Tobias Hartl

Contact

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Research Interests

Econometrics, State Space Models, Factor Models, Long Memory, Macroeconometrics, Climate Econometrics

Professional Experience

University of Regensburg, Economics Dept.

- Postdoctoral Researcher (75%) — 2023-
- Doctoral Researcher (75%) — 2017-2023
- Student Assistant — 2016-2017

Institute for Employment Research (IAB) Nuremberg, Macroeconomics Dept.

- Postdoctoral Researcher (25%) — 2023-
- Doctoral Researcher (25%) — 2017-2023
- Research Intern — 2016

Princeton University, Economics Dept.

- Visiting Postdoctoral Researcher — 2023-2024

Education

Dr. rer. pol. (Ph.D.) in Economics, University of Regensburg — 2023

Title: Fractional unobserved components and factor models: econometric theory and applications
Supervision: Prof. Rolf Tschernig and Prof. Uwe Hassler
Final Grade: Summa cum laude

M.Sc. in Economics, University of Regensburg — 2017

Final Grade: 1.03 (on a scale of 1-5, where 1 is the best grade)

B.Sc. in Economics, University of Regensburg — 2015

Final Grade: 1.81 (on a scale of 1-5, where 1 is the best grade)

Job Market Paper

The fractional unobserved components model: a generalization of trend-cycle decompositions to data of unknown persistence

This paper provides a data-driven solution to the specification of long-run dynamics in trend-cycle decompositions by introducing a state space model of form $y_t = x_t + c_t$, where the trend $x_t \sim I(d)$ is fractionally integrated of order d, whereas c_t represents a stationary cyclical component. The model encompasses the literature that typically assumes $x_t \sim I(1)$, or $x_t \sim I(2)$, but also allows for intermediate solutions between integer-integrated specifications and thus for richer long-run dynamics. Trend and cycle are estimated via the Kalman filter, for which a closed-form solution is provided. The integration order d is treated as unknown and is estimated jointly with the other model parameters. The paper derives the asymptotic theory for parameter estimation under relatively mild assumptions. While the proofs are carried out for a prototypical model, the asymptotic theory carries over to generalizations allowing for deterministic terms and correlated innovations.

An application to monthly sea surface temperature anomalies reveals a smooth, diverging trend component, together with a cyclical component that is closely coupled to the Oceanic Niño Index.

Peer-Reviewed Publications

Haimerl, P. and Hartl, T. (2023). Modeling COVID-19 infection rates by regime-switching unobserved components models. *Econometrics*, 11(2):10. `https://doi.org/10.3390/econometrics11020010`

Hartl, T. and Jucknewitz, R. (2023). Multivariate fractional components analysis. *Journal of Financial Econometrics*, 21(3):880–914. `https://doi.org/10.1093/jjfinec/nbab022`

Hartl, T. and Jucknewitz, R. (2022). Approximate state space modelling of unobserved fractional components. *Econometric Reviews*, 41(1):75–98. `https://www.tandfonline.com/doi/full/10.1080/07474938.2020.1841444`

Working Papers

Hartl, T. (2023). The fractional unobserved components model: a generalization of trend-cycle decompositions to data of unknown persistence. Working paper. `http://tobiashartl.github.io/files/Hartl_fUCM.pdf`

Hartl, T., Hutter, C., and Weber, E. (2021). Matching for three: big data evidence on search activity of workers, firms, and employment service. Working paper. `http://doku.iab.de/discussionpapers/2021/dp0121.pdf`

Hartl, T. (2020). Macroeconomic forecasting with fractional factor models. Working paper. `https://arxiv.org/abs/2005.04897`

Hartl, T., Tschernig, R., and Weber, E. (2020b). Fractional trends in unobserved components models. Working paper. `https://arxiv.org/abs/2005.03988`

Hartl, T., Tschernig, R., and Weber, E. (2020c). Solving the unobserved components puzzle: A fractional approach to measuring the business cycle. Working paper. `http://tobiashartl.github.io/files/Hartl_Tschernig_Weber_Puzzle.pdf`

Work in Progress

Ammon, D., Hartl, T., and Tschernig, R. (2024). Determining the number of factors in fractionally integrated factor models.

Hartl, T., Müller, U., and Watson, M. (2024a). Optimal unit root and stationarity tests. Technical report

Hartl, T., Tschernig, R., and Weber, E. (2024b). Multivariate fractional unobserved components and the cyclicality of labor market flows.

Selected Further Publications

Bauer, A., Hartl, T., Hutter, C., and Weber, E. (2021). Search processes on the labor market during the covid-19 pandemic. *CESifo forum*, 22(4):15–19

Donsimoni, J. R., Glawion, R., Hartl, T., Plachter, B., Timmer, J., Wälde, K., Weber, E., and Weiser, C. (2020). Covid-19 in Deutschland - Erklärung, Prognose und Einfluss gesundheitspolitischer Maßnahmen. *Perspektiven der Wirtschaftspolitik*, 21(3):250–262

Hartl, T., Hutter, C., and Weber, E. (2020a). Neueinstellungen in der Krise. *Makronom.de*, 2020-06-18

Hartl, T., Wälde, K., and Weber, E. (2020d). Measuring the impact of the German public shutdown on the spread of COVID-19. *VoxEU.org*, 2020-04-14. `https://voxeu.org/article/measuring-impact-german-public-shutdown-spread-covid-19`

