ANDREW CLARK–*CURRICULUM VITAE*

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Education

Emerson College, Boston, Massachusetts, 1969–1973.

Courant Institute for Mathematical Sciences, New York, New York, 1973–1976.

Work Experience

Federal Water Quality and Protection Administration (FWQPA, later part of the Environmental Protection Agency [EPA]): summers 1970–1973, worked as a junior mathematician and programmer.

Citibank/Citicorp: 1976–1993

- Staff mathematician in the Economics Department: 1976–1981
- Management trainee: 1981–1982
- Worked in the finance department of Citicorp Savings in Oakland, California
  - Senior financial analyst: 1982 -1984
  - Assistant controller: 1985 - 1986
- One of two senior risk managers for Citibank's North American trading desks: 1986–1988
- Managing director of one of two U.S. Treasury sales and trading desks : 1988–1989
- Managing director of MBS and ABS sales and trading desk : 1989–1991
- Chief of staff to the head of global trading: 1989–1991
- Various M&A work: 1989–1991
- Conducted a special project under the direction of the vice-chairmen and worked with the senior credit officer of Citibank/Citicorp. The goal was to securitize selected assets (both performing and nonperforming) in order to improve the corporation's capital position by $1B: 1992–1993

Thomson Reuters: 2000 - 2014

- Research analyst: 2000–2002
  - Developed the Lipper Leaders mutual fund ranking tools. These rankings covered risk adjusted return, downside variance, the effect of expenses on returns and tax efficiency
- Senior research analyst: 2003–2006
  - One of the two main spokesmen for Lipper. Several TV appearances, in particular on CNBC. Also was regularly quoted in the financial press both in the U.S. and overseas
- Head of Lipper Research for the Americas and Global Manager of Quantitative Research for Thomson Reuters' Research and Asset Management Division: 2006–2008
    - Developed a best-fit index methodology used to calculate benchmarks for equity and bond mutual funds

    - Developed the Lipper Optimal Indices
        - These are indices that analyze ETFs and ETNs in order to construct conservative, moderate and high risk investment portfolios
        - The indices, with ETF and ETN constituents and portfolio weights, were issued as mutual funds issued by Henio and Walsh
        - Patent pending
- Head of Research and Chief Index Strategist for Thomson Reuters Indices: 2008–2011
    - Lead the effort to develop and release 20,000+ country, region and sector equity indices
    - Headed the Index Management Committee
    - Developed Realized Volatility Indices
        - These indices use a realized volatility forecast for each component – stocks or commodities – in order to construct daily, weekly or monthly volatility indices
        - Patent granted in both the U.S. and the E.U. in 2013
    - Using Random Matrix Theory, showed how a replicating index/portfolio can perform as well as existing developing and frontier market country and regional stock indices Presented at the *Art of Indexing* conference, 2008
    - Developed first ESG indices for wide use in the U.S.
    - Developed liquidity methodologies that take into account zeroes (non-trading days).
        - Showed the superior performance of same versus commonly used methods of measuring liquidity See *Journal of Indexes* paper, 2011
        - Methodologies where used by Reuters on their frontier market pages to rank individual stock and stock exchange liquidity
        - Using Random Matrix Theory, showed that the first three eigenvectors (a long only portfolio and two long-short portfolios related to sectors such as financials, energy and utilities) can be sorted based on their liquidity. Presented to the Hong Kong Society of Financial Analysts, 2012

- Manager of Alternatives Investment Research, Lipper: 2011-2014
    - Developed methodologies to build benchmarks for liquid alternative mutual funds and ETFs.

Other Experience

Completed the traditional Tibetan Buddhism three-year, three-week, and three-day religious retreat: 1995–1998

Completed the traditional Tibetan Buddhism college (*shedra*) training on logic, philosophy, and the eight major texts of the Karma Kagyu tradition: 1998–2000

Published Papers

Physica A (2004): Evidence of Log-Periodicity in U.S. Bond Spreads

Quantitative Finance (2005): The Use of Hurst and Effective Return in Investing

European Physical Journal B (2006): Modeling the Net Flows of U.S. Mutual Funds With Stochastic Catastrophe Theory

Proceedings of the Third IASTED International Conference on Financial Engineering and Applications (FEA 2006): Securities Selection and Portfolio Optimization–Is Money Being Left on the Table?

Encyclopedia of Mathematics (2010: Genetic Algorithms, https://www.encyclopediaofmath.org/index.php/Genetic_Algorithms

Journal of Indexes (2011): Realized Volatility Indexes

Journal of Index Investing (2011): Revamping Liquidity Measures: Improving Investibility in Emerging and Frontier Market Indices and Their Related ETFs

Journal of Investing (2012): Using MOEAs to Outperform Stock Benchmarks in the Presence of Typical Investment Constraints

Physica A (2012): Heat Baths and Computational Agent-Based Models

Journal of Indexes (2012): Determining Market-Capitalization Breakpoints–A Global Perspective

Technical Papers

The Use of Linear Programming in Cash Management, technical report, Citibank technical report, 1984.

