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STESEG TASK FORCE ON DATA PRESENTATION AND SEASONAL ADJUSTMENT

**OVERVIEW AND SUMMARY OF THE ACTIVITY OF THE TASK FORCE ON DATA
PRESENTATION AND SEASONAL ADJUSTMENT**

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OVERVIEW AND SUMMARY OF THE ACTIVITY OF THE TASK FORCE ON DATA PRESENTATION AND SEASONAL ADJUSTMENT

Introduction

This note summarises the work of the Task Force on Data Presentation and Seasonal Adjustment up to the STESEG meeting held on 26-27 June 2003.

The paper is divided into four parts

1. Background which sets out the initial targets and outputs of the task force
2. Work Format which details the main presentation issues for which papers were written
3. Summary of members' views regarding the main points arising from the individual papers and comments in response to these papers
4. Recommendations for best practice with regard to presentation.

It is important to note that the recommendations contained in the paper can be considered as a first proposal. There is a general consensus within the task force on some of them but on others there are different views and a consensus has not yet been reached. As a result the recommendations are provisional, subject to the endorsement of the wider membership of the STESEG. The meeting provides a first opportunity for everybody on the task force to discuss these issues, which should help further in making final recommendations. Following discussion at the STESEG meeting, some of the recommendations may require further investigation and this can form the basis for future work.

Background

From the outset, there was a preference among members for an approach that concentrated, where possible, on broad groupings of short-term indicators to provide recommendations that were relevant to a wide set of series.

With this in mind, the main targets of the task force were to

- Identify best practices and/or to make appropriate recommendations
- Enhance the comparability of presentation practices to facilitate cross-countries comparisons and studies of international organisations
- Improve transparency and metadata.

In this regard, the task force agreed that the initial outputs for the STESEG meeting should be

- A number of brief papers by task force members on current practices in the main issues that had been targeted by the task force for investigation and recommendation
- A paper containing a list of standard terminologies related to data presentation issues
- A summary paper by task force organisers giving some initial recommendations of best practices.

In the main, the task force achieved its targets and outputs. However, the members of the task force consider that the time allowed for discussion was less than the optimum. Moreover the discussion was based on a very partial survey of the ongoing practices in the field of data presentation.

Work format

Eight presentation issues were identified for investigation. It was intended that they should contain a comparative analysis of approaches utilised in different countries. It was considered that comparing current practices and understanding why different countries present the same statistics differently (e.g. the way annualised growth rates are defined) could help the identification of best practices and the convergence towards agreed recommendations. The eight areas were as follows:

1. *Standard terminology* – it was agreed that we should compile a list of standard terminologies and definitions related to data presentation (e.g. annualisation of data; year-on-year changes): currently there are no international standard definitions and establishing a first set of “guidelines” can be of some worth.
2. *Presentation of growth rates* – the main aim here was to make a comparison on annualised vs. raw rates, and single period vs. moving period rates; different practices usually being found in different domains. The questions proposed for consideration were:
 - a) Do annualised rates apply mainly/only to quarterly national account data?
 - b) How do annualised rates of QNA aggregates compare with raw rates of other short term indicators?
 - c) How can high frequency indicators (monthly) be averaged to reduce the noise?
 - d) How to calculate year-on-year rates of change when seasonally adjusted data are the main focus?
 - e) How calendar effects could be presented separately from seasonal effects?
 - f) Are period averages a good practice?
3. *Presentation of revisions* – there are different kinds of revisions: short-term (from advance to final estimate), continuous (typically in QNA), ad hoc (i.e. due to specific disturbances/errors in the compilation of statistics), long-term (typically reflecting benchmarking practices). For each typology, specific presentation issues arise in order to make users aware of changes in the evolution of the series. There is a need to provide information on why data are revised (also to make users aware of the gain in information brought about by revisions) and outline good practices on the actual presentation of revisions.

