SAS/ETS® Software

Integrated econometric and time series techniques for modeling, forecasting and simulating business processes

What does SAS/ETS® software do?

SAS/ETS offers a broad array of econometric, time series and forecasting techniques enabling you to model, forecast and simulate business processes for improved strategic and tactical planning.

Why is SAS/ETS® important?

SAS/ETS equips you to address difficult, real-life questions by providing techniques to model complex business scenarios and analyze the dynamic impact that specific events might have on the business over time. It can help you understand the impact that factors such as economic and market conditions, customer demographics, pricing decisions and marketing activity have on your business, providing a scientific basis for better decision making. The forecasting process can help organizations be more proactive and shape their own destinies toward a profitable future.

For whom is SAS/ETS® designed?

SAS/ETS software is designed for econometricians, forecasters and high-end data analysts responsible for or supplying information to business planning processes and decisions. SAS/ETS is desirable for anyone needing breadth and flexibility to address their modeling, forecasting and simulation needs.

Measuring the impact of economic and marketplace factors, and getting a view of the future, are key elements for successful planning. You must be able to model and simulate any business process, and the factors that affect those processes – no matter how complex.

SAS/ETS software provides a wide range of integrated capabilities for econometrics and systems modeling, time series analysis, forecasting and financial analysis with direct access to commercial financial databases. Factors that affect your business – such as the economy, market conditions, customer demographics and marketing activities – can be identified, quantified and included in your forecasting and planning processes to improve results.

Key benefits

- **Analyze the impact of promotions and events**. The time series and econometric capabilities of SAS/ETS software provide users with several mechanisms for determining promotional lift. The depth and flexibility of the SAS modeling environment can accommodate any business scenario. Determining the effectiveness of promotions and events enables you to better allocate marketing dollars in the future.
- **Model customer choices**. SAS/ETS software enables you to maximize marketing efforts by understanding which product features are important to a particular audience. Modeling customer choices based on the attributes of customers and their choices helps improve business strategy by predicting customers' decisions. Understanding these choices and the factors that influence them enables you to adjust marketing strategies or fee structures to modify choices or target the right population.
- **Measure and predict marketing investment activities**. SAS/ETS software can help you understand which key business drivers are having the highest impact on consumer demand. You can model customer demand based on marketing mix activities that measure the impact of pricing, advertising, in-store merchandising, store distribution, sales promotions and competitive activities. Using simulation and optimization tools, you can maximize investments to drive profitable volume growth.

Product overview

SAS/ETS software offers a broad array of econometric, time series and forecasting techniques enabling you to model, forecast and simulate business processes for improved strategic and tactical planning. It provides techniques for modeling complex business scenarios and analyzing the dynamic impact that specific events might have on an organization over time.

Explore time-stamped data for insight

By providing graphical and analytical exploration capabilities for time-recorded data, SAS/ETS software helps you uncover and quantify previously undetected trends. Time-stamped data can be decomposed into separate subcomponents – trend, seasonal and "unexplained" components – so you can understand and diagnose what is happening over time and what is expected to happen in the future. Time series decomposition can be performed using classical decomposition, unobserved components models, or the X11-ARIMA

and X12-ARIMA methods developed and popularized by the US Census Bureau and Statistics Canada.

Forecasting methods

Forecasting is vital to virtually every planning process, and SAS/ETS provides analysts with the broadest array of methods to suit any forecasting problem. The forecasting capabilities in SAS/ETS can be accessed either through SAS procedures or from the interactive Time Series Forecasting System user interface. SAS/ETS contains popular forecasting methods such as regression, unobserved components models, trend extrapolation, exponential smoothing, Winter's method, ARIMA (Box-Jenkins), and dynamic or transfer function models. For forecasting multiple time series jointly, SAS provides VARMAX and general state-space models.

