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Methodologies and
Working papers

Guidelines for compiling the monthly Index of Production in Construction

2011 edition

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Foreword

The index of production in construction (IPC) is covered by the Short-Term Statistics Regulation (STSR) and is an important indicator for monitoring and assessing developments in the construction sector. Furthermore, the IPC is often an important input for the compilation of national accounts. Since 2005, those European Union countries accounting for 2% or more of the value added in the construction sector are required to submit the IPC on a monthly basis. Moreover, many countries that are below the threshold submit monthly data on a voluntary basis.

In practice, the monthly IPC has proved to be a volatile index and the data are frequently revised.

In 2008, the Economic and Financial Committee's Status Report on Information Requirements in EMU stated (p. 51) that 'Three years of experience show that this [monthly production in construction index] has introduced higher volatility in some national data. Methods used to estimate monthly paths differ widely between countries. Sharing of best practices between Member States … will foster improvements in reliability of this indicator.'

Consequently, Eurostat presented a draft mandate for a task force to the Short-Term Statistics (STS) Working Group in July 2010. The European Central Bank and seven EU Member States volunteered to participate in the task force.

The task force met twice, on 20–21 October 2010 and 23–24 March 2011. A large part of the work was carried out through e-mail exchanges between the meetings and after the last meeting.

Upon completing its work, the task force submitted the present report for the approval of the STS Working Group at its meeting of 27-28 June 2011. The STS Working Group approved the report and proposed a few changes that have been included in this final version.

This report aims to serve as a tool for improving the quality of the IPC in the current reporting countries, but it could also be used by the candidate countries that have only recently started implementing the STSR.

Sophie Limpach
Head of Unit
Short-term statistics

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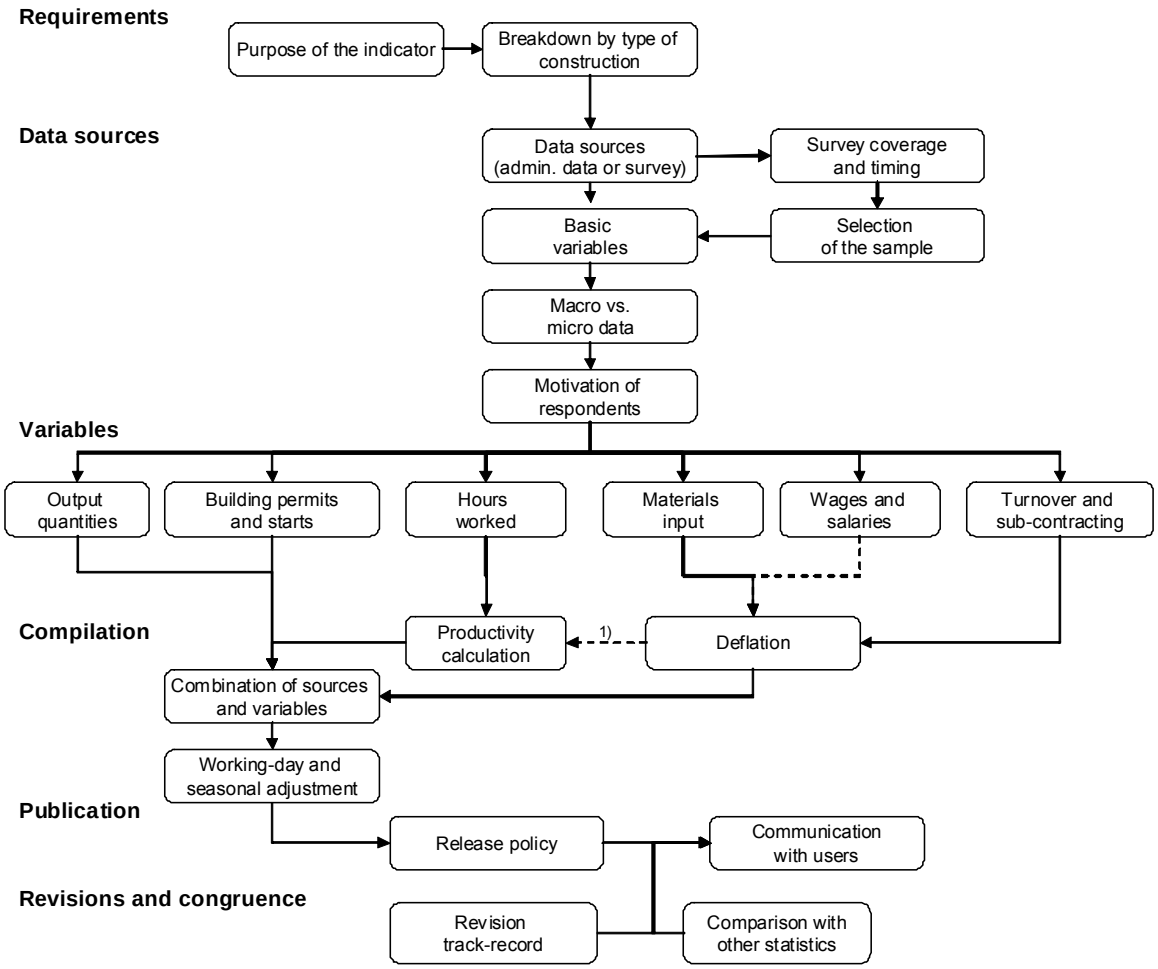
To help the reader

Flow-chart



Notes: 1) Productivity calculation follows deflation for wages and salaries only

Abbreviations

BIS	Department for Business Innovation and Skills in the United Kingdom
CC	Classification by Types of Construction
COICOP	Classification of Individual Consumption by Purpose
EA	Euro area
ECB	European Central Bank
EFC	Economic and Financial Committee
ESS	European Statistical System
EU	European Union

IPC	Index of production in construction
LAPS	Aggregate wages and salaries, employers' contributions for social insurance and preliminary taxes at source (in Sweden)
MS	Member States (of the EU)
NA	National accounts
NACE	Statistical Classification of Economic Activities in the European Community (in French: *Nomenclature statistique des activités économiques dans la Communauté européenne*)
	Section F Construction
	Div. 41 Construction of buildings
	Div. 42 Civil engineering
	Div. 43 Specialised construction activities
NSI	National statistical institute
OECD	Organisation for Economic Cooperation and Development
PRODCOM	It is a survey, with an at least annual frequency, for the collection and dissemination of statistics on the production of industrial (mainly manufactured) goods, both in value and quantity terms, in the European. It is abbreviated from the French '*Production Communautaire'*.
SA	Seasonally adjusted
SBS	Structural business statistics
STS	Short-term statistics
STSR	Short-Term Statistics Regulation
SWDA	Seasonally and working-day adjusted
TF	Task Force
VA	Value added
VAT	Value added tax
WDA	Working-day adjusted
WG	Working Group

Purpose of the indicator

Relevance of the construction industry

The construction industry in Europe is a large employer that makes a considerable contribution to overall economic output. In 2010, the construction industry in the euro area accounted for 5.9% of the total value added of the euro area (EU: 6.0%) and 6.9% of total employment (EU: 7.0%), though the size and importance of the sector varies from country to country.

The construction industry in Europe is highly fragmented, comprising not only large and multi-national enterprises, but also a large number of smaller and medium-sized enterprises, often equipped with highly specialised heavy machinery. In general, the construction industry is project-centred and characterised by short-term partnering between different companies. Furthermore, the planning, authorisation and actual realisation of construction projects span long periods, typically involving banks for the financing aspect. For civil engineering in particular, the public sector is the main awarding authority for construction projects.

The prominent role of the construction industry in macro-economic analysis is due to its relatively large employment share and contribution to economic output, but sometimes with a different pattern compared with the overall business cycle. Construction activity can be subject to fiscal incentive programmes which, in turn, can have an impact on the business cycle as well. In particular during the recent financial and economic crisis, imbalances in housing markets brought construction back into the focus of economic policy makers.