Monte Carlo Simulation of a Mixture of Normals and its Application to Security Pricing, Citibank technical report, 1988.

Expanding the Use of the Ho-Lee model to Asset-back Security Pricing, Citibank technical report, 1991.

Finding the Cheapest Way to Fund Commercial and Consumer Loans via Non-Linear Programming, Citibank technical report, 1992.

Using Hook’s Spring Constant as a way of Analyzing and Investing Excess Deposits, Citibank technical report, 1993.

The Use of Neural Networks in Currency Trading, Citibank technical report, 1994

The Sources of Excess Return in Growth and Value Funds, Lipper *FundIndustry Insight Report*, 2003.

“Does Fund Size Affect Performance – Part I, Lipper *FundIndustry Insight Report*, 2003.

“Does Fund Size Affect Performance – Part II, Lipper *FundIndustry Insight Report*, 2004

The U.S. Dollar – A Recent Analysis, Lipper *FundIndustry Insight Report*, 2004.

Inflation and Commodities, Lipper *FundIndustry Insight Report*, 2004.

Small Cap funds versus Large Cap Funds – The Drivers of Performance and when to Re-Allocate, Lipper *FundIndustry Insight Report*, 2004.

How Well do Expenses and Net Returns Predict Future Performance, Lipper *FundIndustry Insight Report*, 2004.

Oil and Gold: Co movement or Coincidence? Lipper *FundIndustry Insight Report*, 2004.

The Outlook for Crude Oil Prices and Natural Resource Funds, Lipper *FundIndustry Insight Report*, 2004.

The U.S. Dollar: Which Funds to be in When it Climbs and Which Funds to Be in When it Falls, Lipper *FundIndustry Insight Report*, 2004.

Survivorship Bias in Mutual Funds: Is it as Important as Others Claim? Lipper *FundIndustry Insight Report*, 2005.

Asset Allocation: The use of CVaR and Kendall’s Tau in Constructing Portfolios, Lipper *FundIndustry Insight Report*, 2005.

Security Selection and Portfolio Optimization: Is Money Being Left On The Table? Lipper *FundIndustry Insight Report*, 2005.

Risk and Risk Measures, Lipper *FundIndustry Insight Report*, 2005.

Investing at the Center and the Use of the Fisher Information Index, Lipper *FundIndustry Insight Report*, 2005.

Choosing Funds Based on Past Performance – Is That the Best Thing To Do? Lipper *FundIndustry Insight Report*, 2005.

REIT Funds: Cheap, Dear or Fairly Priced? Lipper *FundIndustry Insight Report*, 2005.

Picking the Neffs and Millers of the Future with Lipper Leaders, Lipper *FundIndustry Insight Report*, 2006.

The Role of Hedge Funds and Hedge-like Mutual Funds in a Portfolio, Lipper *FundIndustry Insight Report*, 2007

Stock Funds Net Flows Are Down, But Are They Out? Lipper *FundIndustry Insight Report*, 2007

Growth and Value Stock Indices under the EDA Microscope, Stanford University, 2009

Squeezing a Little More Out of Commodities – Earning Alpha from the Thomson Reuters/Jefferies CRB Index, Thomson Reuters Indices Report, 2010

Expanding the Computation of Mixture Models by the use of Hermite Polynomials and Ideals, arXiv 2015, http://arxiv.org/find/grp_stat,grp_q-fin/1/au:+clark_andrew/0/1/0/all/0/1

Piecewise Linear Topology, Evolutionary Algorithms, and Optimization Problems, arXiv:1206.672, 2014

Book Chapters

Handbook of Portfolio Construction (Springer, 2010): Robust Portfolio Construction

IAENG Transactions on Engineering Technologies, Lectures Notes in Electrical Engineering 170 (Springer, 2012): Using MOEAs to Outperform Stock Benchmarks in the Presence of Typical Investment Constraints

Alternative Investments– Instruments, Performance, benchmarks and Strategies: (John Wiley and Sons, 2013): Performance of Commodities

Financial Markets: Recent Developments, Emerging Practices and Future Prospects (Nova Publishing, 2014): Using Alternative Investments in a Multi-Asset Portfolio

Papers Presented at Conferences: Peer Reviewed

Midwest Finance Association: The Use of Hurst Exponent in Finance, 2003

Midwest Finance Association: Does Fund Size Affect Performance, 2004

10th Annual Factset Users Conference: Security Selection and Portfolio Optimization: Is Money Being Left On The Table? 2005

NAPFA Western Region Conference: Active versus Passive Investing, 2006

Burridge Conference: Measuring Risk in Hedge Funds, 2007

Eastern Sectional Meeting, American Mathematical Society, Penn State: The Use of Random Dynamical Systems in Computational Agent-Based Modeling, 2009

