

Martin Thyrgaard

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Fields	Asset Pricing, Market Microstructure, Applied and Theoretical Econometrics	
Academic Experience	Postdoctoral Fellow, Finance Department, Kellogg School of Management Northwestern University	2019-present
	Visiting Scholar, Finance Department, Kellogg School of Management Northwestern University	2017-2019
Education	Ph.D., Economics, Aarhus University Dissertation: Intraday Phenomena in Financial Markets	2015-2019
	M.Sc., Quantitative Economics, Aarhus University	2014-2017
	B.Sc., Economics and Management, Aarhus University	2011-2014
Awards & Honors	Ph.D. Award for excellence in research, Aarhus University Research Foundation	2020
	International Fellow, CREATES	2019-present
	International Postdoc Grant, Independent Research Fund Denmark	2019
Teaching Experience	Lecturer, Investment and Finance, Aarhus University Undergraduate course for math-economics majors	2018
	Teaching Assistant, Investment and Finance, Aarhus University	2016
	Guest Lecturer, Mathematical Economics II, Aarhus University Undergraduate course for economics majors	2015
Conferences & Seminars	2020 Annual Meetings of the Midwest Finance Association	
	2019 Kellogg School of Management, Northwestern University	
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	2017 Kellogg School of Management, Northwestern University; Rady School of Management, University of California at San Diego; Tenth Annual SoFiE Conference	
	2016 10th International Conference on Computational and Financial Econometrics	
Refereeing	Journal of Empirical Finance, Journal of Econometrics, Econometric Theory, Journal of Financial Econometrics, and Journal of Business and Economic Statistics	
Job Market Paper	Recalcitrant Betas: Intraday Variation in the Cross-Sectional Dispersion of Systematic Risk, <i>with Torben G. Andersen & Viktor Todorov</i> , <i>Revise and Resubmit at Quantitative Economics</i>	
	We study the temporal behavior of the cross-sectional distribution of assets' market exposure, or betas, using a large panel of high-frequency returns. The asymptotic setup has the sampling frequency of returns increasing to infinity, while the time span of the data remains fixed, and the cross-sectional dimension of the panel is either fixed or increasing. We derive functional limit results for the cross-sectional distribution of betas evolving over time. We demonstrate, for constituents of the S&P 500 market index, that the dispersion in betas is elevated at the market open and gradually declines over the trading day. This intraday pattern varies significantly over time and reacts to information shocks	

such as clustered earning announcements and releases of macroeconomic news. We find that earnings news increase beta dispersion while FOMC announcements have the opposite effect on market betas.

Publications

Torben G. Andersen, Martin Thyrsgaard & Viktor Todorov (2019) Time-Varying Periodicity in Intraday Volatility, *Journal of the American Statistical Association*, 114:528, 1695-1707, DOI: [10.1080/01621459.2018.1512864](https://doi.org/10.1080/01621459.2018.1512864)

We develop a nonparametric test for whether return volatility exhibits time-varying intraday periodicity using a long time series of high-frequency data. Our null hypothesis, commonly adopted in work on volatility modeling, is that volatility follows a stationary process combined with a constant time-of-day periodic component. We construct time-of-day volatility estimates and studentize the high-frequency returns with these periodic components. If the intraday periodicity is invariant, then the distribution of the studentized returns should be identical across the trading day. Consequently, the test compares the empirical characteristic function of the studentized returns across the trading day. The limit distribution of the test depends on the error in recovering volatility from discrete return data and the empirical process error associated with estimating volatility moments through their sample counterparts. Critical values are computed via easy-to-implement simulation. In an empirical application to S&P 500 index returns, we find strong evidence for variation in the intraday volatility pattern driven in part by the current level of volatility. When volatility is elevated, the period preceding the market close constitutes a significantly higher fraction of the total daily integrated volatility than during low volatility regimes. Supplementary materials for this article are available online.

Kim Christensen, Martin Thyrsgaard & Bezirgen Veliyev (2019) The realized empirical distribution function of stochastic variance with application to goodness-of-fit testing, *Journal of Econometrics*, 212:2,556-583, DOI: [10.1016/j.jeconom.2019.06.002](https://doi.org/10.1016/j.jeconom.2019.06.002)

We propose a nonparametric estimator of the empirical distribution function (EDF) of the latent spot variance of the log-price of a financial asset. We show that over a fixed time span our realized EDF (or REDF) - inferred from noisy high-frequency data - is consistent as the mesh of the observation grid goes to zero. In a double-asymptotic framework, with time also increasing to infinity, the REDF converges to the cumulative distribution function of volatility, if it exists. We exploit these results to construct some new goodness-of-fit tests for stochastic volatility models. In a Monte Carlo study, the REDF is found to be accurate over the entire support of volatility. This leads to goodness-of-fit tests that are both correctly sized and relatively powerful against common alternatives. In an empirical application, we recover the REDF from stock market high-frequency data. We inspect the goodness-of-fit of several two-parameter marginal distributions that are inherent in standard stochastic volatility models. The inverse Gaussian offers the best overall description of random equity variation, but the fit is less than perfect. This suggests an extra parameter (as available in, e.g., the generalized inverse Gaussian) is required to model stochastic variance.

Working Papers

Predicting Bond Return Predictability, with Daniel Borup, Jonas N. Eriksen & Mads M. Kjær (Submitted)

Optimal Sequential Treatment Allocation, with Anders Bredahl Kock (Submitted)

Intraday periodicity in Cross-Market Trading

Beta Risk and Expected Returns, with Torben G. Andersen & Viktor Todorov

Cross-Sectional Dispersion of Volume - a New Perspective on Two-Fund Separation

References

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