Key legal requirements for the IPC

The Short-Term Statistics Regulation[1] (STSR) calls for the provision of indices for production in construction (IPC), broken down by type of construction into *production of building construction* and *production of civil engineering*. The indicator is normally reported monthly, within one month and 15 days after the end of the reference period. However, countries accounting for less than 2% of the European value added in construction report quarterly and have 15 days more to do so. Data are to be transmitted both in unadjusted form and in working-day adjusted form. In addition, Member States may also transmit seasonally adjusted data.

Scope of the IPC

The IPC measures changes in the volume of output to show the volume trend in value added over a given reference period.[2] However, the compilation of the IPC faces similar

[1] Council Regulation (EC) No 1165/98 of 19 May 1998 concerning short-term statistics (OJ L 162, 5.6.1998, p. 1) with a number of subsequent amendments.

[2] Commission Regulation (EC) No 1503/2006 of 28 September 2006 implementing and amending Council Regulation (EC) No 1165/98 concerning short-term statistics as regards definitions of

problems to the compilation of the industrial production index, namely that value added is typically not available on a monthly basis and hence needs to be approximated. Several possible methods exist and are described in the individual sections further below.

Promotion of best practices

In an effort to promote best practices in compiling the IPC within the European Statistical System (ESS), this document endeavours to rank the various methods for estimating the IPC. There are a wide variety of methods in different countries, and the task force was not able to identify a single method that would be best for all reporting countries. The 'A methods' represent the best approaches to be aimed for. The 'B methods' are acceptable and may be viable options given specific national circumstances or practical considerations. However, the 'C methods' are practices that should be avoided.

The main objective is to upgrade all production methods, in both Eurostat and Member States, from those listed under C to those recommended under B and possibly A. Implementation of the A methods could be a medium- or long-term process.

variables, list of variables and frequency of data compilation; Annex 1 — Definition of objectives and characteristics of variables.

Requirements

Breakdown by Type of Construction

Description

The IPC is to be broken down into two sub-indices: building construction and civil engineering.

There is no direct link between these types of activity and the activity classification of reporting units. This is particularly true of NACE Rev.2 Div. 43.

However, Div. 41 reporting units may also make a significant contribution to civil engineering and vice-versa (Div. 42 reporting units contributing to building construction).

For example, in the UK during 2010, approximately 16% of civil engineering output came from reporting units classified in Div. 41 and 19% of building construction output came from reporting units classified in Div. 42.

The breakdown is required by national accounts even if it does not appear in the *A60* breakdown. It might be used to identify the type of *gross fixed capital formation* in the classification of *asset types* and households' final consumption (COICOP, *Classification of Individual Consumption by Purpose*).

Current practices

In the UK, each reporting unit is required to break down its output into eleven types of activity, from which building construction and civil engineering can be aggregated.

In Cyprus, each reporting unit is required to break down work done or hours worked into housing (CC111), multi-dwelling buildings (CC112/113), other buildings (CC12) and civil engineering (CC2). Based on gross production value in the base year in structural business statistics, the four indices (having been converted to volume indices) are added together as building construction, civil engineering and total indices.

In Sweden, the number of hours worked according to the construction trade union is used to produce building construction and civil engineering indices.

Alternatives *

A: Each responding unit is required to deliver data broken down into these two activities.

B: At least Div. 43 estimates are to be broken down into these two activities.

C: Only the activity classification (NACE) is provided.

* A) Best approach; B) Acceptable; C) To be avoided

Data sources

Data sources (Administrative data or surveys)

Description

The production of short-term statistics is normally based on the compilation of data from numerous sources. The reasons for choosing different sources relate to respondent burden, cost of data gathering for the NSI, the requirements of users and the validity of the possible sources in terms of coverage and conceptual definitions.

Gathering existing information from administrative sources is attractive because it is relatively low-cost and does not impose any additional burden on enterprises. However, the kind of information available from administrative sources is specific to each country, so its suitability and quality for calculating the IPC varies. Examples of such administrative data are VAT and wage and salary declarations, hours worked from trade unions, and building permits.

Often, surveys are needed to complement administrative data where suitable administrative data are not available. In such cases, the design of surveys should endeavour to reduce the burden on respondents and minimise costs for the NSI. Therefore, multi-purpose surveys should be favoured over parallel surveys for different statistics, although stand-alone surveys could be needed for quality reasons. However, it should be kept in mind that timeliness is a particularly important aspect of the quality of the IPC.

Current practices

National practices depend on the availability of data (survey or administrative sources).

- In Sweden, data from short-term statistics on salaries in the private sector, the labour force survey, the wages and salaries survey, the labour cost index, and hours worked from the construction trade union are combined to produce the IPC.
- In Italy, data from a monthly survey of industrial turnover and new orders, deflated with producer price indices, are combined with data from trade unions' and employers' registers and national accounts data.
- In Finland, the first estimate of the IPC is based on a survey of the largest enterprises while subsequent publications also use VAT data from the tax authority.

Alternatives *

A: Combination of administrative data and multi-purpose surveys designed to minimise respondent burden and NSI costs.

B: Stand-alone surveys used for quality reasons when administrative data are not available or sufficient.

C: Parallel surveys for different statistics.

* A) Best approach; B) Acceptable; C) To be avoided

Survey coverage and timing

Description

Under the STSR, the index of production in construction (IPC) is compiled for units classified in Section F 'Construction', according to NACE Rev.2.

To compile this index, the following data can be used:
- input data (hours worked/employment/material consumption)
- output data for gross production (production value/turnover)
- administrative data.

The production variable (variable 110) has to be reported at the two-digit NACE Rev.2 level at least.

For construction, countries should divide variable 110 into:
- index of production in building construction (variable 115) and
- index of production in civil engineering (variable 116)

on the basis of the Classification by Types of Construction (CC).

There is no direct link between partial variables 115 and 116 and the NACE Rev. 2.0 classification of activities. However, it is considered that the output of construction activities can be described by the index of production in construction as the combination of both indices.

Under Council Regulation No 1158/2005, data are sent to Eurostat within:
- 45 days following the reporting period (by countries obliged to prepare the index on a monthly basis, i.e. representing 2 % or more of the European value added in construction),
- 60 days following the reporting period (by countries obliged to prepare the index on a quarterly basis and by those preparing it monthly but accounting for less than 3 % of the European value added in construction).

Current practices

- Finland surveys the entire population of construction companies, although the following data are estimated on the basis of administrative sources:
  - monthly — for companies with a turnover of over EUR 50 000,
  - quarterly — for companies with a turnover in the range EUR 25 000 – 50 000,
  - annually — for companies with a turnover of up to EUR 25 000.

  Moreover, the 200 largest construction companies are covered by a monthly partial survey using purposive sampling. Quarterly and annual data are disaggregated into monthly data.

  Preliminary data are transferred to Eurostat within 45 days following the reporting period. The primary data are revised up to six times: the first delivery accounts for approximately 50 % of the total and the second 98 %.

- Italy samples the entire population of construction companies on the basis of administrative data sources and the secondary use of results from other surveys.

Preliminary data are transferred to Eurostat within 45 days following the reporting period. Data are adjusted in the subsequent quarter and become final after a year, when estimates from national accounts are available.

- Sweden surveys the entire population of construction companies based on 3 data sources:
  - wages and salaries in companies in the private sector — a random sampling stratified by type of activity and size class,
  - labour force survey,
  - data on wages and salaries obtained from the national tax body.

  Preliminary data are transferred to Eurostat within 45 days following the reporting period. Final data are available after 12 months.

Alternatives *

A: The entire population of construction companies are included in a monthly/quarterly survey. In order to reduce the respondent burden, data are also obtained:
- from administrative sources,
- on the basis of estimates/generalisations/imputation,
- on the basis of a sample.

