Anthony Sanford

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CONTACT INFORMATION

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RESEARCH INTERESTS

Asset pricing, recovery theorem, derivatives, portfolio theory, option theory, computational finance, financial econometrics, financial markets, risk, macro-finance

EDUCATION

University of Washington, Seattle, WA

Ph.D., Economics September 2012–Present

- Committee: Eric Zivot (co-chair), Mu-Jeung Yang (co-chair), Yu-Chin Chen, Thomas Gilbert, and Matthew Lorig
- Exam fields: Finance and Macroeconomics

M.A., Economics Fall 2015

Seattle University, Seattle, WA

M.S., Finance June 2012

Concordia University, Montreal, Qc, Canada

B.Comm., Finance and Economics June 2009

WORKING PAPERS

Abstracts provided at the end of this document.

"Recovery Theorem with a Multivariate Markov Chain." (Job Market Paper)

- SWFA Best Doctoral Student Paper in Investments

"State Price Density Estimation with an Application to the Recovery Theorem."

"Does Perception Matter in Asset Pricing? Evidence From Twitter-Based Sentiment Indices."

"Forward-Looking Expected Tail Loss: An Application of the Recovery Theorem."

(with Joannie Tremblay-Boire) "Corporate Executives on American Foundations? Boards of Directors and Foundation Financial Performance."

WORK IN PROGRESS

(with Mu-Jeung Yang) "News vs. Uncertainty Shocks in Firm Dynamics."

(with Thomas Fillebeen) "Do Small Firms Hedge? Forward Looking Beliefs using the Recovery Theorem."

Honors and Awards

Doctoral Fellowship, Fonds de recherche du Québec – Société et culture (FRQSC)	Spring 2017
Travel Grant, Society for Financial Econometrics (SoFiE)	Spring 2017
Best Doctoral Student Paper in Investments Track, Southwestern Finance Association	Fall 2016
Travel Grant, Southwestern Finance Association	Fall 2016
Buechel Scholarship, University of Washington Economics	Spring 2016
Travel Grant, University of Washington	Spring 2016
Travel Fellowship, CIREQ	Spring 2017, Spring 2016
Beta Gamma Sigma	Winter 2012
Alpha Sigma Nu (top 4%)	Winter 2012
Albers Alumni Scholarship, Seattle University	Winter 2012
Fruitt Family Scholarship, Brandeis University	Fall 2009

Research Experience

Graduate Research Assistantships

- Principal Investigator: Bridget Hiedemann — Winter–Spring 2012
  Dept. of Economics, Seattle University

Teaching Experience

Course Instructor

- Computational Finance and Financial Econometrics (Summer 2017, Winter 2017)

Graduate Teaching Assistantships

- Credit Risk Management (Graduate)

  Jay Henniger (Fall 2017)
- Computational Finance and Financial Econometrics (Undergraduate and Graduate)

  Eric Zivot (Summer 2016)
- Trading Systems (Graduate)

  Daniel Hanson (Spring 2016)
- Introduction to Microeconomics

  Melissa Knox (Fall 2014)
- Introduction to Statistical Methods

  Erich Studer-Ellis (Fall 2016, Fall 2015, Spring 2015, Fall 2013)

  Martha Pilcher (Winter 2016, Winter 2015, Winter 2014)

  Bruce Faaland (Summer 2013)
- American Foreign Policy

  Aseem Prakash (Spring 2013)
- Introduction to Political Economy

  Anthony Gill (Winter 2013)

Conference Presentations

"Recovery Theorem with a Multivariate Markov Chain." Presented at the 2017 Society for Financial Econometrics (SoFiE) conference, June 20–23 2017, New York, NY.

"Does Perception Matter in Asset Pricing? Evidence From Twitter-Based Sentiment Indices." Presented at the annual CIREQ conference, 19 May 2017, Montreal, Canada.

"Recovery Theorem with a Multivariate Markov Chain." Presented at the Southwestern Finance Association Conference (SWFA), March 8–11 2017, Little Rock, AR.

