Chapter 8 - Conduct of a Production Campaign

Each month, INSEE collects all the data needed to compile the index, verifies the data, builds the elementary series based on the collected data, analyses them and applies adjustments and corrections where necessary, calculates the indices based on several classifications, seasonally adjusts them and, finally, publishes and disseminates them to a wide range of users. These complex operations are based on well-established processes and applications.

1- Operations Management and Data Collection

Historically, the industrial production index has been the responsibility of INSEE. The decree governing the organisation of INSEE dated 4 August 2016 specifies that the "Short-term statistics" department of the Directorate of Business Statistics is responsible for compiling activity indices (IPI, turnover indices, etc.) in industry, trade and services and the various price indices (purchase and sale) collected from enterprises in industry and services.

The IPI – and, more generally, all related processes, methods and applications – is managed by the "Short-term business indicators" (in French, *Indicateurs conjoncturels d'activité*, or ICA) division within this department.

The task of collecting individual production data (dispatch of campaign opening letters, receipt of results, reminders to late responders, imputation of non-responses…) and of producing the elementary series is handled at the Normandy Regional Directorate within the National Business Statistics Service (in French, *Service des statistiques nationales d'entreprises*, or SSNE) located in Caen for "industry excluding food and agriculture"[44]. Surveys of industrial food and agriculture businesses are managed by the Statistics and Forecasting Service (SSP) of the Ministry of Agriculture located in Toulouse[45], while the collection of energy data is the responsibility of the Statistical Data and Studies Service (SDES) of the Ministry for the Ecological and Inclusive Transition, as is the collection of construction data, with collection delegated in this case to the French Building Federation (FFB) and the French Federation of Public Works (FNTP).

Because of the sheer range of collection bodies and production indicators and the fact that a large number of product groups are tracked, the process of managing the indicator is a highly complex process.

A customised questionnaire is developed for each enterprise included in the sample. The questionnaire focuses on the products for which the enterprise was included in the sample. A letter is sent each month to the enterprises included in the sample to inform them that the questionnaires are available. The vast majority of enterprises respond online (98% of responses), using the COLTRANE portal dedicated to official business statistics surveys. If they wish to respond by post, they must make an explicit request. Mail responses mainly come from small businesses with no Internet access.

2- Legal Basis and Litigation Management

The EMB[46] is compulsory. It has been issued with a general interest and statistical quality label. It is included in the programme of official statistics surveys to which companies must respond under the 1951 Act, which provides for a dispute resolution procedure in the event of non-response. Companies' responses are essential for the quality of the index, and therefore, for short-term diagnostic purposes.

A litigation procedure is set up by the various bodies responsible for overseeing the conduct of surveys to guarantee a high response rate and thereby ensure that the IPI is of good quality. Thus, for example, for the EMBs managed by INSEE, the response rate is over 87% (although the rate varies slightly from one month to the next). In the event of repeated non-responses, the litigation procedure involves serving non-respondents with a formal notice followed by a notification of non-response with acknowledgement of receipt. The

44Except for certain branches, such as the manufacture of basic iron and steel and of ferro-alloys, where collection is conducted by partner professional bodies (see Chapter 2).
45As with the "non-food and agriculture" part, data on some branches are collected by partner professional bodies.
46Or, more precisely, the monthly branch surveys since they cover all collection bodies.

acknowledgements of receipt are sent to the Litigation Committee at the National Council for Statistical Information (CNIS), which then sends a letter of referral to the enterprises concerned. A final decision is taken at a meeting of the Litigation Committee depending on the response provided by the enterprises and their position with regard to the dispute (repeat offender or not). The decision may result in a fine being imposed on non-responding enterprises.

3- Data Processing

The role of the unit responsible for calculating the IPI is to collect all the data required to calculate the index, to produce the aggregated indices (based on different classification levels) using the data collected, to assess them, to seasonally adjust the indices and, finally, to publish and disseminate them in several formats. It also responds to internal and external requests for information on the indices.

The integration of the data and the calculation of the indices are mainly based on two integrated applications for calculation and analysis. These integrated applications enhance the security of the index production process. The gross indices are recalculated each month from January of the previous year based on current production and revisions to historical data may be incorporated over a longer period if necessary.