Data covering the entire population of companies, though without burdening them or focusing on smaller companies (i.e. those that should as far as possible be exempt from burdensome reporting requirements), are available by the deadlines. Well-justified estimates or imputations may be used to compensate for late or missing data.

B: Data sources do not cover all units, but sufficient data are obtained in time and late data do not entail major revisions.

C: Only some units are surveyed and a very long period is needed to obtain preliminary data.

* A) Best approach; B) Acceptable; C) To be avoided

Selection of the sample

Description

Sampling is used in partial statistical surveys. Information is collected only from units in a sample selected from the population surveyed. The sample size and its internal structure should correspond to the size and structure of the represented population (so-called unbiased sample). The selection of the population and the sampling frame (or the administrative register) defines the coverage of the IPC. The inclusion or exclusion of activities or products is based on this choice. Sub-contractors of building developers are covered if they are in the sampling frame.

Units are selected by:
- Random sampling — all units in the population are equally likely to be selected (the same probability). Random sampling is used when the population to be surveyed is very large.
- Purposive sampling — units considered to more representative of a given population are selected.

To obtain more representative results, the statistical population to be surveyed is stratified prior to sampling (e.g. by type of activity, number of employees, region, turnover/production value). Units from each stratum are then selected. This requires more information on the population, but the sample is then more representative than in the case of simple sampling and can be used for a larger number of variables.

Current practices

- Cyprus uses a purposive sample stratified by NACE, territorial division and turnover. Units that have ceased their activity are assigned 0 but are retained in the sample until the base year changes.
- France uses a random sample stratified by territorial division, type of activity and number of employees:
  - for companies employing 10 persons or more,
  - with a sample size of 10 400 companies.
- Sweden uses a survey based on 3 data sources:
  - wages and salaries in companies in the private sector — a random sample stratified by type of activity and number of companies,
  - labour force survey — stratified sampling with a rotating panel,
  - data on wages and salaries obtained from the national tax authority — the entire population of construction companies.

Alternatives *

A: Uses stratification and an adequate sampling method. Stratification ensures appropriate population coverage and allows control of the sample in terms of representativeness. Lack of stratification does not always mean lack of representativeness: it is not necessary in a homogenous population of units, which can be the case in small countries. Sampling increases the coverage of the population surveyed while limiting respondent burden, and constitutes an element in controlling the units selected.

B: Wide coverage of the population and a sufficient sample size, but no stratification or efficient sampling.

C: No stratification or control of coverage, regardless of the sampling method.

* A) Best approach; B) Acceptable; C) To be avoided

Basic variables

Description

The compilation of the IPC uses a volume measure, i.e. it requires the deflation and productivity adjustment of basic variables to allow for a) productivity changes where activity-of-labour measurements are collected and b) price changes where monetary data are collected.

Deflators for building construction and civil engineering should at least be available.

Where monetary data (turnover, value of output, work done) are collected, output price deflators should be used rather than deflators based on input costs. If turnover is used, this will require further adjustment to take account of stocks and work in progress.

Additionally, the target variable 'value added at constant prices' requires the exclusion of double counting of sub-contract work and purchased material consumption (see section *Turnover and sub-contracting*).

Current practices

- In the United Kingdom, each of the eleven sectors for which output data are collected has its own output price deflator. There is a long history of these deflators being produced and published by a separate government department (Department for Business Innovation and Skills, BIS). The volume measures for building construction and civil engineering are an aggregation of the volume measures for the individual sectors.
- In France, a productivity measure is calculated from the national accounts by dividing the value added of the construction sector by total employment.
- In Finland, civil engineering is deflated using a cost index, while building construction is deflated using a price index.
- In Sweden, a labour cost index (LCI) is used to deflate a 'wages and salaries' measurement.

Alternatives *

A: Measurement of the volume trend in value added over a given reference period.

B: Methods that include some double counting or observe only part of construction value added.

C: Methods lacking adjustment for productivity or price changes and also including double or partial counting.

* A) Best approach; B) Acceptable; C) To be avoided

Macro vs micro data

Description

A macro data approach involves the collection and use of activity aggregates at any level of NACE Rev.2. This can be the case when an administrative source is used.

A micro data approach involves the collection and use of individual enterprise data. This is the case when a survey is the source of the data collected.

Advantages of the macro vs micro approach:

- No additional burden on enterprises.
- Less collection cost and burden for the NSI.
- Less data editing, imputations, calculations, etc.
- Minimum personal contact needed, mainly with register keepers.

Disadvantages:

- No direct control over population (or sample) coverage. Classification issues, population (or sample) comparability over time, or treatment of enterprise demography (births, deaths, mergers, etc.) are all usually hidden within sums.
- No real control over data quality. Outliers, data entry and other errors are hidden.
- No direct control over revisions. Revision policy cannot be transparent.

The disadvantages may outweigh the advantages if they affect the quality of the resulting index.

Available NSI resources and administrative burden on enterprises are both issues driving more extensive use of administrative sources, or less use of surveys. Nevertheless, the quality of the index should not be compromised. Efforts need to be made to ensure that non-survey sources of data provide the NSI with micro rather than macro data. This can be via bilateral agreements or national legislation in the context of a data integration policy. If it is not possible to get the micro data, then some form of partnership should be sought between the NSI and the administrative source (register keeper) to give the NSI the access needed to deal with all potential problems related to raw data.

Current practices

National practices depend on the source of data (survey/administrative).

- For example, in Denmark the IPC is based on the outcome of another statistical process where the micro data are managed within the same organisation by another unit. When needed, analysis of the micro data is possible.

Alternatives *

A: Use of micro data, collected either from a survey or an administrative source.

B: Macro data can be used as long as they are accompanied by supporting information, such as sample/population size, no/late response, enterprise demography, outlier treatment, cause of revisions, etc. This can be achieved in partnership with the data keeper.

C: Use of macro data without additional information.

* A) Best approach; B) Acceptable; C) To be avoided

Motivation of respondents

Description

Close cooperation and, in particular, personal contact with the data providers constitute a key element in ensuring quality in every step of the way from survey design to data collection and result assessment.

Construction trade associations are good places to start. They are experts in the field, they know how the construction industry works and they can give valuable advice on data availability and quality. The same applies to the leading enterprises. The NSI (regional or central offices) can approach and visit both the trade associations and leading enterprises to consult them on how to make a reliable indicator that can be beneficial to all. At the same time, the NSI can discretely verify that enterprises are correctly reporting the variable requested.

While it can be argued that the more contacts the NSI makes at personal level the better the cooperation and motivation of respondents, resource constraints may call for a more pragmatic alternative. Instead of individual meetings, conferences or focus group meetings can still offer the necessary face-to-face interaction. At regional or central level, the NSI, the trade associations or leading enterprises may even set up a kind of partnership that meets as and when needed.

Personal contacts should aim to ensure a win-win situation for both respondents and the NSI. Respondents are motivated when they feel they own part of the process, either because their ideas are incorporated in the index production process or because their data input is important for an overall picture of the construction sector. They need to hear that the time they spend answering surveys is not wasted by a faceless institution producing statistics of no use to them. They need to hear that the data they provide are used to create the only official tool that can drive policy making. NSIs can even highlight cases where the use of the IPC as an assessment tool has benefited the construction sector.

Most of the above still holds even in the case of administrative data (e.g. VAT authority). An additional layer in the cooperation network is needed here, shifting the focus to the register keeper rather than enterprises.

Public authorities collecting data that are also used by the NSI should be well aware of this further use. Personal contact is, again, the key factor. The statistician should visit the public authority colleagues and learn firsthand all the little details in the chain of processes leading to the data that will be used by the NSI. This is a way of gaining some control over the data collection process, thus enabling a more thorough quality evaluation.

Current practices

- Current practices depend mostly on the source of data (survey/administrative), the collection medium (post, telephone, web, etc.) and the available resources.
- An example given for effective respondent motivation in Cyprus is the case of a leading enterprise complaining about administrative burden. Through personal

contact, the NSI explained the role of the IPC in justifying the government's early support for the construction sector during a time of economic crisis.

