Viktor Todorov

Contact Information

Finance Department
Kellogg School of Management
Northwestern University
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Education

Duke University, Durham, North Carolina, USA

Ph.D. in Economics, May 2007

- PhD Thesis: "Jump Processes in Finance: Modeling, Simulation, Inference and Pricing"
- Advisors: George Tauchen (chair), Tim Bollerslev, Ron Gallant, Han Hong

Central European University, Budapest, Hungary

M.A. in Economics, June 2002

Varna University of Economics, Varna, Bulgaria

B.A. in Finance, June 1999

Research Interests

Asset Pricing, Derivatives, Theoretical and Applied Econometrics, Applied Probability

Academic Appointments

Harold H. Hines Jr. Professor of Risk Management and Professor of Finance, **Kellogg School of Management, Northwestern University, 2016 - present**

Professor of Finance, **Kellogg School of Management, Northwestern University, 2015 - 2016**

Associate Professor of Finance, **Kellogg School of Management, Northwestern University, 2011 - 2015**

Assistant Professor of Finance , **Kellogg School of Management, Northwestern University, 2007 - 2011**

Publications

Chong, C. and V. Todorov, "Short-time Expansion of Characteristic Functions in a Rough Volatility Setting with Applications", accepted for publication in *Bernoulli.*

Todorov, V. and Y. Zhang, "Intraday Volatility Patterns from Short-Dated Options", *Journal of Econometrics*, 2024. 105732.

Todorov, V. and Y. Zhang, "Testing for Anticipated Changes in Spot Volatility at Event Times", accepted for publication in *Econometric Theory.*

Jacod, J., H. Lin and V. Todorov, "Systematic Jump Risk", *Annals of Applied Probability*, 2024, 34, pp 4342-4386.

Liao, Y. and V. Todorov, "Changes in the Span of Systematic Risk Exposures", *Quantitative Economics*, 2024, 15, pp 817-847.

Andersen, T.G., T. Su, V. Todorov and Z. Zhang, “Intraday Periodic Volatility Curves”, *Journal of the American Statistical Association*, 2024, 119, pp 1181-1191.

Li, J., V. Todorov and Q. Zhang, “Testing the Dimensionality of Policy Shocks”, *Review of Economics and Statistics*, 2024, 106, pp 470-482.

Chong, C. and V. Todorov, “Volatility of Volatility and Leverage Effect from Options”, *Journal of Econometrics*, 2024, 240, 105669.

Bollerslev, T. and V. Todorov, “The Jump Leverage Risk Premium”, *Journal of Financial Economics*, 2023, 150, 103723.

Andersen, T.G., Y. Li, V. Todorov and B. Zhou, “Volatility Measurement with Pockets of Extreme Return Persistence”, *Journal of Econometrics*, 2023, 237, 105048.

Andersen, T.G., R. Riva, M. Thyrsgaard and V. Todorov, “ Intraday Cross-Sectional Distributions of Systematic Risk”, *Journal of Econometrics*, 2023, 235, pp 1394-1418.

Todorov, V. and Y. Zhang, “Bias Reduction in Spot Volatility Estimation from Options”, *Journal of Econometrics*, 2023, 234, pp 53-81.

Todorov, V., “Nonparametric Jump Variation Measures from Options”, *Journal of Econometrics*, 2022, 230, pp 255-280.

Todorov, V. and Y. Zhang, “Information Gains from using Short-Dated Options for Volatility Measurement and Forecasting”, *Journal of Applied Econometrics*, 2022, 37, pp 368-391.

Zhang, C., J. Li, V.Todorov and G. Tauchen, “Variation and Efficiency of High-Frequency Betas”, *Journal of Econometrics*, 2022, 228, pp 156-175.

Todorov, V., “Higher-Order Small Time Asymptotic Expansion of Ito Semimartingale Characteristic Function with Application to Estimation of Leverage from Options”, *Stochastic Processes and their Applications*, 2021, 142, pp 671-705.

