



Anvendt tidsserianalyse med SAS Econometrics

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Data Scientist within the Nordic AI & Analytics Team



Experience ranging from:

- Visualization
- Machine Learning
- Forecasting
- Text Analytics
- Ect.

Background in Biostatistics and Data Science

Paper 3596-2019

Modeling Teenage Smoking Behavior with SAS Econometrics® Software

Gunce E. Walton, SAS Institute Inc.

ABSTRACT

Cigarette smoking is harmful to health and is estimated to have a yearly social cost of billions of dollars. Smoking behavior is often established during the teenage years, so understanding why teens start smoking is important for prevention policies. One issue in modeling smoking behavior is that choices to smoke are often correlated with other circumstances. If appropriate statistical techniques

Paper SAS2114-2018

Economic Capital Modeling with SAS® Econometrics

Mahesh V. Joshi, SAS Institute Inc.

ABSTRACT

A statistical approach to developing an economic capital model requires estimation of the probability distribution model of the aggregate loss that an organization expects to see in a particular time period. A well-developed economic capital model not only helps your enterprise comply with industry regulations but also helps it assess and manage risks. A loss distribution approach decomposes the aggregate loss of each line of business into frequency and severity of individual loss events, builds separate distribution models for frequency and severity, and then combines the two distribution models to estimate the distribution of the aggregate loss for each business line. The final step estimates a copula-based model of dependencies among the business lines and combines simulations from the dependency model with the aggregate loss models of individual business lines. This process yields an empirical estimate of the enterprise-wide loss distribution, which helps you develop an economic capital model. The process is characterized by both big data and big computation problems. This paper describes how SAS® Econometrics software can help you take advantage of the distributed computing environment of SAS® Viya® to implement each step of the process efficiently.

SAS2141-2018

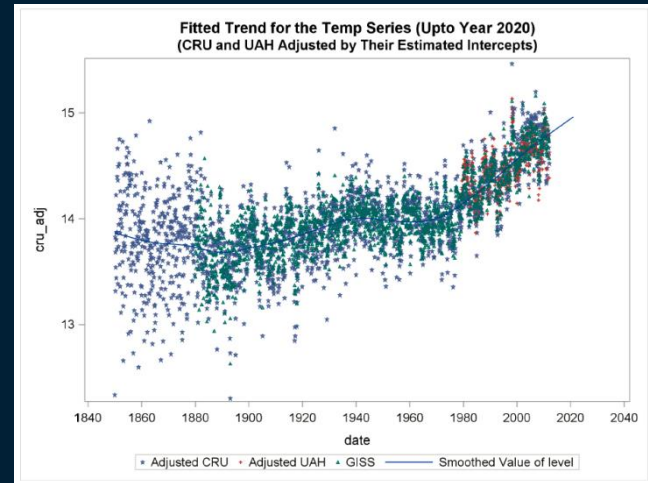
Location Matters: Evidence from Spatial Econometric Analysis of Opioid Prescribing Rates

Ilse-Monge, Guohui Wu, and Jonathan McCopp, SAS Institute Inc.

Medicare patients are at risk of opioid abuse. A Centers for Medicare and Medicaid Services (CMS) analysis identified approximately 225,000 beneficiaries who received potentially high-risk opioid prescriptions filled in high-risk geographic areas. A key to identifying high-risk geographic clusters by applying location analytics is to identify high-risk geographic clusters by applying location analytics. Location analytics blends health data with geographic data to reveal the location of opioid abuse among beneficiaries. Location analytics that includes spatial econometric modeling (like the Geographically Weighted Regression) combined with SAS® Visual Analytics on SAS® Viya® is a powerful and easy-to-use tool to identify high-risk spatial clusters. It can better equip government agencies to effectively identify high-risk spatial clusters as well as boost the integrity of Medicare. This paper shows how to apply location analytics to find high-risk spatial clusters. It uses SAS® data management, data exploration, modeling, and analytics to identify patterns and relationships in data that address risks in Medicare and to provide an adequate response.

SAS Econometrics

- What is SAS Econometrics?
 - Collection of Econometric and Time Series procedures and tools
- Types of tools in SAS Econometrics
 - Time series analysis
 - Cross-sectional econometrics
 - Panel data econometrics
 - Spatial Econometrics
 - Seasonal adjustment and spectral analysis
 - Time series data transformations
 - Access to financial and economic databases



SAS Econometrics vs. SAS/ETS



SAS Econometrics contains SAS/ETS. SAS/ETS is available in Viya SPRE



SAS Econometrics procedures and action sets are on Viya platform, so it can take advantage of all benefits of Viya platform, like distributed computing, open access for Python, R, and other languages.