As noted above, the National Business Statistics Service is responsible for the first part of the processing as part of a monthly campaign to calculate the IPI indices. Sector clerks are responsible for a set of branches within the scope of the index. Their first duty is to check that enterprises have submitted their responses to the monthly surveys, which are received either directly (if the survey is managed by INSEE) or indirectly through OPAs. They are required to ensure that all the results are sent to INSEE within the deadlines set for the production of the IPI and to follow up with correspondents if necessary.

All declarations of production received are processed and assessed by clerks and heads of units. Raw responses from enterprises to the monthly branch surveys may be altered without appeal from the enterprise if the error is obvious (unit error) or after appeal by the enterprise, if necessary. Once the individual data have been verified and validated, the industrial production indices are calculated (taking into account imputations in the event of non-response), accompanied by an analysis of the indices at all classification levels to identify possible atypical changes and to account for (or correct) them as part of a top-down approach from the most aggregated indices down to individual data.

4- Sequence of a Monthly Campaign

For publication on D-Day (no later than the 10th day) of month M and relating to production in month M-2:

At (D-45), the campaign is launched. Thus, for example, in the case of the publication of the January index on 10 March, the campaign is launched around 25 January. The questionnaires are published online on the collection site and a letter (letter of notification) is also sent out to businesses informing them that the questionnaire for the month under review is available and requesting them to respond.

From (D-45) to (D-15), the SSNE collects the data: receipt and verification of the responses submitted by participating enterprises. In the event of very significant changes, the enterprise in question is requested to check the accuracy of the data and to identify any reporting errors. Non-responding enterprises are sent reminders, particularly the largest entities. The collection process continues throughout the month.

From (D-14) to (D-6), the SSNE calculates the elementary series based on the responses provided by enterprises and non-response imputations and analyses changes and revisions. It may also be required to correct automatic imputations. It sends reminders to enterprises that have reported atypical changes and, if necessary, corrects their responses. It takes note of comments provided to explain changes and revisions. It also continues to send reminders to non-responding enterprises.

From around (D-20) onwards, the unit responsible for calculating the IPI begins the initial index calculations, analyses the series and identifies any problems. Following the initial calculations, the indices are then updated as new data become available for advance estimates (see below). The unit also uploads external series: SSP data (food and agriculture), SDES data (manufacture of coke, energy), SDES data collected by the FFB and FNTP (construction) and DARES data on temporary work in construction. It then incorporates the price series for the

series monitored in invoicing terms and the productivity coefficients for the series tracked in hourly terms. The IPI section also calculates the gross aggregate and seasonally and working-day adjusted indices. Finally, contributions to changes and revisions are calculated.

Between (D-5) and (D-2), the IPI section conducts the final analysis of the gross aggregate and seasonally and working-day adjusted indices. To do so, it draws on the changes that contributed the most to the change in the overall index, i.e. the most significant changes or those affecting branches with a high weight. The aim is to understand and explain them. In other words, are the observed changes the result of atypical production by a business? Are they due to the treatment of seasonality and working days? This work can result in the SSNE sending a reminder to the enterprise and, if necessary, in correcting the declaration. Similarly, the section focuses on understanding the most significant revisions: can they be explained by late declarations by enterprises, corrections to past declarations or updates to seasonal adjustment models? (see below)

From (D-2) to (D-1), the dissemination is validated and prepared. After a final calculation of the IPI, the IPI section drafts the "Informations rapides" by way of commentary on developments in the IPI and any relevant revisions before submitting the publication to the formal approval process. It then uploads the data (long series) to the relevant database at insee.fr ("Indices and time series"), with INSEE then sending the series to Eurostat on D-day. The section ensures that operations run smoothly until publication.

The whole thing remains under embargo until D-Day at 8:45!

The media or external or internal users may then request further details on developments in the IPI, which happens relatively frequently.