Alternatives *

A: Personal visits to key data providers and their trade associations or, in case of administrative data, to register keepers. Alternatively, meetings with wider participation such as conferences. Sub-populations according to activity, size and region need to be identified so that meetings cover all eventualities. Frequency of contact depends on the stage of indicator development. The design stage is much more demanding than an established, long-running index. For new enterprises entering the sample, a first contact (visit, phone call or e-mail) with the contact person is ideal.

B: Personal contact other than face-to-face, e.g. phone call, letter, e-mail. A phone call can be more effective than a letter or an e-mail. For new enterprises entering the sample, a first contact (phone call or e-mail) with the contact person will be ideal, especially for 'big' enterprises.

C: No personal contact at any level. Group mail (postal or e-mail) to inform about participation in a survey.

* A) Best approach; B) Acceptable; C) To be avoided

Variables

Output quantities

Description

Output quantity information on structures can be given in square metres of area or cubic metres of volume. The advantage is that deflation is not necessary and the index can be calculated quite easily.

The big disadvantage is that structures are very heterogeneous and this approach may not take account of their different qualities. Another disadvantage it is that it is hard to imagine how an output quantity measure could be constructed to show accurately the development of production activity over a particular reference period.

It is unclear whether any country uses this method in practice for civil engineering.

The *Handbook on price and volume measures* in national accounts classifies this approach as an unacceptable method.

Current practices

- The Danish method of calculating the IPC and the construction value added in quarterly national accounts makes partial use of output quantities together with the corresponding square metre prices.

Alternatives *

A: n.a.

B: Output quantities together with timely price information could be used.

C: Use of only output quantities to measure production in construction.

* A) Best approach; B) Acceptable; C) To be avoided

Building permits or starts

Description

Statistics can be compiled on building activity based on the following events:

- Building permits: indicate the expected building activity, i.e. there is usually a time lag between the registration of the building permit and the economic activity, and a certain proportion of building permits are never taken up.
- Building starts: indicate an existing, physical building activity — and hence an existing economic activity taking place over a specific period of time.

Building activity is typically measured by an area or a number of dwellings. For obtaining the volume trend in value added, an economic value for the building activity must therefore be calculated.

The statistics typically cover the building activity only, not the civil engineering work, i.e. they do not meet all the requirements for calculating the IPC.

If the statistics are compiled on the basis of an administrative register, there is no response burden. At the same time, the use of administrative registers implies that it is more difficult or completely impossible to obtain access to micro data for data validation.

The data quality primarily depends on whether the data are reported punctually. Unfortunately, a characteristic feature of building activity statistics is frequent delays in the reporting of data. In many countries, the reporting delays constitute a major problem for data quality.

Current practices

- Of the countries participating in the IPC task force, only Denmark apparently uses statistics on building activity. However, even the Danish calculation of the volume trend in value added uses the statistics only as an indirect auxiliary variable.
    - To measure new construction of dwellings and private buildings for business purposes over the period (quarter), the national accounts make use of 'activity square metres'. They are compiled by main building categories in the Copenhagen region and the rest of Denmark. They are calculated separately for these categories as the average time between building start and building completion. The resulting average building periods are distributed by month or quarter for the selected building categories. The delays in the reporting of data for each building project add a factor of uncertainty to these calculations.
    - The next step is to calculate the production value for new building construction. For this purpose, average 'square-metre prices' are used, i.e. the total cost of constructing the different building categories, in the Copenhagen region and the rest of Denmark, at current prices. The 'square-metre prices' are estimated on the basis of an analysis of building activities approximately every 10 years, and are adjusted by means of the construction cost index. The production value of new building construction is included as a sub-element in the calculation of the total gross value added for the construction industry. A more frequent updating of the 'm² prices' would improve the calculation of the production value.

Alternatives *

A: Compilations of ongoing building activities can be an appropriate indicator of existing economic activity in the construction of new buildings. However, a precondition is that a satisfactory solution is first found for estimating delayed or inadequate data, e.g. based on verifiable patterns in delays or types of inadequate data. Secondly, the 'square-metre prices' must reflect current prices, through frequent updating of the basis for the calculations.

B: Unsatisfactory solutions for the problem of delays in the reporting of data on building projects and inadequate updating of the 'square-metre prices' result in uncertainty, which reduces the value of the indicator.

C: Building permits and building starts used as independent indicators for the IPC.

* A) Best approach; B) Acceptable; C) To be avoided

Hours worked

Description

By using hours worked to update the IPC, a proportional relationship between labour input and production activity is assumed. Obviously, this is only correct if changes in labour productivity are taken into account. Therefore, it is crucial to adjust the series of hours worked with some productivity factor. However, the method will not perform well if the productivity trend is not predictable. In practice, this means that the basic variable and the value added have to maintain a stable and predictable relationship.

Production results from a combination of factors such as capital goods, intermediate consumption (including purchased services, materials and energy) and labour, measured in number of hours worked. Purely technical progress generally produces a positive trend in the global productivity of factors (production divided by the total volume of factors). Changes in relative prices also cause substitution between factors. As this substitution requires changes in processes and more capital, it is slow to change the trend. In the short and medium term, adaptation of the amount of labour (by hiring, laying-off or firing), from the current amount to the amount needed by the production activity, is lagged. It is also expensive.

When the ratio of *value added* to labour is considered, the trend resulting from technical progress and substitution between factors can be either positive or negative, while a cyclical component, resulting from the lag between the current availability of labour and the actual need remains dependent on the business cycle.

Ideally, the '*productivity*' factor should take into account these two components (trend and cycle). In practice, it is quite difficult to estimate the development of productivity taking into account these two components. Because of the lag in adapting employment to the business cycle, it is not possible to estimate an econometric relationship with the value added as a forecast variable depending on hours worked and a time trend, and to use this relationship to estimate production in the present period. As the link between the business cycle and the development of productivity has to be ignored, the choice of labour variable must ensure that this link is as weak as possible.

In some countries, the contribution of foreign workers hired by foreign enterprises and working in construction projects seems to be an important topic. However, the work done by these workers should not be included in the IPC. As these workers are not registered in the country, the NA will register their income in the country of the foreign enterprise and will consider the corresponding value added as an import of services from that country. More generally, on a monthly basis, the IPC should not try to include elements that cannot be measured by the NA on an annual basis, such as the underground economy.

Current practices

- Of the countries reporting an index of production in construction, hours worked or a combination (unadjusted or adjusted for productivity) are used by Belgium, Bulgaria, Germany, France, Cyprus, Luxembourg, Portugal, Sweden, Croatia and Norway.
- Of the countries participating in the IPC task force, France uses hours worked as explained in A below. By means of two sample surveys, one in building construction

and one in civil engineering, two employers' federations collect the hours worked by regular workers. Hours worked by construction workers employed by temporary work agencies make up 10 % of all hours worked. They are collected by the Ministry of Employment by means of an exhaustive survey of temporary work agencies. As the data concerning temporary workers are available only 60 days after the end of the reference month, temporary work in the latest month is estimated. In all three cases, only the regular working hours of construction workers are covered. Hours worked by architects, engineers and administrative staff are not included.

Alternatives *

A: Hours actually worked on construction sites are a good alternative for calculating the IPC with its long production cycles. They are linked closely to the production process in the reference period and are relatively easy to establish. Only the hours worked by employees (workers) directly involved in the production process are generally considered, not the hours worked in business administration.

The number of hours worked must include those performed by regular workers and those performed by temporary workers hired by outsourcing companies. Overtime has to be included. For calculating the IPC, the hours worked also need to be adjusted for changes in labour productivity (see *Productivity Calculation*).

Although business administration and other services, e.g. architects, are included in the value added of the construction industry, they should not be included in the IPC because the corresponding hours worked do not strictly coincide with the production process, and the inclusion of these hours would generate a productivity change linked to the business cycle.

