actuaries*, Palm Desert, November 2000.

Invited Presentation, “Toward a Unified Valuation Model for Insurers.” (with C. Merrill) *American Risk and Insurance Association*. Baltimore, August 2000.

Invited Presentation, “A 3+N-Factor Valuation Model for Interest-Sensitive Securities.” (with C. Merrill and A. Remeza) *Conference on Integrated Risk and Return Management for Insurance Companies*, New York University, May 1999.

Invited Presentation, “The Ultimate Black Box.” *World Conference on the Valuation of Insurance Business*, co-sponsored by the Society of Actuaries and the New York University Stern School of Business, March 1999.

Invited Discussant, “A New Approach toward the Valuation of High Yield Bonds.” *Wharton Conference on Financial Institutions Management*, Philadelphia, December 1996.

Invited Discussant, “Analysis of the PIMS Model for PBGC Insurance Claims.” *Wharton Conference on the Pension Information Management System of the Pension Benefit Guaranty Corporation*, Philadelphia, November 1996.

Invited Address, “Risk Management by Insurers: An Analysis of the Process.” *Wharton Conference on Insurance Risk Management*, Philadelphia, May 1996.

Invited Discussant, “Fair Value of Insurance Liabilities.” *Society of Actuaries*, New York, December 1995.

Invited Address, “Political Risk Insurance and Reinsurance.” *Inter-American Development Bank*, Washington, D.C., September 1995.

Guest Lecture, “Franchise Value and Insurance Regulation.” *General Accounting Office National Meeting*, Washington, D.C., June 1995.

Invited Lecture, “Insuring Sovereign Debt Against Default.” *World Bank*, Washington, D.C., June 1995.

Invited Lecture, “International Reinsurance Markets and Practices.” *World Bank*, Washington, D.C., April 1995.

Invited Address, “Basis Risk in Insurance Asset/Liability Management.” *Institute for International Research Conference on Asset/Liability Management for Life Insurance*, New York, September 1995.

Invited Address, “Default Risk and the Duration of Bonds.” *2nd Biennial Conference on the Financial Dynamics of the Insurance Industry*, New York University Salomon Center, New York City, May 1995.

Distinguished Lecture, “Tobin’s Q Ratio and Insurer Interest Rate Risk Management.” *Brigham Young University*, Provo, Utah, October 1994.

Invited Address, “On Model Insurance Investment Laws.” *N.A.I.C. Conference on The Future of Insurance Solvency Regulation*, Washington, D.C., February 1994.

Moderator and Advisory Board, “Risk-Based Capital for Insurers.” *Insurance Investment Forum*, Institutional Investor, Palm Beach, Florida, December 1993.

Guest Lecture, “Investment Strategies for Insurers and Pension Funds around the World.” *World Bank*, Washington, D.C., December 1993.

Presented, “Generalized Put-Call Parity.” (with L. Eisenberg) *Financial Management Association*, San Francisco, October 1992.

Presented, “Quantity-Adjusting Options and Forward Contracts.” (with L. Eisenberg) *Financial Management Association*, San Francisco, October 1992.

Guest Address, “Life Insurance in the Year 2000.” *Chief Investment Officers’ Conference*, Chicago, February 1992.

Guest Address, “Measuring Investment Performance in an Asset/Liability Context.” *Association for Investment Management and Research*, New York, December 1991.

Guest Address, “Performance Measurement for Insurers.” *International Insurance Seminar*, San Francisco, June 1991.

Guest Address, “Performance Measurement for Insurers.” *Chief Investment Officers’ Conference*, American Council of Life Insurance, Tucson, March 1991.

Distinguished Lecture, “Toward a Consensus Theory.” *Pennsylvania State University*, West Chester, November 1990.

Presented, “Interest Rate Sensitivity and the Value of Insurer Surplus.” (with K. Staking) *American Risk and Insurance Association*, Orlando, August 1990.

Invited Presentation, “New Directions in Asset/Liability Management.” *Society of Actuaries*, San Francisco, June 1990.

Presented, “Capping the Interest Rate Risks in Insurance Products.” *American Risk and Insurance Association*, Denver, August 1989.

