

Information on the adjustment for seasonal and calendar effects in the Non-Financial Quarterly Accounts for the Institutional Sectors (CTNFSI)

1. Introduction

The objective of the Non-financial Quarterly Accounts for the Institutional Sectors (CTNFSI) is to discover the economic relationships between the institutional units that form the national economy (households and non-profit institutions serving households, non-financial corporations, financial corporations and public administrations) and among them and the rest of the world in an ordered series of accounts that describe each one of the phases of economic processes (production and creation of income, distribution and redistribution, final consumption, savings and accumulation of assets).

The CTNFSI form part of the global objective to create an annual and quarterly accounts system for the European Union and the euro zone. This system includes the main macroeconomic aggregates and the financial and non-financial accounts of the institutional sectors, all of which is created in compliance with the conceptual and regulatory framework established by the European System of National and Regional Accounts (SEC-2010), approved by the *Regulation (EU) 549/2013, of the European Parliament and Council, of 21 May, relative to the European system of national and regional accounts in the European Union.*

Annex B of the said Regulation establishes the obligation for the quarterly transmission of the CTNFSI results to the European Commission (Eurostat), with series from the first quarter of 1999, with detailed information on operations, account balances and institutional sectors included in it, within a period of **t+85 days**¹, with t being the reference quarter. On the other hand, the INE proceeds to the publication of the said results at a national level approximately 90 days after the end of the reference period, with the same level of detail as required by regulations.

Now, as a tool for analysing the economic cycle and the participation of the different economic agents in it and, therefore, as an instrument for political decision-making, the CTNFSI have been facing a growing demand from the users of the results, which having been adjusted for the usual seasonal effects—very pronounced in the case of some series—and calendar effects, enable the interpretation of indicators derived from it and the detection of signals that show the economic tendencies and the phase of the cycle in which we now find ourselves.

The main objective of seasonal adjustment is to filter the series for these seasonal and calendar effect fluctuations, such that the information that they contribute be clearer and easier to interpret. By **seasonal fluctuations** we mean movements that occur with a similar intensity each month, each quarter or each season of the year, and which are expected to continue occurring. On the other hand, the **calendar effect** is defined as the impact produced in the time series of a variable, due to the different structure that the months (or quarters) present in the different years (in both length and composition), even if the remaining factors influencing said variable remain constant. In this way, seasonally adjusted series, that is, those that are adjusted for

¹ The results transmitted in this period can be considered as provisional data, with the possibility to review them within a period of up to t+90 days.

seasonal and calendar effects, provide an estimate of what is “new” in a series (change in the trend, the cycle and the irregular component).

In response, now the ESA 2010 incorporates in the mentioned annex, the obligation by Member States to transmit regularly to Eurostat the CTNFSI results seasonally adjusted (included calendar adjustments when appropriate), for certain operations and balances of the institutional sectors of the national economy and the rest of the world.

On the other hand, the INE, in accordance with this obligation, has been carrying out the adjustment process for seasonal and calendar effects in the said series since December 2015, and its transmission to Eurostat within the time required each quarter. Eurostat is already employing such national results in the elaboration of the corresponding European aggregates and for the euro zone, of which both the European Commission and the European Central Bank (ECB) in the monitoring and analysis of the economic situation.

This is the reason why, in line with the general practice of dissemination of results of the National Accounts since the implementation of ESA 2010, now it is proposed to incorporate those data series adjusted for seasonal and calendar effects to the quarterly publication of the CTNFSI, thereby satisfying the interest of users and also enabling Eurostat its diffusion at the European level, always according with the requirements of the transmission programme of national accounts data to Eurostat in ESA 2010.

2. The de-seasonalisation of the CTNFSI in the framework of ESA 2010

The Transmission Programme of national accounts data to Eurostat established in the ESA 2010 (annex B of the Regulation (EU) 549/2013) establishes the obligation by Member States of transmitting to Eurostat on a quarterly bases the CTNFSI results seasonally adjusted (including calendar adjustments, when appropriate) within the term of **three working days after the deadline for the data not adjusted for seasonal effects**, for the operations and balances referred below²:

- **Since the reference year 2014:**
 - o Resources/uses of the *rest of the world* (resources/uses of the national economy):
 - *Exports of goods and services (P.7)/Imports of goods and services (P.6) (*)*.
 - *Total primary income (D.1 Compensation of employees + D.2 Taxes on production and imports + D.3 Subsidies + D.4 Property income)*.
 - *Total secondary income (D.5 Current taxes on income, wealth, etc. + D.6 Social contributions and benefits + D.7 Other current transfers)*.