Andersen, T.G., M. Thyrsgaard and V.Todorov, “Recalcitrant Betas: Intraday Variation in the Cross-Sectional Dispersion of Systematic Risk”, *Quantitative Economics*, 2021, 12, pp 647-682.

Andersen, T. G., I. Archakov, L. Grund, N. Hautsch, Y. Li, S. Nasekin, I. Nolte, M.C. Pham, S. Taylor and V. Todorov, “A Descriptive Study of High-Frequency Trade and Quote Option Data”, *Journal of Financial Econometrics*, 2021, 19, pp 128-177.

Andersen, T. G., N. Fusari, V. Todorov and R. Varneskov, “Spatial Dependence in Option Observation Errors”, *Econometric Theory*, 2021, 37, pp 205-247.

Andersen, T. G., V. Todorov and M. Ubukata, “Tail Risk and Return Predictability for the Japanese Equity Market”, *Journal of Econometrics*, 2021, 222, pp 344-363.

Todorov, V., “Testing and Inference for Fixed Times of Discontinuity”, *Bernoulli*, 2020, 26, pp 2907-2948.

Andersen, T. G., N. Fusari and V. Todorov, “The Pricing of Tail Risk and the Equity Premium: Evidence from International Option Markets”, *Journal of Business and Economic Statistics*, 2020, 38, pp 662-678.

Todorov, V., “Nonparametric Spot Volatility from Options”, *Annals of Applied Probability*, 2019, 29, pp 3590-3636.

Andersen, T.G., M. Thyrsgaard and V.Todorov, “Time-Varying Periodicity in Intraday Volatility”, *Journal of the American Statistical Association*, 2019, 114, pp 1695-1707.

Andersen, T. G., N. Fusari, V. Todorov and R. Varneskov, “Inference for Option Panels in Pure-Jump Settings”, *Econometric Theory*, 2019, 39, pp 901-942.

Andersen, T. G., N. Fusari, V. Todorov and R. Varneskov, “Unified Inference for Nonlinear Factor Models from Panels with Fixed and Large Time Span”, *Journal of Econometrics*, 2019, 212, pp 4-25.

Li, J., V. Todorov, G. Tauchen and H. Lin, “Rank Tests at Jump Events”, *Journal of Business and Economic Statistics*, 2019, 37, pp 312-321.

Li, J., V. Todorov and G. Tauchen, “Jump Factor Models in Large Cross-Sections”, *Quantitative Economics*, 2019, 10, pp 419-456.

Qin, L. and V. Todorov, “Nonparametric Implied Levy Densities”, *Annals of Statistics*, 2019, 47, pp 1025-1060.

Todorov, V., “Nonparametric Inference for the Spectral Measure of A Bivariate Pure-Jump Semimartingale”, *Stochastic Processes and their Applications*, 2019, 129, pp 419-451.

Jacod, J. and V. Todorov, “Limit Theorems for Integrated Local Empirical Characteristic Exponents from Noisy High-Frequency Data with Application to Volatility and Jump Activity Estimation”, *Annals of Applied Probability*, 2018, 28, pp 511-576.

Li, J., V. Todorov, G. Tauchen and R. Chen, “Mixed-scale Jump Regressions with Bootstrap Inference”, *Journal of Econometrics*, 2017, 201, pp 417-432.

Li, J., V. Todorov and G. Tauchen, “Adaptive Estimation of Continuous-Time Regression Models using High-Frequency Data”, *Journal of Econometrics*, 2017, 200 pp 36-47.

Todorov, V., “Testing for Time-Varying Jump Activity for Pure Jump Semimartingales”, *Annals of Statistics*, 2017, 45, pp 1284-1311.

Andersen, T. G., N. Fusari and V. Todorov, “The Pricing of Short-Term Market Risk: Evidence from Weekly Options”, *Journal of Finance*, 2017, 72, pp 1335-1386.

