



**An  
Phríomh-Oifig  
Staidrimh**

Central  
Statistics  
Office

# **Standard SIMS Report: Monthly Services Index**



# **Single Integrated Metadata Structure (SIMS) Report**

## **For**

# **Monthly Services Index**

This documentation applies to the reporting period:  
**2022**

Last edited: 16/12/2022



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## 2. Introduction

The monthly services value index (MSI) monitors trends in output at both current prices and constant prices of enterprises in the non-financial traded services sector. The MSI is compiled and published every month by the CSO. This survey has been conducted continuously since January 2009, with the initial publications, beginning in 2012, producing indices at current prices only. However, since January 2022, output is measured in both current prices (value index) and in constant prices (volume index) for each sector, where the value of output is deflated by price changes within each sector.

## 3. Contact

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## 4. Metadata Update

### 4.1. Metadata last certified

16/12/2022

### 4.2. Metadata last posted

17/12/2022

### 4.3. Metadata last update

16/12/2022



## 5. Statistical Presentation

### 5.1. Data Description

The monthly services value index (MSI) monitors trends in output at current prices of enterprises in the non-financial traded services sector. This is the first step in the development of a Services Production Index that measures gross value added changes at constant prices, i.e. a volume index. From January 2022, output is measured in current prices (turnover) and in constant prices (volume index) for each sector, where the value of turnover is deflated by price changes within each sector.

The primary purpose of the MSI is to provide a short-term indication of change in the value of the services sector in Ireland.

### 5.2. Classification System

Statistical Classification of Economic Activities in the European Community, Rev. 2 (2008) (i.e. NACE Rev. 2).

### 5.3. Sector Coverage

The Sectors covered are listed below

- **Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles (NACE 45-47)**
- **Transport and Storage (NACE 49-53)**
- **Accommodation and Food Activities (NACE 55, 56)**
- **Information and Communication (NACE 58-63)**
- **Professional, Scientific and Technical Activities (NACE 69-75)**
- **Administrative and Support Service Activities (NACE 77-82)**
  - NACE 7735 – Aircraft leasing is excluded
- **Other Business Services**
  - NACE 68 Real estate activities
  - NACE 92 Gambling and betting activities
  - NACE 93 Sports activities and amusements and recreation activities
  - NACE 95 Repair of computers and personal and household goods
  - NACE 96 Other personal service activities

### 5.4. Statistical Concepts and definitions

The MSI measures turnover for the non-financial traded services sector in Ireland for a specific period. The index also provides information on year-on-year, quarter-on-quarter and month-on-month changes in turnover for the non-financial traded services sector in Ireland.

The sole data collected from enterprises in the non-financial traded services sector is their monthly turnover figure. Two separate sets of indices are produced. The indices published nationally are services output indices based on GVA base weights and updated monthly using estimated GVA returns derived from turnover data. Separate indices are sent to Eurostat where the base weights are based on turnover and also deflated turnover.

Currently, commencing with January 2012, the index is compiled with respect to the base year 2015 (Base Year: 2015 = 100) using updated base weights taken from the 2015 Annual Services Inquiry (ASI), replacing the former series (Base Year: 2009 = 100). MSI data (Base Year: 2015 = 100) is available from January 2009 to the current period. Data are compiled and published at national level only i.e., NUTS 1 level.

The outputs from the survey are:

1. Unadjusted Value Index
2. Seasonally Adjusted Value Index
3. Unadjusted Volume Index



## 6. Seasonally Adjusted Volume Index

### 6.1. Statistical Unit

The reporting unit is the enterprise, where an enterprise is defined as the smallest legally independent unit, allowing enterprises to provide a single overall turnover figure each month. It also ensures that any new branches opened by respondents are automatically included in the index.

Enterprises with a reported turnover of less than €0.5 million are excluded from the survey.

### 6.2. Statistical Population

The statistical population is made up of all enterprises in the non-financial traded services sector covered in the 2015 Annual Services Inquiry (ASI). Enterprises with an annual turnover value of more than €500,000 or enterprises with more than 100 persons engaged are included in the survey.

NACE 45-63, 69-82, 92-96 excluding Aircraft leasing N7735. From the 2015 Annual Services Inquiry these sectors were made up of approximately 158000 enterprises.