The Time Series Forecasting System

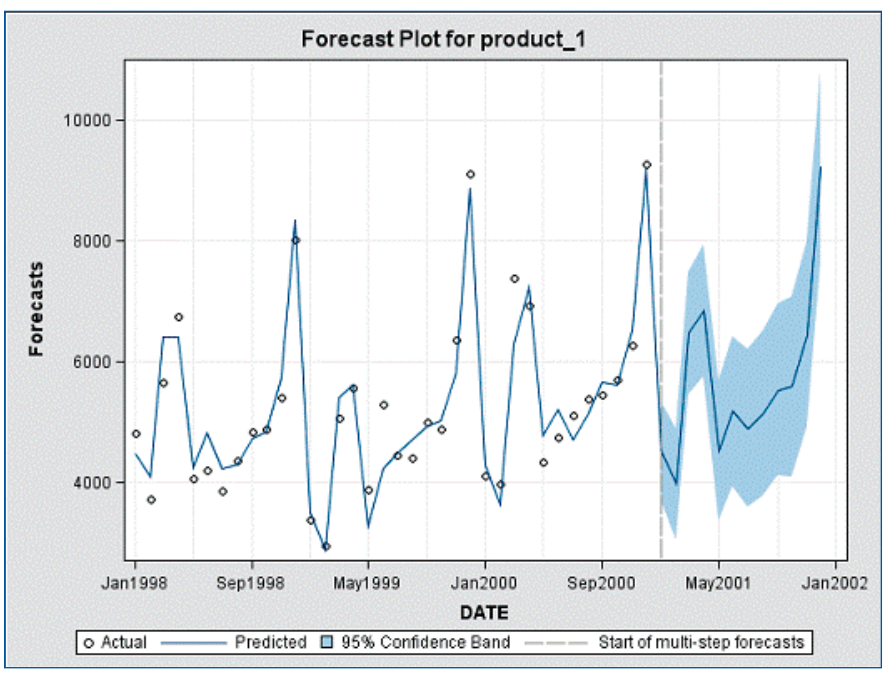
The Time Series Forecasting System is a point-and-click interface that provides interactive exploration and forecasting. It enables novice forecasters to quickly master the forecasting process, and provides a robust set of tools for more experienced analysts. The Time Series Forecasting System can generate forecasts automatically by selecting the most appropriate forecasting model from an extensive list of candidate models. Advanced forecasters can create their own models in a model development workspace, and these models can then be added to the automatic model selection list. The Time Series Forecasting System allows outside data to be included in the forecasting process. Forecasts from others in your organization also can be fed into the system for statistical evaluation or combined with statistically generated forecasts, enabling a collaborative forecasting process.

Econometric analysis

Econometric analysis is the application of statistical techniques to "economic" problems. SAS/ETS includes many econometric analysis capabilities, ranging from linear and nonlinear modeling of simultaneous equations to discrete choice models. SAS/ETS software provides techniques for analysis of small data sets, limited and discrete dependent variables, and sample selection bias – all common problems in the real world.

Simulation for strategic forecasting and planning

For strategic planning, SAS/ETS provides a variety of means for modeling business processes within what-if and Monte Carlo simulation analyses. Complex systems and processes can be simulated and a variety of scenarios can be tested, giving you a safe means for evaluating and fine-tuning proposed policies before actually putting them into practice.



