

TRAMO SEATS

TRAMO and SEATS are programs developed by Victor Gómez and Agustín Maravall for the analysis of time series. The programs, as well as documentation and various papers describing the underlying methodology, are available for download from the [Bank of Spain](http://www.bde.es/servicio/software/econome.htm). (<http://www.bde.es/servicio/software/econome.htm>)

Note: The dXtime installation includes its own versions of the TRAMO-SEATS programs, so it is not necessary to download them in order to use the software with dXtime.

TRAMO (Time Series Regression with Arima Noise, Missing Observations and Outliers) is a program for estimating, forecasting and interpolating time series regression models. Its features include

- automatic identification and estimation of an appropriate ARIMA model;
- interpolation of missing observations which may occur in the series;
- detection and correction of several types of outlier;
- estimation of special effects such as trading day and Easter effects;
- forecasting of the original series, based on the fitted model.

SEATS (Signal Extraction in Arima Time Series) is a program for decomposing a time series into various "unobserved" components, such as the trend, seasonal and irregular. It typically receives as input the original series, along with the ARIMA model description of the series.

TRAMO and **SEATS** are designed to work together, with TRAMO "cleaning up" the original series, and identifying an appropriate ARIMA model, and the results being passed onto SEATS for decomposition into various components. Both programs offer many configuration options, but also offer the ability to model series in a fully automatic way. At present, dXtime uses this automatic modeling procedure when generating TRAMO-SEATS models.

When dXtime executes a TRAMO-SEATS model, it follows these steps.

1. A TRAMO input file is prepared, based on the data from the parent series.
2. The TRAMO and SEATS programs are executed in sequence (TRAMO itself prepares the input file for SEATS).
3. dXtime analyses the output of both programs.
4. New series corresponding to model outputs of interest are saved in the Series Directory.
5. Additional information, including model dimensions, parameter estimates, and diagnostic statistics are also saved in the target Workfile.

Directory locations

Normally, it is not necessary to explicitly configure the directories used by dXtime for TRAMO-SEATS modeling.

Model output directory: This directory contains the various input and output files used by TRAMO-SEATS. By default, this location is set to a Models sub-directory of your existing Work directory. If necessary, the location may be modified using the Options > Directories command.

Tip: Users interested in inspecting the full TRAMO-SEATS output will find these files in the model output directory immediately after dXtime runs a single model. If required for later analysis, they should be copied elsewhere, since these files are overwritten each time a TRAMO-SEATS model is run.

Specifying TRAMO-SEATS outputs

The set of outputs for a particular TRAMO-SEATS model can be controlled from the Outputs tab of the TRAMO-SEATS Model dialog box. To access this dialog box

- for a new model, choose the Series > Seasonal Adjustment and Forecasting command, and then click the Additional Outputs button;
- for an existing model, select any of the current model outputs and choose the Edit > Model command.

Some of the outputs which may be of interest include:

- Seasonally adjusted series
The original series with the seasonal component (as estimated by SEATS) removed.
- Trend-cycle
The original series with both seasonal and irregular components removed.
- Linearized series
The series resulting from the removal of outliers and special regression (trading day, etc.) effects.
- Interpolated series
The original series interpolated for any missing observations.
- Forecast original series
The original series forecast forward using the ARIMA model from TRAMO.

Viewing model results

To view the details of the fitted model, select any model output in the Series Directory, choose the Edit > Model command, and click on the Results tab. The model results include:

- the sample period over which the model has been estimated, and also the sample period used for the full model identification procedure;
- the dimensions of the fitted ARIMA model;
- whether or not trading day and Easter effects have been included;
- the location and type of any outliers;
- a number of diagnostic statistics, which may be used to verify the suitability of the model.