4. *Presentation of sampling error estimates* – the work was to focus on a preliminary survey of different practices in the presentation of error statistics (standard errors, confidence intervals), gathering also some elements about the reasons why errors are seldom presented.
5. *Presentation of filtered series* – the discussion on filtered data (e.g. time series filtered for high frequency movements) was limited to whether or not to produce certain types of indicators, rather than to which techniques should be used to produce them. The following points were considered relevant:
 - a) Should trend-cycle estimates be released for volatile series, or not at all (i.e. filtering should be left to users)?
 - b) How to deal with revisions deriving from filtering techniques (and with the related end-point problem)?
 - c) If volatility is the key feature to discriminate among indicators, perhaps a standard should be set in order to define volatility.
6. *Presentation of historical retrospective data* – the analyses and treatment of short-term indicators is frequently hampered by breaks or shortness of the series length, in particular when fixed base index numbers are involved. Are official solutions to bridge the gaps preferable or is it better to leave the users to do the job by themselves? Which kind of explanatory notes should accompany the data?
7. *Presentation of seasonally adjusted data* – for seasonal adjustment, the task force only looked at issues related to the presentation of seasonally adjusted data and of information concerning the underlying seasonal adjustment procedure. Methodological issues arising from the comparison of different approaches to seasonal adjustment were out of scope of our task force. Relevant issues were:
 - a) Presentation of raw and adjusted data in a coherent way (see above about growth rates);
 - b) Ongoing revisions due to seasonal adjustment procedures and revisions deriving from changes in seasonal adjustment (e.g. because of changes in filter specification);
 - c) Presentation of components when the direct approach is used (i.e. how to deal with discrepancies in the aggregation process);
 - d) Presentation of metadata on seasonal adjustment, including model options enabling users to replicate the process.
8. *Relating certain series to similar but not identical series* – the titles of many series are often very general with little differentiation between the titles of quite different series. In some countries consideration has been given to informing users of the differences between non-identical series with almost identical titles. Apart from alerting users to this through explanatory text, is there anything else that can be done?

Summary of members' views

1. *Standard terminology*

Clients of statistical institutions often complain about different terminologies being used to describe the same thing in different publications. Sometimes, the one publication even contains different terms describing the same phenomenon. Glossaries such as the OECD Glossary of Statistical Terms (<http://cs3-hq.oecd.org/scripts/stats/glossary/index.htm>) contain definitions that can explain many terms which are of interest only to the more informed user of statistical data. The work was thus concerned with terms that give rise to presentational misunderstandings on the part of all users.

Many terminologies were considered but in general it was considered that there was no real problem with most of them. There are six recommendations with regard to presentation.

The following recommendations are proposed

1. To avoid the confusion that may arise over the use of the word “annual”, it is proposed that statistical institutions should use “year-on-year growth rate” (“year-on-year change”) when describing $Q_t/Q_{t-4}-1$ or $M_t/M_{t-12}-1$ (Q_t-Q_{t-4} or M_t-M_{t-12}) and use “annual growth rate” (“annual change”) only when describing $Y_t/Y_{t-1}-1$ (Y_t-Y_{t-1})
2. To avoid confusion over the use of annualised, it is proposed that the word “annualised growth rate, compounded form” should be used when data derives from compounding and “annualised growth rate, linearised form” should be used when data derives from multiplying by four.
3. If it were to be generally agreed that annualising for monthly series is not particularly appropriate, a reference to its non-suitability be inserted in the OECD Glossary.
4. To avoid the possibility of users mistakenly thinking that “calendar adjustment” means “working day adjustment”, when it actually means working day plus other adjustments, it is proposed that
 - a) Only the term “calendar adjustments” should be used but with an explanation as to what adjustments are included
 - OR
 - b) “Working day” should refer to adjustments for number of work days only and “calendar” should refer to other calendar adjustments and/or number of work days and other calendar adjustments
5. The following definition of “calendar adjustment” should be included in the OECD Glossary of Terms.
 - The correction for calendar variations other than seasonal factors, e.g. number of days in the calendar period, the accounting or recording practices adopted or the incidence of moving holidays (such as Easter).
6. The definition of “moving average” as drafted below and accompanied by a formula should be included in the OECD Glossary of Terms.
 - A moving average is a method of smoothing by averaging n terms of a time series. It is the average of a series of observations over a specified time period, such as a quarter, used to

identify trends by flattening or smoothing out large fluctuations. Each new period's data are added to the average and the oldest are dropped so that the average "moves" over time. In general, the greater the value of n , the smoother the series.

