

Tobias Hartl

Contact

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Research Interests

Econometrics, State Space Models, Factor Models, Long Memory

Professional Experience

Princeton University, Economics Dept.

Visiting Postdoctoral Researcher 2023-

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

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). <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>
- Hartl, T., Wälde, K., and Weber, E. (2020d). 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>

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

Work in Progress

- Ammon, D., Hartl, T., and Tschernig, R. (2023). Determining the number of factors in fractionally integrated factor models.
- Hartl, T., Tschernig, R., and Weber, E. (2023). Multivariate fractional unobserved components and the cyclicity 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., Wälde, K., and Weber, E. (2020e). 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., Hutter, C., and Weber, E. (2020a). Neueinstellungen in der Krise. *Makronom.de*, 2020-06-18

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

Teaching Experience

- Quantitative Economic Research II (Lecture)**, University of Regensburg Summer 2023
 Graduate lecture (6 ECTS). The course covers advanced time series models, Summer 2022
 their identification, specification, and estimation. Topics covered are simultaneous Summer 2021
 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 program-
 ming 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 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**
- 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 (conversational)