An Phríomh-Oifig Staidrimh
Central Statistics Office

Standard SIMS Report:

Production in Building and Construction Index

Single Integrated Metadata Structure (SIMS) Report

For

Production in Building and Construction Index

This documentation applies to the reporting period:
2023

Last edited: 22/11/2023

1. Table of Contents

2. Introduction

The quarterly Production in Building and Construction Index provides quarterly statistics on output in the Construction sector. The index monitors trends in the value and the volume of production in building and construction. The primary purpose of the index is to measure changes in value added at constant prices i.e. where the impact of price inflation over the time period of the index is removed.
The principal difference between the value and volume indices is that the volume index traces the quantitative volume of production each quarter i.e. effect of price changes is excluded. The “Capital Goods” price index for Building and Construction materials was used as the price deflator for this series - this is a wholesale price index for Capital Goods in the Construction sector.

The Quarterly Survey of Construction (QSC) was established to provide quarterly results on the value and volume of work done in the Construction sector.

3. Contact

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4. Metadata Update

4.1. Metadata last certified

25/05/2023

4.2. Metadata last posted

04/09/2023

4.3. Metadata last update

25/08/2023

5. Statistical Presentation

5.1. Data Description

The CSO’s Production in Building and Construction Index provides a short-term indicator of output in the Construction sector. The index monitors trends in the value and the volume of production in building and construction.

The primary purpose of the index is to measure changes in “Value Added" of construction work done at constant prices.

The “Capital Goods price index for building and construction materials” is used as the price deflator for this series.

The Production in Building and Construction index is designed as a short-term indicator, so while it provides good estimates of quarter-on-quarter change, it is not designed to be used to examine long term or structural changes in the Construction sector.

5.2. Classification System

The activity coverage is classified under NACE Rev. 2.

The QSC collects data on the value of construction work done and each enterprise surveyed is asked to break down the work done into 3 categories at product level, namely:

- Residential (which includes: Local Authority & Voluntary Housing, Affordable Housing and Private Housing)
- Non-Residential (Public & Private which includes: Education, Health and other public or semi state buildings, Commercial, Industry, Agriculture, Tourism, Sport and Recreation and other non-residential construction not elsewhere classified)
- Civil Engineering (which includes, Roads, Public Transport, Seaports/Airports, Water, Sanitary, Energy, Telecommunications and other civil engineering activities not elsewhere classified)

Thus, the product level is assigned independent of NACE.

5.3. Sector Coverage

The survey is designed to cover the entire Construction sector as defined by NACE Rev. 2 (Industrial Classification of Economic Activity in the European Communities) Sector F (41-43).

The NACE Rev. 2 classification defines the Construction sector (i.e. Sector F) as:

"General construction and specialized construction activities for buildings and civil engineering works. It includes new work, repair, additions and alterations, the erection of prefabricated buildings or structures on the site and also construction of a temporary nature."

All enterprises with employment size classes of at least 20 persons are included.

5.4. Statistical Concepts and definitions

The subject of the statistics is the trend in the value and the volume of production in building and construction.

The volume of work done is derived from the value figures using the Wholesale Prices Index (WPI) "Capital goods for Building and Construction materials" index as a deflator.

The CSO collects absolute values and publishes an index, which is derived by comparing results for the current quarter, and the same quarter in the previous year.

The following value and volume indices are produced as part of the national publication:

- Seasonally Adjusted Production in All Building and Construction
- Seasonally Adjusted Production in All Building and Construction (excl. Civil Engineering)
- Seasonally Adjusted Production in Residential Building
- Seasonally Adjusted Production in Non-Residential Building
- Seasonally Adjusted Production in Civil Engineering

5.5. Statistical Unit

The reporting unit is the enterprise.

5.6. Statistical Population

The population comprises all enterprises in Ireland classified to Sector F of NACE Rev. 2.

5.7. Reference Area

Republic of Ireland

5.8. Time Coverage

The latest result covers up to Quarter 3 2023.

The results from 2003 onwards have been calculated from the survey returns. In the absence of survey data prior to 2003, a retrospectively derived series was calculated, back to 2000, using a combination of data sources.

The first results from the survey were published in August 2007.

5.9. Base period

The set of indices has been compiled with reference to base year 2015.

6. Unit of Measure

Data - Collected in Euro.
Data - Disseminated as indices.

7. Reference Period

Up to Q3 2023.

