Adam Lee

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ACADEMIC EMPLOYMENT

2022 - **Assistant Professor**
Department of Data Science & Analytics, BI Norwegian Business School

EDUCATION

2018-22 **Ph.D. in Economics**
Universitat Pompeu Fabra

Essays on statistical inference in non-regular semiparametric models

Advisor: Geert Mesters
Committee: Juan Carlos Escanciano, Kirill Evdokimov & Majid Al-Sadoon

2016-17 **Master of Research in Economics, Finance and Management**
Universitat Pompeu Fabra

2015-16 **Master of Science in Economics and Finance**
Barcelona Graduate School of Economics

2009-13 **BSc in Economics**
University of Bath

PUBLICATIONS

[1] **Locally Robust Inference for Non-Gaussian Linear Simultaneous Equations Models** *with G. Mesters,* Journal of Econometrics*, Volume 240, Issue 1, 105647, 2024*

All parameters in linear simultaneous equations models can be identified (up to permutation and sign) if the underlying structural shocks are independent and at most one of them is Gaussian. Unfortunately, existing inference methods that exploit such identifying assumptions suffer from size distortions when the true distributions of the shocks are close to Gaussian. To address this weak non-Gaussian problem we develop a locally robust semi-parametric inference method which is simple to implement, improves coverage and retains good power properties. The finite sample properties of the methodology are illustrated in a large simulation study and an empirical study for the returns to schooling.

[2] **Locally Robust Inference for Non-Gaussian SVAR models** *with L. Hoesch and G. Mesters,* Quantitative Economics*, 15: 523 – 570, 2024*

All parameters in structural vector autoregressive (SVAR) models are locally identified when the structural shocks are independent and follow non-Gaussian distributions. Unfortunately, standard inference methods that exploit such features of the data for identification fail to yield correct coverage for structural functions of the

model parameters when deviations from Gaussianity are small. To this extent, we propose a locally robust semiparametric approach to conduct hypothesis tests and construct confidence sets for structural functions in SVAR models. The methodology fully exploits non-Gaussianity when it is present, but yields correct size/coverage for local-to-Gaussian densities. Empirically, we revisit two macroeconomic SVAR studies where we document mixed results. For the oil price model of Kilian and Murphy (2012), we find that non-Gaussianity can robustly identify reasonable confidence sets, whereas for the labor supply–demand model of Baumeister and Hamilton (2015) this is not the case. Moreover, these exercises highlight the importance of using weak identification robust methods to assess estimation uncertainty when using non-Gaussianity for identification.

WORKING PAPERS

[3] **Locally Regular and Efficient Tests For Non-Regular Semiparametric Models**, *Submitted*

Previously titled: "Robust and efficient inference for non-regular semiparametric models"

This paper considers hypothesis testing in semiparametric models which may be non-regular. I show that C(α) style tests are locally regular under mild conditions, including in cases where locally regular estimators do not exist, such as models which are weakly identified. I characterise the appropriate limit experiment in which to study local (asymptotic) optimality of tests in the non-regular case, and generalise classical power bounds to this case. I give conditions under which these power bounds are attained by the proposed C(α) style tests. The application of the theory to a single index model and an instrumental variables model is worked out in detail.

[4] **Semiparametrics via parametrics and contiguity** *with E. Aas Stoltenberg, Working paper*

In semiparametric models, if we can show asymptotic normality and efficiency under certain parametric submodels, under what conditions have we already proven said properties for the full semiparametric model? In this paper we provide conditions which are sufficient for this conclusion. Our approach departs from the established literature by being more specific about the approximating parametric models, and also by working under these when treating the parametric models. In consequence, we are able to move more of the analysis onto these parametric models and circumvent some of the difficulties often associated with establishing asymptotic properties of semiparametric estimators. The parametric results are subsequently lifted to the true semiparametric model by way of contiguity. We illustrate our results with two canonical examples of semiparametric models: we show that the estimators resulting from natural choices of approximating parametric models are closely related to classical semiparametric estimators which have been proposed for these models. In particular, we find that this approach leads to a straightforward proof of the efficiency of the Cox partial likelihood estimator in the proportional hazards model, as well as a proof of the efficiency of the maximum likelihood estimator in the partially linear regression model.