Hours actually worked do not include any paid non-working periods (holidays, sick leave).

B: The exclusion of overtime and the hours performed by workers hired by outsourcing companies is problematic because these components are typically cyclical.

The aim of restricting hours worked to employees (workers) directly involved in the production process (excluding administrative staff) is to focus on the most cyclical component of labour input, the work force with the highest turnover rate. However in some circumstances (or countries), depending on labour market conditions, companies facing a crisis choose first to reduce administrative support staff and to retain workers in training programmes. In such circumstances or countries, the restriction to workers is inadequate. In other cases (or countries), however, the inclusion of administrative employees creates a distorting production cycle effect on productivity.

Here too, hours worked need to be adjusted for productivity in compiling the IPC (see *Productivity Calculation*).

C: The number of employees is used instead of hours worked; the average working time of each worker is typically a cyclical component of hours worked.

* A) Best approach; B) Acceptable; C) To be avoided

Materials input

Description

Data on the use of raw materials in the construction process may not be available on a monthly basis. In such cases, it is necessary to identify a proxy indicator for this variable. A natural candidate is the turnover of industrial enterprises producing and selling the building materials typically used in the construction sector. The turnover must be deflated using an output price index.

This approach is based on two crucial assumptions:

- the input material purchased is immediately used in the production process and
- the share of imports in the goods selected is not significant or at least more or less stable over time.

The first assumption seems to hold in the construction sector, where the number of small firms is very large.

In order to arrive at a composite index of industrial turnover as a proxy for the value of raw materials used in the construction sector, the following steps are required:

- selection of the relevant industry groups,
- deflation of industrial turnover indices of goods sold on the domestic market with producer price indices in the domestic market, and
- identification of a proper weighting system in order to aggregate the selected groups.

As the typical breakdown for turnover indices corresponds to the 3-digit level of the NACE classification, a preliminary list of groups can be identified using surveys that involve a list of products (in Italy, for example, the survey on the costs of construction). Then, the PRODCOM survey is useful to identify the correspondence between these products and the 3-digit groups in the NACE classification.

The criteria adopted to select the final list of groups take into account two types of information: activation coefficients of the input/output matrix for the economy and the share of products in each group used exclusively in the construction sector. For example, *the production of cement, concrete and plaster* and *the making of cement, concrete and plaster products* are the most important inputs of the construction sector according to the activation coefficients. Moreover, the products of these two groups are used only in the construction sector.

The selected groups enter into the calculation of the composite index, excluding other groups for which either the activation coefficient has a low value or the products are not mainly used in the construction sector.

The share of imports for the groups selected can be measured using the data from the input-output matrix for the economy, as a ratio between the value of imports and the total intermediate inputs used in the construction sector.

The composite index of the intermediate inputs is finally calculated using two different weighting systems:

- for each branch, different groups are aggregated by the weightings used to compile the index of domestic turnover in the industrial sector;
- different branches are aggregated through the activation coefficients (with the sum standardised to 1).

Current practices

- Italy uses materials input as a supplement to labour input in a Cobb-Douglas-type production function.

Alternatives

A: The turnover of industrial enterprises producing and selling building materials typically used in the construction sector should be used after careful selection of the materials input and deflation. Materials input supplements other variables.

B: The selection of materials used supplements other variables, but the selection is based on intuition and not followed regularly.

C: Using building materials alone as the only input for the IPC.

* A) Best approach; B) Acceptable; C) To be avoided

Wages and salaries

Description

Wages and salaries statistics are characterised by the following features:

- Data on wages and salaries are an alternative measurement of labour input. Labour input is continuously required during the construction activity and is therefore closely linked to the production process.
- If data on wages and salaries are used as an alternative to the number of hours worked, overtime must be included, annual bonuses must be excluded and a timely labour cost index must be available for deflation.
- Ideally, only work performed by workers and also self-employed people is included. Administrative work should be excluded.
- The statistics may be based on existing administrative registers. This means no extra data collection, so the response burden can be kept to a minimum.
- Data quality depends on whether the data are reported in time. Since the IPC is compiled at an early stage, a high non-response rate may be a problem.

Methodological coordination with the national accounts is required, and divergences due to different statistical processes and revisions need to be followed up.

Current practices

- Of the countries reporting an IPC, only Sweden uses data on wages and salaries, in combination with the number of hours worked.
    - In Sweden, the national accounts only use the IPC as a benchmark. The national accounts calculate quarterly production in construction from the demand side as gross fixed capital formation (investment). Full coherence with national accounts data is therefore not achievable.
    - Statistics Sweden uses aggregate wages and salaries as one of three main variables to measure labour input (aggregate wages and salaries, employers' social insurance contributions, and preliminary taxes at source, abbreviated LAPS from Swedish).
    - LAPS is an exhaustive survey and coverage is therefore very good. Data on wage sums is collected from the national tax authority. An advantage with this

source is that the non-response rate is normally very low (in cases where Statistics Sweden does not have access to all tax declarations for the target population). However, the main disadvantage with the statistics is that the pay of administrative and office staff and bonuses are included in the wage sums. Bonuses are irregular payments and normally do not coincide with the period when the activity takes place. Since LAPS only collects aggregate data it is not possible to distinguish the contribution from administrative staff, office staff and irregular payments. The data are normally revised twice a year.

- The preliminary labour cost index (LCI) for workers (for NACE Rev.2 section F *Construction industry*) is used to deflate the wage sums from LAPS. The LCI does not have its own collection procedure but is based on short-term statistics on salaries (KLP) in the private sector.
- The results from the LCI are published late, which means that the reference month must be estimated earlier by carrying forward the previous month's index.
- Since wages and salaries are assumed to have a loose link to productivity and the number of working days over the short term, the index for deflated wages and salaries is adjusted neither for productivity nor for working days.

Alternatives *

A: Wages and salaries could be used as an alternative to hours worked as a measure of labour input, provided that overtime is included, annual bonuses are excluded and a timely labour cost index is available for deflating the labour input. For compiling the IPC, wages and salaries need to be deflated with an adequate labour cost index and adjusted for productivity (see *Deflation* and *Productivity Calculation*).

B: Partial coverage, for example information on overtime missing, can be acceptable. For compiling the IPC, wages and salaries need to be deflated with an adequate labour cost index and adjusted for productivity (see *Deflation* and *Productivity Calculation*).

C: Use of intermingled data sources on labour input where overtime, bonuses and administration staff salaries cannot be separated. The use of non-deflated labour costs is to be avoided.

* A) Best approach; B) Acceptable; C) To be avoided

Turnover and sub-contracting

Description

As the IPC is intended to measure the volume trend in the value added of the construction sector over a given reference period, an IPC based on turnover or the value of output (in the sense of the national accounts) could be contaminated by sectors that provide their output to the construction sector as its intermediate consumption (raw materials and sub-contracting). Conceptually, this is not desirable. However, 'turnover' and 'output' can be measured monthly, which is not feasible for value added. Note that IPCs compiled using activity-of-labour measurements are not affected by this problem.

The IPC is intended to be a monthly volume trend in a value added series. In particular, it should exclude work done by sub-contractors as this will lead to double counting within the construction sector. Including purchased materials violates the 'value added'

principle, but does not introduce double counting within the construction sector. Indeed, as the consumption of raw materials is almost proportional to production in the short term, the inclusion of purchased raw materials could be tolerated for the sake of simplicity or in order to limit the burden (B method). Conversely, as subcontracting is highly cyclical, eliminating this source of double counting is essential.

IPCs that use monetary measurements (turnover, value of output, work done) need to receive data from responding units net of sub-contracting payments and the value of purchased material consumption. This will usually require calculations over and above what normal business accounting systems might produce, thereby increasing the compliance burden.