8. Institutional Mandate

8.1. Legal Acts and other agreements

8.1.1. Legislative basis - National

The Quarterly Survey of Construction (SC) is carried out in accordance with the Statistics (Quarterly Survey of Construction) Order 2022 Number 141, made under the 1993 Statistics Act.

8.1.2. Legislative basis - European

The statistics are also required for EU comparisons under Council Regulation (EC) No 1165/98 and amended by Regulation (EC) No.1893/2006.

8.2. Data Sharing

The data is not shared with other Departments or organisations.

9. Confidentiality

9.1. Confidentiality – policy

All information supplied to the CSO is treated as strictly confidential. The Statistics Act, 1993 sets stringent confidentiality standards: Information collected may be used only for statistical purposes, and no details that might be related to an identifiable person or business undertaking may be divulged to any other government department or body.

These national statistical confidentiality provisions are reinforced by the following EU legislation: Council Regulation (EC) No 223/2009 on European statistics for data collected for EU statistical purposes. Further details are outlined in the CSO's Code of Practice on Statistical Confidentiality.

For more information on the CSO confidentiality policy please visit:
https://www.cso.ie/en/aboutus/lgdp/csodatapolicies/statisticalconfidentiality/

9.2. Confidentiality – data treatment

All information supplied to the CSO is treated as strictly confidential. The Statistics Act 1993 sets stringent confidentiality standards: Information collected may be used only for statistical purposes, and no details that might be related to an identifiable person or business undertaking may be divulged to any other government Department or body.

10. Release Policy

10.1. Release Calendar

The date of dissemination of all statistics released by CSO can be found in the Release Calendar published on the CSO's website. This is a 12-month advance calendar that is regularly updated.

10.2. Release calendar access

The release calendar can be accessed via the CSO website
https://www.cso.ie/en/csolatestnews/releasecalendar/

10.3. User access

In accordance with Principle 6 of the European Statistics Code of Practice all users of CSO statistics have equal access via the CSO website at the same time of 11 am. Any privileged pre-release access to any outside user is limited, controlled and publicised. In the event that leaks occur, pre-release arrangements are revised so as to ensure impartiality.

The CSO recognises that in very limited circumstances a business need for pre-release access may be substantiated. Any form of pre-release access is a privilege and a strict CSO pre-release access policy is adhered to for these special requests. The full pre-release access policy can be accessed at
https://www.cso.ie/en/aboutus/lgdp/csodatapolicies/csopolicyonpre-releaseaccess/

The various results are published nationally in statistical release format as well as on the CSO website www.cso.ie. Selected extracts from the results are posted on the CSO's data dissemination database, PxStat.

11. Frequency of Dissemination

The data is disseminated on a quarterly basis both to Eurostat and nationally.

12. Accessibility and clarity

12.1. News release

News releases for the Production in Building Construction Index are not produced on a regular basis. An information notice was published with the Q4 2018 data to inform users that a new base year was being used. https://www.cso.ie/en/releasesandpublications/in/pbci/informationnotice-productioninbuildingandconstructionindexq42018/

12.2. Publications

The most recent publication can be found on the CSO website:
https://www.cso.ie/en/statistics/construction/productioninbuildingandconstructionindex/

Quarterly publications on the Production in Building and Construction Index are located on the CSO website:
https://www.cso.ie/en/statistics/construction/productioninbuildingandconstructionindex/

All previous releases are made available from the Releases and Publications archive:
http://www.cso.ie/en/statistics/construction/archive/

12.3. On-line database

The Production in Building and Construction Index tables, released on the database PxStat on the CSO website, are updated quarterly. The tables can be accessed directly from this link
https://data.cso.ie/product/pbci

12.3.1. AC 1. Data tables - consultations

Not calculated.

12.4. Micro-data Access

Microdata is not publicly available.

12.5. Other

Data from the Production in Building and Construction index can also be found in several other CSO outputs:

- Statistical Yearbook https://www.cso.ie/en/statistics/statisticalyearbookofireland/
- The Quarterly National Accounts: Gross Fixed Capital Formation in tables 2, 3 and 5
  https://www.cso.ie/en/statistics/nationalaccounts/quarterlynationalaccounts/
- The National Income and Expenditure: Gross Fixed Capital Formation in tables 5, 5.1, 6, 6.1, 15 – 18
  https://www.cso.ie/en/statistics/nationalaccounts/nationalincomeandexpenditureannualresults/

Relevant EU data can be found at http://ec.europa.eu/eurostat/web/national-accounts/data/database

Specific user requests are acceded to where possible, and where confidentiality issues do not arise.

