

Gradual changeover to JDemetra+ software for seasonal adjustment of the official statistics

The Bundesbank is currently phasing in JDemetra+ as its new software tool for the seasonal adjustment of official economic indicators in Germany.¹ JDemetra+ is thus replacing Census X-12-ARIMA (version 0.2.8), which was the program used previously. JDemetra+ is a user-friendly open source software tool which contains both the X-12-ARIMA method² developed by the US Census Bureau and the TRAMO/SEATS method³ promoted by Banco de España. The methods most widely used internationally and recommended for seasonal adjustment in Europe are thus both available in this software.⁴ Its modular implementation means that JDemetra+ can be easily enhanced and adapted.

The National Bank of Belgium and the Bundesbank are responsible for developing and maintaining JDemetra+ in line with the recommendations of the European Statistical System and the European System of Central Banks. It is also used by the European Central Bank, Eurostat and many of the national statistics offices and central banks in the European Union.⁵

The approach applied at present with Census X-12-ARIMA will initially be retained by the Bundesbank in JDemetra+. The new software has benefits in terms of its graphical user interface and its multiple new diagnostics for statistical quality assurance.⁶ Looking ahead, the changeover to JDemetra+ will make it possible to extend the scope of application to higher-frequency data, such as weekly or daily data.⁷ Moreover, the inclusion of the ARIMA model-based approach, which was carried over from TRAMO/SEATS, could further improve the quality of the adjusted data.⁸

In connection with JDemetra+ a number of software plug-ins used in the official German statistics are being made available by the Bundesbank to other users free of charge. This allows, for example, the aggregation and disaggregation of chain indices, the calculation of mathematical contributions to growth and the centring of regressors for the purposes of calendar adjustment.⁹

¹ In collaboration with the Federal Statistical Office, the indices for orders received by industry and the stock of orders in industry as well as the indices of output in the production sector were already adjusted using the new software in April and May 2018, respectively. These will be followed in stages by the other monthly indicators, such as the current account and the monetary indicators. Jointly with the Federal Employment Agency, the changeover to the new seasonal adjustment software for their labour market indicators is scheduled for the second half of 2018. The changeover to JDemetra+ for the seasonal adjustment of the national accounts is planned to be implemented along with the major revision scheduled for the summer of 2019.

² See DF Findley, BC Monsell, WR Bell, MC Otto and BC Chen (1998), *New Capabilities and Methods of the X-12-ARIMA Seasonal Adjustment Program*, *Journal of Business and Economic Statistics*, 16, pp 127-177; D Ladiray and B Quenneville (2001), *Seasonal Adjustment with the X-11 Method*, Volume 158 of *Lecture Notes in Statistics*, New York, Springer.

³ *Time Series Regression with ARIMA Noise, Missing Observations and Outliers and Signal Extraction in ARIMA Time Series*. For further information, see V Gómez, A Maravall (2001), *Seasonal Adjustment and Signal Extraction in Economic Time Series*, Chapter 8, in D Peña, GC Tiao and RS Tsay (eds), *A Course in Time Series Analysis*, New York, J Wiley and Sons.

⁴ See Eurostat (2015), *ESS Guidelines on Seasonal Adjustment*, ISSN 2315-0815, section 3.1.

⁵ See Eurostat and European Central Bank (2015), *Note to the attention of the members of the ESS and ESCB*, Ref Ares(2015)241738.

⁶ JDemetra+ contains, inter alia, additional tests for identifying seasonality, residual seasonality and residual calendar effects as well as the description of the stability of the model.

⁷ See Deutsche Bundesbank, *Seasonal adjustment of daily data*, *Monthly Report*, March 2018, p 40.

⁸ See K Weibel (2016), *A data-driven selection of an appropriate seasonal adjustment approach*, *Deutsche Bundesbank Discussion Paper*, 7/2016.

⁹ For further information, see <https://www.bundesbank.de/Redaktion/EN/Standardartikel/Statistics/jdemetra.html?nsc=true&https=1>