116th Meeting, American Mathematical Society: Continuous Time Model of Bifurcations and Related Phenomena in Agent-Based Models, 2010

4th International Conference on Computational and Financial Economics (CFE '10), sponsors: London School of Economics and University of London, Semiplenary speaker: Using Wavelets and Nonlinear Dynamics to Forecast Volatility, 2010

Section Leader for 4th International Conference on Computational and Financial Economics (CFE '10), sponsors: London School of Economics and University of London

SIAM Conference, Control and Its Application, Plenary speaker: Optimization Using Evolutionary Algorithms, 2011

Section Leader for 25th IFIP TC7 Conference on System Modeling and Optimization

International Conference on Operation Research (OR 2011): Why Evolutionary Algorithms Work–The Convex Optimization Case, 2011

Section Leader for International Conference on Operation Research (OR 2011)

25th IFIP TC7 Conference on System Modeling and Optimization: Using MOEAs to Outperform Stock Benchmarks Given Typical Investment Constraints, 2011

IAENG, World Congress of Engineering and Computer Science: Using MOEAs to Outperform Stock Benchmarks Given Typical Investment Constraints, 2011

Conferences: Invited Speaker

Institutional Investor Fixed Income Conference: Fixed Income Innovations: A Review and Outlook of Lipper Ratings and Rankings, 2003

Thornberg Client Conference: Customizing the Fund Investment Process, 2003

NEBC Conference: Oil, Gold, and the Stock Market, 2003

Denver Society of Securities Analysts: Fixed Income Outlook and Review, 2003

Wuhan International Financial Fair 2003 and World Forum: Fixed Direct Investment: Review of Current Trends and the Outlook for China, 2003

NAPFA Analytical Conference: Best Practices for Planners in Light of the Mutual Fund Scandals, 2004

NAPFA Analytical Conference: Passive Versus Active Investing, 2005

Factset Investment Process Symposium: Securities Selection and Portfolio Optimization: Is Money Being Left on The Table?, 2005

Singapore Society of Financial Analysts Conference: Mutual Fund Performance Measures: A Review and Look Forward, 2005

Third IASTED International Conference on Financial Engineering and Applications: Security Selection and Portfolio Optimization: Is Money Being Left On The Table? and Investing at the Center and the Use of the Fisher Information Index , 2006

Fourth IASTED International Conference on Financial Engineering and Applications: Evidence of Turbulence and Random Fractals in U.S. Bond Fund Flows, 2007

Art of Indexing: Exposure Stock Indices: Minimum Purchases for Regional Exposure, 2008

13th Annual SuperBowl of Indexing: Emerging Market Liquidity, 2008

Art of Indexing: Can Commodities Be Used to Hedge U.S. Consumer Inflation?, 2009

Dividend Days, sponsored by Societe General and Thomson Reuters: Dividend-Based Indices, 2009

14th Annual SuperBowl of Indexing: Correlations and Stock Selection, 2009

Inside ETFs Europe: Implementing Portfolio Strategies with ETFs, 2010

London Society of Financial Analysts: Quantitative Investment Case Study - The Finer Points: What Makes Sectors Tick?, 2010

Indexing and ETF Investments: Promoting Index-Based Products in an Uncertain Economy, 2010

Asian Investor Conference (Master Class): Portfolio Construction & Asset Class Strategies–Determining Specific Securities Weightings and Implementing a Value-Investing Approach, 2010

Asian Investor Summit: Quantitative Investment Case Study - The Finer Points: What Makes Sectors Tick?, 2010

15th Annual SuperBowl of Indexing: Frontier Market Liquidity Premiums, 2010

Asian Wealth Management Forum: Stocks and Stock Indices in APAC–Where Are They Going?, 2012

Hong Kong Society of Financial Analysts: Price Risk, Liquidity Risk, and Noise: Constructing Better Risk-Based Investments, 2012

ICI Investment Management Conference, 2014

5th Annual Inside ETFs Europe, 2014

Awards

Best Investment Paper, Midwest Finance Association: Does Fund Size Affect Performance?, 2004

Most Innovative Index, SuperBowl of Indexing: Realized Volatility Index, 2009

Best Paper, World Congress on Engineering and Computer Science: MOEAs and Optimization, 2011

Patents

Lipper Optimal Indices (pending)

Realized Volatility Indices, Thomson Reuters Indices (patent granted in 2013)

MOEAs and Portfolio Construction, Thomson Reuters Indices (pending)

University Courses Taught

University of Colorado, Denver, three-day Colloquium on the Mathematical Review of Fund Returns, 2005

University of Colorado, Boulder, Introduction to Fixed Income, three sessions, part of a semester-long MBA course in Finance, 2005

Stanford University, two-day Colloquium on the Use of Topology in Finance, 2009

Instructor, Leeds School of Business, University of Colorado, Boulder, 2015 to present

Past Referee for:

Applied Computing

Journal of Investing

Journal of Index Investing