Li, J., V. Todorov and G. Tauchen, “Robust Jump Regressions”, *Journal of the American Statistical Association*, 2017, 112, pp 332-341.

Li, J., V. Todorov and G. Tauchen, “Jump Regressions”, *Econometrica*, 2017, 85, pp 173-195.

Li, J., V. Todorov and G. Tauchen, “Estimating the Volatility Occupation Time via Regularized Laplace Inversion”, *Econometric Theory*, 2016, 32, pp 1253-1288.

Li, J., V. Todorov and G. Tauchen, “Inference Theory for Volatility Functional Dependencies”, *Journal of Econometrics*, 2016, 193, pp 17-34.

Bollerslev, T., S. Zhengzi Li and V. Todorov, “Roughing up Beta: Continuous vs. Discontinuous Betas, and the Cross-Section of Expected Stock Returns”, *Journal of Financial Economics*, 2016, 120, pp 464-490.

Jacod, J. and V. Todorov, “Efficient Estimation of Integrated Volatility in Presence of Infinite Variation Jumps with Multiple Activity Indices”, *The fascination of Probability, Statistics and Their Applications – In honour of Ole E. Barndorff-Nielsen on his 80th birthday*, 2015, Springer-Verlag.

Bollerslev, T., V. Todorov and L. Xu, “Tail Risk Premia and Return Predictability”, *Journal of Financial Economics*, 2015, 118, pp 113-134.

Andersen, T. G., N. Fusari and V. Todorov, “The Risk Premia Embedded in Index Options”, *Journal of Financial Economics*, 2015, 117, pp 558-584.

Todorov, V., “Jump Activity Estimation for Pure-Jump Ito Semimartingales via Self-Normalised Statistics”, *Annals of Statistics*, 2015, 43, pp 1831-1864.

Andersen, T. G., O. Bondarenko, V. Todorov and G. Tauchen, “The Fine Structure of Equity-Index Option Dynamics”, *Journal of Econometrics*, 2015, 187, pp 532-546.

Andersen, T. G., N. Fusari and V. Todorov, “Parametric Inference and Dynamic State Recovery from Option Panels”, *Econometrica*, 2015, 83, pp 1081-1145.

Reiß, M., V. Todorov and G. Tauchen, “Nonparametric Test for a Constant Beta between Ito Semimartingales based on High Frequency Data”, *Stochastic Processes and their Applications*, 2015, 125, pp 2955-2988.

Bollerslev, T. and V. Todorov, “Time-Varying Jump Tails”, *Journal of Econometrics*, 2014, 183, pp 168-180.

Todorov, V. and G. Tauchen, “Limit Theorems for the Empirical Distribution Function of Scaled Increments of Ito Semimartingales at High Frequencies”, *Annals of Applied Probability*, 2014, 24, pp 1850-1888.

Jacod, J. and V. Todorov, “”Efficient Estimation of Integrated Volatility in Presence of Infinite Variation Jumps”, *Annals of Statistics*, 2014, 42, pp 1029–1069.

Todorov, V., G. Tauchen and I. Grynkiv, “Volatility Activity: Specification and Estimation”, *Journal of Econometrics*, 2014, 178, pp 180-193.

Li, J., V. Todorov and G. Tauchen, “Volatility Occupation Times”, *Annals of Statistics*, 2013, 41, pp 1865-1891.

Todorov, V., “Realized Power Variation from Second Order Differences for Pure Jump Semimartingales”, *Stochastic Processes and their Applications*, 2013, 123, pp 2829-2850.

Bollerslev, T., V. Todorov and S. Zhengzi Li, “Jump Tails, Extreme Dependencies and the Distribution of Stock Returns”, *Journal of Econometrics*, 2013, 172, pp 307-324.

Diop, A., J. Jacod and V. Todorov, “Central Limit Theorems for Approximate Quadratic Variations of Pure Jump Ito Semimartingales”, *Stochastic Processes and their Applications*, 2013, 123, pp 839-886.