A moving average may be centred in which case it is plotted at the middle of the time interval of which it is the average, or lagged in which case it is plotted at the last term included.

OR

- A Moving Average applied to a time series replaces each observed value by a weighted average of p preceding values, the given value, and f following values of the series.

If $p=f$, the moving average is said to be centred.

The moving average is symmetric if it is centred and in addition, for each $k=1,2,\dots,p=f$, the weight of the k -th preceding value is equal to the weight of the k -th following one.

The moving average is lagged, if $f=0$.

The moving average is not defined for the first p and the last f observed values. In order to compute the moving average for those values, the series must be backcasted and forecasted.

2. *Presentation of growth rates*

The task force developed a quite comprehensive discussion of the issues involved in the presentation of growth rates of short-term indicators, focusing on issues that arise in the dissemination of indicators (i.e., in press releases, in tables posted on the website of statistical institutions, etc.). Any particular rate of change can be useful depending on the needs of a specific analyst and this is not the concern of our analysis. Here rather, we are considering the most suitable way of presenting economic indicators to the general public, in order to prevent misunderstandings in the reading of economic events.

Rate of change with respect to previous period

Monthly or quarterly growth rates (with respect to the previous period) on raw series are not very informative, unless seasonal effects are negligible. This is the reason why statistical institutions seldom use them in their releases of indicators affected by seasonal fluctuations. The growth rate on seasonally adjusted series (or for raw data where seasonal factors are of no significance), conveys the most recent information about the cyclical movements and is the best way of presenting short-term developments, even if the irregular component is relatively large. To deal with irregular movements that blur the trend the "rate of change based on two or three month's worth of values" can be utilised. This practice, which is customary in some countries, seems a very convenient (and transparent) way of quantifying the short term movements averaging out a reasonable part of the irregular component.

Rate of change with respect to the same period of previous year

The change from previous year (henceforth year-on-year change, YoY) can be misleading in assessing the cyclical movements of an indicator, due to the compounding of movements over a 12 month span. However its utilisation is so entrenched in the current practice of users and media that it cannot be discarded from official data presentation.

The YoY changes should be applied to raw data and to data adjusted for calendar effects if the latter is available; in this way the working day effects are made clear. It would also be technically correct to advise

against the utilisation of YoY changes on seasonally adjusted data. In particular, when the seasonal component is not deterministic, the rate of change on raw and SA data can be very different, conveying conflicting signals. However, YoY change calculated on SA series is a very common practice in the domain of quarterly national accounts. This is a point that deserves some discussion, maybe advising against this practice and recommending instead YoY changes on raw and calendar adjusted data for GDP and for other national accounts data.

Annualised growth rates

Particular caution should be exercised when annualising changes that occur within the space of a year and data should only be annualised on the basis of seasonally adjusted and calendar adjusted time series which contain only minor irregularities. This means that annualising the growth rate of a single month can result in misleading signals. In turn, proposing a minimum length for the period to be annualised (for instance, six months), while correct in principle, seems not very worthwhile in practice, as press release and other dissemination formats seldom allow for such a kind of data transformation.

It is important that an explicit definition of the “annualised rate of change” is recommended (see Standard Terminology).

3. *Presentation of revisions*

The discussion about the presentation of revisions in short-term indicators was based mainly on the experience of the largest European countries (Germany, France, Italy) but, even in this rather narrow perspective, it was pointed out that many different practices occur across countries and across indicators. None of the surveyed countries has set an overall policy for the presentation of revisions in all the domains of infra-annual economic indicators, while the practice of stating the revision policy for the specific indicator at hand in the methodological note accompanying the press release is not standard, with many different variants in terms of information provided. Then, this seems an area where the scope for an improvement of the current practices in data presentation is particularly direct and relatively easy to implement.

Among the approaches discussed in the task force, one that seems worth mentioning is the German practice about the presentation of the first estimate of industrial production. In the initial press release there is information as to whether the first revision is expected to be upward or downward. Another interesting presentation device is the French one, concerning again the industrial production index, where once a quarter, a graph with the revision of the monthly indexes of the main aggregates is published.