12.5.1. AC2. Metadata consultations

Not calculated.

12.6. Documentation on Methodology

Dissemination of documentation on methodology and sources used in preparing statistics:
This is available on the CSO website at:
http://www.cso.ie/en/methods/construction/productioninbuildingandconstructionindex/

12.6.1. AC3 – Metadata completeness – rate

Not calculated

12.7. Quality Documentation

Further information on the quality of this output can be found on the CSO website:
http://www.cso.ie/en/methods/qualityreports/productioninbuildingandconstructionindex/

13. Quality Management

13.1. Quality Assurance

Quality Management Framework
The CSO avails of an office wide Quality Management Framework (QMF). This framework allows all CSO processes and outputs to meet the required standard as set out in the European Statistics Code of Practice (ESCOP). The QMF foundations are based on establishing the UNECE's Generic Statistical Business Process Model (GSBPM) as the operating statistical production model to achieve a standardised approach to Quality Management. All and any changes implemented to CSO processes and outputs require adherence to the QMF.

13.2. Quality Assessment

Not assessed.

14. Relevance

14.1. User Needs

The production index is required under European Short-Term Statistics-Regulation 1165/98.

14.1.1. Main National Users

The index is of relevance to the following user groups: -

1. Government
2. Economists
3. Other CSO sections
4. Construction Industry Federation
5. The general public
6. Professional Bodies
7. University students and other interest groups for research purposes

14.1.2. Principal External Users

Internationally, the index is mainly used by Eurostat.

14.2. User Satisfaction

No index for user satisfaction is available, but there are regular meetings with national experts and essential users to react to new requirements, if these are not in contrast with legal necessities or constraints. In addition, a user's satisfaction survey takes place in periodic intervals.

14.3. Data Completeness

The production index is fully compliant regarding STS-Regulation 1165/98. All the required series are produced, although the classification system used for breakdown of total construction does not follow the STS regulations (NACE Rev. 2 instead of Classification of Types of Construction (CC)).

14.3.1. Data Completeness rate

Not calculated.

15. Accuracy and reliability

15.1. Overall accuracy

The QSC is designed as a short-term indicator, so while it provides good estimates of quarter-on-quarter change, it is not designed to be used to examine long term or structural changes in the Construction sector.

For interpretation of results, users have to be aware that every index draws a picture of reality in a simplified way. There is no statistical model which is able to represent the complexity of reality in total.

A benchmarking exercise is carried out annually by the annual survey of construction against the quarterly returns and the match is based on the value of work done. The volume of work done is derived by deflating the value by the price index of building and construction (including wages and materials).

The sample selection technique used minimises sampling error. Also, non-response contributes to non-sampling error but with relatively high response rates (circa 50%-60%) the effect should be small. Key companies are also targeted for non-response leading to response rate of close to 100% within this list.

Provisional and final indices in general report the same trends.

15.2. Sampling Error

Samples are chosen each quarter, stratified by NACE and size class, to be representative of the population as far as possible. The sample is chosen from the CSO's Short Term Statistics Register which is populated from the Central Business Register.

Some NACE categories have few enterprises, and in such cases, staff contact these enterprises in order to boost response.

15.2.1. A1. Sampling error indicator

Not calculated.

15.3. Non-sampling Error

Detailed information on non-sampling errors, as applicable to Quarterly Survey of Construction are as follows:

- **Coverage errors** - Neyman Allocation should be providing optimal allocation (based on employment levels).
- **Data collection errors** - Negligible - Forms are electronic (online) only thus reducing the risk of data capture error.
- **Measurement errors -** Edits have been developed to compare values for variables in each category of work done against previous returns. If differences exceed specified thresholds, an edit is raised. The system produces lists of errors for each type of edit each quarter. These are then analysed, and records are corrected as appropriate.
- **Non-response errors -** Unit and item non-response (missing data) - All strata should be well represented in responses.
- **Data processing errors** - Minimal - If any arise they will be picked up while processing for index calculations (There are 2 versions of programs run simultaneously by 2 different persons to ensure processing completed correctly).
- **Model errors** - It is assumed that non-respondents have the same characteristics as respondents. Grossing or imputation is not used when generating results for the QSC, however, weighting is used. Weights have been derived for each category of construction by size class. Each firm is size

coded at the time of rebasing the series. Thus the size classes are based on activity in the middle of the base period. It is assumed that each firm remains in the same size class throughout the base period.