### 6.3. Reference Area

The geographical area covered is the Republic of Ireland.

### 6.4. Time Coverage

The first monthly MSI index figures were published in June 2012 which related to the period from 2009 until April 2012. The MSI has been published continuously since then.

### 6.5. Base period

Base year 2015=100.

## 7. Unit of Measure

Collection: Euro.

Dissemination: Indices and percentage changes.

## 8. Reference Period

2022

## 9. Institutional Mandate

### 9.1. Legal Acts and other agreements

#### 9.1.1. National legal acts

The MSI is a statutory inquiry, collected under the Statistics (monthly services inquiry) order 2018 No. 431/2018. This order can be found at:

<http://www.irishstatutebook.ie/eli/2018/si/431/made/en/pdf>



### 9.1.2. European legal acts

- Council Regulation (EC) No. 1165/98 and Commission Regulation No. 472/2008 concerning short-term statistics.
- Statistics (Services Turnover) Order 3 2018 S.I. No. 431/2018
- Council Regulation (EC) No. 1165/98 and Commission Regulation No. 472/2008 concerning short-term statistics

## 9.2. Data Sharing

Data is not shared.

# 10. Confidentiality

## 10.1. 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/lqdp/csodatapolicies/statisticalconfidentiality/>

## 10.2. Confidentiality – data treatment

The MSI turnover data provided by the respondent enterprises are treated as strictly confidential in accordance with Part V of the Statistics Act, 1993 and cannot be accessed under the terms of the Freedom of Information Act, 1997. Data are not disclosed by the CSO to any other Government Department or outside body.

# 11. Release Policy

## 11.1. Release Calendar

The date of dissemination of all statistics released by CSO can be found in the Release Calendar published in CSO.ie. This calendar is regularly updated.

## 11.2. Release calendar access

The release calendar can be accessed via the CSO website, [www.cso.ie](http://www.cso.ie), or directly from this link:

<https://www.cso.ie/en/csolatestnews/releasecalendar/>

## 11.3. 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](http://www.cso.ie)). Selected extracts from the results are posted on the CSO's data dissemination database, PxStat.

The CSO disseminates the MSI publication on the CSO website at 11am (local time) on the day of publication.

MSI data is transmitted to Eurostat after 11am on the day of publication or under embargo, if the national MSI publication is scheduled to be published after the deadline for transmission of data to Eurostat.

## 12. Frequency of Dissemination

Monthly.

## 13. Accessibility and clarity

### 13.1. News release

There is no news release associated with MSI

### 13.2. Publications

The most current publication can be found in the CSO website or via this link: <https://www.cso.ie/en/statistics/social/monthlyservicesindex/>

### 13.3. On-line database

The data that is published in the MSI monthly publication are also made available on PXStat (CSO Main Data Dissemination Service) with each aggregated index also published as an unadjusted value index on PX Stat only.

- Monthly Services ( Base 2015 = 100) by NACE Rev 2 and Month <https://data.cso.ie/table/MSI02>
- Monthly Services (Base 2015 = 100) By NACE Rev 2 and Quarter <https://data.cso.ie/table/MSQ02>
- Monthly Services (Base = 100) By NACE Rev 2 and year <https://data.cso.ie/table/MSA02>

#### 13.3.1. AC 1. Data tables - consultations

The total number of consultations to the release for the period 1 January 2021 to 2 November 2021 was 3386 page views, of which 1613 were unique views.

### 13.4. Micro-data Access

Microdata are not publicly available.

### 13.5. Other

Data are sent to Eurostat to be used in European aggregates and/or to be released as national data. There are no planned future changes in national dissemination.

EU level data and methodology is available via the Eurostat website:

Eurostat – STS: <http://ec.europa.eu/eurostat/web/short-term-business-statistics/data/main-tables>



#### **Eurostat Methodology:**

<http://ec.europa.eu/eurostat/web/short-term-business-statistics/methodology>

#### **13.5.1. AC2. Metadata consultations**

Not calculated.