"Recovery Theorem with a Multivariate Markov Chain." Presented at the American Economics Association (AEA) poster session, January 6–8 2017, Chicago, IL.

(with Joannie Tremblay-Boire) "Corporate Executives on American Foundations? Boards of Directors and Foundation Financial Performance." Presented at the International Society for Third-Sector Research (ISTR) international conference, June 28–July 1 2016, Stockholm, Sweden.

"Recovery Theorem with a Multivariate Markov Chain." Presented at the annual Computing in Economics and Finance conference, June 26–28 2016, Bordeaux, France.

"Recovery Theorem with a Multivariate Markov Chain." Presented at the annual CIREQ conference, 20 May 2016, Montreal, Canada.

Invited Speaker

"Recovery Theorem with a Multivariate Markov Chain." *Amazon*, 18 August 2017, Seattle, WA.

"Does Perception Matter in Asset Pricing? Evidence From Twitter-Based Sentiment Indices." *Amazon*, 28 July 2017, Seattle, WA.

"Portfolio Theory: Risk Budgeting." Computational Finance and Financial Econometrics course, 9 August 2016.

Workshops

"Recovery Theorem with a Multivariate Markov Chain." Macroeconomics and Int'l Macroeconomics Workshop, University of Washington, 25 September 2017.

"Recovery Theorem with a Multivariate Markov Chain." Computational Finance and Risk Management's Microsoft Seminar Series, University of Washington, 13 January 2017.

"Forward-Looking Expected Tail Loss: An Application of the Recovery Theorem." Weekly Macroeconomics Brownbag, University of Washington, 8 November 2016.

Society for Financial Econometrics Summer School, July 2016, Brussels, Belgium. *(declined)*

"Recovery Theorem with a Multivariate Markov Chain." Weekly Macroeconomics Brownbag, University of Washington, 17 May 2016.

Professional Service

Panel Discussant. "Statistical Methods & Econometric Modeling 2." Southwestern Finance Association (SWFA) Conference, 8–11 March 2017, Little Rock, AR.

Session Chair. "Statistical Methods & Econometric Modeling 2." Southwestern Finance Association (SWFA) Conference, 8–11 March 2017, Little Rock, AR.

Graduate Student Mentor. University of Washington, 2017-2018, Seattle, WA.

Professional Organizations

Memberships:

- Financial Management Association 2017–Present
- Bachelier Finance Society 2017–Present
- Society for Financial Econometrics 2017–Present
- Southwestern Finance Association 2016–Present
- American Finance Association 2016–Present
- American Economic Association 2016–Present
- Northern Finance Association 2016–Present
- Society for Computational Economics 2016-Present
- Econometric Society 2016-Present
- Canadian Economics Association 2016-Present

Other Information

Languages:

- English: fluent (native); French: fluent (native); Spanish: basic

Software:

- LaTeX, R, Matlab, Stata, SAS, Interactive Brokers

References

Dr. Eric Zivot
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Dr. Thomas Gilbert
Foster School of Business, Finance
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Dr. Yu-Chin Chen
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Recovery Theorem with a Multivariate Markov Chain

In this paper, I redefine the prices derived in Ross' Recovery Theorem (Ross, 2015) using a multivariate Markov chain rather than a univariate one. I employ a mixture transition distribution where the proposed states depend on the level of the S&P 500 index and its options' implied volatilities. I include volatility because the transition path between states depends on the propensity of an underlying asset to vary. An asset that is highly volatile is more likely to transition to a far-away state. These higher transition probabilities should lead to higher state prices. The multivariate method improves upon the univariate RT because the latter does not include the volatility inherent in the state transition, which makes its derived prices less precise. The multivariate RT produces forecast results far superior to the univariate RT. Using quarterly forecasts for the 1996-2015 period, the out-of-sample R-square of the RT increases from around 12% to 30%. Moreover, using simulated data, I show that including the implied volatility in the multivariate Markov chain more closely captures the inherent risk in business cycles.