15.3.1. Coverage error

The sample selection is taken from the Short Term Statistics (STS) register. Coverage is dependent on the quality of the Register used. The STS register is updated annually from the CSO Business Register and updates to both Registers are made continually throughout the year, to improve quality.

15.3.1.1. A2. Over coverage rate

Not calculated.

15.3.1.2. A3. Common units – proportion

Not calculated.

15.3.2. Measurement error

Measurement errors are not formally calculated, however, hereunder are some sources of measurement errors and the measures which are employed by the section to guard against them:

- Only those enterprises who are engaged in activities defined in NACE Rev. 2, Sector F are requested to complete the form as outlined in the instructions.
- Explanatory notes are provided on the questionnaire, in order to provide some assistance in filling in the survey form. These provide a definition of terms as well as describing how the questionnaire should be completed, in terms of what to include and what to exclude from the figures.
- The reference period and units of response are clearly outlined on the questionnaire itself.
- Data is compared at enterprise level. Data for the current quarter is compared with data for the previous quarter.
- Staff are trained so that they have a good knowledge of the enterprise they are responsible for.
- The design of the questionnaire is monitored and any changes which can be made to improve the questionnaire are incorporated into the questionnaire.

15.3.3. Non-Response Error

Extensive follow up of non-responding companies is carried out by telephone, email, and postal reminders.

In the case of item non-response, contact is made with the enterprise to retrieve any missing data. The matched unit response rate is approximately 50% per quarter. Some enterprises find it difficult to supply data each quarter

15.3.3.1. Unit non-response rate

c.50%

15.3.3.2. Item non-response rate

Not calculated

15.3.4. Processing error

Data Capture
Data capture errors are unlikely to arise due to online data being transferred to the CSO's Data Management System (DMS), where the data can be viewed and amended as required.

Data Editing
Edits are run on the data. Any inconsistencies are queried with the firm. Any changes required are keyed manually.

15.3.5. Model assumption error

It is assumed that non-respondents have the same characteristics as respondents. Grossing or imputation is not used when generating results, however, weighting is used. Weights have been derived for each category of construction by size class. Each firm is size coded at the beginning of each year. It is assumed that each firm remains in the same size class throughout the year.

16. Timeliness and punctuality

16.1. Timeliness

Provisional Results are produced for the current quarter within 75 days of the reference date. The release contains value and volume indices together with annual percentage change for production in Building and Construction and also for subsectors such as Civil Engineering, Residential and Non-Residential, together with EU comparative data.

Final results are provided for the last published quarter e.g. if the current quarter published is Q1 2021 then final results for Q4 2020 will be produced within 145 days of the reference date.

16.1.1. TP1. Time lag – First results

75 days (11 weeks)

16.1.2. TP2. Time lag – Final results

145 days (21 weeks)

16.2. Punctuality

National publications have always been on time.
Deliveries to Eurostat have also always been on time.

16.2.1. TP3. Punctuality – Punctuality - delivery and publication

0 days

17. Comparability

17.1. Comparability – Geographical

Data for the QSC is comparable with that for other EU states as can be seen in tables 3(a) and 3(b) of the release.
Data is also available from the Eurostat website.

It is possible to compare calculated Irish aggregates with those of other European countries, due to harmonised STS indices in the European Union.
Moreover, the production index is provided to UN on ISIC Rev. 4 to enable further country comparisons.

17.1.1. CC1. Asymmetry for mirror flow statistics

Not calculated

17.2. Comparability over time

Comparisons are made between quarters going back to Q1 2000 and there is no break in the time series.

17.2.1. Length of Comparable Time series

22 years – 2000 to 2022

17.3. Coherence – cross domain

Data from the Quarterly Survey of Construction is also checked for consistency with other data sources, such as:

- Labour Force Survey (LFS) - numbers employed in construction;
- Earnings and Labour Costs Survey (EHECS) - average hourly and weekly rate, hours worked;
- Planning Permissions - number of units granted planning permission;
- New Dwellings Completions Series;
- Commencement Notices;
- House Registrations.