### **13.6. Documentation on Methodology**

Background Notes and Quality Reports are available on the CSO website at:

<https://www.cso.ie/en/methods/services/monthlyservicesinquiry/>

#### **13.6.1. AC3 – Metadata completeness – rate**

Not calculated

### **13.7. Quality Documentation**

Background Notes and Quality Reports are available on the CSO website at:

<https://www.cso.ie/en/methods/services/monthlyservicesinquiry/>

## **14. Quality Management**

### **14.1. 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.

### **14.2. Quality Assessment**

The CSO requires that all their dissemination products conduct an annual self-assessment exercise to review the quality of the output and the processes that generate it. During the last iteration of this exercise there were no issues found with the quality of the Monthly Services Inquiry however it was identified that a supported quality appraisal should be carried out prior to the next rebase taking place.

## **15. Relevance**

### **15.1. User Needs**

The MSI is compiled to meet national and EU requirements. It provides some of the information required by National Accounts in compilation of the quarterly GDP.

#### **15.1.1. Main National Users**

National Accounts, Government Departments and Agencies, Economists, Brokers, Researchers and Academics

#### **15.1.2. Principal External Users**

Eurostat.



## 15.2. User Satisfaction

No user satisfaction survey was conducted.

## 15.3. Data Completeness

The index is fully compliant with requirements of the Council Regulation (EC) No 1165/98 concerning short-term statistics and the subsequent amendments.

### 15.3.1. Data Completeness rate

100%.

## 16. Accuracy and reliability

### 16.1. Overall accuracy

Response rates are compiled and analysed each month. Quality checks and validation of data are done throughout the whole compilation process.

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.

### 16.2. Sampling Error

Numerical estimates of MSIs sampling errors are not produced by the CSO. The CSO tries to reduce sampling errors by using a sample of enterprises that is as large as possible while taking burden on enterprises and time and resource constraints into account.

The population of non-financial traded services enterprises in Ireland is approximately 90,000. The MSI sample comprises about 2,600 enterprises. This gives an average sampling fraction of over 2% however this fraction can differ significantly from sector to sector and within size class. If coverage is viewed from a turnover perspective, the coverage is considerably higher, with an average sampling fraction of approximately 80%.

#### 16.2.1. A1. Sampling error indicator

Not calculated.

### 16.3. Non-sampling Error

Non-sampling errors are not quantified. The CSO tries to reduce non-sampling errors through continuous methodological improvements and survey processing improvements. Bias may be introduced as a result of the matched sample approach. It is difficult to completely represent the population due to ongoing births and deaths of enterprises within the services sectors. This may result in the consistent under-estimation of growth during sustained periods of growth.

#### 16.3.1. Coverage error

The Short-Term Statistics (STS) Register is updated annually with relevant enterprises in the non-financial traded services sector. Commencements of enterprises, changes of business activity and cessations of enterprises are updated at this time. Ad-hoc changes are also made when the Hours and Employment Costs Survey (EHECS)) becomes available from individual enterprises or from other sources. The STS Register is a subset of the CSO Central Business Register (CBR). The CBR is updated on an on-going basis using administrative and survey data.



The dataset is created from the latest version of the CBR number of all of the sampled enterprises in the non-financial services sector. Duplicates are checked and removed each month as necessary. Enterprises that have been discovered to be non-relevant are also removed.

#### **16.3.1.1. A2. Over coverage rate**

Not calculated.

#### **16.3.1.2. A3. Common units – proportion**

Not calculated.

### **16.3.2. Measurement error**

Measurement error is not regarded as a major concern for this survey. The following should be noted:

1. Questionnaire – the questionnaire is clear with the period requested clearly defined. The design of the questionnaire is monitored, and changes made if necessary. Occasionally enterprises may provide turnover inconsistent with the period covered. These errors are usually highlighted at the data-cleaning stages.
2. Data collection method – the collection method is primarily by electronic questionnaire (eQ). This method is unlikely to be a source of measurement error.
3. Interviewer- this technique not used by the survey.
4. Respondent – survey data can contain sensitive and confidential information due to the fact that it is a short-term survey and may be requested prior to annual accounts being completed. The survey only publishes aggregated data at NACE division (i.e. 2- digit level) which preserves confidentiality of individual returns.