Todorov, V. and G. Tauchen, “Inverse Realized Laplace Transforms for Nonparametric Volatility Density Estimation in Jump-Diffusions”, *Journal of the American Statistical Association*, 2012, 107, pp 622-635.

Todorov, V. and G. Tauchen, “Realized Laplace Transforms for Pure-Jump Semimartingales”, *An-*

nals of Statistics, 2012, 40, pp 1233-1262.

Todorov, V. and G. Tauchen, "The Realized Laplace Transform of Volatility", *Econometrica*, 2012, 80, pp 1105-1127.

Bollerslev, T. and V. Todorov, "Estimation of Jump Tails", *Econometrica*, 2011, 79, pp 1727-1783.

Bollerslev, T. and V. Todorov, "Tails, Fears and Risk Premia", *Journal of Finance*, 2011, 66, pp 2165-2211.

Todorov, V., G. Tauchen and I. Grynkiv, "Realized Laplace Transforms for Estimation of Jump Diffusive Volatility Models", *Journal of Econometrics*, 2011, 164, pp 367-381.

Todorov, V. and G. Tauchen, "Volatility Jumps", *Journal of Business and Economic Statistics*, 2011, 29(3), pp 356-371.

Todorov, V. and G. Tauchen, "Limit Theorems for Power Variations of Pure-Jump Processes with Application to Activity Estimation", *Annals of Applied Probability*, 2011, 21(2), pp 546-588.

Todorov, V., "Econometric Analysis of Jump-Driven Stochastic Volatility Models", *Journal of Econometrics*, 2011, 160, pp 12-21.

Andersen, T. G. and V. Todorov, "Realized Volatility and Multipower Variation", *Encyclopedia of Quantitative Finance*, 2010, Ole Barndorff-Nielsen and Eric Renault (eds).

Jacod, J. and V. Todorov, "Do Price and Volatility Jump Together?", *Annals of Applied Probability*, 2010, 20(4), pp 1425-1469.

Todorov, V. and T. Bollerslev, "Jumps and Betas: A New Theoretical Framework for Disentangling and Estimating Systematic Risks", *Journal of Econometrics*, 2010, 157, pp 220-235.

Todorov, V., "Variance Risk Premium Dynamics: The Role of Jumps", *The Review of Financial Studies*, 2010, 23(1), pp 345-383.

Todorov, V. and G. Tauchen, "Activity Signature Functions for High-Frequency Data Analysis", *Journal of Econometrics*, 2010, 154, pp 125-138.

Jacod, J. and V. Todorov, " Testing for Common Arrivals of Jumps for Discretely Observed Multidimensional Processes", *Annals of Statistics*, 2009, 37, pp 1792-1838.

Todorov, V., "Estimation of Continuous-Time Stochastic Volatility Models with Jumps using High-Frequency Data", *Journal of Econometrics*, 2009, 148, pp 131-148.

Todorov, V. and G.Tauchen, "Simulation Methods for Levy-Driven CARMA Stochastic Volatility Models", *Journal of Business and Economic Statistics*, 2006, 24(4), pp 455-469.

Working Papers

Andersen, T. G., Y. Tan, V. Todorov and Z. Zhang, "On-Line Detection of Changes in the Shape of Intraday Volatility Curves", September 2024.

Chong, C. and V. Todorov, "Do Equity and Options Markets Agree about Volatility?", August 2024.

Andersen, T.G., Y. Ding and V. Todorov, "The Granular Origins of Tail Dispersion Risk", August

2024.

Liao, Y. and V. Todorov, "Observable versus Latent Risk Factors", August 2024.

Chong, C. and V. Todorov, "A Nonparametric Test for Rough Volatility", August 2024.

Andersen, T. G., V. Todorov and B. Zhou, "Real-Time Detection of Local No-Arbitrage Violations", August 2024.