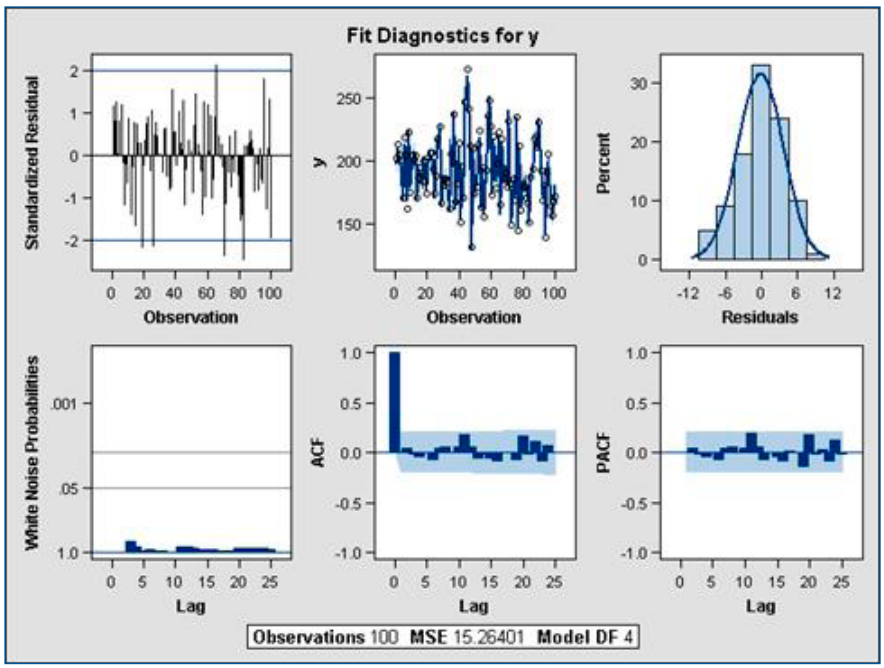
Forecasting: SAS/ETS can automatically select the most appropriate method for generating forecasts.

Specialized data management and preparation

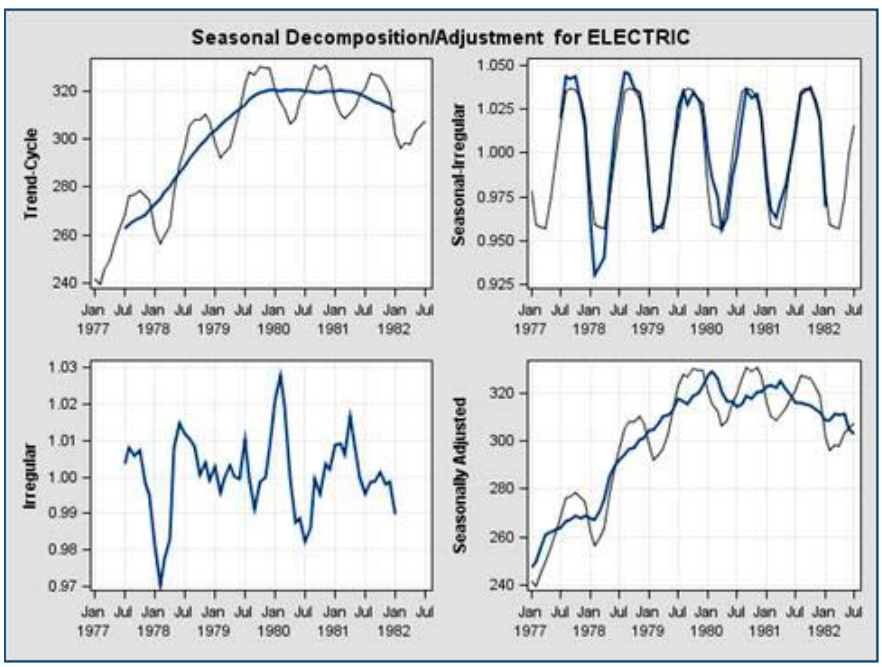
SAS/ETS software provides special data management capabilities for time-recorded data. Data coming from transactional systems, which is typically recorded with no regard to a particular time frequency, can be aggregated to form a time series of equally spaced observations – one for each time period – for subsequent analysis. Any time series frequency can be calculated from the same transactional data. SAS/ETS also can convert the data from one time frequency to another. Automatic outlier and intervention (or event) detection are provided in many procedures, and several options are available for specifying how missing values are to be interpreted or replaced.

Specialized data access

It's easy to access commercially available economic and financial time series data with SAS/ETS software. Data can be extracted directly from files supplied by government and commercial data vendors and then converted to SAS data sets. Government sources include the US Bureau of Economic Analysis and the US Bureau of Labor Statistics, the International Monetary Fund (IMF), and the Organization for Economic Cooperation and Development (OECD). Commercial database vendors include FAME, DRI, Standard & Poor's (COMPUSTAT), Haver Analytics, and the Center for Research in Security Prices (CRSP).