### **16.3.3. Non-Response Error**

#### ***Unit Non-Response:***

High quality of data is ensured due to a high weighted response rate. Non-response bias is not measured in the survey

The main reasons for unit non-response are as follows:

- Enterprise Gone Away from the address on the survey form - investigated and resolved by the section
- Duplicate – enterprise receives two survey forms with different CBR numbers – removed from the survey
- Enterprise has ceased trading – marked as ceased and removed from future post outs from the survey
- Enterprise is inactive/ dormant – enterprise is removed from the survey
- Merger/Takeover or Change in the structure of an enterprise – enterprise is investigated and resolved for future post outs for the survey

#### ***Item Non-Response***

Item non-response is not measured in the survey, where a part of the form is not completed, the following is done.

- The enterprise is contacted and requested to submit the data
- If no other data are available, the value for the previous month is carried forward.

Non-response bias is not measured in the survey.



#### **16.3.3.1. Unit non-response rate**

The typical unweighted response rate over a 30month period 'Mar-20 to Sept-22' is as follows:

- mean provisional response result, 46% (range: 42 - 50%),
- mean final response rate, 52% (range: 49 - 54%).

The size weighted response rate based on turnover is typically 80-85%.

#### **16.3.3.2. Item non-response rate**

Not measured.

#### **16.3.4. Processing error**

1. Data capture errors are likely to be low risk as survey forms are electronic.
2. NACE class (4-digit) and NACE division (2-digit) codes are linked to the CBR number and are data captured when the information is uploaded to the DMS. Where the NACE classification of individual enterprises changes, the new sample is taken from the CSO's Central Business Register.
3. See section on 'Data Validation.
4. Contact is made with company to confirm returned figures if required. Data are manually changed if required.
5. Occasionally enterprises may provide turnover inconsistent with the period covered. These errors are usually highlighted at the data-cleaning stages.
6. Data collection method – the collection method is by electronic questionnaire (eQ). This method is unlikely to be a source of measurement error.
7. Respondent – survey data can contain sensitive and confidential information due to the fact that it is a short-term survey and may be requested prior to annual accounts being completed. The survey publishes aggregated indices at Sector Level

#### **16.3.5. Model assumption error**

See 'Data Compilation' section.

## **17. Timeliness and punctuality**

### **17.1. Timeliness**

Our release is published each month within 35 days (Provisional) and within 65 days (Final) after the end of the reference period.

There are preliminary results for month m (current month) and final results for month m-1 (previous month) published in each monthly release.

#### **17.1.1. TP1. Time lag – First results**

35 days.

#### **17.1.2. TP2. Time lag – Final results**

65 days.

### **17.2. Punctuality**

The publication dates of all CSO releases are specified in the public release calendar available from CSO.ie. The MSI release was disseminated in accordance with the date determined in the calendar.



#### **17.2.1. TP3. Punctuality – Punctuality - delivery and publication**

0 days.

## **18. Comparability**

### **18.1. Comparability – Geographical**

The data sent to Eurostat on a monthly basis is as per Eurostat's recommended methodology and per regulation and is comparable with other MS data.

The national publication of the monthly services index is based on a different weighting scheme.

#### **18.1.1. CC1. Asymmetry for mirror flow statistics**

Not applicable.

### **18.2. Comparability over time**

The MSI was first introduced in June 2012 (Base Year 2009=100). In January 2013, a new series was introduced with a new base year (Base Year 2010=100). This rebased series had more detailed breakdowns for some sectors and contained some major methodological improvements. The most important of these changes was that the new base weights were now updated each month using changes in respondents' monthly estimates of gross value-added (GVA) as opposed to changes in respondents' reported turnover. In April 2018, another rebase (Base Year 2015=100) was completed.

#### **18.2.1. Length of Comparable Time series**

10 years.

### **18.3. Coherence – cross domain**

In certain instances, comparisons with other data sources such as Revenue Commissioners data and Industry data are conducted. These are investigated where necessary leading to better quality data. In general, the same trends are evident in the various data sources.

Coherence checks are done with Credit card data and other private surveys.

#### **18.3.1. Coherence – Sub annual and annual statistics**

Consistency checks are done on an ad-hoc basis with the Annual Service Inquiry. Differences are verified, leading to improved data quality.

#### **18.3.2. Coherence with National Accounts**

The Large Cases Unit in the CSO National Accounts division send the data for certain enterprises which are very dominant this improves the coherency with other CSO statistics.

