

## VITA

**DOUGLAS M. PATTERSON**  
**April, 2009**

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## EDUCATION

Doctor of Philosophy, 1978, Graduate School of Business, University of Wisconsin, Madison, Wisconsin.

Dissertation: "Warrant Prices in the Context of the Option Pricing Model and the Efficiency of the New York Stock Exchange." Dissertation Committee Co-chairmen, Robert Haugen and Dean Wichern.

Master of Business Administration, 1972, University of Wisconsin, Madison, Wisconsin.

Bachelor of Science, 1968, Electrical Engineering, University of Wisconsin, Madison, Wisconsin.

## TEACHING EXPERIENCE

Professor, Virginia Polytechnic Institute and State University, 1999-present.

Associate Professor, Virginia Polytechnic Institute and State University, 1986-1999.

Visiting Associate Professor, University of California - Santa Barbara, Winter, 1989.

Assistant Professor, Virginia Polytechnic Institute and State University, 1980-1985.

Assistant Professor of Finance, University of Michigan, School of Business Administration, 1978-1980.

Lecturer in Finance, University of Michigan, School of Business Administration, 1976-1977.

Teaching Assistant, University of Wisconsin, School of Business, 1972-1973.

## **INDUSTRIAL EXPERIENCE**

Electrical Engineer, Westinghouse Electric Corporation, Baltimore, Maryland, 1968-1971.

## **TEACHING**

### ***Undergraduate Courses Taught at Virginia Polytechnic Institute and State University (last nine years):***

International Finance  
Debt Markets and Interest Rates  
Free Markets & Individual Freedom  
Advanced Financial Management  
Investments I  
Investment Analysis and Equity Markets

### ***Graduate Courses Taught at Virginia Polytechnic Institute and State University (last nine years):***

Interest Rates & Fixed Income Securities  
Free Markets & Individual Freedom  
Principles of Finance  
Financial Policies  
Investment Analysis and Portfolio Management  
Introduction to Financial Theory (Ph.D. seminar)  
Investments (Ph.D. seminar)

### ***Courses Taught at Other Universities:***

Managerial Finance (MBA and Undergraduate)  
Investments (MBA and Undergraduate)  
Quantitative Methods in Finance  
Theory of Finance  
Ph.D. Seminars in finance theory and investments  
Faculty Member of Michigan Banking School (Summer 1979)

### ***Innovations:***

Developed a course Web page for each teaching assignment since 1997.

Computer Applications: developed a series of investment exercises which use Value Screen Plus by Value Line.

Wrote computer programs to: calculate IRR and NPV (uses methods of Teichroew, Robichek, and Montalbano); calculate various measures of bond yield.

Developed a bond portfolio management game that simulates a bond market with a stochastic term structure.

Developed series of exercises that are used in conjunction with an LP package to apply Weingartner's capital budgeting methods.

Updated and modified for the PC a program by Gordan Alexander which solves for the efficient frontier.

## **PUBLICATIONS**

### **I. Refereed Journal Articles:**

"A New Bispectral Test for Nonlinear Dependence," (with R. Ashley and E. Rusticelli) *Econometric Reviews*, Vol. 28 (1-3) Jan. – June 2009, pp. 279 – 293.

"Detecting Epochs of Transient Dependence in White Noise," (with M. Hinich) in M. Belongia, and J. Binner, eds., *Money, Measurement and Computation*. Palgrave Macmillian, 2006, pp. 61 - 75.

"Evaluating the Effectiveness of State Switching Time Series Models for U.S. Real Output," with R. Ashley), *Journal of Business and Economic Statistics*, Vol. 24 (3), July 2006, pp 266 – 277.

"The Cross-Sectional and Cross-Temporal Universality of Nonlinear Serial Dependencies: Evidence from World Stock Indices and the Taiwan Stock Exchange," (with P. Ammermann), *Pacific-Basin Finance Journal*, forthcoming.

"A Transactions Data Analysis of Nonsynchronous Trading," (with G. Kadlec), *Review of Financial Studies*, (12) Fall 1999, pp. 609-630.

"Are Technology Shocks Nonlinear?," (with S. Altu□ and R. Ashley), *Macroeconomic Dynamics*, 3(4), 1999 pp. 506-533.

"A Test for Nonstationarity: Abridged Version," in W. Barnett, M. Salmon, and A. Kirman, eds., *Nonlinear Dynamics in Economics*, Cambridge University Press, 1996, pp. 297-306. [An earlier version of this paper appeared in The Proceedings of the Business and Economic Statistics Section of the American Statistical Association, San Francisco, August 8-12 (1993).]

