Publication policy for Seasonal and Calendar Adjustment for Luxembourg Quarterly National Accounts

It is important for users to be able to reproduce seasonally and calendar adjusted series from raw data. The list below gives the options chosen during seasonal and calendar adjustment of Luxembourg QNA data:

Frequency: Quarterly

Series compiled:

- Raw data (CUP, PYP, COP10)
- Seasonally and Calendar Adjusted (CUP, COP10) (PYP obtained by calculation)
- Only Calendar Adjusted (CUP, COP10) (PYP obtained by calculation)

Software used: JDemetra+ v2.2.0

Method used: X-12-ARIMA / X-13ARIMA-SEATS

Calendar used: Luxembourg National Calendar implemented manually in JDemetra+, with 10 Special Days (New Year, Easter, Easter Monday, Ascension, Pentecost, Whit Monday, May Day, Assumption, All Saints Day, Christmas – no starting or ending date – no offset), no Easter related days and 2 Fixed holidays (23rd June, 26th December – no starting or ending date – no offset)

Calendar adjustment:

- Easter effect
- Leap Year effect

Detection and replacement of outliers: Automatic outlier detection and correction (additive outliers, level shifts, transitory changes)

Model/filter selection: Automatic except in case of Severe Quality of the output

Seasonal Adjustment decomposition: Additive, Log-additive, Multiplicative

Direct/indirect adjustment of series: Direct adjustment

Consistency/Identity between GDP and components: No (neither for current prices nor for volumes)

Time consistency between quarterly and annual data: No (no benchmark to annual data form quarterly seasonally adjusted data)

Consistency / Identity between production, expenditure and income side: No (neither for current prices nor for volumes)

Model, filters, outliers, calendar regressors re-identification: Once a year, in September, when annual data becomes available, re-identification of the whole model

Parameters / factors re-estimation: For all the other updates, Partial concurrent adjustment + Arima parameters

Horizon for published revisions: Complete Series

Seasonal adjustment of long time series: Separation of long series (from 1995-now) into two overlapping periods (1995-2012 and 2008-now), with 01/01/2010 being the breaking point

Quality indicators: M-statistics, Autocorrelation at seasonal lags, Friedman test, Kruskall-Wallis test, F-test on seasonal dummies, Periodogram, Auto-regressive spectrum etc. (in fact all the tests implemented in JDemetra+ for X-13ARIMA-SEATS)

Publications/methodological reports: Internal document *" JDemetra+ in Luxembourg's Quarterly National Accounts "* is available on demand.

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Glossary of statistical terms:

- JDemetra+: Software officially recommended by Eurostat to perform seasonal adjustment of official statistics.

  JDemetra+ can be downloaded via the following link:
  https://github.com/jdemetra/jdemetra-app/releases/tag/v2.2.0

  JDemetra+ is based on the two leading algorithms: TRAMO/SEATS and X-12-ARIMA.

- TRAMO/SEATS:
  TRAMO: "Time series Regression with ARIMA noise, Missing values and Outliers" and
  SEATS: "Signal Extraction in ARIMA Time Series"
  is a parametric method for seasonal adjustment developed by Maravall and Gómez of the Bank of Spain. It uses ARIMA models to fit the data.

- X-12-ARIMA is a non-parametric method for seasonal adjustment developed by Findley and Monsell of the US Census Bureau. It uses moving averages to model the data and the ARIMA part only for the end time problem.

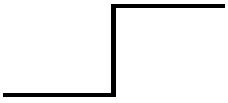
- X-13ARIMA-SEATS allows to generate ARIMA model-based seasonal adjustment using a version of the SEATS procedure as well as non-parametric adjustments form the X-11 procedure.

- CUP: CUurrent Prices

- PYP: Previous Year Prices

- COP10: chain linked COnstant Prices (reference year 2010)

- Additive outlier: 

- Level shift : 

- Transitory change :