5- Implementation of Early Estimates for the IPI

Since 2013, INSEE has been producing early estimates of the IPI for internal purposes. These indices are calculated at month end (30 days) to update the cyclical diagnosis established in the context of business cycle scores and points. These early estimates also help to secure the process by providing initial estimates well in advance of publication.

In addition, since 2016, in the first month of each quarter (January, April, July, October), the IPI section also calculates an early estimate at 23 or 25 days (indices for December, March, June, September). The indices for the third month of the quarter enable INSEE's quarterly accounts division to calculate an initial estimate of GDP using as much information as possible. The estimate is published 30 days after the end of the quarter (a system in place since the end of 2016) as opposed to 45 days previously.

6- Analysis

The analysis conducted by the IPI section aims first of all to understand changes in total industrial output compared to the previous month, adjusted for seasonal and working-day variations.

The seasonally adjusted change in the index of total industrial production results from the changes to its components, in particular within the classes forming it, these being the most detailed seasonally adjusted series[47]. The IPI section focuses its analysis primarily on the classes making the biggest contributions and conducts detailed examinations of the changes applicable to them.

The analysis of class changes begins with the determination of the elementary series that contributes (or contribute) the most. For example, if the seasonally and wording-day adjusted index for "Manufacture of machinery for food, beverage and tobacco processing" decreases between two consecutive months, it is necessary to determine which subseries within it account for the decrease.

The elementary series contributing to the seasonally adjusted change cannot be determined immediately, notably because a link must be established between a series at the "class" level whose seasonally adjusted change is to be

47As a reminder, below the class level, there is the NAF subclass level and the elementary series level (see Chapters 3 and 5). These last two levels are only available in "gross" form, i. e. before seasonal and working-day adjustment.

explained and elementary series that are not adjusted (the minimum level of seasonal adjustment being NACE-4).

To facilitate the work involved, several analytical tools are available. The key tool is the contribution to year-on-year change and the year-on-year change rate, which are calculated for each elementary series, the idea being that an atypical monthly change will be reflected in the year-on-year change or the year-on-year change rate, even if the relationship is not perfect. Various other graphical and display tools are provided to facilitate the analysis, in particular the annual superposition of the indices of the elementary series, thereby highlighting additive outliers in relation to the usual seasonal profile.

Once the elementary series explaining changes in the series at the "class" level has (or have) been determined, it is then necessary to understand which enterprise (or enterprises) accounts (account) for this change and why. Here too, the key tool is the year-on-year analysis of business output. If necessary, the enterprise may be contacted by the SSNE to explain or correct the atypical individual change.

With regard to revisions, the IPI section focuses on the series that contributed the most. The aim is to establish the reason for the revision based on the information provided by the SSNE. The process of analysing revisions can lead to the detection of anomalies, which are then corrected.

A significant part of the analytical work carried out by the IPI section consists in examining the treatment of seasonal and working-day adjustments, whether in terms of changes in the last month or revisions to previous months. The aim is to ensure that the models carry out appropriate and relevant operations. Adjustments may be carried out if necessary, including by adding or removing an outlier. For example, a significant change in the index over the past can be excluded from the calculation of seasonality if it relates to a clearly identified exceptional event (temporary closure of a plant leading to a fall in the index, which therefore does not relate to a seasonal phenomenon, etc.).

7- Revisions

The Purpose of Revisions

Indices are generally revised, albeit within a limited range (see below), several times after their initial release, for several reasons:

- the declarations of certain enterprises are received late by the body conducting the survey;
- errors in the interpretation of questionnaires by respondents or data entry errors (whether by the responding enterprise or the collecting body) may not be detected during the initial calculations;
- seasonal and working-day adjustments naturally lead to revisions to the seasonally and working-day adjusted indices as new monthly data become available to refine the estimates;
- INSEE conducts the annual production survey, which provides more detailed and complementary results for the year preceding the last period covered by the IPI; monthly and annual data are then compared, which may result in revisions to the IPIs.

The amount and scale of revisions decreases as one moves further away from the month in question. Successive revisions lead to a gradual convergence towards a more accurate estimate of production (with the receipt, in particular, of late responses). In line with the European Statistics Code of Practice, and for the sake of transparency, revisions made to recent months are reported in the monthly publication (see Chapter 9).

