JDemetra+: workbook for seasonal adjustment with the Graphical User Interface (GUI)

1 EXERCISE 1: First automatic SA

1.1 Create and save a Workspace

- Open JDemetra+ software
- Save Workspace
  - Click on **File > Save Workspace As...**.
  - Enter a name for the workspace and choose the location where it will be saved
  - Exit JDemetra+ and open the location where the workspace was saved.

What do you notice ?

1.2 Import raw series into JDemetra+

1.2.1 Importing an Excel file into JDemetra+

Here, we assume that the raw data are contained in an Excel file that complies with the following rules:

- the first column corresponds to the date in DD/MM/YYYY format
- the first line contains the series name
- Return to JDemetra+
- Click on the **Providers** tab
- Right-click on **Spreadsheets**
- Click on **Open**
  - Click on the **...** button
  - Select Excel file "IPI_nace4.xlsx" containing series to be seasonally adjusted
  - Click on **OK**

What do you notice under Spreadsheets?

1.2.2 Set a file as a "favorite

- Right-click on the Excel file name that appeared under **Spreadsheets**.
- Click on **Add star**
- Save the workspace and open it again
- Click on the **Providers** tab

What do you notice ?

1.3 Launch a first automatic seasonal adjustment in JDemetra+.

1.3.1 Create a new multi-document

- Click on the **Workspace** tab

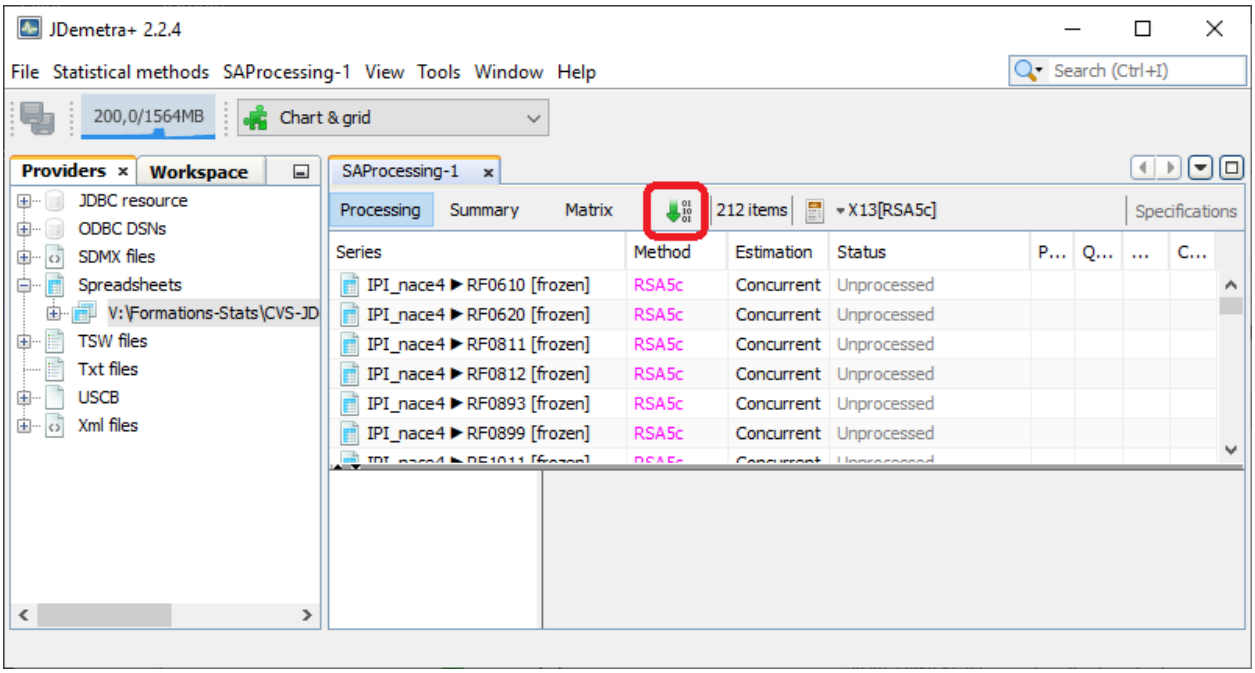
- Double-click on **Seasonal adjustment**.
- Right-click on **multi-documents**
- Click on **New**
- Double-click on the "multi-document" created, named **SAProcessing-1** by default

1.3.2 Choose a predefined specification

- Go to the **SAProcessing-1** tab
- Click on the arrow next to the little "calculator
- Click on the + next to "x13", then click on **RSA5c**.
- Click somewhere in **SAProcessing-1**.

1.3.3 Start seasonal adjustment

- Click on **Providers**
- Drag all series from the "IPI_nace4_ind.xlsx" file into the **SAProcessing-1** tab
- Click on the green arrow in the **SAProcessing-1** tab



What's going on?

- Click on the **RF0610** line (first series)

What do you notice ?

- Save workspace

2 EXERCISE 2: Seasonally adjust a series (without correcting for calendar effects)

- Create a new workspace
- Save workspace
- Import series (IPI_nace4_ind.csv)

- Automatically seasonally adjust these series using the predefined X13 **RSA3** specification

2.1 Analyze seasonal adjustment quality

For ONE series: browse the diagnostics available in **Main results**.

Does the SA series show residual seasonal effects?

Does the SA series show residual "trading days" effects" (= residual calendar effects)?

Then - Go to **Charts**

What do the different curves correspond to?

- Go to **S-I ratio**

Are seasonal factors stable?

How good is the pre-adjustment phase?