An analysis quantifying the differences between the above is not published but one reason is that each data series serves a different purpose. An internal coherence exercise is undertaken on a quarterly basis as follows:

a) LFS: when the numbers employed in construction rise or fall one would expect the volume of construction to similarly rise or fall.
b) EHECS: when the number of hours worked in construction rise or fall one would expect the volume of construction to similarly rise or fall.
c) When you compare trends of planning permissions by product (residential, civil engineering and non residential) planning permissions predict the trend of the QSC by one quarter.

The trends between series are consistent on a quarterly basis regarding numbers employed and hours worked. There is a lag of one quarter between planning permissions and work done. House completions and commencements are more consistent with the QSC on an annual basis. As a result, there are no obvious weak points.

17.3.1. Coherence – Sub annual and annual statistics

There are differences (due to timing, definitions, and other factors) between the quarterly and annual trends measured by this survey and by other national data sources. In particular, the quarterly series from the Quarterly Survey of Construction shows considerable volatility. Comparability is improving as this survey matures. The methodology is continually under review to make any further improvements if required.

17.3.2. Coherence with National Accounts

Not applicable.

17.4. Coherence – internal

Non-residential and civil engineering products are classified by the enterprise surveyed. This may give rise to coherence issues within the dataset. However large changes in values between quarters result in the enterprise being queried.

18. Cost and Burden

Estimates of Cost and Burden can be obtained from the Response Burden Barometer
https://www.cso.ie/en/statistics/multisectoral/responseburdenbarometer/

Survey specific information is available via CSO's dissemination database PxStat.
https://data.cso.ie/product/RBB

In order to reduce the burden on enterprises a review of the QSC was carried out in 2010 using Lean Six Sigma techniques. As a result, various methodological changes were introduced, which included reducing the content and complexity of the original questionnaire.

19. Data Revision

19.1. Data Revision Policy

Revisions refer to changes made to published statistical data when the information used in its production has been updated or corrected. This information includes all data used in compiling the statistic e.g. respondent data, administrative data, weights and factors, methodology, classifications, definitions, modifications to survey questionnaires, survey scope and data collection methods. The data revision policy that CSO statistics adheres to can be found via the following link:
https://www.cso.ie/en/methods/quality/treatmentofrevisions/

provisional data are revised at the next quarter routinely.

19.2. Data Revision Practice

There is at least one quarter of advance notice given for major changes in methodology by including footnotes in the respective tables.

We also have a database called PxStat, which contains all published data, and it has an audit trail of all revisions going back since the survey was first introduced a decade ago.

Any revisions made nationally are transmitted to Eurostat at the same time.

Production in Construction data is typically revised once provisional data has been disseminated (75 days after the end of the reference period) due to late returns or amendments being required or existing returns. Revised data becomes final data and final indices are published 150 days after the end of the reference period.

The data series back to the rebase year is revised during a rebase e.g. data was revised back to Q1 2015 in the most recent rebase, data for earlier years were spliced and rescaled.

Data was revised in March 2021 back to Q1 2015 due to a correction of an error in the application of the Laspeyres Index and to the revision of the deflator that is used.

19.2.1. Data Revision – Average size

The computed values for the last 20 quarterly Production in Building and Construction indicators are:
Annual Growth rates for unadjusted volume data series (YoY):

Mean Absolute Revision (MAR) = 0.030 ,
Relative Mean Absolute Revision (RMAR) = 0.245
Mean Revision (MR) = -0.0049

20. Statistical processing

20.1. Source Data

The Quarterly Survey of Construction (QSC) is used to collect the data to generate the Production in Building and Construction Index and is a primary statistical survey.

20.1.1. Population and sampling frame

The Central Business Register (CBR) in the CSO provides the basis for the Short Term Statistics (STS) Register used as a sampling frame.

The CBR is updated continuously based on various Revenue sources and on survey returns. The CBR and STS register are synchronised annually. As part of this, manual checks are done on birthing / ceasing enterprises with 50 or more persons employed or turnover >= 20 million. Other enterprises are birthed automatically. Manual checks are also done before ceasing enterprises which sent in a survey return in the previous year.
The STS register is also updated more frequently based on survey returns and other information received.

The sampling frame consists of all enterprises in the STS register classified under NACE Rev 2, Sector F.

20.1.2. Sampling design

All relevant companies with 20 or more persons employed are surveyed each quarter.
A Neyman allocation method is used to optimally select the remainder of the sample by size class and NACE Rev. 2 group.

