Latest Release: SAS/ETS® 14.3
Econometrics and Time Series

Overview

SAS/ETS 14.3 introduces many new features, including a new high-performance procedure to model relationships among variables that form a system of one or more nonlinear equations; an interface access engine to retrieve time series data from the World Bank Group Open (WBGO) website; additional support for dynamic panel models; support for flow dependent variables in state space models; and the no-U-turn sampler (NUTS) of the Hamiltonian algorithm, for exogenous variables in vector autoregressive fractionally integrated moving average (VARFIMA) models.

SASEWBGO Interface Access Engine


The TMODEL Procedure

The TMODEL procedure is an experimental version of the MODEL procedure. The code that you use to perform nearly all analyses in PROC MODEL can also be used in PROC TMODEL. However, PROC TMODEL incorporates high-performance computational techniques and offers new features, including these:

- panel data when you specify cross-sectional variables in the CROSSSECTION statement
- nonlinear random-effects parameters when you identify cross-sectional variables in the input data
- use of analytic expressions for Hessian matrices in the optimization
- use of the nonlinear programming solver available in SAS/OR® software
- the ability to perform optimizations during estimation tasks

In PROC TMODEL, computations can be multithreaded across partitions of the input data set, across BY groups, across repetitions in Monte Carlo simulations, and across sets of initial estimates in the optimization process (see Figure 1).

![Figure 1: Examples of Partitioning](image)

Enhancements to PANEL Procedure

The PANEL procedure includes these five main enhancements:

- dynamic panel estimation using the generalized method of moments (GMM)
- Hausman-Taylor and Amemiya-MacCurdy estimators
- random-effects estimation in models where some variables are correlated with individual effects
- support for between and pooled estimation
- variance components estimation for both balanced and unbalanced panels using the methods described by Fuller and Battese (1974), Wansbeek and Kapteyn (1989), Wallace and Hussain (1969), and Nerlove (1971)

Enhancements to SSM Procedure

The main enhancements to the SSM procedure enable you to do the following:

- Analyze general linear state space models.
- Estimate unknown model parameters by (restricted) maximum likelihood.
- Print or output to a data set the series forecasts, residuals, and full-sample estimates of any linear combination of the underlying state variables.
- Generate residual diagnostic plots and plots useful for detecting structural breaks.
Overview

SAS Econometrics procedures, which run on SAS® Viya™, provide a new, resilient, distributed, and scriptable method of conducting advanced econometric modeling and time series analysis. They also provide a programming entry point for econometricians in government, academics, and industry (especially banking, insurance, and other financial services). SAS Econometrics leverages the speed, scalability, and elasticity of the SAS in-memory environment. Key features of SAS Econometrics 8.2 include:

- compound distribution models
- linear spatial models
- hidden Markov models
- environment for time series models
- count data models
- panel models
- severity models
- copula model simulations

The CCDM Procedure

The CCDM procedure estimates a compound distribution model, which is the distribution of an aggregate loss that you expect to see during a period of time. The aggregate loss depends on the number (frequency) of loss events that occur and the severity (magnitude) of each loss event. PROC CCDM combines the frequency and severity models to estimate the distribution of the aggregate loss, whose probability distribution model is referred to as the compound distribution model. PROC CCDM works closely with two other procedures to estimate the compound distribution model:

- The frequency model is estimated through PROC CNTSELECT.
- The severity model is estimated through PROC SEVSELECT.

The HMM Procedure

The HMM procedure estimates hidden Markov models, which have been widely applied in economics, finance, science, and engineering. This model has many well-known aliases, such as the general state space model, regime-switching model, Markov-switching model, and Markov regime-switching model. PROC HMM estimates the Gaussian hidden Markov model and includes these features:

- support for cross-sectional time series
- estimation by the maximum likelihood method and the maximum a posteriori method
- various nonlinear optimization algorithms
- specification of initial parameter values and prior hyperparameter values
- multiple starting points for optimization
- statements for obtaining filtering, smoothing, decoding, and forecasting results
- Akaike’s information criterion (AIC), the corrected AIC (AICC), the Bayesian information criterion (BIC), and the Hannan-Quinn criterion (HQC)

The CSPATIALREG Procedure

The CSPATIALREG procedure analyzes a class of linear spatial econometric models for cross-sectional data whose observations are spatially referenced or georeferenced. Unlike standard regression models, spatial econometric models are capable of handling spatial dependence in the data—for example, to model housing prices when you know that prices in adjoining counties are correlated. PROC CSPATIALREG can fit the following models by maximum likelihood:

- linear models
- linear models with spatial lag effects
- spatial autoregressive models
- spatial Durbin models
- spatial error models
- spatial Durbin error models

PROC CSPATIALREG uses compact data storage and approximation techniques that enable it to scale to big data in a distributed environment.

For More Information

For more information, ask your organization’s SAS representative to contact SAS at 1.800.727.0025.