### **18.4. Coherence – internal**

Data is tested for coherence at individual enterprise level each month comparing data with the corresponding data from the same month of the previous year and any inconsistencies are followed up with the enterprise.



## 19. Cost and Burden

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

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

## 20. Data Revision

### 20.1. 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/>

### 20.2. Data Revision Practice

Each month the provisional data from the previous month are revised on the receipt of late returns or amendments of existing returns. The current month's data are always provisional and only becomes final when the next month is published.

As turnover indices are seasonally adjusted, the complete series are revised on a monthly basis due to updated seasonal factors. Other revisions are flagged as such in the Release. Updating methodologies are not usually announced in advance but simultaneously with implementation. A significant change (e.g. rebasing of the indices) would be notified in advance.

#### 20.2.1. Data Revision – Average size

The size of the revision varies from month to month but would typically be in the order of +/- 2% for "Total Non-Financial Traded Services" indices.  
No MR or MAR are provided.

## 21. Statistical processing

### 21.1. Source Data

The primary data source is micro-data (i.e. turnover) from individual enterprises.  
Data for Bars (NACE 563), Motor Trades (NACE 45) and Retail Trade excluding Motor Trades (NACE 47) are taken from the Retail Sales Index.

#### 21.1.1. Population and sampling frame

The CSO CBR provides the basis for the Short-Term Statistics (STS) Register from which the sample is selected. In 2015, the services sector was the largest economic sector in Ireland, comprising 51.2% of total enterprises and accounting for 47.2% of employment. The MSI sample comprises about 2,200 enterprises.

#### 21.1.2. Sampling design

The sample comprises of (i) a census of all enterprises with an annual turnover value of more than €20m or enterprises with more than 100 persons engaged and (ii) a stratified sample of enterprises with a turnover of less than €20m. Enterprises are stratified initially by their NACE classification and then within each NACE division (i.e. 2-digit level) by turnover.



Motor Trades, Retail Trades excluding Motor Trades and Bars indices are taken from the RSI which sample contains approximately 1,400 enterprises. Within each NACE Rev. 2 division there are 3 size classes. These size classes are defined according to annual turnover i.e. enterprises are categorised into 3 groups (or size classes) according to their turnover.

The 3 size classes are:

Size Class	Turnover
1	€0.5 million ≥ turnover < €1 million
2	€1 million ≥ turnover < €5 million
3	€5 million ≥ turnover < €20 million

#### 21.1.3. Survey size

Approximately 2600 enterprises.

#### 21.1.4. Survey technique

Form data is captured and edited in the Data Management System (DMS). From February 2011 and where respondents have indicated their wish to receive correspondence via e-mail; an e-mail is sent that contains a link to an MSI electronic web questionnaire (eQ). Data are entered by the respondent into the eQ which is automatically saved to the cloud. The data file is then captured and edited in the DMS.

### 21.2. Frequency of data collection

Monthly

### 21.3. Data Collection

The information is collected from selected enterprises via an electronic questionnaire (eQ) only. Approximately 80% of surveyed enterprises receive an email request with the secure link to complete the questionnaire, with the remaining 20% in receipt of a letter with instructions on how to log in and complete the eQ questionnaire online.

Information from surveyed large enterprises referring to the MSI is received via a CSV file issued by the CSO's LCU unit. The deadline for receipt of this data is T + 25 days (i.e. 25 days after the end of the reference month or next working day if day falls on Sat. or Sun. or Bank Holiday)

#### 21.3.1. Type of Survey/Process

The survey is a sample survey. The sample is selected from the CSO Central Business Register (CBR).

#### 21.3.2. Questionnaire (including explanations)

Each month participants in the survey are requested to return their turnover figure (excluding VAT) for the reference month. Turnover should include all receipts (excluding VAT) accruing to the enterprise as a whole from the sales of goods and provision of services, after trade and cash discounts, rebates etc. as well as grants or allocations of funds from head offices where the enterprise has no turnover. Sales of capital assets and non-trading receipts (e.g. Insurance claims) should be excluded.

Wholesalers are asked to complete the form as they are included in the survey and are not covered by either the RSI or Monthly Industrial Inquiry (MII).