"On the Importance of Being Nonlinear: A Frequency Domain Approach to Nonlinear Model Identification and Estimation," (with R. Ashley), in W. Barnett, M. Salmon, and A. Kirman, eds., *Nonlinear Dynamics in Economics*. Cambridge University Press, 1995. [An earlier version of this paper appeared in The Proceedings of the Business and Economic Statistics Section of the American Statistical Association, San Francisco, August 8-12 (1993).]

“A New Diagnostic Test of Model Inadequacy Which Uses the Martingale Difference Criterion,” (With M. Hinich), *Journal of Time Series Analysis*. (1992) 13 (3), pp. 233-252.

“Intra-Day Nonlinear Behavior of Stock Prices,” (with M. Hinich) in R. Day and P. Chen, eds., *Evolutionary Dynamics and Nonlinear Economics - A Transdisciplinary Dialogue*, Proceedings of the International Symposium, the University of Texas at Austin, New York: Oxford University Press, 1993. [An earlier version of this paper was published as “Bispectral Analysis of Trade-by-Trade Stock Prices and the Time-of-Day Effect,” in The Proceedings of the Business and Economics Statistics Section of the American Statistical Association, New Orleans, August 22-25 (1988), pp. 81-90. (Invited paper).]

“The Marginal Value of Management Under Stochastic Control,” (with D. Bosshardt), *Journal of Economic Dynamics and Control*, 15, 1991, pp. 455-489.

“A Nonparametric Distribution-Free Test for Serial Independence in Stock Returns: A Comment,” (with R. Ashley), *Journal of Financial and Quantitative Analysis*, (September 1990), pp. 417-418.

“Identification of the Coefficients in a Non-Linear Time Series of the Quadratic Type,” (with M. Hinich) reprinted in W. Barnett and A. R. Gallant, eds., *New Approaches to Modeling, Specification Selection, and Econometric Inference*, Cambridge University Press, 1990.

“Linear Versus Nonlinear Macroeconomies: A Statistical Test,” (with R. Ashley), *International Economic Review*, (1989) 30 (3), pp. 685-703.

“Evidence of Nonlinearity in the Trade-by-Trade Stock Market Return Generating Process,” (with M. Hinich), in W. Barnett, J. Geweke, and K. Shell, eds., *Economic Complexity: Chaos, Sunspots, Bubbles, and Nonlinearity*, Cambridge University Press, 1989, pp. 383-409.

“Nonlinear Serial Dependence in Industrial Stock Returns,” (with R. Ashley and M. Hinich), in D. Lawrence, J. Guerard, and G. Reeves eds., *Advances in Mathematical Programming and Financial Planning*, Vol. 2, Greenwich, Connecticut: Jai Press, 1990.

“Bispectral Based Tests for the Detection of Gaussianity and Linearity in Time Series,” (with P. Brockett and M. Hinich), *Journal of the American Statistical Association*, (Sept. 1988), pp. 657-664.

“A Diagnostic Test for Nonlinear Serial Dependence in Time Series Fitting Errors,” (with R. Ashley and M. Hinich), *Journal of Time Series Analysis*, (1986), pp. 165-178.

“The Speed of Adjustment of Warrant Prices to Changes in Stock Prices,” *Journal of Business & Economic Statistics*, (1986), pp. 223-241.

“A Non-Parametric, Distribution-Free Test for Serial Independence in Stock Returns,” (with R. Ashley), *Journal of Financial and Quantitative Analysis*, (1986), pp. 221-227.

“Identification of the Coefficients in a Nonlinear Time Series of the Quadratic Type,” (with M.

Hinich), *Journal of Econometrics*, (1985), 30 (12), pp. 109-129. This work was supported by Research Grant N60921-83-G-A165-B005, Naval Surface Weapons Center.

“Reply to Marsh’s Note,” (with M. Hinich), *Journal of Econometrics*, (1985) 30 (12), pp. 140-142.

“Evidence of Nonlinearity in Daily Stock Returns,” (with M. Hinich), *Journal of Business & Economic Statistics*, (1985) 3 (1), pp. 69-77.

“BISPEC: A Program to Estimate the Bispectrum of a Stationary Time Series,” *American Statistician*, (1983) 37 (4), pp. 323-324.

