

# **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 1<sup>st</sup> 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 Gretl software, with information from the series as at the close of 2024 (data up to the fourth quarter of that year). The selected models are the following:

- For the total number of employed persons:  $ARIMA(1,1,0) \times (0,1,1)_4$ , with the series in logarithms.
- For the total number of unemployed persons:  $ARIMA(1,1,0) \times (0,1,0)_4$ , 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, an additive outlier with a positive effect in Q2-2011 and a transitory change with a negative effect in Q2-2020.
- For the total number of unemployed persons: two level shifts with a positive effect in Q4-2008 and Q1-2009, and two transitory changes, one with a positive effect in Q3-2020 and another, with a negative one, in Q4-2021.

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.