Hartl, T., Wälde, K., and Weber, E. (2020e). Measuring the impact of the German public shutdown on the spread of COVID-19. *Covid Economics*, 1:25–32. `https://cepr.org/publications/covid-economics-issue-1`

Awards and Scholarships

Alumnus of the Lindau Nobel Laureate Meeting 2020

Award for Best Master's Thesis, Economics Dept., University of Regensburg 2017

Award for Best Master's Degree, Economics Dept., University of Regensburg 2017

Student Scholarship, Friedrich-Ebert-Stiftung 2013-2017

Third-party Funded Project

Research Grant, German Research Foundation (DFG) 2021-2024

Co-authored the proposal for project "Multivariate fraktionale unbeobachtete Komponenten- und Faktormodelle für die makroökonomische Analyse und Prognose" (234,000 EUR; Applicants: Prof. Rolf Tschernig and Prof. Enzo Weber)

Presentations at Conferences

Int. Association of Applied Econometrics Annual Conference (BI Norwegian Business School) 2023
Int. Conference on Computational and Methodological Statistics (HTW Berlin, invited)

Symposium of the Society for Nonlinear Dynamics and Econometrics (virtual) 2022
Department Seminar (University of Regensburg)
Workshop on High-dimensional Time Series in Macroeconomics and Finance (IHS Vienna)
Annual Meeting of the German Economic Society (University of Basel)
Annual Meeting of the German Statistical Society (University of Münster)
Int. Conference on Computational and Methodological Statistics (King's College London, invited)

Seminar on Long Memory Econometrics (virtual, invited) 2021
Department Seminar (University of Regensburg)
European Summer Meeting of the Econometric Society (virtual)
Annual Meeting of the German Statistical Society (virtual)
Annual Meeting of the German Economic Society (virtual)
Int. Conference on Computational and Methodological Statistics (virtual)

World Congress of the Econometric Society (virtual) 2020
Symposium of the Society for Nonlinear Dynamics and Econometrics (virtual)
Department Seminar (University of Regensburg)
PhD Seminar (University of Regensburg)
Int. Conference on Computational and Methodological Statistics (virtual)

Department Seminar on Statistics and Econometrics (Kiel University, invited) 2019
Econometric Seminar (IAB Nuremberg)

Joint Statistical Meeting of the German Statistical Society (LMU Munich)
Workshop on High-dimensional Time Series in Macroeconomics and Finance (IHS Vienna)
Annual Meeting of the German Statistical Society (Trier University)
Annual Meeting of the German Economic Society (Leipzig University)
Int. Conference on Computational and Methodological Statistics (University of London)

Long Memory Conference (Aalborg University) 2018
Workshop on Statistics and Econometrics (University of Passau)
European Summer Meeting of the Econometric Society (University of Cologne)
Annual Meeting of the German Statistical Society (JKU Linz)
Int. Conference on Computational and Methodological Statistics (University of Pisa)

Referee Service

Advances in Statistical Analysis, Empirical Economics, International Journal of Forecasting (3), Journal of Business & Economic Statistics, Journal of Labour Market Research, Journal of Official Statistics, Journal of Quantitative Economics, Statistical Papers (2), World Development

Teaching Experience

Quantitative Economic Research II (Lecture), University of Regensburg — Summer 2024, Summer 2023, Summer 2022, Summer 2021

Graduate lecture (6 ECTS). The course covers advanced time series models, their identification, specification, and estimation. Topics covered are simultaneous equation models, (structural) vector autoregression and (structural) vector error correction models.
Average student evaluation (on a scale of 1-6; 1=best): **1.0** (2023); **1.6** (2022); **1.2** (2021)

Programming in R (Lecture), University of Regensburg — Winter 2021

Graduate lecture (2 ECTS). The course gives an introduction into the programming language R. It covers data analysis and manipulation, flow control, regression, simulation, numerical optimization, bootstrap and efficient programming.
Average student evaluation (on a scale of 1-6; 1=best): **1.3**

Advanced Econometrics (Lecture), University of Regensburg — Summer 2024, Summer 2020

Graduate lecture (6 ECTS). The course details advanced estimation techniques and analyzes their asymptotic properties. Topics covered are the nonlinear regression model, maximum likelihood estimation, generalized least squares, generalized instrumental variables, and the generalized method of moments.
Average student evaluation (on a scale of 1-6; 1=best): **1.3** (2020)

Advanced Dynamic Econometrics (Lecture), University of Regensburg — Winter 2019

Graduate lecture (2 ECTS). The interactive course captures state space models and related topics such as filtering, smoothing, and parameter estimation.
Average student evaluation: **not evaluated**

Advanced Econometrics (Tutorial), University of Regensburg — Summer 2021

Graduate tutorial (6 ECTS). See above for the description.
Average student evaluation (on a scale of 1-6; 1=best): **1.0**

Advanced Issues in Econometrics (Tutorial), University of Regensburg Winter 2020

Undergraduate tutorial (6 ECTS). The course focuses on panel data and limited dependent variables. It covers causality and evaluation studies, pooled cross section analysis, fixed- and random-effects estimators, instrumental variables and two stage least squares, simultaneous equation models, Logit and Probit models, and models for sample selection corrections.

Average student evaluation (on a scale of 1-6; 1=best): **1.1**

Support in Supervision, University of Regensburg

Master's thesis supervision (5); Bachelor's thesis supervision (2)

Language and Computer Skills

Computer Skills: R, Python, Matlab, Stata, EViews, Gauss, LaTeX
Languages: German (native), English (fluent), French (basic)