² Those that are required to be transmitted within the term of t+2 months are indicated with an asterisk, since they are part of the set of main aggregates of the total economy, with which the CTNFSI should, in any case, be consistent.

- Account balances for the total economy:
 - *Gross Domestic Product* (B.1) (*).
 - *Gross Operating Surplus and Gross Mixed Income* (B.2 + B.3) (*).
 - *Gross National Income* (B.4).
 - *Gross National Disposable Income* (B.6).
 - *Gross savings* (B.8).
 - *Net lending/borrowing* (B.9).
- **Since the reference year 2017:**
 - *Non-financial Corporations Sector* (S.11):
 - *Compensation of employees* (D.1) (uses).
 - *Gross fixed capital formation* (P.51g).
 - *Gross Value Added* (B.1g).
 - *Gross Operating Surplus and Gross Mixed Income* (B.2g + B.3g).
 - *General Government Sector* (S.13).
 - *Final consumption expenditure* (P.3).
 - *Gross fixed capital formation* (P.51g).
 - Total expenditures.
 - Total income.
 - Net lending/borrowing (B.9).
 - *Households and NPISH Sectors*³:
 - *Individual consumption expenditure* (P.31) (*).
 - *Gross fixed capital formation* (P.51g).
 - *Compensation of employees* (D.1) (resources) (*).
 - Property income (D.4) (uses).
 - Property income (D.4) (resources).
 - *Current taxes on income, wealth, etc.* (D.5).
 - *Net social contributions* (D.61) (uses).
 - *Social benefits other than social transfers in kind* (D.62).
 - *Other current transfers* (D.7) (resources and uses).
 - *Adjustment for the change in net equity of households in pension funds reserves* (D.8).
 - *Gross Operating Surplus and Gross Mixed Income* (B.2g + B.3g).
 - *Gross Disposable Income* (B.6g).
 - *Gross savings* (B.8g).

The aforementioned Transmission Programme also brings another set of operations and account balances that Member States can provide on a voluntary basis.

The INE, in accordance to what has been mentioned, has been carrying out since December 2015 the adjustment process for seasonal and calendar effects in the first set of series (required since the reference year 2014), and its transmission to Eurostat

³ Non-Profit Institutions Serving Households.

within the time required each quarter. It is also planned to address the seasonal adjustment and the transmission of the adjusted series for the second set (required since the reference year 2017) since the transmission of the results of the first quarter of 2017, next **June**.

3. Methodology

The processing of the results of the CTNFSI adjusted for seasonal and calendar effects covers both the process of extraction of signals, which includes the adjustment for seasonal and calendar effects, as well as the procedures which ensure the necessary annual consistency between raw data and seasonally adjusted data and between operations and balances of the account system.

The procedures applied are described in the general methodology⁴ of the main aggregates series of the Quarterly National Accounts of Spain (QNAS). Therefore, they comply with the recommendations published in the quarterly accounts manuals (Eurostat, 1999/2013⁵ and IMF 2001/2016⁶) and related to seasonal adjustment (ESS *guidelines on seasonal adjustment, 2015*⁷) and with the *INE Standard for adjusting seasonal and calendar effects in short-term series, 2013*⁸. In fact, some of the series adjusted for seasonal and calendar effects of the CTNFSI (*exports of goods and services, imports of goods and services, Gross Domestic Product, Gross Operating Surplus and Gross Mixed Income*, all of them of the total economy, and *final consumption expenditure of the Public Administrations and of the Households and of the NPISH*) correspond to those disseminated in the series of main aggregates at current prices of the QNAS.

In this way, the seasonal adjustment procedures are developed in accordance with a parametric approach, based on regression models with ARIMA errors, identifying and estimating a priori a model that adequately adjusts to the observed series and deriving from it appropriate models for each of the components of the series (cycle-trend, seasonal and irregular). Use of the last version of the software TRAMO-SEATS⁹ (Gómez y Maravall, 1994).

It should be taken into account that the ARIMA model is chosen once a year at a time when the annual series are also revised. Such models remain fixed during the rest of the year. However, these are monitored in each quarter. In addition, the parameters of the ARIMA model are recalculated whenever a new observation is available.

