INSTITUTO NACIONAL DE ESTADISTICA

Methodology for the calculation of seasonally adjusted employment and unemployment data

The quarterly variation rates of the following seasonally adjusted series (adjusted for seasonal and calendar effects) from the Economically Active Population Survey, as of the 1st quarter of 2005, are disseminated:

Total employed persons

Total unemployed persons

The above-mentioned seasonally adjusted series have been obtained in accordance with the INE Standard for the adjustment of seasonal and calendar effects in the short-term series.

The quarterly seasonal adjustment is carried out using the Reg-ARIMA models. The identification of each model has been carried out manually, following the Box-Jenkins methodology and using, mainly, Gretl software, with information from the series as at the close of 2019 (data up to the fourth quarter of that year). The selected models are the following:

For the total number of employed persons: ARIMA(1,1,0)x$(0,1,1)_4$, with the series in logarithms.

For the total number of unemployed persons: ARIMA(1,1,0)x$(0,1,1)_4$, with the series in levels.

As for the analysis of atypical data, the following interventions have been included in the models:

- For the total number of employed persons: a level shift with a negative effect in period Q1-2009 and a positive effect one in Q2-2014, one additive outlier with a positive effect in Q2-2011 and four negative effect ones in Q1 to Q4 of 2020.
- For the total number of unemployed persons: two level shifts with a positive effect, in Q1-2009 and Q4-2008 and a negative effect one in Q2-2013, one additive outlier with negative effect in period Q2-2011 and three positive effect ones in Q2 to Q4 of 2020.

The interventions in Q1 to Q4 of 2020 for the series of total employed persons and in Q2 to Q4 of 2020 for the series of total unemployed persons have been introduced with the aim of gathering the effect that the crisis caused by the Covid-19 pandemic is having on both series. For the moment, the previously mentioned interventions have been defined as additional outliers, but it is possible that the evolution of the effects of the coronavirus in the following quarters implies a change in the type of intervention.

The estimation of the model, the decomposition of the series and its seasonal adjustments have been conducted automatically through the JDemetra Plus software.

The model identified at the beginning of each year is used to seasonally adjust the series of the four quarters of the current year. The estimation of the model parameters is made each quarter for the complete series.