Andersen, T. G., Y. Tan, V. Todorov and Z. Zhang, "Testing for Stationarity of Volatility Curves", June 2024.

Chong, C. and V. Todorov, "Asymptotic Expansions for High-Frequency Option Data", April 2024.

Todorov, V., and H. Lin, "Aggregate Asymmetry in Idiosyncratic Jump Risk", September 2019.

Honors and Awards

Runner-up for the Bates-White Prize for the Best Paper at the 2024 Annual SoFiE Meeting for the paper "The Fine Structure of Volatility Dynamics"

Bates-White Prize for the Best Paper at the 2022 Annual SoFiE Meeting for the paper " Intraday Cross-Sectional Distributions of Systematic Risk"

Best Associate Editor Award, Journal of Econometrics, 2019

Best Paper Award at the 2017 CBOE Conference on Derivatives and Volatility for the paper "Nonparametric Option-Implied Volatility"

2015-2019 NSF Grant: "Econometric Tools for Analysis of Derivatives Data", with Torben G. Andersen

Fellow of the Journal of Econometrics, 2014.

Finalist for the 2014 AQR Insight Award for "The Risk Premia Embedded in Index Options"

Fellow of the Society for Financial Econometrics, 2013

2012 Chicago Mercantile Exchange Research Grant

2010-2015 NSF Grant: "Estimation of Jump Tails: Theory and Applications", with Tim Bollerslev

2008 Arnold Zellner Thesis Award for Best Thesis in Business and Economic Statistics, American Statistical Association

Professional Service

Editorial service:

Journal of Econometrics, 2023-present, Co-Editor

Econometric Theory, 2017-2023, Co-Editor

Journal of Econometrics, Guest Co-Editor for special issue "Financial Econometrics in the Age of the Digital Economy"

Econometrica, Associate Editor, 2016-2022

Journal of Econometrics, Associate Editor, 2012-2023

Econometric Theory, Associate Editor, 2014-2016

Journal of Financial Econometrics, Associate Editor, 2012-2016

Memberships:

Econometric Society, SoFiE, Western Finance Association

Journal referee:

Annals of Applied Probability, Annals of Statistics, Bernoulli Journal, Econometrica, Econometric Theory, International Journal of Forecasting, Journal of the American Statistical Association, Journal of Applied Econometrics, Journal of Applied Probability, Journal of Business and Economic Statistics, Journal of Econometrics, Journal of Economic Dynamics and Control, Journal of Empirical Finance, Journal of Finance, Journal of Financial Econometrics, Journal of Financial Economics, Management Science, Mathematical and Computer Modelling, Mathematical Finance, Mathematics and Financial Economics, NSF Grant Proposal Review, Review of Economics and Statistics, Review of Economic Studies, Review of Finance, Review of Financial Studies, Southern Economics Journal, Statistics and Computing, Quarterly Journal of Economics

Program Committee: 2010, 2013-2024 Annual Conference of the Society for Financial Econometrics (SoFiE); WFA 2012, 2017, 2018, 2019, 2020; 2013 North American Winter Meeting of the Econometric Society; EFA 2014, 2015, 2016; The Third Annual Conference of the International Association for Applied Econometrics, Milan, 2016; International Symposium on Financial Engineering and Risk Management (FERM) 2016, 2018, Guangzhou, China; 2016-2019, 2021-2024 Conference on Derivatives and Volatility, Chicago; 2017 Midwest Finance Association meeting (track chair); Financial Econometrics Program Area Coordinator for Econometric Society 2020 World Congress, Milan, Italy; 2021 North American Summer Meeting of the Econometric Society; 2023 AFA session chair;

Conferences Organized: 2013 Kellogg Junior Finance Conference; 2017 NBER-NSF Time Series Conference; 2017, 2019, 2021, 2024 SoFiE Financial Econometrics Summer School;

Outside Activities

Short (one week or less) PhD level courses at various research institutions.

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