## **II. Other Publications:**

“Stock Markets,” in *Encyclopedia of Electrical and Electronics Engineering*, Vol. 20 pp. 555-566. J. G. Webster, ed. New York: John Wiley & Sons, 1999.

Review of *Nonlinear Dynamics, Chaos, and Instability*, by W. A. Brock, D. A. Hsieh, and B. LeBaron. *Journal of Finance*, (1993), 48 (1), pp. 404-407.

*Warrant prices in the context of the option pricing model and the efficiency of the New York Stock Exchange*. University Microfilms: Ann Arbor, 1978. Library of Congress call number H62 D57 1978 P38.

## **III. Books:**

R. J. Ashley and D. M. Patterson, *A Nonlinear Time Series Workshop: A Toolkit for Detecting and Identifying Nonlinear Serial Dependence*. New York: Kluwer Academic Publishers, 2000.

## **IV. Working Papers:**

“The Traditional Form of the Market Model as a Nested Model of the Error Correction Form of the Market Model: An Application to Size Portfolios,” (with J. Hur), April 2009.

“A Test of the GARCH (1,1) Specification for Daily Stock Returns,” March 2009.

“A Disequilibrium Capital Asset Pricing Model,” (with R. Powers), February 2002.

“The Episodic Behavior of Dependencies in High Frequency Stock Returns,” (with M. Hinich), October, 2000.

“Nonlinear Model Specification/Diagnostics: Insights From a Battery of Nonlinearity Tests,” (with R. Ashley), April, 2000.

## AWARDS AND GRANTS

Summer research Grant 2003, Dept. of Finance, Virginia Tech.

National Science Foundation travel grant, 2001. Supported travel to the NBER Time Series Seminar, North Carolina State University, Raleigh, NC.

National Science Foundation travel grant, 1998. Supported travel to the Econometrics and Financial Times Series Conference, Isaac Newton Institute, Cambridge, England.

National Science Foundation travel grant, 1998. Support for travel to the NBER Time Series Seminar, University of Chicago Graduate School of Business, Chicago, Illinois.

Department of Finance Summer Research Grant, 1997. Supported work in the area of continuous time valuation theory.

National Science Foundation travel grant, 1996. Support for travel to the NBER Time Series Seminar, Erasmus University, Rotterdam, Netherlands.

National Science Foundation travel grant, 1995. Support for travel to NBER Time Series Seminar, Harvard University, Cambridge, Massachusetts.

Research Contract, "Angle Glint and its Bicovariances," Naval Underwater Systems Center (\$19,700), 1990.

Department of Finance Summer Research Grant, 1988. Supported work on the paper "Intra-Day Nonlinear Behavior of Stock Prices."

National Science Foundation travel grant, 1986. Supported travel to the NBER Time Series Seminar, Southern Methodist University, Dallas, Texas.

Research Grant, "Methods for Nonlinear Time Series Identification," Naval Surface Weapons Center (\$28,138), 1985. Provided support for "Linear Versus Nonlinear Macroeconomies: A Statistical Test," (with R. Ashley).

Teaching Learning Grant, "CRSP Access System," Learning Resources Center, VPI & SU, 1984 (competitive award).

Research Grant, "Proposal to Study the Statistical Properties of Ambient Noise Using Bispectral Estimation Techniques," Naval Surface Weapons Center (\$26,989), 1984. Provided support for "Identification of the Coefficients in a Nonlinear Time Series of the Quadratic Type," (with M. Hinich) *Journal of Econometrics*, (1985).

Teaching Learning Grant, "Bond Market Simulation Game," Learning Resources Center, VPI & SU, 1981 (competitive award).

Received \$2,500 research grant for acquisition of trade-by-trade stock and option price data from Rackham Graduate School, University of Michigan, 1979 (competitive award).

Faculty Research Fellowship, Rackham Graduate School, University of Michigan, 1979 (competitive award).