Eliminating double counting when VAT returns are used to compute turnover values can be very complex, especially if the information on tax deductions is inaccurate. The amount of tax to be paid can be used to deduce the value of construction services provided, but often not enough information is available in time to compute the actual value added. Using the value of construction services provided without proper subtraction of tax deductions leads to double counting.

It should be said that small businesses rarely make payments to sub-contractors , particularly in NACE Rev.2 Div. 43, which represents more than half of total construction activity (Sec. F) in the European Union (including building construction and civil engineering).

Speculative buildings (those built to be sold later) present a particular challenge for picking up activity in the reference period. The same applies to work-in-progress. There might also be local differences between countries in how advance and interim payments for unfinished work are handled during construction projects.

Current practices

- In the United Kingdom, responding units are asked to report the value of work excluding payments made to sub-contractors but including the value of purchased materials consumed in the reference period.
- In Poland, data on the value of construction and assembly production includes production (at current prices) by construction enterprises in Poland for sale, excluding sub-contractors. The data cover completed work for which invoices have been issued, regardless of whether they have been paid (fast invoicing).

Alternatives *

A: The best approach requires the subtraction of payments to sub-contractors and the value of purchased material consumption from turnover, along with adjustments for unsold production and work-in-progress. These adjustments should be attributed to the relevant reporting periods and deducted from final sales invoicing.

B: Subtraction of payments to sub-contractors and adjustments for movements in own product stocks are taken into account. However, no subtractions are made for building materials and unsold building stock is not accounted for.

C: Use of non-adjusted turnover, with inclusion of payments to sub-contractors.

* A) Best approach; B) Acceptable; C) To be avoided

Compilation

Deflation

Description

Calculating the IPC with turnover or value data makes it necessary to deflate the data. Therefore, appropriate price indices have to be available. Labour input collected in the form of wages and salaries also needs to be deflated in order to identify the trend in value added at constant prices.

In the context of construction statistics, the focus of attention is on the development of prices in the construction sector. For this reason, the terms *cost index* and *price index* are to be considered from the point of view of the contractors responsible for the actual construction process.

A construction cost index shows the development of costs incurred by contractors in the construction process. An output price index shows the development of prices paid by clients to contractors; it is also referred to as a producer price index.

A construction cost index measures the relationship between costs, for a constant technology and a constant input mix associated with a fixed amount of construction work. Such an index differs from an output price index, which measures movements in prices charged to construction work clients. This is especially true when the price index is calculated from tender prices, which can vary from time to time and place to place, depending on the state of competition and market conditions. Output price indices include changes both in productivity and in contractor margins.

An output price index would be an appropriate price deflator. In its absence, the construction cost index series could be an alternative. In this context, it should be noted that the *Handbook on price and volume measures in national accounts* regards the deflation of output measures with input prices as an unacceptable method.

Current practices

National practices depend on the need for and availability of suitable deflators.

- In Finland the civil engineering time series are deflated with a cost index and the building construction series with the development of output prices for the construction of new buildings.
- The United Kingdom uses a method to convert tender prices into output prices.
- Sweden uses a labour cost index to deflate wages and salaries when compiling IPC on the basis of labour input.

Alternatives *

A: Deflation with an output price index corresponding to the definition of the collected variable (construction output prices for construction output and labour cost index for wages and salaries).

B: Deflation with a construction cost index.

C: Turnover or value series are used without deflation.

* A) Best approach; B) Acceptable; C) To be avoided

Productivity calculation

Description

For the monthly measurement of labour productivity, only work performed by workers contributes to the monthly variation in value added. Administrative tasks should ideally not be included in productivity calculations for labour, while the contribution of self-employed people should be included. In practice, the value added and number of hours worked by workers at construction sites are difficult to distinguish from total value added and labour input. Therefore, total labour productivity is used instead of workers' productivity.

Work performed by non-registered workers (black market) should ideally be taken into consideration.

In order to avoid big jumps due to major revisions and the lack of availability of recent data, it is recommended to smooth the productivity factor between different periods.

It is crucial to adjust hours worked with a productivity factor. A common practice is to continue in the current reference period with the productivity trend observed in the past, dropping the cyclical component. The aim of the IPC is to measure the volume trend in value added over a given reference period, similar to the national accounts. National accounts are published annually and quarterly. The result of the short-term branch surveys, for example the IPC, is a monthly series of hours worked, which can be aggregated by quarter and annually.

Ideally, the series of hours worked resulting from branch surveys should be benchmarked against the value added at constant prices in the quarterly national accounts, which are published up to quarter q-1 — this is required for an A method. In this case, the ratio of the value added at constant prices to worked hours should be fairly stable, or at least predictable (a time trend for instance).

If the relationship between the quarterly series of value added at constant prices and worked hours is too noisy in the short term, it might be difficult or inappropriate to benchmark the IPC against construction value added on a quarterly basis, and this could not be considered an A method.

Note that the IPC and the quarterly national accounts should be based on an integrated set of information — with a simplified framework for the IPC, which must be calculated each month. However, there are countries where the quarterly accounts preferably consider information other than the branch surveys (for example sales or building permits). The result can be a poor correlation between the monthly IPC and the quarterly national accounts series.

Current practices

According to *PEEIs in focus* 2008, five EU countries use hours worked adjusted for productivity: Belgium, Germany, France, the Netherlands and Sweden.

- In Sweden the national accounts cannot split productivity by factor. No distinction is made between workers and office staff in their contribution to the number of hours worked or value added.
    - As an input to the productivity calculations, the national accounts employ the short-term statistics on salaries in the private sector (KLP) to distribute the total number of worked hours in the private sector (based on the labour force survey (LFS) for the overall population) to business sector level. Overtime is included. Adjustments are made for the number of hours performed by non-registered labour.
    - The national accounts used to provide data on the annual productivity trend half a year after the end of the calendar year. After discussions with the national accounts department, it was concluded that it was more appropriate to use preliminary productivity figures based on quarterly data. This would probably ensure better coherence with the national accounts' quarterly estimates. The index from January 2011 is compiled on the basis of these new figures.

  Example: Calculation of the annual productivity factor for year 2010:

  Value added 2010 (fixed prices, 2009)/Value added 2009 (current prices)

  ÷

  Total number of hours worked 2010/Total number of hours worked 2009.

    - The above annual factor is chained in the final calculations by multiplying the factor for each year.
    - For periods with missing productivity figures, imputations are carried out. The imputation for 2011 was shown to be reasonable after benchmarking against the latest forecast for 2011.
- **None** of the countries participating in the IPC task force practices benchmarking on a quarterly basis, which is the A method described below.
- The German method is near to the B method (benchmarking on an annual basis). However, the development of productivity in the present period is based on an expert judgment in conjunction with the national accounts.
- In France, productivity in the national accounts is benchmarked, and the differences between the IPC and the national accounts come from incomplete coverage of the work force in the survey. For this reason, the practice cannot be considered as a good alternative (France intends to turn to the B method in the near future).

Alternatives *

A: The ideal A practice would be to benchmark the IPC against value added on a quarterly basis. For this, the correlation between hours worked and value added also has to be good enough on a quarterly basis.

The treatment of this correlation between quarterly series necessarily interferes with seasonal and working-day adjustment. Concretely, the benchmarking procedure could be as follows:

- Adjust the monthly worked hours (WHm) for seasonality and working days
- Calculate SWDA hours worked on a quarterly basis (WHq)
- Calculate the quarterly productivity series by dividing the SWDA value added by SWDA hours worked, PIq = VAq / WHq
- Forecast the quarterly productivity PIq over several quarters using econometrics

- Calculate a monthly productivity PIm series from the quarterly series using a smoothing procedure.
- Calculate the IPC on a monthly basis, IPCm = WHm*PIm; the same PIm series should be used to calculate the uncorrected, SWDA and WDA index.

Productivity development has to be distributed over each month of each quarter (all reference periods), and gaps when changing to the next year have to be avoided (for example by using moving averages). The smoothing procedure minimises the change in productivity evolution but fixes quarterly productivity at the quarterly level observed in the past and forecast in the future.

