Quality diagnostics in JD+

ESTP training

15-17/10/2024

Eurostat

1. Possible outcomes

Value	Meaning
Undefined	The quality is undefined: unprocessed test, meaningless test, failure in the computation of the test...
Error	There is an error in the results. The processing should be rejected (for instance, it contains aberrant values or some numerical constraints are not fulfilled
Severe	There is no logical error in the results, but they should not be accepted for some statistical reasons
Bad	The quality of the results is bad, following a specific criterion, but there is no actual error and the results could be used.
Uncertain	The result of the test is uncertain. Consider it with caution
Good	The result of the test is good

Diagnostics

summary
Good

Basic checks
definition: Good (0.000)
annual totals: Good (0.004)

Regarima residuals
normality: Bad (0.000)
independence: Good (0.815)
spectral td peaks: Good (0.283)
spectral seas peaks: Good (0.339)

Outliers
number of outliers: Good (0.018)

Residual seasonality tests
Qs test on SA: Good (1.000)
F-Test on SA (seasonal dummies): Good (1.000)

Residual trading days tests
F-Test on SA (td): Good (0.999)

Seats
seas variance: Good (0.628)
irregular variance: Good (0.343)
seas/irr cross-correlation: Good (0.695)

1.1 Computation of the global indicator (summary)

Sum	Rules
Undefined	All diagnostics are Undefined
Error	There is at least 1 error
Severe	There is at least 1 "severe" diagnostic but no error
Bad	No error, no severe diagnostics; the average of the (defined) diagnostics (Bad=1, Uncertain=2, Good=3) is < 1.5
Uncertain	No error, no severe diagnostics; the average of the (defined) diagnostics (Bad=1, Uncertain=2, Good=3) is in [1.5, 2.5[
Good	No error, no severe diagnostics; the average of the (defined) diagnostics (Bad=1, Uncertain=2, Good=3) is ≥ 2.5

- In most cases, we can't say that one seasonal adjustment is « better » than another one → NO FIGURE
- We even can't say that a SA is really good
- We just can say that there is probably a problem in a given SA (or not)

2. Customization of the diagnostics
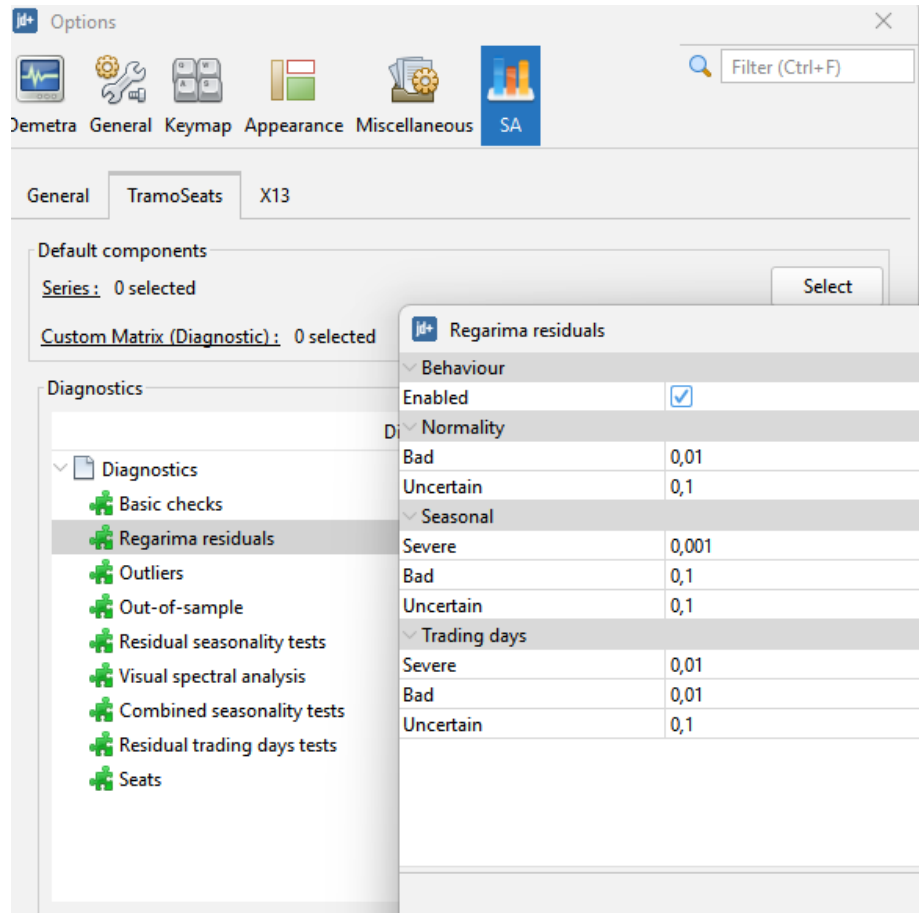
- Diagnostics can be enabled/disabled
- Thresholds can be modified
- Different diagnostics following the algorithm (new in v3)

3.1 Basic checks

- Definition
  - Verification that the definition constraints implied by the model of the series are well respected
    - $Y = T * S * I$
    - …
  - Error → Bug in the software (→ github)

- Annual totals
  - Comparison of the annuals totals of the original series and those of the seasonally adjusted series
  - Error ≡ not an actual bug, but an unacceptable result (→ additive decomposition, benchmarking)

3.21 Modeling: REGARIMA residuals

- Various NIID tests on the residuals of the REGARIMA pre-processing.
    - Normality (Doornik-Hansen)
    - Independence (Ljung-Box)
    - Spectral TD (periodogram).
    - Spectral Seas (periodogram)
- Should not be overstated
    - especially normality, independence
    - especially for X12
- Show possible problems in the decomposition part.

3.22 Modeling:
Outliers, out-of-sample diagnostics

- Should we accept a series with many outliers ?

- Should we accept a model that provides biased/bad forecasts (mean/variance) at the end of the series ?

- Not enabled by default, but used for model selection in Tramo (AMI)

3.31 Residual seasonality tests

- Most important test
- Qs test and F-test on seasonal dummies (last 12 years)
- On the SA series and on the irregular component (sufficiently large)

3.32 Combined seasonality tests [TODO]

- X12-like

- Seasonality tests on SA, I

- Computed on the whole series, on the last 3 years

3.4 Residual trading days tests

- Disabled for quarterly series, rather important for monthly series
- F-test on trading days variables
- On the SA series

3.51 Seats diagnostics

- Model-based diagnostics
  - Comparison of the variances of the theoretical estimators of the (stationary) components (seasonal, irregular) and of their estimates
  - More detailed information available in the interactive module (not used in the diagnostics)
  - Possible problems when
    - The ARIMA model is changed by SEATS
    - The chosen ARIMA model doesn't fit correctly the data (see also ARIMA residuals)

3.52 X11 Diagnostics

- M-Statistics: global indicators (see Ladiray-Quenneville…)
    - Q
    - Q-M2