UNIVERSITY OF PASSAU
Faculty of Business Administration and Economics

A cordial invitation to the opening talk of the
Brown Bag Seminar
*Recent Developments in Data Science*:

# Using Subspace Algorithms for the Estimation of Linear State Space Models in the Context of Approximate Dynamic Factor Models

by
Prof. Dr. Dietmar Bauer

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| Date: | 13.06.2024 (Thursday) at 12:00 (s.t.) |
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https://www.wiwi.uni-passau.de/csm/brown-bag-seminar-rdds

**Abstract**

Approximate Dynamic Factor Models (aDFM) are a popular tool for modelling a large number of time series jointly. aDFMs decompose the observations into a common component, containing the most valuable information, and idiosyncratic components that are typically seen as additive noise. Identification for aDFMs is achieved for cross sectional dimension tending to infinity assuming that information on the common components accumulates while the idiosyncratic component is only weakly correlated in the cross-section.
In this setting the common part is often estimated using principal components in the first step. In the second step then a state space model for the static common factor process is estimated explaining the evolution of the static factors by an underlying latent dynamic factor process modelled as white noise. Empirically one often finds more static factors than dynamic factors such that the corresponding transfer function is tall. Consequently, there is no unique left pseudo-inverse for this transfer function.
In this paper we show, that – since they rely on projections of the future of a process onto its own past, which are unique also for tall transfer functions – the canonical variate analysis (CVA) type of subspace methods can be used in order to obtain consistent estimates of the tall transfer function. Our results cover integrated processes as well as stationary, differenced processes, even if the differentiation leads to spectral zeros. In that case, however, the convergence rate decreases considerably.

**Speaker**

Dietmar Bauer has a Diploma and Doctorate in Mathematics from TU Wien. He has held post-doctoral positions in Newcastle/Australia, Linköping/Sweden and at the Cowles Foundation in Yale/USA. After his Habilitation in Econometrics at the TU Wien, he worked as a Senior Scientist at the Austrian Institute of Technology. Since 2014, he holds the Chair of Econometrics at the Faculty of Business Administration and Economics at Bielefeld University. He has published numerous articles in the fields of Econometrics and Transportation and has obtained the prestigious *Multa Scripsit* award by the leading field journal Econometric Theory.