B: If the correlation between the annual series is good enough to benchmark just on an annual basis, the following procedure (B method) should be followed when the national accounts of year n-1 are published:

- Calculate the ratio VA/WH until year n-1
- Forecast this annual productivity for years n, n+1, n+2 using econometrics
- Calculate a monthly series from this annual series using a smoothing procedure
- Calculate the IPC using the monthly productivity and adjust the data for working days and seasonality.

Productivity development has to be distributed over each month of each year (all reference periods), and gaps when changing to the next year have to be avoided (for example by using moving averages). The smoothing procedure minimises the sum of the squares (variance) of the monthly series to calculate, but fixes the annual average at the level observed during the past and forecast for the future. Note that the SWDA correction does not interfere with productivity estimation in this case.

C: No productivity estimation or the productivity estimation used to adjust the IPC is not appropriate, because it is not restricted to workers directly involved in production. The series of hours worked used for the IPC should differ from the hours worked in the construction industry, as published in the national accounts on an annual basis up to year n-2.

* A) Best approach; B) Acceptable; C) To be avoided

Combination of sources and variables

Description

Raw data may come from administrative sources or surveys. Additionally, a number of different variables can be used for estimating the volume trend in value added. Given this abundance of potential data sources and variables, several kinds of combinations may be used to compile the IPC. The word ‘combination’ itself suggests an inherent complication, so this kind of method should not be the first option for NSIs but rather a last resort.

Using more than one data source may be necessary, for example where:

- an administrative register is the primary source used but timeliness does not meet the STSR requirement, so a small-scale survey is necessary for an early estimate,
- a subpopulation (size class) in construction is not covered by administrative sources and has to be surveyed.

Using more than one basic variable may be necessary, for example where:

- not all subpopulations (activities) within construction are able to report a single variable,
- a single variable is not a good proxy for value added at constant prices for certain subpopulations (activities),
- a single variable cannot be collected on time for all subpopulations (activities or size classes) in order to meet the STSR requirement,
- an auxiliary variable is needed to split total construction between building and civil engineering.

Regardless of the combination of sources and variables, the aim of the composite method should be to ensure the quality of the resulting IPC. In order to control and assess the quality of the IPC, the composite method can be broken down into several distinct processes (or components or steps) that can be assessed individually. These individual processes may be already covered in this manual in previous topics about sources or variables. It can be argued that the overall assessment of a method based on a combination of sources depends on the assessment of the individual processes.

Current practices

- Italy: Production function model: deflated raw materials turnover and hours worked.
- Cyprus: Deflated production value (work done), deflated turnover and unadjusted hours worked.
- Denmark combines quarterly accounting data and employment with monthly building starts and VAT (purchases & sales).
- Finland combines a (purposive) survey and administrative data on turnover.
- Sweden combines several labour input sources of different coverage and one for splitting hours worked by CC.
- The Netherlands:[3] Deflated sales, deflated progress of works and productivity-adjusted hours worked are each used to compile indices, which are then combined with quarterly national accounts.
- Austria:[3] Deflated production value and output quantity.

Alternatives *

A composite method may be assessed by evaluating separately the distinct processes and then by considering the impact (e.g. weight) of each process on the overall index. For assessment of the individual processes, please refer to the sections above.

A: Each process qualifies for an A method.

B: The impact of A and B methods is greater than the impact of C methods.

C: The impact of C methods is greater than the impact of A and B methods together.

* A) Best approach; B) Acceptable; C) To be avoided

[3] Source: PEEI in focus — a summary for the Production Index in Construction, 2008.

Working-day and seasonal adjustment

Description

Construction work is very sensitive to weather conditions. Unlike in most other industries, a large part of building construction and civil engineering is in the open air. This poses a natural challenge to the seasonal adjustment of the IPC. Inappropriate treatment of weather conditions in the seasonal adjustment frequently causes instability in the seasonally adjusted IPC time series. Distinguishing between seasonal effects, i.e. effects that have a similar impact on the IPC year by year in the same period, and weather conditions that may vary considerably from one year to the next, typically in winter, is a prerequisite for obtaining seasonally adjusted results that are sufficiently stable over time.

Working-day adjusted series are explicitly required by the STSR. Indeed, reporting countries are in the best position to handle working-day effects, which are particularly strong in the construction sector and also vary considerably by country. However, the STSR does not require countries to report seasonally adjusted data to Eurostat. Of course, if they do submit seasonally adjusted data, Eurostat will refrain from making its own seasonal adjustments public. As for working-day adjustments, reporting countries are in a better position than Eurostat to carry out seasonal adjustments, where the treatment of outliers requires local knowledge.

Currently, Eurostat's IPC headline figure is first aggregated from the reporting countries' working-day adjusted data and then seasonally adjusted by Eurostat (*direct seasonal adjustment*). The EU and EA aggregates are published together with the data for the reporting countries. If reporting countries do not provide Eurostat with seasonally adjusted figures, Eurostat will also seasonally adjust and publish their time series (only if this is technically possible).

The results of Eurostat's direct seasonal adjustment of the EU and EA aggregates do not coincide with the weighted averages of the nationally reported values, because the results of seasonal adjustment methods and models are typically not additive. A comparison of the aggregated nationally published adjusted figures and the EU and EA aggregates shows sometimes larger and sometimes smaller discrepancies.

In 2009, Eurostat issued '*ESS Guidelines on Seasonal Adjustment*' to harmonise seasonal adjustment practices in the reporting countries. Currently, a task force is working to prepare a more detailed '*Handbook on Seasonal Adjustment*'.

Current practices

- Eurostat currently adjusts aggregated data for seasonality using TRAMO-SEATS, either using the Demetra user interface or a Unix package for automatic processing. Aggregates are published with the national data of the reporting countries, which are adjusted by them using a variety of seasonal adjustment methods (X-11 or X-12 ARIMA, TRAMO-SEATS). In 2008, most countries used the direct method for the IPC but several countries also used an indirect method.
- Italy overhauls its seasonal adjustment model every year in September, together with the release of the second quarter's data.

Alternatives *

A: Seasonal adjustment of the IPC is carried out using the A methods of the '*ESS Guidelines on Seasonal Adjustment*'. The A methods all involve use of TRAMO-SEATS or X-12 ARIMA, proper pre-treatment of time series with at least an annual review of the models, and a careful interactive assessment of diagnostics for the main series.

B: Overwhelming use of automatic tools for pre-treatment, seasonal adjustment and diagnostics for established methods without in-depth consideration of diagnostics and residual seasonality.

C: Non-transparent working-day and seasonal adjustment, adjustments using non-conventional methods or complete lack of adjustment.

* A) Best approach; B) Acceptable; C) To be avoided

Publication

Release and revision policy

Description

Revision policy is part of dissemination policy, which defines the rules governing dissemination of the data and the metadata.

Rare and small revisions give an impression of accurate data, and users generally do not like frequent but minor revisions. However, if the first release is defective or incomplete, revisions are a way to improve the intrinsic quality of the data.

The monthly IPC has proved to be particularly prone to revision of the initial values. Generally, there are many reasons for revision:

- Respecting the short deadline forces reporting countries to send incomplete data, so the arrival of further survey results or administrative declarations requires revision of the initial data.
- Seasonal adjustment makes assumptions about the future development of the time series, and each new observation can lead to temporal redistribution of the whole series, also affecting the older observations.
- Because the different reporting countries have different reporting deadlines (based on their size), the initial European aggregates have to be re-calculated as soon as the smaller countries' data arrive.
- Due to the synchronisation of different statistical processes (for example, STS with structural business statistics and national accounts), the STS data may be systematically revised several months, even years, after the first release.
- Changes in the base year and classifications entail revisions.
- Errors occur and need to be corrected as soon as possible.