Late Declarations

For some products tracked among a large population of enterprises, non-responding enterprises may, at the time of the first release, account for between 10% and 20% of the month's total production.

The tools available provide a means of estimating the output of non-responding enterprises in addition to that of responding enterprises and of calculating the production statistics for month (m). The initial statistic for month (m) is termed “provisional”.

The following month, late respondents submit their production declaration for month m. The imputations are then replaced by the responses received. This then becomes a “corrected” statistic for month (m).

Some enterprises may not respond to surveys for a relatively long period of time: in such cases, the estimate applied over several months will be weaker, and when the enterprises in question do respond, the corrections made may have a significant retroactive effect, particularly in cases where the enterprise carries significant weight in terms of production on national soil.

Correction of Response Errors

Inevitably, some enterprises make mistakes in their declarations, whether material errors, errors in the interpretation of the explanatory notes to the questionnaires or errors related to staff changes or changes in internal information systems.

When these errors are detected (either by the responding enterprise or by INSEE following checks carried out on the data), amended declarations are drawn up, resulting in revisions to the indices.

In this context, the availability (the following year) of detailed annual data from the EAP can also lead to reporting errors being detected and in values from past series being reviewed.

Corrections Related to the Updating of Seasonal Adjustment Models

Seasonal adjustment models and seasonal coefficients are re-estimated each month since knowledge of the index for month m+1 enables models and estimates to be further refined. Even without any change in the raw data, knowledge of the index for an additional month has an (admittedly limited) impact on the estimation of the trend, on the estimation of seasonality coefficients and, more generally, on all stages of the seasonal adjustment process (see Chapter 7). In particular, the detection of additive outliers (outliers, level changes, etc.) is updated over the last few months, with potentially significant effects on the estimation of model parameters.

Taken together, all of these factors result in moderate revisions: on average over the period 2015-2018[48], changes in the industrial index of the previous month was revised by 0.16 percentage points (see Table 1), either upwards or downwards, pointing to a limited range compared to the standard deviation of the series (1.4 points over the period). The bias (average of revisions) is close to 0 and not significant.

Of course, revisions made to industrial production indices may offset each other: in other words, an upward revision to changes in one series may be offset by a downward revision to changes in another series. Similarly, revisions to the raw data of one series may be mitigated by a revision arising from updates to the seasonal adjustment models in the same or another series. Thus, we see that the revision of the development in the seasonally and working-day adjusted manufacturing index is lower on average than the revision of the change due to the raw data (0.16 compared to 0.22 points), with the updating of the seasonal adjustment models generally mitigating the revision of the raw data.

48More specifically, January 2015-June 2018, and excluding months associated with a major change in methodology (January 2018: base change; March 2016: update of weights). Average of the revisions in absolute terms applied to the change in the manufacturing index published the previous month. As an example, when the March 2018 IPI was published, the change in the manufacturing index between January and February 2018 was revised by +0.09 points. Having initially been estimated at -0,6%, it was increased to -0,5 % in the April publication. The +0.09 point revision breaks down as follows: + 0.05 points related to the revision of raw data and + 0.04 points related to the updating of the seasonal and working-day adjustment coefficients.

Table 1: Revisions Affecting the Manufacturing Index for the Last Published Month (Absolute Revisions, in Points)

	Average of revisions in absolute value	1st quartile	Median	3rd quartile
Revisions – manufacturing – Total	0.16	0.08	0.14	0.20
Including revision due to updating of raw data	*0.17*	*0.06*	*0.12*	*0.27*
Including revision due to updating of seasonal adjustment models	*0.10*	*0.04*	*0.07*	*0.13*

Reading note: the average of the revisions in absolute value (in other words, without taking into account the direction, i.e. upwards or downwards, but only the range) of the change in the manufacturing index in the previous month (for example, the change in the manufacturing index between August and September, during the October index calculation campaign) is 0.16 points. 25% of the revisions are lower than +0.08 points and 75% are below +0.20 points. These statistics were calculated over the period January 2015-June 2018, excluding months corresponding to a major change in methodology.