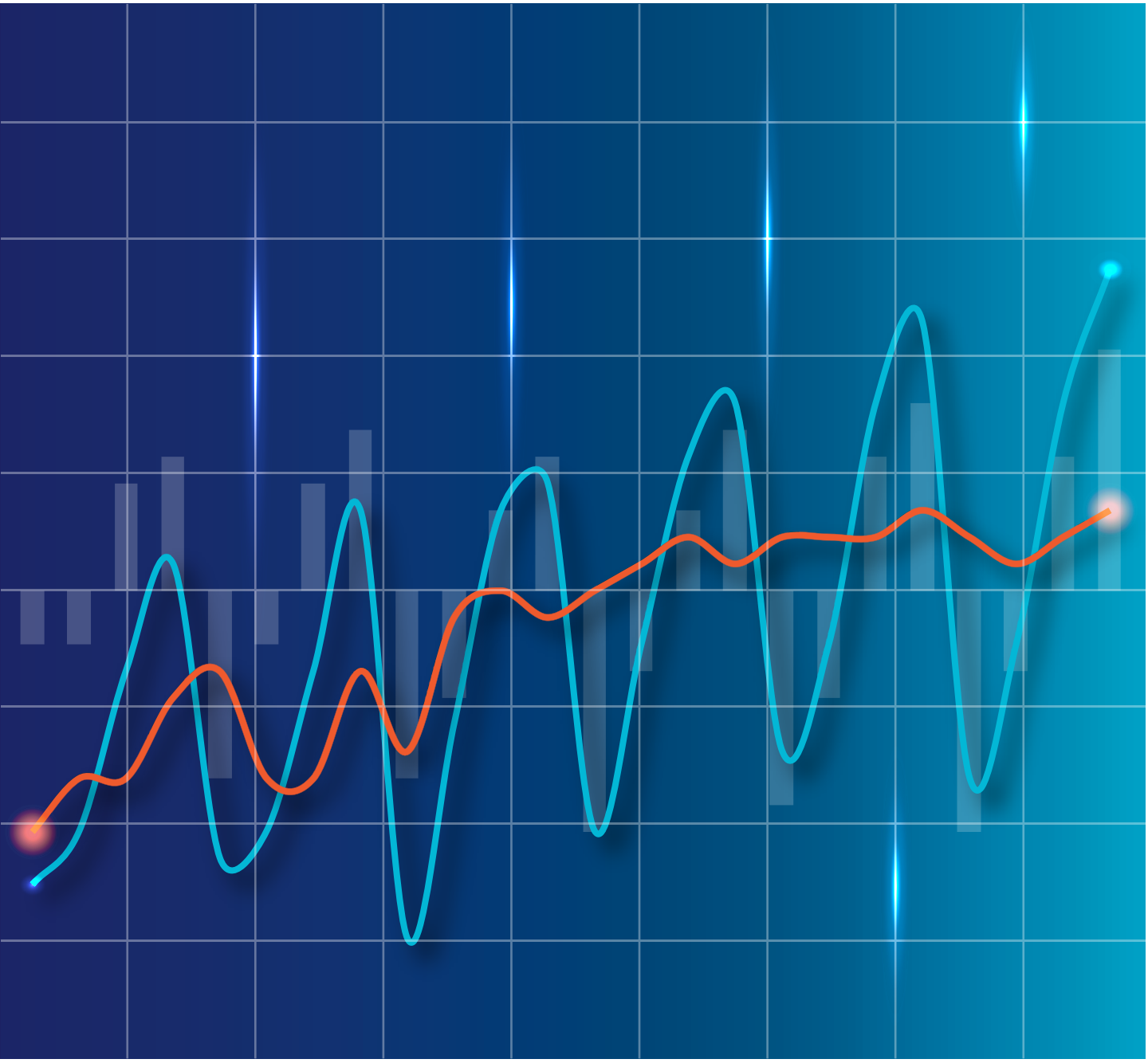
UNECE

Practical Guide to Seasonal Adjustment with JDemetra+

From source series to user communication



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PRACTICAL GUIDE TO SEASONAL ADJUSTMENT WITH JDEMETRA+

FROM SOURCE SERIES TO USER COMMUNICATION

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Preface

To assess the economic development and make informed decisions on economic policy, relevant and timely economic statistics must be available to users. However, since many economic phenomena such as production, income and employment are influenced by seasonal factors, simply relying on the original, unadjusted statistical series may not provide a clear picture of the development.

Seasonally adjusted time series provide a more transparent and comparable measure of socioeconomic developments over time and enable the monitoring and detection of cyclical movements and turning points. This is achieved by identifying and removing the seasonal pattern to reveal the underlying development. Seasonal adjustment makes it easier to draw comparisons over time and to interpret the development in the series. It allows time series with different seasonal patterns to be compared between different industries or countries. It also provides more meaningful and insightful month on month or quarter on quarter comparisons of time series.