The latest version of the electronic questionnaire may be accessed on the CSO website at:

<https://www.cso.ie/en/methods/surveyforms/monthlyservicesindex/>





### 21.3.3. Survey Participation

Participation in the survey is compulsory as it is a statutory survey under the Statistics (Services Turnover) Order 2018 (S.I. No. 431/2018).

### 21.3.4. Data Capture

Data are received via two primary means:

- Questionnaires are issued to respondents via a web questionnaire using our eQ system.
- The Large Cases Unit (LCU) issue a monthly questionnaire to all units identified as large cases and perform a series of edit checks in the data using the DMS. The appropriate data for the MSI is then extracted from their system and handed over to the DCU via a Comma Separated Values (.CSV) file. This file is uploaded to the DMS and no further micro checks are performed on the data.

Once data are securely received they are uploaded to the DMS, the 4-digit NACE classes and the 2-digit NACE division are attached to the individual return via a register NACE variable. Edit rules are run regularly to clean the returns.

Information received via eQ is transferred to the DMS and edit rules are run regularly to clean the data.

## 21.4. Data Validation

The edit checks performed are checks on consistency of data between months.

The following checks are carried out:

- Zero value turnover
- Turnover > €500 million
- Turnover < Internet sales
- Large increase in turnover compared to the previous month
- Large decrease in turnover compared to the previous month
- Large increase or decrease in turnover compared to the corresponding month in the previous year

Each member of staff is responsible for a block of enterprises based on Business Groups. Key enterprises have been identified on each block based on turnover and are prioritised regarding edits.

Returns for the previous months are also checked for indications of a trend. The enterprise is contacted to resolve any discrepancy where necessary.

The return is then manually edited on the basis of the explanation from the enterprise. Once all errors are amended a copy is made of the clean dataset. Reports are run throughout the survey period outlining the number of edits outstanding and also response rates are tracked.

The following response rates reports are generated and monitored regularly:

- Overall Response Rates
- Response Rates per Business Group
- Response Rates per NACE Division
- Response Rates per Unit Type (i.e. LCU, Key)
- Response Rates per Work Allocated ID (WAID)
- Response Rates for Return Type

## 21.5. Data Compilation

To compile the MSI, each of the published NACE sectors is separated into three distinct cells based on the constituent enterprises' calculated gross value added (GVA) for 2015. Using data taken from the 2015 ASI,



GVA base weights are then calculated for each of these cells and the base weights are updated each month using a matched sample approach.

The index system is structured on the non-financial traded services sector enterprises covered in the 2015 ASI classified by seven services sectors and three cell sizes based on turnover value.

An enterprise's monthly GVA value is calculated as follows: respondents report their monthly turnover figures which are transformed into estimated GVA figures by applying an enterprise specific factor based on an individual respondent's 2015 ASI return. The factor is calculated for each enterprise by simply dividing their estimated GVA by reported turnover. If an enterprise was not on the ASI sample, then the relevant cell mean GVA/turnover ratio, calculated from the 2015 ASI, is applied. The reason for this change in methodology is to reduce the disproportionate impact that some enterprises (which report large turnover figures but have a relatively small GVA) can have on the overall series.

The compilation of the index for the current month ( $m$ ) is based on the percentage change in monthly turnover (based on a matched sample) over the corresponding monthly period of the previous year ( $m-12$ ).

The MSI sample is broken down into 7 NACE Rev.2 sub-categories (business groups) and further broken down by 3 cell sizes. Initially, for each cell, a matched sample based on returns for the current month is established. The ratio (RC) of total cell turnover for the current month ( $T_{cm}$ ) over total cell turnover for the same month of the previous year ( $T_{c(m-12)}$ ) is then calculated.

$$Rc = T_{cm}/T_{c(m-12)}$$

RC is then applied to the cell weight from the previous year ( $W_{c(m-12)}$ ) to calculate an updated cell weight ( $W_{cm}$ ).

$$W_{cm} = Rc \times W_{c(m-12)}$$

An updated business group (BG) weight ( $W_{bm}$ ) is then calculated for the current month by summing the three updated cell weights.

$$W_{bm} = \text{Sum}(W_{cm}) \text{ where } c = 1 \text{ to } 3$$

$W_{bm}$  is then converted into a BG index by dividing by the average 2015 monthly base weight for the business group ( $W_{bm0}$ ) and multiplying by 100.

