



ΚΥΚΛΟΣ ΣΕΜΙΝΑΡΙΩΝ ΣΤΑΤΙΣΤΙΚΗΣ ΦΕΒΡΟΥΑΡΙΟΣ 2019

Dimitris Korobilis

University of Essex - Essex Business School

High-Dimensional Macroeconomic Forecasting Using Message Passing Algorithms

ΠΕΜΠΤΗ 21/2/2019

13:00

**ΑΙΘΟΥΣΑ Τ103, 1ος ΟΡΟΦΟΣ
ΝΕΟ ΚΤΙΡΙΟ ΟΠΑ, (ΤΡΟΙΑΣ 2)**

ΠΕΡΙΛΗΨΗ

This paper proposes two distinct contributions to econometric analysis with large information sets and structural instabilities. First, it treats a regression model with time-varying coefficients, stochastic volatility and exogenous predictors, as an equivalent high-dimensional static regression problem with thousands of covariates. Inference in this specification proceeds using standard regression tools such as Bayesian hierarchical priors that shrink many irrelevant coefficients towards either zero or time-invariance. Second, it introduces the framework of factor graphs and message passing inference as a means of designing efficient posterior estimation algorithms. In particular, a Generalized Approximate Message Passing (GAMP) algorithm is derived, and is shown to have very low algorithmic complexity and to be trivially parallelizable. The result is a comprehensive methodology that can be used to estimate time-varying parameter regressions with arbitrarily large number of exogenous predictors. In a forecasting exercise for U.S. price inflation this methodology is shown to work very well.



AUEB STATISTICS SEMINAR SERIES FEBRUARY 2019

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THURSDAY 21/2/2019

13:00

**ROOM T103, 1ST FLOOR,
NEW AUEB BUILDING, (TROIAS 2)**

ABSTRACT

This paper proposes two distinct contributions to econometric analysis with large information sets and structural instabilities. First, it treats a regression model with time-varying coefficients, stochastic volatility and exogenous predictors, as an equivalent high-dimensional static regression problem with thousands of covariates. Inference in this specification proceeds using standard regression tools such as Bayesian hierarchical priors that shrink many irrelevant coefficients towards either zero or time-invariance. Second, it introduces the framework of factor graphs and message passing inference as a means of designing efficient posterior estimation algorithms. In particular, a Generalized Approximate Message Passing (GAMP) algorithm is derived, and is shown to have very low algorithmic complexity and to be trivially parallelizable. The result is a comprehensive methodology that can be used to estimate time-varying parameter regressions with arbitrarily large number of exogenous predictors. In a forecasting exercise for U.S. price inflation this methodology is shown to work very well.