State Price Density Estimation with an Application to the Recovery Theorem

In this paper, I propose a new methodology for estimating a risk-neutral probability distribution. Many theoretical frameworks require market completeness. For most assets, however, the market is rarely, if ever, complete. In the case of financial options, we require completeness in order to estimate a full and well behaved risk-neutral probability distribution (implied volatility surface). Current estimation techniques use one mathematical model to interpolate option prices on two dimensions: strike price and time-to-maturity (TTM). I argue that the methodology to interpolate option prices should be different depending on which dimension we are trying to interpolate. This paper shows theoretically and empirically that using two different models is more accurate and efficient. I use B-splines with at-the-money knots and a function that depends on the option expiration horizon for TTM-based interpolation. This paper shows that the TTM dimension does not include enough observations to produce a reliable result from splines. The results of my "hybrid" interpolation technique are particularly striking when compared to benchmarks (Aït-Sahalia and Lo, stochastic volatility (SABR), and Heston models) in an application.

Does Perception Matter in Asset Pricing? Evidence from Twitter-Based Sentiment Indices

In this paper, I ask the question of whether consumer and investor perceptions matter in asset pricing? Using Twitter data, this paper tests whether short-term fluctuations in asset prices can be modeled using sentiment indices. This paper makes two major theoretical contributions. First, I scraped my own Twitter data and built sentiment indices using sentiment word dictionaries. Others have relied on third-party companies like Stocktwits to complete these tasks, which reduces transparency and limits the potential for customization. Second, my sentiment indices are numerical scores, not dichotomous variables, which allows me to control for the fact that words invoke sentiment strength (e.g. good vs. great), and not just a positive or negative feeling. The paper also makes an important theoretical contribution by using stock prices instead of returns. Fama and French (1989) suggest that stock prices can be decomposed into permanent and temporary components. In this paper, I show that the temporary components of stock price fluctuations can be attributed to changes in consumer or investor sentiments. An analysis on Apple stock finds that 20%-50% of the short-term (daily) fluctuations in log stock prices can be attributed to sentiment indices.

Forward-Looking Expected Tail Loss: An Application of the Recovery Theorem

In this paper, I propose to construct an optimal portfolio by minimizing the expected tail loss (ETL) derived from the forward-looking true distribution of the Recovery Theorem (RT). The RT is one of the first successful attempts at deriving an unparameterized true distribution of future asset returns. This distribution can be used as the criterion function in a portfolio optimization ETL problem. Using basket option prices, I apply the RT to obtain an expected distribution of returns. I then minimize the tail of this expected distribution of returns. The contributions of this paper to portfolio theory are twofold. First, we are making a minimal number of assumptions about the distribution of returns and about the investors in the economy in the optimization. Second, the criterion function (expected tail loss) used in the portfolio optimization problem is a coherent risk measure, which means it has the four generally agreed upon characteristics required to be defined as risk. In sum, this paper constructs a portfolio by minimizing the tail risk obtained from the natural probability distribution function derived from the RT. This paper constitutes the first major application of Ross' RT beyond its use in forecasting asset prices.

Corporate Executives on American Foundations? Boards of Directors and Foundation Financial Performance

We examine the relationship between the financial performance of American corporations and that of American foundations which have executives of these corporations as trustees. Various literatures, such as the board interlock and nonprofit literatures, suggest that we should see a positive association between the two organizations? (company and foundation) financial performance. The board interlock literature in management has demonstrated that corporate executives often use boards of directors as mechanisms to import and export various ideas, practices, and innovations from one firm to another. Nonprofit empirical research shows that corporate executives, based on their managerial experience and financial knowledge, influence nonprofits? financial performance positively. It may be the case that foundations seek out executives as trustees specifically to help them become more efficient financially. We hypothesize that when an executive of a high (low) performance company is on a foundation?s board of trustees, that foundation is also more likely to perform well (poorly) financially. We operationalize ?financial performance? for companies as the volatility and return on their stocks. For foundations, we operationalize financial performance as return on investments, fiscal efficiency, and grantmaking performance. We conduct statistical analyses using financial returns of S&P 500 companies and tax filings of grantmaking foundations.