From the discussion, it emerged that data producers should inform explicitly the users about the current status of each indicator released (i.e. signalling revised and provisional figures). Leaving aside the case of an advance estimate, characterized by large revision errors and which can be considered as a separate release, it is not worth devoting a separate release to revised data. In this respect, releasing the revised indicators along with the new provisional estimate (i.e. in the following monthly/quarterly release) seems a good practice, striking the right balance between the user needs and the cost of disseminating data.

The presentation of the revision history should be taken into consideration (at least for the most important indicators like the production index, consumer price index, quarterly national accounts). The past revisions could be an important issue for improving economic forecasts by taking account of the (systematic) revision process.

Furthermore, it could be useful to calculate revision measures (for example the average sum of absolute revisions (ASAR), the average balance of revisions (ABoR)). A practical way could be to calculate the measures yearly and disseminate the results in the metadata.

4. *Presentation of sampling errors*

The investigation into national practices regarding presentation of sampling error estimates showed that much research has been done on the subject but that in general no estimates of variance or covariance tends to be published for short term indicators, with the exception of labour force indicators (for example Canada, Italy) and employment and compensation indicators derived from the Current Employment Statistics in the USA. In all these cases, cautionary notes are published to warn the user of the approximate nature of the co-variances.

The study also found that several promising but complex methods have been developed to provide better information on sampling errors. While numerous research papers have been applied to real series such as the LFS, these methodologies are not being used as a matter of course by statistical agencies.

Much of the work in this area is experimental and at this stage it is difficult to recommend anything relating to dissemination of sampling errors, especially relating to seasonally adjusted series since any presentation of sampling errors for users seems confined to original or raw series.

5. *Presentation of filtering*

With regard to trend-cycle estimates, national practice may differ across OECD countries. For instance, as well as releasing raw data and seasonally adjusted data, Australia for all series releases trend data where the irregular component has been filtered out of the seasonally adjusted data. The German Federal Statistical Office publishes the trend-cycle component and the irregular component of the industrial production index. The Korean NSO produces trend-cycle series as reference material for Composite Indices of Business Indicators. In Italy, ISTAT does not release filtered time series for any indicator although in some press releases, three terms moving averages are added to graphs but with no values or comments. Other countries such as France do not publish trend-cycle data at all.

Much of the discussion focused on the end-point problem. The paper showed that significant differences can arise following the revisions to provisional data from which trend data are derived. Data can even change from a positive to a negative change or vice versa. It was generally considered that cycle analysis could only be made retrospectively since it could not rely on most recent values of the trend that were prone to significant revision. In order to assess the direction in which current trends were heading, one would really need to know the unknown future data.

The general consensus among the group was that that filtering was something that should be left to individual users rather than provided directly by the National Statistical Institution. There were a number of reasons for this

- There is a danger that filtering may also remove the trend or cyclical component, thereby removing the important information behind the original data
- The definition of trend-cycle component can be discretionary and can depend on its analytical purposes
- The measure of the most recent values of the trend-cycle component are subject to significant revision and are thus uncertain and potentially misleading
- With there being general agreement that NSOs should not release trend data as a mater of practice, the question of setting a standard to define volatility was not discussed.

6. *Presentation of historical retrospective data*

As for the presentation of retrospective data, the discussion has been limited to issues arising from the presentation and dissemination of time series of fixed base indexes spanning over two or more base years. As the recalculation of long time series, performed through the splicing of “rebased” indices (i.e. indices referenced to a base year different from the original one) is often accompanied by changes in classification, it is important to provide users with all the relevant elements.

In particular, a careful examination of the steps involved in the recalculation of retrospective time series points out the following elements that should be made clear to users:

- The methodological approach adopted for the rebasing
- The linking year
- The classification level at which index numbers are rebased and disseminated
- The rounding policy followed in the rebasing, even though rounding should only be carried out at the very last stage for presentation purposes
- A transition table from the old to the new classification system, if this is introduced
- The description of the new weighting system and its impact on the aggregation of lower level indices.