$$\text{Index } BG_m = (W_{bm}/W_{bm0}) \times 100$$

To calculate an updated "MSI" weight the individual business group weights are summed.

$$WMSI_m = \text{Sum}(W_{bm}) \text{ where } b = 1 \text{ to } 7$$

$WMSI_m$  is then converted into an index by dividing by the average 2015 monthly base weight for the MSI ( $WMSI_0$ ) and multiplying by 100.

$$\text{Index } MSI_0 = (WMSI_m/WMSI_0) \times 100$$

### Rebase 2015

The rebasing of the series is in line with EU recommendations to update the base reference periods at regular five-year intervals. This new series replaces the existing series to base year 2010 as 100.

The difference in the new rebased MSI series is the use of new cell and sector base weights taken from the Annual Services Inquiry 2015. The existing cell structure/breakdown was maintained in this series. For each sector, enterprises are placed in a particular cell based on the following criteria and each sector is then weighted to compile the overall index:

- Cell 3 If annual GVA is greater than €80,000,000



- Cell 2 If annual GVA is between €2,500,000 and €80,000,000
- Cell 1 If annual GVA is less than €2,500,000
- 

The new base weights are updated each month using changes to respondents' monthly estimated GVA.

#### **21.5.1. Imputation (for Non-Response or Incomplete Data Sets)**

The MSI adopts a matched sample approach and therefore there is generally no need to conduct imputation. Occasionally, however, some ad-hoc imputation is carried out for some key enterprises. In these cases each enterprise is looked at individually and an extension of nearest neighbour and last observation carried forward techniques are used to impute the missing values.

##### **21.5.1.1. A7. Imputation rate**

Not calculated.

#### **21.5.2. Grossing and Weighting**

The weights that correspond to the base period are referred to as base weights. The current base for the MSI is the year 2015. The base weights for the current series were derived from the 2015 Annual Services Inquiry (ASI).

By convention, the indices for the base year are expressed as 100 i.e. Base Year = 100.

Base weights for each cell are derived from the 2015 ASI. These base weights are updated on a monthly basis by applying a cell relative calculated using a year on year matched sample approach.

## **21.6. Adjustment**

#### **21.6.1. Seasonal Adjustment**

Seasonal adjustment is conducted using the direct seasonal adjustment approach. Under this approach each individual series is independently adjusted, e.g. aggregate series are adjusted without reference to the component series. Each individual seasonally adjusted series is calculated based on unadjusted data spanning from January 2010 to the current period.

Each individual Monthly Services series or sub-index is seasonally adjusted separately using the model that best fits the characteristics of that series. Individual series models will be reviewed once every 12 months and series models and parameters are adjusted if required.

The revised series are published on the CSO web – [www.cso.ie](http://www.cso.ie). Distinct seasonal factors are calculated for each Business Group and each Combined Group. This reflects the different seasonal patterns exhibited by different Business Groups and Combined Groups. For example, sales in G45 Motor Trades are low in December, contrasting with G47 Retail Sales, which usually increase in the lead up to Christmas.

The adjustments are completed by applying the X-13-ARIMA model, developed by the U.S. Census Bureau to the unadjusted data. This methodology allows seasonal factors to be estimated whilst 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, temporary changes and level shifts in the series.

#### **Identifying and Treating Outliers, Temporary Changes and Level Shifts**

Outliers, temporary changes and level shifts are abrupt changes in the underlying series that can affect the quality of the seasonal adjustment if not treated correctly. The X-13-Arima seasonal adjustment program identifies any outliers, temporary changes or level changes and removes them from the original series before the seasonal adjustment factors are calculated. Once the seasonal adjustment factors are



calculated these outliers, temporary changes and level shifts are then re-introduced so they are present in the final seasonally adjusted series.

## 22. Comment

For additional information on the use of X-13-ARIMA-SEATS see Findley, D.F., B.C. Monsell, W.R. Bell, M.C. Otto, and B. Chen (1998), "New Capabilities and Methods of the X-12-Arima Seasonal Adjustment Program", *Journal of Business & Economic Statistics*, 16, pp. 127-177 and the webpage

<https://www.census.gov/content/dam/Census/library/working-papers/1998/adrm/jbes98.pdf>