[5] **Robust Estimation and Inference for Time-Varying Unconditional Volatility** *with G. Sucarrat and R. Sandberg, Submitted*

We derive a general and robust parametric estimator of time-varying unconditional volatility of univariate and multivariate financial returns, and establish its Consistency and Asymptotic Normality (CAN). A number of well-known and widely used parametric specifications, for many of which asymptotic results have not been specifically established, are contained in the class. The estimator is robust in the sense that the exact specification of the conditional volatility dynamics need not be known or estimated, and in the sense that the stochastic component need not be strictly stationary. The latter is especially important in light of recent findings, which document that financial returns are frequently characterised by a non-stationary zero-process. Our estimator is also robust to the well-known "curse of dimensionality" in multivariate models due to its equation-by-equation nature. While our estimator does not require the exact specification of the conditional volatility dynamics to be known or estimated, our results imply that the scaled GARCH(1,1) specification is well-defined under both correct

and incorrect specification. We provide methods for its estimation in a second step. Also, due to the assumptions we rely upon, our results extend directly to the Multiplicative Error Model (MEM) interpretation of volatility models. This means our results can also be applied to other non-negative processes like volume, duration, realised volatility, dividends, unemployment and so on. Finally, three numerical applications illustrate our results.

TEACHING EXPERIENCE

2022- **BI Norwegian Business School**
- Advanced Statistics and Alternative Data Types (MSc)
- Excel Automation and Programming (BSc)

2016-22 **Barcelona School of Economics (TA)**
- Advanced Econometric Methods III (PhD)
- Econometric Methods III (MSc)
- Quantitative & Statistical Methods III (MSc)

2016-21 **Universitat Pompeu Fabra (TA)**
- Econometrics II (BSc)
- Econometrics (BSc)
- Introduction to Game Theory (BSc)
- Topics in Macroeconomics (BSc)

AWARDS & SCHOLARSHIPS

2022 Best paper award at the 2022 Spring Meeting of Young Economists for "Robust and efficient inference for non-regular semiparametric models"

2021 SNDE Young Scholars Award, for the best paper presented at the 2021 SNDE Workshop for Young Researchers for "Robust and efficient inference for non-regular semiparametric models"

2015 Full fee-waiver, Barcelona GSE.

2013 Neil Farmery Prize for "outstanding work in quantitative economics", University of Bath.

PROFESSIONAL ACTIVITIES

Presentations

2024: Microeconometrics Class of 2022 & 2023 Workshop (Duke University), European Association of Young Economists Annual Meeting (Paris School of Economics), University College London (Economics), IMS International Conference on Statistics and Data Science (Nice)

2023: IAAE Annual Conference (BI Norwegian Business School), Meeting of Young Economists (Collegio Carlo Alberto), University of Oslo (Statistics & Data Science), 16th CFE-CMStatistics (HTW Berlin)

2022: University of Surrey, BI Norwegian Business School (Department of Data Science and Analytics), Toulouse School of Economics, Duke University, Erasmus University Rotterdam (Econometric Institute), University of Liverpool, Western University, 12th Workshop in Time Series Econometrics (Zaragoza), Spring Meeting of Young Economists (Orléans), Data Analytics for Business Workshop (Verona), Advances in Econometrics (Barcelona School of Economics Summer Forum), EEA/ESEM (Bocconi), SAEe (València), 15th CFE-CMStatistics (King's College London)

2021: Barcelona GSE Jamboree (Online), SAEe (Barcelona), SNDE Workshop for Young Researchers (Online)

2020: Barcelona GSE Jamboree (Online)

Posters

2020: EC^2 (Online)

Refereeing

Journals: Quantitative Economics, Journal of Business and Economic Statistics, Annals of Applied Statistics, SERIEs

Conferences: Northern Lights Deep Learning Conference (2023), Annual Meeting of the European Association of Young Economists (2023, 2024)

Service

Program Committee: Annual Meeting of the European Association of Young Economists (2023, 2024, 2025)

Board Member: European Association of Young Economists (2023 –)

Co-president: European Association of Young Economists (2024 –)

IT SKILLS

Languages	Julia, R, Python, C++, Javascript & Typescript
Miscellaneous	Linux, Bash, LaTeX, Git

OTHER EMPLOYMENT

2017-18	**Research Assistant**	**Princeton University**
2013-15	**Assistant Economist**	**HM Treasury, UK**
2011-12	**Economist (Intern)**	**UBS Global Asset Management, UK**