### **EDITORIAL SERVICE (Past 8 years)**

*The Review of Financial Studies* – referee

*National Science Foundation* - proposal reviewer

*Review of Economics and Statistics* - referee

*Journal of the American Statistical Association* - referee

*Macroeconomic Dynamics* – referee

*International Economic Review* - referee

*Journal of Economic Dynamics and Control* - referee

*Journal of Financial and Quantitative Analysis* - referee

*Journal of Applied Econometrics* - referee

*Journal of International Money and Finance* - referee

*Annals of Finance* – referee

*Cambridge University Press* - proposal reviewer

*Journal of Economic and Business Organization* - referee

*The Financial Review* - referee

*Journal of American Acoustical Society* - referee

*Journal of Business Economics* – referee

*Econometric Reviews* – referee

*Journal of the Society for Nonlinear Dynamics and Econometrics* – referee

*Journal of Empirical Economics* – referee

## **PROFESSIONAL MEETINGS, CONFERENCES, AND WORKSHOPS**

Presented: "Did Herding Cause the Stock Market Bubble of 1998-2001?" at the annual meeting of the society for the Study of Nonlinear Dynamics and Econometrics," San Francisco, April 3-4, 2008.

Presented: "A Disequilibrium Capital Asset Pricing Model," NBER/NSF Conference "Financial Risk and Time Series Analysis," Munich Germany, September 20-21, 2005.

Invited Speaker: "Statistical Inference on Linear and Non-Linear Dynamics in Time Series," conference held in Bressanone Italy, June 9-11, 2005.

Discussant: NBER/NSF Time Series Seminar, September 19-20, 2003, University of Chicago, Chicago IL.

Presented: "Identification of Coefficients in a Quadratic Moving Average Process Using the Generalized Method of Moments" to the Research Seminar of the Atlanta Fed, March 20, 2003.

Presented: "Identification of Coefficients in a Quadratic Moving Average Process Using the Generalized Method of Moments" at Tenth Annual Symposium of The Society for Nonlinear Dynamics and Econometrics, March 14-15, 2002 Atlanta Georgia.

Presented: "Identification of Coefficients in a Quadratic Moving Average Process Using the Generalized Method of Moments" at NSF/NBER Time Series Seminar, Sept. 20-22, 2001 Raleigh NC.

Presented: "A Transactions Data Analysis of Nonsynchronous Trading," at the University of California - Santa Barbara, the University of California - Riverside, and the University of Southern California, April 16-22, 1999.

Presented: "The Episodic Behavior of Dependencies in High Frequency Stock Returns," at the Econometrics and Financial Time Series Conference, Isaac Newton Institute for Mathematical Sciences, October 12-16, 1998 at Cambridge England.

Presented: "Nonlinear Model Specification/Diagnostics: Insights from a Battery of Nonlinearity Tests," at the NSF/NBER Time Series Seminar held September 4-5, 1998 at the Graduate School of Business, University of Chicago, Chicago, Illinois.

Presented: "A Direct Comparison of the BDS, Hinich, and Other Tests for the Presence of Nonlinear Dependence in Time Series," at the meeting of the Society of Nonlinear Dynamics and Econometrics, New York, March 19-20, 1998.

Presented: "A Direct Comparison of the BDS, Hinich, and Other Tests for the Presence of Nonlinear Dependence in Time Series," at the NSF/NBER Time Series Seminar held October 17-19, 1996 at Rotterdam Netherlands.

Presented: "Detecting Epochs of Transient Dependence in Intra-Day Stock Returns," at Annual Meeting of Society for Nonlinear Dynamics and Econometrics, March 15-17, 1996, Boston, Massachusetts (invited paper).

Presented: "Detecting Epochs of Transient Dependence in White Noise," at NBER Time Series Seminar, November 17-18, 1995, Harvard University, Cambridge, Massachusetts.

Presented: "The Episodic Nature of Observed Linear and Nonlinear Behavior in Common Stock Intra-Day Returns and Trading Volume," at Southwest Conference on Dynamical Systems and Ergodic Theory, November 19-20, 1994, Austin, Texas.

Presented: "A Test for Nonstationarity: Abridged Version," at the 153rd annual meeting of the American Statistical Association, San Francisco, August 8-12, 1993.

Discussed: "A Causal Relationship Between Stock Returns and Volume," by Rochelle L. Antoniewicz, at the 153rd annual meeting of the American Statistical Association, San Francisco, August 8-12, 1993.

Presented: "A New Diagnostic Test of Model Inadequacy Which Uses the Martingale Difference Criterion," at 67th Annual Conference of the Western Economic Association, San Francisco, July 9-13, 1992, (invited paper).

Presented: "Relating Sample Bicovariances of a Process to the Parameters of a Quadratic Nonlinear Model," at UCLA Program in Applied Econometrics Conference on Nonlinear Dynamics and Econometrics, Los Angeles, April 5-6, 1991.