Diagnostics: Here is an example of default diagnostic plots for the autoregression procedure (PROC AUTOREG).



Trend analysis: SAS/ETS provides seasonal decomposition and adjustment for time-series data.

SAS/ETS® Software Technical Requirements

Supported platforms

- AIX: Version 5.3 and Version 6.1 on POWER architectures
- HP-UX PA-RISC: HP-UX 11iv2 (11.23), 11iv3 (11.31)
- HP-UX Itanium: HP-UX 11iv2 (11.23), 11iv3 (11.31)
- Linux for x86 (x86-32): RHEL 4 and 5, SuSE SLES 9 and 10
- Linux for x64 (EM64T/AMD64): RHEL 4 and 5, SuSE SLES 9 and 10
- Microsoft Windows (x86-32): Windows XP Professional, Windows Vista*, Windows Server 2003 family
- Microsoft Windows on x64 (EM64T/AMD64): Windows XP Professional for x64, Windows Vista* for x64, Windows Server 2003 for x64
- Microsoft Windows (on Itanium): Windows Server 2003 for Itanium-based systems
- OpenVMS for HP Integrity Servers (Itanium): 8.3
- Solaris on SPARC: Version 9, 10
- Solaris on x64: Version 10
- z/OS: V1R7, V1R8, V1R9 and higher

NOTE: Windows Vista editions that are supported include Enterprise, Business and Ultimate

Required software

- Base SAS®
- SAS/GRAPH® required for ODS graphics.

Key features

Econometric analysis

- Regression with correction for autocorrelated errors.
- Fitting, analyzing and simulation for simultaneous systems of both linear and nonlinear regression models.
- Multinomial discrete choice analysis.
- What-if, Monte Carlo simulation.
- Time series cross-sectional analysis.
- Qualitative and limited dependent variable models.

Full range of forecasting and time series methods

- Trend extrapolation; exponential smoothing; Winters method (additive and multiplicative); ARIMA (Box-Jenkins).
- Structural time series models or unobserved components models.
- Dynamic regression or transfer function models.
- Joint forecasting of multiple time series using vector time series analysis and general state-space models.
- Automatic outlier and event detection.
- Time series decomposition and seasonal adjustment.
- Spectral and cross-spectral analysis for finding periodicities or cyclical patterns in your data.

Time Series Forecasting System

- Point-and-click interface for exploring and forecasting time series data.
- Automatic selection of the most appropriate forecasting model for each time series.
- Mathematically optimized model parameters.
- Interactive model development facility for more experienced forecasters.
- Graphical display of time series diagnostics tests.
- Inclusion of regression variables and unusual events in the forecasting model.
- Diagnostic checks on fitted models.
- Option to statistically combine multiple forecasts.

Time series data management and preparation

- Conversion of time series from one sampling frequency to another.
- Interpolation of missing values.
- Aggregation of time-stamped transactional data into time series.
- More than 100 time series transformation operations.

Financial analysis

- Interactive analysis system for time-value-of-money analysis.

Provides tools to access many commercial and government databases

- Commercial database vendors: FAME, DRI, Standard & Poor's (COMPUSTAT), Haver Analytics and CRSP.
- US government data: Bureau of Economic Analysis, Bureau of Labor Statistics.
- International agency data: International Monetary Fund (IMF), Organization for Economic Cooperation and Development (OECD).
- SAS/ACCESS® software (licensed separately) provides seamless read, write and update access to other data sources, including relational and nonrelational databases, PC file formats and data warehouse appliances. SAS Data Surveyors are available for accessing enterprise applications (such as Oracle, SAP, PeopleSoft and Siebel).

SAS Institute Inc. World Headquarters +1 919 677 8000
To contact your local SAS office, please visit: **www.sas.com/offices**