OECD System of Unit Labour Cost and Related Indicators: Report from the Annual Update to Seasonal Adjustment Models – August 2009

A. Introduction

1. Seasonal adjustment is a process by which changes that are due to seasonal or calendar influences are removed to produce a clearer picture of the underlying behaviour of a time series. Consequently, seasonally adjusted data is one of the main sources of information used by policy-makers, economists and business analysts when attempting to identify important features of economic series such as direction, turning points, and consistency between other economic indicators. The implementation of a seasonal adjustment procedure has many important features. In summary, it is the application of a theoretical framework which could be divided into 'economic theory' and 'statistical theory'. This requires significant computer and human resources with sophisticated knowledge.

2. The OECD System of Unit Labour Cost and Related Indicators provides high quality quarterly Unit Labour Cost (ULC) estimates for raw, seasonally adjusted and trend data. Due to the inherently volatile nature of derived series such as ULC's, the OECD encourages users to focus on the Trend-Cycle estimates provided. The ULC data is seasonally adjusted and Trend-Cycled using the TRAMO-SEATS package in the software Demetra[1]; the Trend-Cycle series includes all non-seasonal and non-irregular movements in the underlying time series. This series can be regarded as a smoothed seasonally adjusted series, where the degree of smoothing is dependent on the underlying ARIMA model and will thus vary from series to series.

3. The OECD System of Unit Labour Cost and Related Indicators undertakes a comprehensive review of its seasonal adjustment methodology once a year in either July or August depending on resources. This timing has been chosen due to the extensive updating carried out by the Annual National Accounts team in the May and June months that impact directly on the ULC input data. This review will involve re-evaluating all series for model and outlier (additive outlier, transitory change, and level-shift) changes. For the remainder of the year, seasonal adjustment undertaken using TRAMO-SEATS in Demetra is done allowing the coefficients of the model to change but with the underlying ARIMA model locked. It should also be noted here, that after extensive investigation and testing it was decided best that for most series the level-shift operator be switched off. That is, level shifts which distort the continuity of the long time series are not allowed[2] unless a legitimate level shift due to an observed economic event has occurred (thus approximately 98% of ULC Seasonally Adjusted and Trend-Cycle series are free of level shift outliers).

[1] http://circa.europa.eu/Public/irc/dsis/eurosam/library?l=/software/demetra_software/demetra_manuals&vm=detailed&sb=Title

[2] The TRAMO-SEATS package in its default mode tries to fit the best model. For long time series it may often implement a level shift outlier at certain places to obtain a better model fit before and after this level shift outlier. This is seen as undesirable for the continuity of long time series and thus is avoided where possible.

B. Summary of changes from the August 2009 update

4. When performing the review of models used for seasonal adjustment of the OECD ULC series, analysis is concentrated on the Trend-Cycle series. This is because the Trend-Cycle series are the headline ULC series' and an assumption could be made that changes in the Trend-Cycle series will be reflected in the seasonally adjusted series. In total 125 ARIMA models have been changed (59% of the total) in the August 2009 update compared with the July 2009 update; and there are 111 cases where the number and timing of outliers have been changed (52% of the total). In this year, Greece is included in the annual seasonal adjustment models.

5. Using a revision cut-off for further investigation of greater than or less than 3% for any data point (index series) for the Trend-Cycle series', there were 29 series that met this threshold. All the revisions for these 29 series can be explained either by a change in the ARIMA model or a change in the number and timing of outliers or both. Please note that all information relating to the new and old model, the outliers, the parameters, and the coefficients can be obtained directly from the OECD by emailing: stat.contact@oecd.org (attention: Ms. Perla Ibarlucea). A change in the ARIMA model does not necessarily result in revisions to the series, and in some cases revisions are more impacted by changes in outlier detection and changes in the raw data (which should be expected).

6. Of the 29 revisions above the threshold, the following series in Table 1 are considered by the OECD System of Unit Labour Cost and Related Indicators team to be of more importance and as such Table 1 outlines the new and old seasonal adjustment models, giving an indicator of the degree of revisions to the underlying time series and the likely reasons for these changes.

7. In Table 1, the following acronyms are used for the outliers, whose affects are removed from the trend-cycle series:

    - AO: Additive Outlier (abnormal value at one point of the series); and
    - TC: Transitory Change (series of outliers with transitory effects on the level of the series).

    The seasonally adjusted series are modelled according to a RegARIMA process in the form of (p,d,q)(P,D,Q) where the triplet (P,D,Q) represents the seasonal part of the process and the triplet (p,d,q) represents its non–seasonal part.

Table 1. Series Revised in Annual Seasonal Adjustment Update

Series	Old Seasonal Adjustment Model and Outliers	New Seasonal Adjustment Model and Outliers	Average Revision to Trend-Cycle; Level and Growth over last 5 years	Possible reason for the revision
EMU, Industry	(1,0,1) (0,1,1) No AO or TC found	(1,1,0) (0,1,0) No AO or TC found	Level 1.39 % New growth 0.90 % Previous growth 0.34 %	Changes due to the new model.
EMU, manufacturing	(1,0,0) (0,0,1) No AO or TC found	(1,1,0) (0,1,0) No AO or TC found	Level 1.55 % New growth 0.96 % Previous growth 0.34%	Changes due to the new model.
Slovak, Financial and business services	(0,1,1) (0,1,1) No AO or TC found	(0,1,1) (0,1,1) No AO or TC found	Level 1.67 % New growth 1.98 % Previous growth 2.72 %	Historical revisions to quarterly value added at constant prices and compensation of employees.
Slovak, Construction	(1,0,0) (1,0,0) No AO found, TC Q3 1999	(0,0,3) (1,0,0) AO Q1 2009, TC Q3 1999	Level 1.13 % New growth 1.98% Previous growth 1.44%	Mainly changes due to an additive outlier at the endpoint, which explains the difference previous and new trend. Also historical revisions to quarterly value added at constant prices and compensation of employees.
Slovak, Trade, transport and communication	(0,1,0) (0,1,1) No AO or TC found	(0,0,1) (0,1,0) No AO, TC Q1 2008	Level 2.95 % New growth 1.25% Previous growth 2.39%	Differences due to the new model and new transitory change from Q1 2008. Also historical revisions to quarterly value added at constant prices and compensation of employees.
Hungary, Construction	(0,1,1) (0,1,1) No AO or TC found	(1,0,0) (0,1,1) No AO or TC found	Level 1.77 % New growth 1.68 % Previous growth 1.83 %	Historical revisions to quarterly value added at constant prices. Also, the differences are explained by the new model
Ireland, Industry	(0,1,1) (0,1,1) No AO or TC found	(1,1,0) (0,1,1) AO Q4 2000	Level 1.22 % New growth 1.45 % Previous growth 0.80 %	Historical revisions to quarterly value added at constant prices and compensation of employees. New additive outlier is included in the model, Q4 2000.
Japan, Industry	(1,1,0) (0,1,1) TC Q3 1994	(1,1,0) (0,1,1) AO Q4 2008 and Q1 2009, TC Q3 1994	Level 0.93 % New growth 0.76 % Previous growth 1.21 %	Major changes due to the new adjusted model and new additive outlier almost at the end point.

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