Presented: "Bispectral Analysis of Trade-by-Trade Stock Prices and the Time-of-Day Effect," at the Department of Finance Seminar Series, University of Texas at Austin, November 3, 1989.

Presented: "New Diagnostic Test of Model Inadequacy Which Uses the Martingale Difference Criterion," at the Econometrics Workshop, Department of Economics - UCLA, May 19, 1989.

Presented: "Intra-Day Nonlinear Behavior of Stock prices," at the International Symposium on Evolutionary Dynamics and Nonlinear Economics, IC<sup>2</sup> Institute, Austin, Texas, April 16, 1989 (invited paper).

Presented: "Bispectral Analysis of Trade-by-Trade Stock Prices and the Time-of-Day Effect," at the annual meeting of the *American Statistical Association*, New Orleans, Louisiana, August 22-25, 1988 (invited paper).

Presented: "Fitting a Quadratic Moving Average Model to Data," at the annual meeting of the Economic Dynamics and Control Society, Tempe, Arizona, March 17-19, 1988 (invited paper).

Presented: "A Bispectrum Based Test of the Stationary Martingale Model," December 3-9, 1987 at the following locations in Great Britain: University of Manchester Institute of Mathematics and Statistics; University of Kent, Canterbury; London School of Economics; Imperial College of Technology, London.

Presented: “Evidence of Nonlinearity in the Trade-by-Trade Stock Market Return Generating Process,” at Conference on Economic Complexity: Chaos, Sunspots, Bubbles and Nonlinearity, Austin, Texas, May 28-29, 1987.

Presented: “Linear Versus Nonlinear Macroeconomies: A Statistical Test” and “A Bispectrum Based Test of the Stationary Martingale Model,” at the NSF-NBER Seminar on Time Series, Dallas, Texas, October 17-18, 1986.

Presented: “Linear Versus Nonlinear Macroeconomies: A Statistical Test,” at the Interdisciplinary Modeling Seminar, Department of Economics, NYU, April 28, 1986.

Presented: “Identification of the Coefficients in a Nonlinear Time Series of the Quadratic Type,” (with M. Hinich), at the conference - New Approaches to Modeling, Specification Selection, and Econometric Inference - sponsored by the Institute for Creative Capitalism, University of Texas, Austin, Texas, May, 1984.

Presented: “Evidence of Nonlinearity in Daily Stock Returns,” (with M. Hinich), at the Financial Management Association, (subsequently published in *Journal of Business & Economic Statistics*, see journal citations). Atlanta, Georgia, October, 1983.

## **SERVICE**

Director of the Program on Exploring the Foundations of Capitalism and Freedom, 2007-present

Director of Department of Finance Ph.D. Program, 1991-1996

Chairman of the Pamplin College of Business Computer Committee, 1990-1995, 2000-2001.

Undergraduate Career Advisor, Finance, 1993-1995.

Member Department of Finance Promotion and Tenure Committee

Past chairman of the Finance Department Student and Faculty Awards Committee

Past member Pamplin College of Business Faculty and Student Awards Committee

Member Finance Department Ph.D. Committee

Past member Finance Department Undergraduate Curriculum Committee

Past member Finance Department Graduate Curriculum Committee

## **HONORS AND RECOGNITIONS**

College of Business, VPI & SU, Certificate of Teaching Excellence, 1983.

Listed in 2003 edition of *Marquis Who's Who in America*.

Listed in 32nd edition of *Marquis Who's Who in Finance and Industry*.

## **PH.D. COMMITTEES**

### **I. Service as Chairman:**

Vivek Sharma, Ph.D in Business, Virginia Polytechnic Institute and State University, 2004.

Debra Skaradzinski, Ph.D. in Business, Virginia Polytechnic Institute and State University, 2003.

Peter Ammermann, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1999.

Douglas DeJong, Ph.D. in Business, University of Michigan, 1980.

### **II. Service as Committee Member:**

William Moore, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1982.

Zakri Bello, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1982.

John MacDonald, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1986.

Thomas Gosnell, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1987.

Phillip Taylor, Ph.D. in Economics, Virginia Polytechnic Institute and State University, 1989.

John Broughton, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1989.

Calin Valsan, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1996.

Jaideep Chowdhury, Ph.D. in Business, Virginia Polytechnic Institute and State University, 2008.

## **MEMBERSHIP IN HONORARY AND PROFESSIONAL ORGANIZATIONS**

American Finance Association

American Economic Association

Beta Gamma Sigma