

## Note on methods for seasonal adjustment

The Quarterly Transport Statistics presents the latest quarterly data on transport available for the ITF member countries, collected through a questionnaire.

For analytical purposes, national data are seasonally adjusted by the Joint Transport Research Centre of the OECD and the International Transport Forum Secretariat.

Short-term data is normally compiled to allow timely identification of changes in any indicator and especially to identify possible turning points. However, quarterly transport statistics are often characterized by seasonal patterns. A time series from which the seasonal variations have been eliminated basically allows for the comparison of data between two quarters for which seasonal patterns are different, also helping to identify turning points and the underlying direction of the change.

Seasonal adjustment is carried out with the Demetra programme using the TRAMO/SEATS adjustment method.

Trading day & leap year and Eastern effect adjustments are done with 7 regressors, allowing reducing the number of trading day regressors (it is possible that no trading day adjustments are done if the model cannot find any trading day effect). No country-specific holidays are used due to the great number of countries and variables.

For aggregates (EU area), data is first adjusted for trading day and leap-year effect. Resulted series are then summed up and seasonal adjustment is done on the new aggregated series.

Quality check of Tramo/Seats Adjustment include Ljung-Box on residuals, Ljung-Box on squared residuals, Box-Pierce on residuals, Box-Pierce on squared residuals and normality. A time series adjustment is rejected:

- If the decomposition of the chosen ARIMA model was not admissible.
- If there is at least 1 of the selected statistics which is significant at a 0.1% level.
- If there are at least 3 of the selected statistics which are significant at a 5% level.
- If the automatic outlier detection procedure detected more outliers than 5% of the number of observations of the original time series.

As regards the rule for quality check of X-12 Arima Adjustments, a time series is rejected:

- If the Ljung-Box statistics is significant at a 0.1% level.
- If the average percentage standard error in within-sample forecasts over the last year is greater than 15%.
- If the automatic outlier detection procedure detected more outliers than 5% of the number of observations of the original time series.
- If the combined statistic Q (M1, M3-M11) is not accepted.

Data passes all statistical test.