- Go to the **Pre-processing** node for more detailed diagnostics

Is the decomposition performed by X11 of satisfactory quality?

- Go to the **Decomposition (X11)** node for more detailed diagnostics

Then, based on these diagnostics, decide on the quality of seasonal adjustment:

Is seasonal adjustment of satisfactory quality?

3 EXERCISE 3: Seasonally adjust series with correction for calendar effects

3.1 Import calendar regressors into JDemetra+.

- Click on **Providers** tab
- Right-click on **Spreadsheets**
  - Click on **Open**
  - Click on the **...** button
  - Select the Excel file “regs_cal_m.xlsx” containing the calendar regressors (in the case of a quarterly series, select the Excel file “regs_cal_t.xlsx”).
  - Click on **OK**
- Click on the **Workspace** tab
- Click on the + next to **Utilities**
- Right-click on **Variables**
- Click on **New**
- Click on the + next to **Variables**
- Double-click on **Vars-1** icon
- Return to the **Providers** tab
- Drag all series from the “regs_cal_m.xlsx” (or “regs_cal_t.xlsx”) file into the **Vars-1** tab.
- Rename series using their original names in the Excel file “regs_cal_m.xlsx” (or “regs_cal_t.xlsx”) (REG1_AC1, LP...)

3.2 Create a specification including calendar regressors sets

- Click on the **Workspace** tab
- Double-click on **Seasonal adjustment**
- Double click on **specifications**
- Double-click on **x13**

- Right-click on **RSA3**
- Click on **Clone**

What do you notice ?

- Double-click on **X13Spec-1**.
- Click on the + next to **Calendar**.
- Click on the + next to **tradingDays**.
- Click on **Default** next to **option**.
- Click on **UserDefined**
- Click on **Unused** next to **userVariables**.

What do you notice ?

- Pass the 7 calendar regressors of the REG6 regressor set (REG6_AC1, REG6_AC2...) + LY from left to right.
- Click on **Done** button
- Click on **OK**

3.3 Perform automatic seasonal adjustment of your series using the X13Spec-1 specification

3.4 Analyze diagnostics related to the correction of calendar effects

For each series, answer the following questions:

Was there a correction for calendar effects?

If yes, are all coefficients associated with the calendar regressors significantly different from 0?

If not, try other sets of calendar regressors.

Has the Easter effect been corrected? Would it make sense ?

Does the SA series show any residual "Trading days" effects (= residual calendar effects) ?

3.5 Improve the quality of the entire SA processing by customizing parameters

Perform an automatic SA process on a set of series, using the relevant specification (RSA3, RSA5c, customized with user defined calendar regressors)

For each series of interest:

- Analyse the different diagnostics
  - Is the SA treatment of satisfactory quality?
    - residual seasonality ?
    - residual calendar effects ?
    - quality of Reg-Arima residuals ?
    - quality of X-11 decomposition ?
  - If not, make the necessary changes in the specification box (related to a given series) (access by clicking on the **Specifications** button in the top right-hand corner)

3.5.1 Additive / multiplicative model

TRANSFORMATION > function

- None: additive model
- Auto: choice between additive/multiplicative model is made by JD+.
- Log : multiplicative model

3.5.2 Regression variables

REGRESSION > Calendar > tradingDays (if applicable)

- Change the set of calendar regressors ? Remove it ?

REGRESSION > Calendar > easter

- Possibly introduce a gradual effect for Easter (rare !)
- Optionally choose a different length (Easter duration)

REGRESSION > Calendar > Pre-specified outliers

- if you want to add outliers which haven't been automatically detected, and you are aware of special events (Covid, strikes...)

REGRESSION > User-defined variables

- Allows you to introduce variables more specific than outliers and to allocate its effects to a component

3.5.3 Outlier detection

Here you customize the way JDemetra+ detects outliers

- Select the outlier detection period (Detection span)
- Change the outlier detection threshold (Use default critical value and Critical value)
- Select the type of outliers which can be detected automatically

3.5.4 ARIMA model

- If the diagnostics on the residuals of the Reg-ARIMA model are not satisfactory, you can try to determine the (p,d,q)(P,D,Q) orders of the ARIMA model by hand (once the regression variables have been adjusted).

Try out the default model (Airline (0,1,1)(0,1,1))

3.5.5 X11

3.5.5.1 Choosing the moving averages used by X11

- Identify the moving averages used by X11:
  - **Decomposition (X11) > Final filters**
- Analyse **S-I ratios
- You can change the moving averages used by X11:
  - X11 > Seasonal filter**

3.5.5.2 Choosing the Henderson moving average used by X11

- Identify the Henderson moving average used by X11:
  - **Decomposition (X11) > Final filters**
- Analyze the trend graph
- You can change the Henderson moving average used by X11:
  - **X11 > Automatic Henderson filter**
  - **X11 > Henderson filter**

3.5.6 Span of the Reg-Arima model ("model span")

Faced with unsatisfactory results over the whole period, we can reduce the estimation period of the model.

Adjust parameters in the specification box (Beware some restrictions are fixed (eg "from"), some are dynamic (eg "last"))

3.5.7 SA estimation span ("series span")

In the case of long series, with several regimes, we may be obliged to reduce the estimation period.

Adjust parameters in specification box (Beware some restrictions are fixed (eg "from"), some are dynamic (eg "last"))

3.5.8 Strike a balance between left box and right box specifications

Considering a data set:

- left box: will be applied to a group, as specific as possible to save time and clicks
- right box: will be applied to one given series, highly customized