

29 OCTOBER 2024  
VIRTUAL MEETING

TOUCH-BASE MEETING OF THE VOORBURG GROUP

# DEFLATION AND SEASONAL ADJUSTMENT OF THE MONTHLY INDEX OF TURNOVER ON SERVICES

MARIAGRAZIA MOSCHETTA  
ISTAT | DCSE | SED  
ITALY

# Contents

---

1. The new Index of Turnover on Services
2. The transition to the new base 2021=100
3. The matrix of deflators
4. The turnover volume indices
5. The seasonally adjusted indices
6. Final considerations

# Introduction

---

The Italian survey of turnover on services (FAS) produces short term economic indicators useful for measuring the intra annual trend of the value and the volume of services sold by companies operating in the sectors of the considered economic activities.


Starting from January 2024, the EU Regulation 2019/2152 of the European Parliament and of the Council of 27 November 2019 (with subsequent EU Implementing Regulation 2020/1197 of the European Commission) which replaces Regulation (EC) no. 1165/1998 of the European Council (subsequently amended by Regulation (EC) no. 1158/2005) requires the National Statistical Institutes to produce deflated indices of turnover in the service sector on a monthly basis.

The first referred period is January 2021.

# The new base year 2021=100 (1)

---

The main changes introduced with the transition to the new base 2021=100:

- Different release of the indices: quarter  monthly
- Issues regarding data acquisition.
  - Re-engineering of the survey management system for the creation of an Integrated System for Business Statistics (SINTESI) with new functions relating all the phases of the process:
    - ✓ data acquisition;
    - ✓ management of registry events;
    - ✓ macro editing;
    - ✓ calculation of the indices;
    - ✓ dissemination of monthly indices.

# The new base year 2021=100 (2)

---

- Production of indicators for the base 2021=100 (Availability of microdata from January 2022).

Mixed approach has been used:

- For the period 2021-2022 the quarterly indices referred to the base 2015=100 have been shifted in the base 2021;
- For the period January 2020 – December 2022 the turnover collected from the Survey on Services Activities has been combined with the data from administrative source (electronic invoicing);
- The elementary indices for all months has been created from data referred to electronic invoicing.

# The new base year 2021=100 (3)

---

- Extention of the field of observation.

The economic activities covered with the old base year 2015=100 were section G (excluding G47); sections H, I, J, M (excluding M701, M72 e M75) and section N (excluding N77, N811 and N813).

With the transition to the new base, in addition to the sectors already present, have been included:

- section L (Real estate activities);
- division N77 (Rental and leasing activities);
- groups N811 (Combined facilities support activities) and N813 (Landscape service activities).

# Deflated turnover

---

According to regulations, it is required to produce deflated turnover, in particular, of the wholesale and retail trade and repair of motor vehicles and motorcycles (G45), wholesale trade (excluding motor vehicles and motorcycles) (G46), retail trade (excluding motor vehicles and motorcycles) (G47) and section G of the NACE classification and, separately, the turnover of sections H, I, J, M (excluding M701, M72 and M75) and section N.

The main steps for calculating the deflated index are:

1. Collection of all sources necessary to calculate the IPS
2. Construction of the matrix of deflators
3. Calculation of volume indices
4. Seasonal adjustment

# Sources for the calculation of ISP

---

In order to calculate the deflated index of services turnover, are used the following price indices:

- Monthly producer price indices of industry PPI
- Quarterly services production price indices SPPI
- Monthly harmonized consumer prices indices HICP
- Quarterly house price indices H1

The PPI, SPPI and HICP indices are linked indices, but are treated as if they were elementary indices.

The presence of many price sources has made the automation of the system implemented for the calculation of volume indices quite complicated.