SAS Econometrics has many new procedures and more coming

Uses of SAS Econometrics

- Media (Marketing) mix modeling
- Price elasticity modeling
 - Capacity constrained events
 - Supply and demand systems
- Customer lifetime value
 - Churn models
- Policy and Environmental Impact
- Loss distribution models
- Credit risk modeling
- Consumer choice modeling
 - Attribution modeling
- Spatial Dependence
- Forecasting
 - Sophisticated univariate extrapolation
 - Multiple regression modeling with time series
 - Multivariate forecasting
- Time series data management

Ways to Forecast with SAS Viya

The screenshot displays the SAS Viya Model Studio interface for a forecasting pipeline titled "Oslo Spot Prices".

Code Editor:

```
1 cas;  
2 caslib all_assign;  
3  
4 data spotprices;  
5 set public.elspotprices_all;  
6 format newdate date9.;  
7 run;  
8  
9 proc sort data=spotprices out=spotprices_new;  
10 by newdate;  
11 run;  
12  
13 /*Plot the time series data*/  
14 proc gplot data=spotprices_new;  
15 plot Oslo*newdate=1;  
16 symbol 1=spline v=none h=2;
```

Pipeline:

- Data
- Auto-forecasting
- Model Comparison
- Output

Auto-forecasting Panel:

Run Pipeline

Description: Automatically fit the best model to generate forecasts from the selected model families.

Code editor: Open

> Model Generation

> Model Selection

Forecast Plot:

- Residual Correlation Plot
- Residual Normality Plot
- Residual Plot
- Model Filters
- Model for variable
- Autoregressive
- Forecast 1
- Forecasts for Oslo
- Forecasts Only Plot
- Forecast Plot
- Outlier Detection Summary
- Outlier Details

Forecast

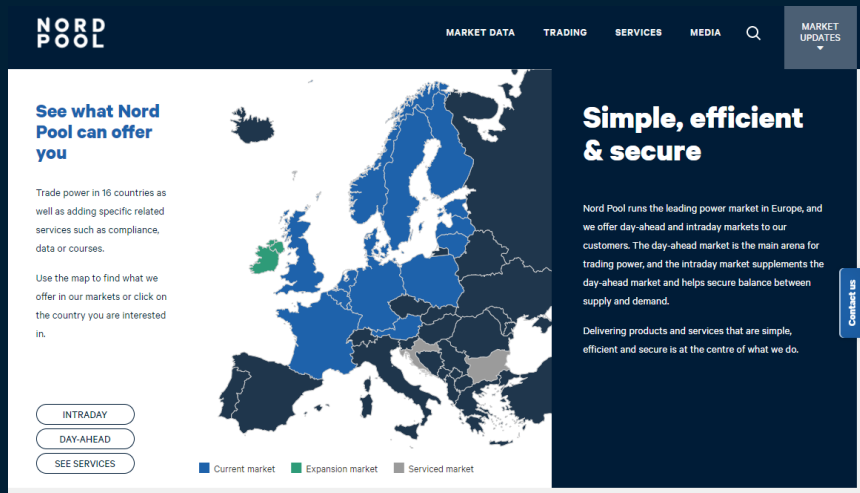
newdate

Actual Predicted 95% Confidence Limits Start of multi-step forecasts

Oslo (Model) Oslo (Actual)

Case Study

Electricity Spot Prices in Oslo



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We have Monthly Spot Prices for Multiple Regions in Norway from 2011-2020.

Our goals are to:

- Forecast the Monthly Spot Prices for the Year ahead for one region (Oslo)

Data obtained from:

- <https://www.nordpoolgroup.com/historical-market-data/>

Further Reading

Documentation:

- https://go.documentation.sas.com/?cdcId=pgmsascdc&cdcVersion=9.4_3.4&docsetId=casecon&docsetTarget=casecon_intro_sect001.htm&locale=en
- https://go.documentation.sas.com/?cdcId=pgmsascdc&cdcVersion=v_009&docsetId=etsug&docsetTarget=titlepage.htm&locale=en

Applications of SAS Econometrics:

- <https://www.sas.com/content/dam/SAS/support/en/sas-global-forum-proceedings/2019/3596-2019.pdf>
- <https://www.sas.com/content/dam/SAS/support/en/sas-global-forum-proceedings/2018/2141-2018.pdf>
- <https://www.sas.com/content/dam/SAS/support/en/sas-global-forum-proceedings/2018/2114-2018.pdf>

Relevant Blogs:

- <https://blogs.sas.com/content/subconsciousmusings/2021/01/14/the-road-to-modern-econometrics/>

Thanks!



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