The Neyman allocation method is a stratified sampling method, where the sample can often be split up into sub-samples, i.e. the total sample size is given by the sum of the sub-sample sizes. It takes sub-samples from distinct sub-populations or "strata" of the original population, with the aim of decreasing variances of sample estimates.

20.1.3. Survey size

Approximately 2,500 companies are surveyed each quarter. This consists of a census of enterprises with 20 or more persons engaged and the remainder is a random sample of the smaller units stratified by activity (NACE Revision 2) and employment size class.

20.1.4. Survey technique

Survey forms are issued electronically and returned forms are transferred to the CSO's Data Management System (DMS), where they can be viewed and amended as required. SAS programs are used for management of the survey. Postal reminders, emails and telephone calls are used to seek the return of forms from non-respondents. Edits are run on the received data and any required changes are made.

20.2. Frequency of data collection

Quarterly

20.3. Data Collection

Survey forms are issued electronically and returned forms are transferred to the CSO's Data Management System (DMS), where they can be viewed and amended as required. SAS programs are used for management of the survey. Postal reminders, emails and telephone calls are used to seek the return of forms from non-respondents.

20.3.1. Type of Survey/Process

The QSC is a primary sample survey.

20.3.2. Questionnaire (including explanations)

The questionnaire used to collect the data from respondents can be accessed from the following link:
https://www.cso.ie/en/methods/surveyforms/productioninbuildingandconstructionindex/

20.3.3. Survey Participation

This is a statutory inquiry in accordance with the Statistics (Quarterly Survey of Construction) Order 2022 (S.I. No. 141 of 2022) made under the 1993 Statistics Act.

20.3.4. Data Capture

Electronic returns are uploaded to CSO's in-house Data Management System (DMS).

20.4. Data Validation

A number of validation procedures are in place for all returned data.

Edit checks have been developed to compare values for variables in each category of work done against previous returns. If differences exceed specified thresholds, an edit is raised. The system produces lists of errors for each type of edit each quarter. These are then analysed, and records are corrected as appropriate.

Data is transmitted to Eurostat using the SDMX format. Validation of the correct structure of these files is done in-house in advance prior to transmission.

20.5. Data Compilation

The inquiry is used to obtain information on the value of construction work done.
Volume indices are derived from value figures using the Wholesale Prices Index (WPI) "Capital goods for Building and Construction materials" index as a deflator.

The QSC Index is calculated using a modified fixed weight Laspeyres index:

$$(\sum W_{q-1}(C T_{q}/C T_{q-1})/\sum W_{0})*100$$

- W_0 and W_{q-1} are the base weights and updated values respectively.
- CT_q and CT_{q-1} are the category values of production (or output) for the current and previous quarter respectively.

In the case of the QSC, 3 base weights are used, one for each category of construction work. The compilation of the index for the current quarter (q) is based on the percentage change in the value of quarterly production (based on a matched sample) over the previous quarter.

It is assumed that non- respondents have the same characteristics as respondents. Grossing or imputation is not used when generating results for the QSC, however, weighting is used.

Each firm is size coded at the time of rebasing the series. Thus size classes are based on activity in the middle of the base period. It is assumed that each firm remains in the same size class throughout the base period.

Note: This calculation methodology is currently undergoing review within the CSO and changes might be implemented at a future date.

20.5.1. Imputation (for Non-Response or Incomplete Data Sets)

Not applicable.

20.5.1.1. A7. Imputation rate

Not applicable.

20.5.2. Grossing and Weighting

Weights have been derived for each category of construction by size class.

The weights used are updated every 5 years.

20.6. Adjustment

20.6.1. Seasonal Adjustment

Seasonal Adjustment is conducted using the direct seasonal adjustment approach. Under this approach each individual series is independently adjusted. Each individual seasonally adjusted series is calculated based on working day adjusted data.
The adjustments are completed by applying the X-13-ARIMA model, developed by the U.S. Census Bureau to the working day adjusted data. This methodology estimates seasonal factors while also taking into consideration factors that impact on the quality of the seasonal adjustment such as:

- Calendar effects, e.g. the timing of Easter
- Outliers and level shifts in the series.

See attached metadata document in the annex.

For additional information on the use of X-13-Arima see Monsell B. C., Lytras, D., and Findley, D. 'Getting Started with X-13 ARIMA SEATS Input Files', March 2016 available at www.census.gov/srd/www/x13as/.

21. Comment