There are basically two options for revision policy. ***Concurrent revision polic***y means that past releases are revised continuously as soon as new information becomes available. ***Current revision policy*** arranges the revisions to coincide with releases of new data at pre-announced release dates. Serious errors are an exception: they are corrected immediately, preferably with a specific news release to users.

Eurostat is currently preparing '*ESS Guidelines on Common Revision Policy*' to harmonise the revision policies for different statistical domains in the reporting countries and at Eurostat. These guidelines continue the work of the joint Eurostat and OECD (Organisation for Economic Cooperation and Development) task force on revisions (see the TF's Revision Analysis Framework at:

http://www.oecd.org/document/21/0,3343,en_2649_34257_40016853_1_1_1_1,00.html).

Current practices

- The short-term statistics on Eurostat's public Eurobases online reference database currently apply a concurrent revision policy. Data submitted late by the reporting

countries, because of a later deadline or a delay, are validated concurrently and uploaded to the online database immediately.

- The French IPC is linked to the cycle of national accounts via the productivity coefficient. Data are systematically revised in June when the productivity coefficient is fixed for the year y-3, and revised for the more recent reference periods.
- Italy submits data to Eurostat at m+45 (until 2010 the monthly data were tagged as confidential). The quarterly data are revised when new and more complete information becomes available. Together with each base year change, the Cobb-Douglas-type production function is reviewed. The seasonal model is overhauled every year and the time series are revised correspondingly. Revision 'vintages' are published in a 'revision triangle' similar to that of the OECD.

Alternatives *

A: Revision policies complying with the A practices in '*ESS Guidelines on Common Revision Policy*' qualify as A methods. In particular, the main elements of such a policy are communication to users and transparency, plus tools (a vintage database) for revision analyses by users.

B: Consistent policy for dealing with revisions, with transparency concerning major revisions, but without appropriate historical data for revision analyses.

C: Lack of a rigorously implemented revision policy.

* A) Best approach; B) Acceptable; C) To be avoided

Communication with users

Description

Communication with users has two elements: structure and contents. As far as structure is concerned, the Statistical Data and Metadata eXchange (SDMX) standard provides a unique set of structures, file formats and tools for data and metadata in different statistical domains. The contents of the data and metadata are the result of data compilation and contacts with data providers. The contents sometimes develop in an iterative way.

The data and metadata may be published via different media, for example in news releases, specialised publications, yearbooks and online databases.

The Commission Recommendation of 23 June 2009 on reference metadata for the European Statistical System (2009/498/EC) invites national statistical authorities to apply the statistical concepts and sub-concepts listed in the annex of the recommendation when compiling reference metadata in the different statistical areas and exchanging reference metadata within the European Statistical System or beyond.

The aim of the SDMX standard was to develop and use more efficient processes for the exchange and sharing of statistical data and metadata among international organisations and their member countries. SDMX aims to ensure that metadata always accompany the data, making the information immediately understandable and useful. For this reason, the SDMX standards and guidelines deal with both data and metadata.

The SDMX website (http://www.sdmx.org) provides a single point of entry for all information on SDMX, ranging from the documentation on standards and guidelines to the downloadable software, together with announcements, events and information on implementation activities and data structure definitions. The SDMX User Guide and other tutorials are available via the website.

Current practices

- Eurostat currently publishes a generic metadata file for all short-term statistics indicators collected on the basis of the STSR. Metadata on the IPC are included in this file along with those for other indicators, but are not linked to the data at the indicator level. Additionally, each monthly news release and specialised publication (for example, an issue of Statistics in Focus) aims to cover the most relevant metadata for the publication and also to inform users of forthcoming major revisions. Reporting countries' metadata are available in a separate '*Sources and Methods*' publication, updated every 2-3 years, but currently not following the SDMX structure.

Alternatives *

A: The public and other users of the IPC have access to an online database that also contains links to related metadata. The metadata are structured according to the SDMX specification. Data and related metadata are updated frequently. Major revisions — changes to classifications, the base year or definitions — are announced to the public in preceding news releases or before. Users should have an opportunity to contact the producers of statistics and find the contact information at the expected location in the structured metadata.

B: Data and metadata are available to users via different media, but the synchronisation of the different communication channels is not up-to-date. Structured data formats are not used comprehensively.

C: Communication with users is ad hoc or inconsistent in different media.

* A) Best approach; B) Acceptable; C) To be avoided

Revisions and congruence

Revision track-record

Description

In practice, the reporting countries and Eurostat revise their IPCs frequently and for different reasons. Some countries introduce major revisions after the first release, whereas others do not considerably change the initial releases.

Developments in the short-term series should be confirmed by other statistical sources that become available later. If many revisions of the IPC are needed to synchronise it with the quarterly and annual statistics, the reliability of the fresh monthly figures seems questionable.

On the one hand, frequent major revisions give users the impression that the first releases are inaccurate. On the other hand, revisions improve the original values and can bring them closer to a less frequent indicator (construction value added in the quarterly and annual national accounts; construction value added in structural business statistics). In this way, revisions contribute to the compilation of better time series, even if the most recent values might seem less reliable.

Monitoring of the revision track record is a key method for assessing the accuracy and reliability of the IPC. For this purpose, a 'vintage' database, storing the history of the values for each reference period, needs to be constantly updated.

Current practices

- Sweden regularly compares the monthly index of production with the corresponding sub-aggregate of the national accounts.

Alternatives *

A: Revisions are rarely needed to align the IPC with the corresponding lower-frequency indicators in the national accounts and structural business statistics, and this can be proven with the help of a vintage database. The temporal aggregation of the three months of the quarter shows a similar development as in quarterly national accounts, without the need for revisions.

B: The monthly IPC needs to be revised often in order to improve the coherence with national accounts, but after early revisions the two indicators show a similar development.

C: The development of the IPC appears independent from that of the NA and SBS and revisions are not made to align the series. Alternatively, revisions do not converge towards less frequent statistics on construction, and the difference is not justified.

* A) Best approach; B) Acceptable; C) To be avoided

Comparison with other statistics

Description

The compilation of the IPC faces similar problems to the compilation of the industrial production index (IPI). If it is accepted that value added can only be measured annually, an alternative has to be used. As with the IPI, there are several possible alternatives and these are described in the specific sections under each method.

However, the fact that the observed basic variable is different from the target (the volume trend in value added over a given reference period) does not mean that the divergence between the short-term statistics, structural business statistics and national accounts should be accepted.

First, the selection of the basic variable should aim for coherence with the volume trend in value added in the less frequent statistical data collections. Second, the use of the same sources — surveys or administrative data — should be encouraged, not only because of coherence but also to reduce respondent burden. And finally, if the monthly and quarterly developments in construction differ from those revealed by the less frequent statistics, the differences should be analysed and adjusted correspondingly.

This requires methodological coordination, systematic follow-up and comparison of the different statistical processes and revisions of the data.

Current practices

- In France, the IPC is not directly benchmarked against the national accounts. As productivity is benchmarked, the differences between the IPC and the national accounts come from the differences in surveys and the different coverage of the work force (the IPC takes only workers into account, while the national accounts depict the total employment of the sector).
- In Denmark, quarterly national accounts, based on companies' quarterly statements, are available 85 days after the reference quarter and are used as a basis for compiling the monthly IPC. To arrive at a monthly index, sales and purchases by firms (turnover above DKK 50 000), available approximately 45 days after the reference month, and municipalities' records of new building starts, available in principle approximately 20 days after the reference month, are used.

Alternatives *

A: Systematic synchronisation of the IPC with national accounts (NA) and structural business statistics (SBS) is required. This also implies that the users are informed of the differences between the results and compilation methods. Ideally, the STS data are used for compiling quarterly national accounts.

B: Occasional synchronisation with delayed coherence is acceptable.

C: Compilation of the IPC independently of the NA and SBS without justification.

* A) Best approach; B) Acceptable; C) To be avoided

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