SAS® Econometrics on SAS® Viya™
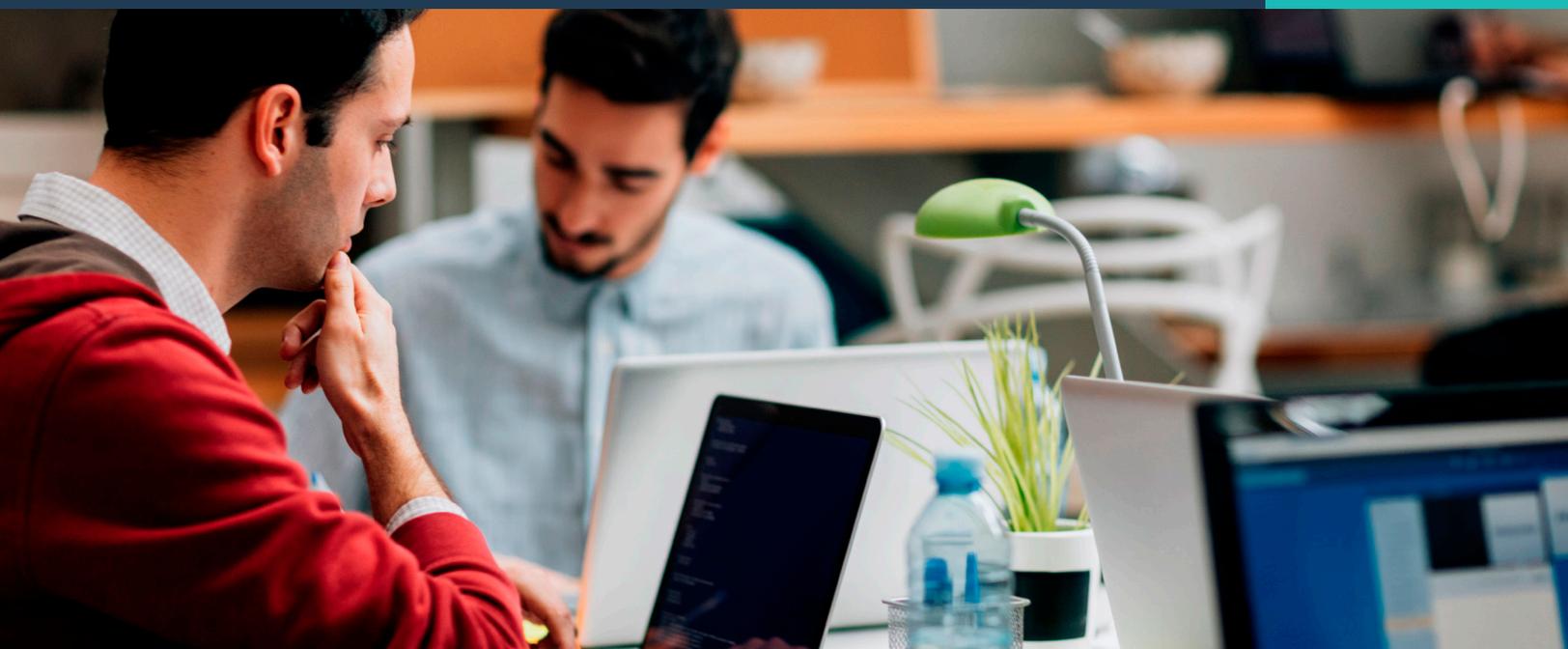Model, forecast and simulate business processes for improved strategic and tactical planning

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THE POWER TO KNOW®

Key Benefits

- **Quickly solve complex econometric problems.** This solution takes advantage of SAS® Viya™, the SAS Platform's new distributed, in-memory engine, to deliver econometric modeling results at breakthrough speeds. In-memory data persistence eliminates the need to load data multiple times during iterative analyses. So you get faster answers to your time- and event-specific questions.

- **Empower users with language options.** Python, Java, R and Lua programmers can experience the power of this solution without having to learn SAS. Now they can access trusted and tested SAS econometrics models from other languages.

- **Drive better, more scientific decision making**. SAS Econometrics can help you understand the impact that factors such as economic and market conditions, customer demographics, pricing decisions and marketing activity have on your organization, providing a scientific basis for better decision making.