7. *Presentation of seasonally adjusted data*

Almost every OECD country produces seasonally adjusted data, providing to users some kind of metadata describing the treatment of the series. The discussion of the task force has focused on the issue of how to present seasonally adjusted data, and which information on the seasonal adjustment method and what kind of specification details should be disseminated or made available to users. The framework of the discussion was set by the distinction of users in three different typologies: general public, informed users, analytical users. The needs of those three groups are very different and to meet them statistical institutions have to provide differentiated sets of metadata. According to the task force consensus the information required by the different typologies of users is:

- General public needs “popular” metadata on seasonal adjustment, i.e. a layperson’s explanation of this adjustment while it is not interested in more technical information (like diagnostics of the procedure).
- Informed users need detailed information on how the statistical program performing the seasonal adjustment was carried out, as well as statistics on the validity of the adjustment for specific series. For this category of users, statistical agencies generally provide at least one comprehensive document per statistical program.
- Analytic users need some of the results of the statistical program to reprocess them for their own uses; in other words they should be supplied with all the relevant parameters needed to replicate the official seasonal adjustment, and to modify it if they wish to.

About the terminology relating seasonal adjustment and the treatment of calendar effects, there is an agreement about the fact that in data dissemination it is appropriate to define seasonally adjusted indicators as time series adjusted for both seasonal and calendar effects.

The discussion about the presentation of seasonally adjusted indicators tends to overlap with the one concerning growth rates but there is one issue that is probably better placed in the domain of seasonal adjustment: whether year-on-year rate of changes calculated on seasonally adjusted series are to be presented. The agreement seems to be that this is a practice that should be discouraged on the ground of statistical considerations, but that in the domain of consumer price statistics – because of the usual definition of headline inflation rate – it cannot be discarded. Moreover it is important to publish year-on-year rate of change computed on raw series, as original data is an important piece of information.

Other elements about the presentation of seasonal adjustment were added by the paper of the Bank of Italy that, focusing on the issues related to the treatment of the CPI, has outlined the point of view of institutional users, providing, on the one hand, a feedback on the discussion about the needs of analytic users, and, on the other hand, many insights on the information requirements (in terms of seasonally adjusted CPI data) of users engaged in the making of economic policy.

8. *Presentation of related (but not identical) variables*

The main aim here was to see if anything could be done to make users more aware of the differences between similar but non-identical series apart from alerting them to this through explanatory text. This paper focused on a number of examples:

- The title “industrial manufacturing” and the heading “intermediate goods” where the national definitions differ from those of Eurostat
- Eurostat requirements may sometimes be complied with by a national organisation and data published in the Eurostat format but without any reference as to how complete coverage may be, how reliable the data really are, whether they comply with minimum standards, etc.
- The difficulty for the user in extracting data classified according to NACE from Eurostat’s New CRONOS database and comparing it with similar French series classified according to NES114.

It also highlighted an example of different versions of a series being published using different seasonal adjustment techniques. However, in the subsequent discussion, it was pointed out that as long as the official series was clearly marked and reference series were also marked, then this was acceptable practice.

There were three recommendations made for consideration

1. The international offices that disseminate national data should always know whether the data are disseminated in the country or not. If the data are calculated by the international office, it should indicate it.
2. The classification name should always be clearly indicated (for instance, NACE, CITI, MIG or National classification) so that when the same denomination is used in various classifications such as intermediate goods, the user knows whether it is one classification or another.
3. when a field of activity is only partially covered (such as MIG-intermediate goods or MIG-consumer goods in the new orders indicators of STS-regulation), it should be clearly indicated for

instance with an asterisk or a footnote (by example, in the STS-New orders series, MIG-non durable goods (1) - (1) *Partial* ; does not include NACE 151-155, 158, 159, 16, 19, 22, 364-366).

Summary of Recommendations

1. *Standard terminology*

There are six recommendations which aim to

- Avoid confusion over the use of the word “annual growth rate”
- Avoid confusion over the term “annualized growth rate”
- Change the OECD Glossary to advise against annualising based on monthly growth rates
- Differentiate between “calendar adjustment” and “working day adjustment”
- Define “calendar adjustment” and include it in the OECD Glossary
- Define “moving average” and include it in the OECD Glossary.