Keynote Lecture, “Hedging Uncertain Insurer Liabilities.” *Life Insurance Companies Annual Retreat*, Cape Cod, summer 1988.

Invited Presentation, “Gazing into the Insurance Future.” *Society of Actuaries*, Boca Raton, April 1988.

Invited Presentation, “Asset/Liability Management for Insurers: Information Management.” *I.B.M. Insurance Marketing Conference*, Palm Springs, April 1988.

Keynote Speaker, “Asset/Liability Management for Insurers.” *Chief Investment Officers’ Insurance Conference*, Key Largo, February 1988.

Guest Address, “Duration and the Term Structure of Interest Rate Volatility.” *Southwest Actuarial Society Convention*, Austin, November 1985.

Invited Presentation, “Aspects of Optimal Multiperiod Life Insurance.” *Operations Research Society of America*, Atlanta, November 1985.

Distinguished Lecture, “Multifactor Models of the Term Structure of Interest.” *Laval University*, Québec City, Canada, May 1985.

Guest Address, “Financial Economics Perspectives in Insurance.” *Plenary Session of the American Risk and Insurance Association*, Minneapolis, August 1984.

Presented, “Aspects of Optimal Multiperiod Life Insurance Contracts.” *American Risk and Insurance Association*, Minneapolis, August 1984.

Presented “The Brennan and Schwartz Two-Factor Model of the Term Structure of Interest: Empirical Extension.” *Academy of International Business*, Singapore, June 1984.

Guest Address, “The International Debt Crisis in Brazil and Prospects for Repayment.” *Invited speaker before officials of the U.S. Treasury, State, Commerce and Senate*, Washington, D.C., May 1984.

Presented, “Determinants of Demand for Life Insurance: A Time Series Study.” *American Risk and Insurance Association*, Philadelphia, August 1983.

Invited Presentation, “The Term Structure of Interest Rate Volatility: A Binational Comparison.” *Western Economics Association*, Los Angeles, July 1982.

Invited Presentation, “The Pareto Optimal Design of Term Life Insurance Contracts.” *L'Association Française de Finance,* Orleans, France, June 1982.

Invited Presentation, “Duration and the Term Structure of Interest Rate Volatility.” *World Conference on Duration: State of the Art*, Ashland, July 1981.

Discussant of, “Optimal Risk Retention Under Partial Insurance.” *Western Finance Association, Jackson Hole*, June 1981.

Presented, “Anticipated and Unanticipated Inflation and the Real Value of Equities: An International Comparison.” (with J. Wilcox) *Western Finance Association*, Jackson Hole, June 1981, and *Western Economics Association*, San Francisco, July 1981.

Invited Presentation, “Financing Economic Development: The Case of Gambling and Insurance in Brazil.” *Stanford University Colloquium on Latin American Studies*, April 1980, and *Latin American Studies Association*, Bloomington, November 1980.

Presented, “Inflation, Indexation and Life Insurance Sales in Brazil.” *Western Finance Association*, San Diego, June 1980.

Discussant of, “Are Export Controls Anti-Inflationary?” *American Economic Association*, Atlanta, December 1979.

EXECUTIVE EDUCATION PROGRAMS

Guest Lecturer, “Rational Accumulation and Decumulation.” AXA, Thrivent, Prudential, Merrill Lynch, KPMG, and other companies. Wharton School, 2005-2011.

Guest Lecturer, “The Theory of Consensus.” *Federal University of Goiás; Federal University of Mato Grosso; INESC of Minas Gerais; Sindicato dos Administradores do Tocantins*, *SAETO*; (these 3 universities and 1 professional association are located in Brazil), 2004-2005.

Invited Presentation, “Valuation and Value Creation in Reinsurance.” *Swiss Re Group*, Zürich, July 2001.

Director and Lecturer, “Advanced Asset/Liability Management for Life Insurers.” *Society of Actuaries and Wharton School*, Philadelphia, 1988-2011.

Director and Lecturer, “Modern Valuation and Risk Management Techniques for Insurers.” *General Electric Corporate Research and Development*, Schenectady, 1998.