# Quarterly price indices

---

SPPI and H1 indices released quarterly



A. 1 or 2 steps forecast

B. Interpolation assuming that monthly prices have a similar trend within the quarter.



Critical issues within the deflation process due to revisions

(which can go back up to 6 months)

# Construction of the matrix of deflators

---

The construction of the deflators was carried out separately for the G45 and G46 divisions and for all other service sectors H\_N

## A. Matrix of deflators H\_N

The deflators are:

- SPPI indices
- Weighted average of the SPPI indices (for the BTB component) and HICP (for the BTC component).

The weighting is based on the annual data of the USE matrix, produced by the National Accounts:

- intermediate consumption of companies associated with the SPPI;
- final consumption of families associated with the HICP.

The weighting system is annual and is updated in October of each year according to the annual accounts revision policy. Currently, the **2022 weighting system is being replicated for 2023 and 2024.**

# Construction of the matrix of deflators

---

## B. Matrix of deflators G45 and G46

**Division 45.** Proxies based on the PPI and HICP indices are used, aggregated with the values of the USE matrix or with the net turnover (referring to the base year 2021).

**Division 46.** The wholesale trade sector is divided in order to have the complete breakdown and to associate each service with a deflator:

1. the PPI index exactly corresponding to the sector;
2. a proxy based on the arithmetic mean of price indices (the weights are given by the net turnover referring to the base year 2021);
3. in the absence of other sources, a proxy based on the arithmetic mean of the indices obtained in the previous steps 1. and 2. (the weights are given by the net turnover referring to the base year 2021).

# Calculation of volume indices

---

Most of the elementary volume indices are calculated at the Nace group level (*3-digit*), while for some sectors the deflation is at class level (*4-digit*) and for others at division level (*2-digit*), dividing the turnover indices for the corresponding deflator.

We then calculate the aggregated indices using the official weighting system referring to the 2021 base year:


- net turnover for the G components
- added value for the H\_N sectors

The aggregate referring to section **G** is **obtained also considering the division G47** whose deflated turnover index is developed as part of the monthly survey on retail sales.

# Seasonal adjustment

---

The seasonally adjusted indices are calculated using the Arima model-based method of Tramo-Seats implemented in the JDemetra+ 2.2.4 software package.

The first reference period is January 2021  the length of the time series does not allow the adjustment for calendar effects (which may require 6 or 7 regression variables).

The seasonal adjustment is performed with a double indirect approach (therefore in 3 steps).

# Seasonal adjustment: step 1

---

Direct adjustment approach for the component series

(same disaggregation level as deflation)

## A. Seasonal adjustment of turnover indices:

- Imposition of airline models without calendar effects or outliers
- Manual interventions based on available diagnostics

## B. Seasonal adjustment of deflators:

- Imposition of airline models without outliers
- Exclusion of series with seasonality variance less than 10% of the total variance
- Manual interventions based on the diagnostics available for the remaining series

# Seasonal adjustment: steps 2 and 3

---

**Step 2:** Indirect adjustment approach of the deflated indices of turnover

$$\text{Adjusted deflated index of turnover} = \frac{\text{Adjusted index of turnover}}{\text{Adjusted deflator}}$$

**Step 3:** Indirect adjustment approach of all aggregates

- Indices of turnover
- Deflated indices of turnover

The indices adjusted for calendar effects are imposed equal to the raw indices except for the G47 division and the G section (for the G47 division the adjustment for calendar effects is carried out by the monthly retail sales survey).

All phases of the process were automated through an R procedure, using the roracle, data.table and rjwsacruncher packages.

# Final considerations

---

The calculation process for the ISP is rather complex and the main difficulty lies in assembling the information from different surveys, each with its own methodology, timeliness and frequency.

The work done up to this point has been important, but needs further improvement:

- some sectors could be supported by further quantitative information: the number of overnight stays in hotels or other accommodation facilities for Accommodation activities and Restaurant services (section I) or the number of plane or train tickets for Transport activities (section H);
- evaluate the opportunity to adopt additional price indices (prices of agricultural products, import prices).



# Thank you for your kind attention

MARIAGRAZIA MOSCHETTA  
mariagrazia.moschetta@istat.it