Overview

SAS Econometrics helps you address difficult, real-life questions by providing techniques to model complex business and economic scenarios and analyze the dynamic impact that specific events might have over time. It's useful whenever time dependencies, simultaneous relationships or dynamic processes complicate the analyses. The forecasting process can help organizations be more proactive in shaping a profitable future. With SAS Econometrics, you can:

- Run large-scale multivariate simulations that can be fitted using different specifications.

- Perform count regression, cross-sectional analysis, panel data analysis and censored event estimation for both discrete and continuous events.

- Achieve exceptional processing speeds on even the largest data sets using parallel distributed processing of econometric algorithms.

```
4209  /* One-way random effects */
4210  proc cpanel data = mycas.psid;
4211     id id t;
4212     model lwage = wks south smsa ms exp exp2 occ
4213                        ind union fem blk ed / ranone;
4214  run;
4215
4216  /* Hausman-Taylor */
4217  proc cpanel data = mycas.psid;
4218     id id t;
4219     model lwage = wks south smsa ms exp exp2 occ
4220                        ind union fem blk ed / htaylor;
4221     correlated wks ms exp exp2 union ed;
4222  run;
4223
4224  /* Amemiya-MaCurdy */
4225  proc cpanel data = mycas.psid;
4226     id id t;
4227     model lwage = wks south smsa ms exp exp2 occ
4228                        ind union fem blk ed / amacurdy;
4229     correlated wks ms exp exp2 union ed;
4230  run;
4231
4232  /* Comparison Tables */
4233  proc cpanel data = mycas.psid;
4234     id id t;
4235     model lwage = wks south smsa ms exp exp2 occ
4236                 ind union fem blk ed / ranone htaylor amacurdy;
4237     correlated wks ms exp exp2 union ed;
4238     compare;
4239  run;
4240
```

Figure 1: The SAS Studio coding environment in SAS Econometrics.

Capabilities

Count regression models

The CNTSELECT procedure produces regression models for integer-valued dependent variables. It analyzes the number of times specific events occur during a time period.

- Supports Poisson, negative binomial and Conway-Maxwell-Poisson (CMP) regression models.
- Supports zero-inflated models conditional on covariates.
- Supports overdispersion models conditional on covariates (with CMP model).

Severity regression models

Severity modeling estimates probability distributions for the severity (magnitude) of random events. Events can be those with negative effects like the magnitude of damages caused by natural disasters or the distribution of losses claimed under insurance policies, or those with positive effects like intermittent demand for certain products.

- Supports left censoring and right truncation (e.g., deductibles and coverage limits).
- Supports many distributions, including Burr, Exponential, gamma, generalized Pareto, Wald, log-normal, Tweedie and Weibull.
- Additional distributions can be programmed.
- Can fit multiple distributions and automatically select the best.
- Provides automated variable selection methods.

Qualitative and limited-dependent variable regression models

The CQLIM procedure estimates regression models for univariate qualitative and limited-dependent variables.

- Support censored and truncated models.
- Supports ordinal and binary logit and probit models.
- Supports models with heteroscedasticity.
- Estimates stochastic frontier production and cost models.

Copula models

Copula models let you model multivariate dimensions of risk factors. These can be useful when you have to model many correlated risk factors that are non-normally distributed. It supports simulations from Normal, T, Clayton, Gumbel and Frank copulas.

Panel data econometric models

Panel data can have a large number of observations and more than one observation per time period. Regression models for panel data solve problems such as predicting the effect of changes in policies and strategies by analyzing relationships between the past and the future.

- Supports one-way and two-way models.
- Supports fixed-effects, random-effects and hybrid models.
- Provides Hausman-Taylor and Amemiya-MaCurdy estimators.
- Supports instrumental variable regression.
- Fits and compares multiple models.

Open, cloud-enabled, in-memory engine

SAS Econometrics takes advantage of the SAS Viya engine for even faster insights. SAS Viya brings new enhancements to the SAS Platform, including high availability, faster in-memory processing and native cloud support. SAS Viya also provides an open analytics coding environment. Whether it's SAS, Python, Java, R or Lua, analytical professionals can access the power of SAS using their language of choice. And with SAS Viya REST APIs, you can add the power of SAS Analytics to other applications. All analytical assets are managed within a common environment to provide a single, governed model inventory across applications.

Learn More

Find out more at sas.com/econometrics.