The consistency between raw data and seasonally adjusted data is also maintained, that is, the annual total of the seasonally adjusted series coincides with the annual total of the original series. This preference for the consistency on the optimality in the sense of the seasonally adjustment must be understood in the context of the coherence which must exist in all national accounts, which is indispensable for the analysis of the economic developments both in the short and long-term. In order to

⁴ http://www.ine.es/daco/daco43/metodologia_cntr.pdf

⁵ <http://ec.europa.eu/eurostat/documents/3859598/5936013/KS-GQ-13-004-EN.PDF/3544793c-0bde-4381-a7ad-a5cfe5d8c8d0>

⁶ <http://www.imf.org/external/pubs/ft/qna/2000/Textbook/ch1.pdf>

⁷ <http://ec.europa.eu/eurostat/documents/3859598/6830795/KS-GQ-15-001-EN-N.pdf>

⁸ http://www.ine.es/clasifi/estandar_efectos_estacionales.pdf

⁹ TSW+ Revisión 941.

do this, use is made of methods based in models for the disaggregation of time series and for adjustment of the set of quarterly data to the data¹⁰.

On the other hand, some of the series of results of the CTNFSI are arithmetic balances of others. If these series of balances are directly adjusted for seasonal and calendar effects, the result would not be identical to the balance obtained through the elements seasonally adjusted, mainly due to their different seasonal pattern and to the number of non-linear operations involved in the process of adjustment for seasonal effects. Given the need for coherence in the balances with the series previously adjusted for seasonal effects, the option is taken for an estimation of such series in an indirect form as the result of the operations or flows involved.

Finally, an exhaustive control is made in order to check that there is no residual seasonality in the series adjusted for seasonal effects. This control is particularly important when applying the indirect method in some series, as previously said.

4. Dissemination plan

The general strategy of dissemination for the results of the National Accounts since the implementation of the ESA 2010 by the INE meets the criterion of alignment of the content disseminated and of its publication schedule, according to the transmission requirements of such results to the European Commission (Eurostat). In accordance with this, the series of results adjusted for seasonal and calendar effects will be incorporated to the quarterly publication of the CTNFSI. This enables free access to all users and international organizations to data which has already been transmitted to Eurostat and the possibility that Eurostat make use of them for the dissemination of national and aggregated data from Europe.

To do this, and also in line with the reporting obligation of such information to Eurostat as determined by the ESA 2010, the corresponding expansion of the contents of the CTNFSI publication will be carried out, in two stages:

1. **From the first quarter of 2017** (publication of **30 June 2017**), the series adjusted for seasonal and calendar effect which have been transmitted to Eurostat since December 2015 (specified in the section 2) will be added.
2. **From the first quarter of 2018** (publication on **June 2018**), the series adjusted for seasonal and calendar effects which will begin to be transmitted to Eurostat since the first quarter of 2017, will be included.

Similarly, as in the case of the results not adjusted for seasonal effects, the seasonally adjusted series would start from the first quarter of 1999.

In addition, the dissemination of series adjusted for seasonal and calendar effects has represented a significant change, not only in the contents of the operation, but also in the tools traditionally used in its presentation. This dissemination has always been carried out in classic account format, following the presentation in the form of

¹⁰ Chow, G. y Lin, A.L. (1971) "Best linear unbiased distribution and extrapolation of economic time series by related series", Review of Economic and Statistics, vol. 53, n. 4, p. 372-375. In certain situations there is clear evidence against a co-integration relationship between the final adjusted series with the restriction in the annual totals and the adjusted series at the beginning, therefore it is probable that the disturbances for the temporal disaggregation model proposed by Chow-Lin (1971) were, instead of a white Gaussian noise, a random walk of a unit root. In such cases, it is convenient to flexibilize the hypothesis about the distribution of the quarterly disturbance. In those cases use is made of the Fernandez's method (1981).

“double-entry” typical of accounting, both national and corporate and in excel format¹¹. Building on the incorporation of the series adjusted for seasonal and calendar effects, it has been added to the classic presentation in the form of account of the seasonally unadjusted data, the diffusion of both the adjusted and unadjusted results for seasonal and calendar effects in a time series format, through the tools commonly used in IneBase for the rest of statistical operations. Moreover, it has been included both the results at current prices in monetary terms of million euros, as well as the quarterly and annual variation rates. This incorporation of series adjusted for seasonal and calendar effects to the results of the operation also implies a redesign of the press release content accompanying the quarterly dissemination of said results.

¹¹ Only an overview of the operations and balances of the institutional sectors in a time series format is included as an annex to the accounts of each sector.