This Guide introduces seasonal adjustment and gives practical guidance to national statistical offices in producing seasonal adjusted monthly or quarterly time series covering all steps in the production process, from the evaluation of the original data series to the dissemination and communication of the seasonally adjusted series. The Guide can be used in introducing new staff to seasonal adjustment, in training courses or as a complement to other material on seasonal adjustments.

The Guide is based on the use of *JDemetra+* which is an open source software for seasonal adjustment. JDemetra+ is developed by the National Bank of Belgium in cooperation with Deutsche Bundesbank and Eurostat in accordance with the guidelines of the European Statistical System (ESS). JDemetra+ offers the possibility to perform seasonal adjustment by use of internationally recommended methods, TRAMO/SEATS and X-13-ARIMA-SEATS, and is officially recommended to members of the ESS and the European System of Central Banks for seasonal and calendar adjustment of official statistics.

The Guide is an update of the *Practical Guide to Seasonal Adjustment with Demetra+* (UNECE, 2012). This Guide has been updated to support the new version of the software, JDemetra+, and give guidance on the use of the new and improved features of JDemetra+. The Guide refers to JDemetra+ version 2.1.0 but may also be used for later versions of the software.

The Guide is targeted to countries of Eastern Europe, Caucasus and Central Asia but may also be found useful by other countries.

Acknowledgments

In 2012 UNECE published the *Practical Guide to Seasonal Adjustment with Demetra+* to give practical guidance to countries on seasonal adjustment based on the open source software Demetra+.

In 2014, JDemetra+ was released as a result of the joint work of the National Bank of Belgium, Deutsche Bundesbank and Eurostat. JDemetra+ includes several new features and improvements compared to Demetra+. To align with JDemetra+ and support countries in their use of the new version of the software it was decided to update the Guide.

The updated Guide draws on information from international organisations, national statistical offices and academics. In particular, the updated Guide draws on *JDemetra+ User Guide* (Grudkowska, JDemetra+ User Guide, 2015), *ESS Guidelines on Seasonal Adjustment* (Eurostat, 2015), *Methodology of Short-term Business Statistics* (Eurostat, 2006) and *International Recommendations for the Index of Industrial Production 2010* (UN, 2013).

The Guide has been updated by Necmettin Alpay Koçak, who was also the main author of the 2012 version of the Guide together with Anu Peltola (UNECE). UNECE thanks Alpay Koçak for updating the Guide. Patrick Foley, Central Statistics Office of Ireland, contributed with substantive comments and suggestions and edited the chapters to ensure clear language and coherence throughout the Guide. UNECE is thankful to Patrick Foley for his support to the Guide. Evita Sisene, Albert Bredt and Carsten Boldsen (UNECE) assisted in the editing and formatting of the publication.

Contents

1 Introduction

This introduction outlines briefly the purpose of the Guide and gives a general overview of what is understood by seasonal, calendar and irregular effects in sub-annual (monthly or quarterly) time series and why it is necessary to adjust for these effects to derive time series that allow comparisons over time and enable a coherent interpretation of the developments in the series. JDemetra+ is introduced followed by a short description of the four main steps of seasonal adjustment: preparation of data, seasonal adjustment, analysis of the results and user communication. Lastly, an overview of the chapters of the Guide is provided.

1.1 The purpose of the Guide

The aim of this Guide is to provide information and practical guidance to statistical offices on how to undertake seasonal adjustment of time series by using JDemetra+ Version 2.1.0 or later versions.

It provides background information on methods applied in JDemetra+ and gives practical guidance to compilers of short-term statistics that need to produce seasonal adjusted time series, covering all steps in the production process, from the evaluation of the original data series to the dissemination and communication of the seasonally adjusted series. It offers guidance on how to interpret quality diagnostics produced as part of the process of seasonal adjustment and practical tips on using the software. It highlights the user-friendly and flexible features of JDemetra+. The Guide can also be used for training of staff in statistical offices on how to perform seasonal adjustment. The Guide is targeted to countries of Eastern Europe, Caucasus and Central Asia but it may also be useful in a wider context.

1.2 Seasonal, calendar and irregular effects

Many short-term time series, e.g. monthly or quarterly data series, may be influenced by seasonal, calendar or irregular effects.

Seasonal effects are associated with regular periodic changes in time series that repeat itself from calendar year to calendar year. Seasonal effects may be caused by many different reasons, including climate and weather conditions, traditions and cultural or administrative habits. For instance, economic activity in terms of production and employment in some sectors of the economy will be influenced by the season of the year, e.g. the agriculture and fishing and tourism. In many countries retail sales peak in the run up to Christmas. Similarly, there may be a tradition for summer sales that impact on the values and volume of sales. Administrative and legal habits may also be linked to the time of the year and cause seasonal effects, including for instance quarterly provisional tax payments or periodic invoicing.

Calendar effects usually include both *working day effects* and *trading day effects*. Working day effects are such changes that can be attributed to the number of working days in a given month (or quarter). The number of working days changes from month to month and is influenced by fixed holidays and moving