Guest Lecturer, “Asset/Liability Management for Insurance Companies and Pension Funds around the World.” *World Bank*, Washington, D.C., September 1995, September 1994.

Lecturer, “Investment Policy and Private Pensions.” *Brazilian Leaders of Private Pensions and Social Security*, Wharton School, Philadelphia, November 1993.

Guest Lecture, “Investment Strategies for Insurers and Pension Funds around the World.” *World Bank*, Washington, D.C., December 1993.

Invited Lecturer, “Investment Policy and Private Pensions.” *Brazilian Leaders of Private Pensions and Social Security*, Wharton School, Philadelphia, November 1993, 1997.

Director and Lecturer, “Financial Markets and Strategies for Credit Card-Backed Receivables.” *Discover Credit Card*, Wharton School, Philadelphia, 1993, 1992.

Director and Lecturer, “Liability Management for Central Banks and Ministries of Treasury.” *Treasury Department*, Ankara, Turkey, 1992, 1990.

Lecturer, “Financial Executive Development Program for Bell Atlantic Corporation.” *Wharton School*, Philadelphia, Pennsylvania, summer 1986.

Lecturer, “Programa Ejecutivo IESA.” *Instituto de Estudios Superiores de Administración 2-week Executive Program*, Caracas, Venezuela, February 1985.

Lecturer, “Strategic Financial Management and Control.” *Middle East Management Consultants 5-day Seminar*, Bahrain, December 1984.

Lecturer, “Intensive Program on Offshore Banking.” *Bankers Institute of Taiwan 4-day Seminar*, Berkeley, California, July 1984 and July 1983.

Lecturer, “Offshore Banking and International Capital and Money Markets.” *Development Bank of Taiwan 3-day Seminar*, Taipei, Taiwan, November 1982.

Lecturer, “International Banking and Finance.” *Bankers Institute of Taiwan 5-day Seminar*, Taipei, Taiwan, August 1982.

Fellow, “International Business Education—The Japanese Case Study.” *Japan-America Society 2-day Seminar*, Los Angeles, California, February 1982.

Fellow, “International Treasury Management.” *Bank of America 5-day Workshop*, San Francisco, California, August 1981.

Fellow, “Foreign Exchange Exposure.” *Bank of America 5-day Workshop*, San Francisco, California, July 1980.

Lecturer, “Indexation of Financial Instruments.” *Seminar in Applicable Capital Market Theory*, Haas School of Business, Berkeley, California, December 1978.

EDITORIAL SERVICE

American Economic Review, California Management Review, Financial Management, Geneva Papers on Insurance and Economics, International Review of Public Policy, Journal of Applied Economics, Journal of Banking and Finance, Journal of Business, Journal of Finance, Journal of Financial and Quantitative Analysis, Journal of Financial Intermediation, Journal of Financial Research, Journal of Futures Markets, Journal of International Business Studies, Journal of International Money and Finance, Journal of Political Economy, Journal of Risk and Insurance, Management Science, North American Actuarial Journal, Risk Management and Insurance Review.

COURSES TAUGHT

Investments and securities markets

- Executive level (Berkeley and Wharton)
- Graduate level (Berkeley and Wharton)
- Undergraduate level (Berkeley and Florida)

Financial management

- Graduate level (Berkeley and Wharton)
- Undergraduate level (Berkeley)

International financial management

- Executive level (Berkeley)
- Graduate level (Berkeley)

Advanced Asset/Liability Management

- Executive level (Wharton)

Financial Strategies and Analysis: Insurance (advanced fixed-income course)

- Graduate level (Wharton)
- Undergraduate level (Wharton)

Advanced corporate finance

- Executive level (Wharton)
- Graduate level (Wharton)
- Undergraduate level (Florida, Wharton)

Structured notes and asset-backed securities

- Graduate level (Wharton)

Risk and Crisis Management

- Graduate level (Wharton)

Risk Management

- Undergraduate level (Wharton)

Principles of Risk and Insurance

- Graduate level (Wharton)
- Undergraduate level (Wharton)

Doctoral Seminar in Life Insurance—various sessions

- Doctoral level (Wharton)

Macroeconomics

- Undergraduate level (Brigham Young University)