2. *Presentation of growth rates*

- For rate of change with respect to previous period, seasonally adjusted data is the best way of presenting information about cyclical movements and of presenting short-term developments, even if the irregular component is relatively large. To deal with irregular movements that blur the trend the “rate of change based on two or three month’s worth of values” can be utilised.
- For rate of change with respect to the same period of previous year the Year-on-Year changes should be applied to raw data and to data adjusted for calendar effects if the latter is available. However, YoY change calculated on SA series is a very common practice in the domain of quarterly national accounts. This is a point that deserves some discussion
- For annualised growth rates, data should only be annualised on the basis of seasonally adjusted and calendar adjusted time series which contain just minor irregularities. This means that annualising the growth rate of a single month can result in misleading signals. It is important that an explicit definition of the “annualised rate of change” is recommended.

3. *Presentation of revisions*

There is no particular standard for the presentation of revisions. Among the approaches that could be recommended are

- Data producers should inform explicitly the users about the current status of each indicator released (i.e. signalling revised and provisional figures).
- It is not generally worth devoting a separate release to revised data. In this respect, releasing the revised indicators along with the new provisional estimate (i.e. in the following monthly/quarterly release) seems a good practice, striking the right balance between the user needs and the cost of disseminating data.

- To clarify the revision process, publish graphs depicting the sequence of revised data (limited to main aggregates) for recent periods
- It could be useful to calculate the revision measures (for example the average sum of absolute revisions (ASAR), the average balance of revisions (ABoR)). A practical way could be to calculate the measures annually and disseminate the results in the metadata.

4. *Presentation of sampling errors*

As much of the work in this area is experimental, it is difficult to recommend anything about dissemination of sampling errors. This is particularly so relating to seasonally adjusted series since any presentation of sampling errors for users seems confined to original or raw series.

5. *Presentation of filtering*

There is no particular standard for the presentation of filtered series. The general consensus among the group is that filtering should be left to individual users rather than provided directly by the National Statistical Institution.

6. *Presentation of historical retrospective data*

As the recalculation of long time series, performed through the splicing of “rebased” indices (*i.e.* indices referenced to a base year different from the original one) is often accompanied by changes in classification, it is important to provide users with all the relevant elements. This should include

- The methodological approach adopted for the rebasing
- The linking year
- The classification level at which index numbers are rebased and disseminated
- The rounding policy followed in the rebasing, even though rounding should only be carried out at the very last stage for presentation purposes
- A transition table from the old to the new classification system, if this is introduced
- The description of the new weighting system and its impact on the aggregation of lower level indices.

7. *Presentation of seasonally adjusted data*

There are three distinct types of user: general public, informed user, analytical user. The needs of the three groups are different and to meet them statistical institutions have to provide differentiated sets of metadata.

- General public needs “popular” metadata on seasonal adjustment, *i.e.* a layperson’s explanation of this adjustment.
- Informed users need detailed information on how the statistical program performing the seasonal adjustment was carried out, as well as statistics on the validity of the adjustment for specific series. For this category of users, statistical agencies generally should provide at least one comprehensive document per statistical program.

- Analytic users need some of the results of the statistical program to reprocess them for their own uses; in other words they should be supplied with all the relevant parameters needed to replicate the official seasonal adjustment, and to modify it if they wish to.
- There is agreement that in data dissemination it is appropriate to define seasonally adjusted indicators as time series adjusted for both seasonal and calendar effects.
- There is agreement that presenting year-on-year growth rates on seasonally adjusted data should be discouraged on the ground of statistical considerations. However, in the domain of consumer price statistics – because of the usual definition of headline inflation rate – it cannot be discarded.
- As for consumer price indexes, some specific recommendations can be in order. At this point of the task force work it seems better to leave the matter to the general discussion, taking as reference the recommendation proposed in Mr. Sabbatini's paper.

8. Presentation of related (but not identical) variables

There were three recommendations made for consideration

- If national data disseminated by international organisations are calculated by the international office, it should indicate it
- The classification name (e.g., NACE, CITI, MIG or National classification) should always be clearly indicated so that when the same denomination is used in various classifications such as intermediate goods, the user knows the actual classification
- When a field of activity is only partially covered (such as MIG-intermediate goods or MIG-consumer goods in the new orders indicators of STS-regulation), it should be clearly indicated for instance with an asterisk or a footnote (by example, in the STS-New orders series, MIG-non durable goods (1) - (1) *Partial ; does not include NACE 151-155, 158, 159, 16, 19, 22, 364-366*).